

VOL 12
AND SUPS

READER SERVICE CARD PAGES 39 AND 40 MISSING
FROM ISSUE 2 (JANUARY 9, 1978)

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by Computerworld, Inc.

Vol. XI, No. 52 -Vol. XII, No. 1

December 26, 1977/January 2, 1978

75¢ a copy/\$18/year

NEWSPAPER



SBS' Linda Zier and Ralph Fairbanks participate in a simulated business conference in Harrison, N.Y. Freeze-frame video (on large screen) shows users in Houston; data on CRT terminal comes from a minicomputer also in Houston.

CW Photo by R. Frank

New Yorkers 'Meet' Texans At SBS Satellite Conference

By Ronald A. Frank
CW Staff

HARRISON, N.Y. — A different kind of business conference took place at the new headquarters of Texaco, Inc. here recently. The conference was held via satellite to resolve a "typical business problem" and it included participants in Harrison and in Houston, Texas.

The communications link between the two sites was part of the Project Prelude experiment being conducted by Satellite Business Systems (SBS) to demonstrate the future uses of satellite technology for data communications and other services [CW, Nov. 21].

The National Aeronautics and Space Administration (Nasa) authorized SBS to use the Communications Technology Satellite (CTS) to conduct experiments to demonstrate the feasibility of using satellite facilities to enhance business communications.

During the one-hour satellite demonstration at Texaco, high-speed data transmission, facsimile, video and

freeze-frame video techniques were utilized, over a single integrated satellite channel. A Hewlett-Packard Co. Model 2648A graphics terminal in Harrison displayed data accessed from (Continued on Page 6)

Complete System Security Seen as 'Rings' of Defense

By Nancy French
CW Staff

LONDON — Defenses against computer misuse can be grouped into a series of concentric rings much like the defenses of a medieval castle. Ranging from protective elements built into system software to external people-oriented security disciplines, each plays a role in total system security, according to Adrian R.D. Norman, a management consultant with Arthur D. Little here.

Since each method, or "ring," will

Equifax Tactics Unfair To Subjects, FTC Rules

By Nancy French
CW Staff

WASHINGTON, D.C. — Equifax Services, Inc., which develops reports about the personal lives of about 20 million Americans every year, has used "unfair and deceptive" practices in developing and disseminating that information, a Federal Trade Commission (FTC) judge ruled here recently.

The information the firm collects and sells becomes part of millions of computerized files that are used by the firm's business and government clients to evaluate applications for employment, credit and insurance.

The unfair and deceptive practices found by the FTC are violations of the Fair Credit Reporting Act (FCRA) and were committed by the firm in the course of investigating individuals' backgrounds.

Among the violations cited in the 300-page opinion, written by FTC Administrative Law Judge Theodor P. von Brand, were: failure to reinvestigate disputed information; disclosure of consumer investigative reports to

unauthorized persons; inclusion of adverse information about consumers in reports even though it was outdated; and maintaining a level of production pressure on its investigative personnel that was inconsistent with accurate reporting, thus failing to adopt reasonable procedures to assure maximum possible accuracy in its reports.

Reports' Accuracy Defended

Equifax Services, Inc. and Credit Bureau, Inc. — the latter of which is a nationwide credit bureau that maintains computerized files on about 30 million American consumers — are subsidiaries of Equifax, Inc., which was formerly known as Retail Credit Co.

In a statement, W. Lee Burge, chairman of Equifax, Inc., expressed "strong disagreement" with the FTC ruling in this four-year-old case.

Burge said the judge's conclusions "appear to ignore the high degree of accuracy the company achieves in its reports and seem to be based on isolated instances in which individual employees may have violated company policy."

"Certainly our policies and practices are designed to assure full compliance and fair dealing and to quickly correct individual instances of noncompliance with immediate termination," he said.

Von Brand found that Equifax rated the performance of individual employees as well as branch offices largely on the amount of adverse information they reported.

Consequently, there was considerable pressure on individual employees to produce information that, in the case of insurance companies, for example, would cause them to either decline to write a policy or at least charge higher premium rates.

In addition, von Brand found that (Continued on Page 2)

have its special advocates within an organization, the DP manager must assess their conflicting claims and "as-

CW Special Report on Supplies and Security follows Page 28.

sure he does not invest in a \$100,000 software package instead of improving programming discipline or build a concrete fortress on an isolated island when a software lock would have been (Continued on Page 4)

DP Finds A Home On the Range

By Jeffery Beeler
CW Staff

FT. COLLINS, Colo. — Until recently, few rodeo cowboys knew — or cared to know — much about computers. A typical bronco buster of the old school probably would have defined the word "bit" as an accessory that fits in a horse's mouth and "kilobyte" as a wound inflicted by a rattlesnake.

But calf roping and Brahma bull riding are no longer the simple diversions they were a few years ago, when all a rodeo cowboy had to worry about was saddling up the nearest available mount and hanging on for dear life.

Today, rodeo riding is big business, just like any other professional sport, and as the management and paperwork problems of life in the corral have increased, many cowpokes have discovered computers can be as useful as a pair of chaps or a trusty lasso.

Yes, DP has at last begun to find a home on the range.

One place where computers have recently proven helpful to cowboys is at Rodeo Communications of America (Rocom), a service firm here that specializes in entering competitors in rodeos organized by the Professional Rodeo Cowboys Association (PRCA).

Rocom uses a system that works much like a computerized hotel or motel reservations network. When a professional rodeo performer decides to enter a PRCA competition, he contacts Rocom headquarters by dialing a toll-free telephone number.

One of the company's 30 telephone operators notes the cowboy's name and registration information and forwards it to the data entry department for keying on an IBM 3742 terminal. The information then goes into the computer system, which reserves a spot for the cowboy in the event or events of (Continued on Page 4)



EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Associate Editor	Esther Surden
Associate Editor	Molly Upton
Assistant Editor	Frank Vaughan
Washington Bureau	Edith Holmes
Staff Writers	Catherine Arnst Jeffrey Beeler Timothy J. Scannell Brad Schultz
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Barbara T. VanSoyoc Susan Gerrard
Photography Editor	Ann Dooley
Editorial Assistant	Denise Petski
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger Frampton
Munich	Hans-Jürgen Ballnath
Asia	Hidetuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone

SALES

Vice President/ Marketing	Roy Enreinhofer
Advertising Administrator	Ferry Williams
Display Advertising	Mary Anne Furlong
Classified Advertising	Frank Collins
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen
CIRCULATION	
Vice-President/ Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti
Customer Service Rep Assistant	Peggy Kelly Maureen Burke
PRODUCTION	
Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm
Typesetting Supervisor	Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone (617) 965-5800. Telex: USA-92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W411N. Phone: (01) 995-3352. Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristramstrasse 11. Phone: 36-40-36/37. Telex: 5213350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15 Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except a single combined issue for the last week in December and the first week in January) by Computerworld, Inc. Copyright 1978 by Computerworld, Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Walter Boyd.

75 cents a copy. U.S. — \$18 a year, Canada and P.O. Box — \$28 a year, Europe and Middle East — \$50 a year, all other foreign — \$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed; write to Circulation Dept. for subscription information.

COMPUTERWORLD, INC.

Board Chairman/ Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Enreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Equifax Tactics Judged Unfair

(Continued from Page 1)

Equifax employees were expected to meet quotas that restricted the amount of time they could spend on any one case. Given these circumstances, some employees completed reports by contacting unqualified sources, hurrying through interviews or failing to ask a full range of questions. Some also completed reports without corroborating information as well as falsifying sources when none could be found within the limited work period.

Although falsifying reports was against company policy, it was impossible for management to assure such practices were not going on, the decision said.

Equifax, in its statement, denied the firm's production requirements exceeded the performance that could or should be expected of employees, saying "quality control records plus studies by independent consulting firms clearly indicate otherwise."

Reinvestigation Procedure

As for reinvestigating disputed information, von Brand found that wherever possible, cases in which disputed information was of a subjective nature were assigned to a new investigator who reopened the case without seeing the original report. However, it was not always possible to assign a new investigator.

When the reinvestigation was assigned to the field representative who did the original investigation, he received production credit only if the customer was charged for the reinvestigation. However, the customer was not charged if an error was found in the original report.

The company's policy of not giving production credit in such cases resulted in field representatives' emphasizing information showing the investigator, rather than the data subject, was right.

In many cases, when consumers did not know they were entitled to a reinvestigation of claims — and thus failed to request them — they were not undertaken at all.

Equifax also provided information on consumers to persons whom it had no reason to believe intended to use the

Equifax Loses Maine Battle

AUGUSTA, Maine — A Superior Court here recently rejected a request by Equifax Services, Inc. for a temporary injunction against the state's new credit reporting law.

Justice Lewis I. Naiman's ruling earlier this month frustrated Equifax's efforts to prevent enforcement of the 1977 statute, which limits the sale of personal information by credit companies and forbids the collection of information on an individual's life-style, political affiliation, race, religion or philosophy.

The law was enacted by the Maine legislature in response to citizen complaints that Equifax, gathered

information on the sex lives, religious convictions and political activities of those it investigated.

Equifax has argued that the Constitution gives it the right to collect and sell information and that facts about private lives are relevant in evaluating a prospective policyholder's potential risk to an insurance company or employer.

Naiman rejected the company's constitutional claim — a decision that drew praise from the sponsor of the state's credit reporting bill. But at the same time, Naiman invited the firm to test the constitutionality of the new law if it so desires.

information for purposes authorized under the FCRA. This was done through its voluntary follow-up service and its monetary savings program.

Under the voluntary follow-up arrangement, Equifax employees furnished customers with additional adverse information about consumers who were the subjects of prior reports.

Monetary Savings Program

The Monetary Savings Program involved Equifax supplying its salespeople with information about the subjects of previously prepared reports.

The latter reports were used "as promotion devices to demonstrate the value of its reports," according to the findings.

The findings included testimony of many consumers whose rights were denied by Equifax employees. It also contained testimony of Equifax employees about their interviewing and reporting practices.

The decision is being appealed to the full commission by both Equifax, Inc. and the FTC administrative staff, although neither side was willing to detail its claims prior to filing.

Appeals are expected to be filed sometime after Jan. 15, because both have applied for an extension of the 30-day filing deadline. Resolution of the case could take months or even years since after exhausting administrative procedures, Equifax can appeal the case to the federal courts.

Equifax also has been ordered to

cease and desist from:

- Misrepresenting the identity of its investigative personnel.
 - Misrepresenting the sources of its information and the manner in which reports are prepared.
 - Submitting consumer information to persons whom it has no reason to believe intend to use it for purposes permitted under the FCRA or from persons who have not specifically requested such information.
 - Using consumer report information as reference information or as a lead in preparing any report other than a consumer report.
 - Including information which under the FCRA is considered outdated.
 - Inducing its investigative personnel to prepare a certain proportion of consumer reports containing adverse information.
- The company was also ordered to conduct semiannual unannounced performance reviews of field representatives to determine accuracy of their reports.
- In addition, in cases where adverse information was discovered, Equifax was ordered to include a special report indicating the name of the individual who supplied the information.
- Misrepresenting to any consumer his rights under the FCRA.
 - Failing to disclose information in the file to an individual with proper identification.
 - Failing within a reasonable period of time to reinvestigate disputed information.

On the Inside This Week

NEWS

U.S. Asks OECD Group on Transborder Data.....	5
U.S. to Draft Stand on Private-Line Charges.....	7
IBM Asks Two Trials in Catamore Round II.....	8
Competition for Medicare Services Held Lacking... 9	
GM System 'Sees,' Inspects Ignition Chips.....	10
Vendor Plays Can Trap Users, Report Warns.....	11

EDITORIAL

Editorial: Too Late Now.....	14
Human Connection: Will Robots Program Well?...	15
Taylor Report: Saks System Violates ICCP Code...	15

SOFTWARE & SERVICES

Past Year Interesting But Not Dramatic.....	17
Baker Whips Up Total MIS.....	18
Neat/3-Cobol Conversions in North America.....	19

COMMUNICATIONS

SNA, Interfaces Stirred Debate in '77.....	21
Multiple Micros Ease Front-End Processing.....	22
Response Monitor Handles Multidrop Nets.....	24

SYSTEMS & PERIPHERALS

Processors, Price Moves Led '77 Action.....	25
Bendix Has Digitizer, Mapping System.....	26
Air Force Picks Halon With Workers in Mind.....	28

MINIWORLD

Users Confront Myriad of Alternatives.....	29
Demand for System Flexibility Seen Growing....	30
DDP Seen Easing Department Managers' Job....	31
Rapid Advances Predicted in Mini Storage Area...	32

MICROCOMPUTING

Hobby Micro Comes of Age in '77.....	33
Learner's Lexicon.....	36

COMPUTER INDUSTRY

Industry Experiences Boom Year in '77.....	37
F&S Sees Product Mix Changing.....	37
SEL Sees Established Areas Its Major Strength...	38
Varian Gives Univac New Market.....	39

Congratulations IBM on improving SPM II. Now ADR's LIB/OL is only 20 ways better, at about the same price.

	IBM's SPM II (1.3)	ADR's LIB/OL (2.5)
1. Function key control	NO	YES
2. Dual screen	NO	YES
3. ERASE, INSERT, DELETE key support	NO	YES
4. HEX data entry	NO	YES
5. Number of commands to learn	40	12
6. Maintenance-free libraries	NO	YES
7. Simultaneous batch/on-line library access	NO	YES
8. Full compression of program libraries	NO	YES
9. Fully-compatible online/batch functions	NO	YES
10. Tape library support in batch	NO	YES
11. Basic Mapping Support	Req'd.	Not Req'd.
12. Number of transactions for a typical session	16	12
13. CPU time for a typical session (seconds)	12	9
14. Number of EXCPs for a typical session	204	99
15. Number of characters transmitted per field	1520	79
16. Supports TP monitors other than CICS	NO	YES
17. Conversion programs supplied	NO	YES
18. Class A support	NO	YES
19. Installation support included	NO	YES
20. Training included	NO	YES

SWITCH NOW!

Contact ADR today for its competitive analysis of SPM II and LIB/OL and for additional information on why over 500 companies have selected LIB/OL.

Name/Title _____ Company _____

Address _____ City _____ State _____ Zip _____

Telephone _____ Computer Configuration _____



APPLIED DATA RESEARCH THE ON LINE SOFTWARE BUILDERS™

Route 206 Center, Princeton, N.J. 08540, 609-924-9100

Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.

ADR software products: In use at over 7000 installations worldwide. U.S. offices in Boston (617) 245-9540, Chicago (312) 694-2244, Cleveland (216) 826-0190, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (609) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 281-2011. Foreign offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.



Cowboys Learning 'Bit' Not Just Part of a Bridle

(Continued from Page 1)

his choice and selects a bull or bucking bronco for him to ride. For this service, Rocom charges \$3.50 per rodeo.

Thus far, over 10,000 rodeo cowboys have subscribed to the service which Rocom President Bryan McDonald claims is the first of its kind in the world.

Built around a 9K-byte IBM System/32, the system also generates all the necessary paperwork for rodeo organizers, including an alphabetical listing of all the contestants in each competition and a detailed schedule of performances, McDonald said.

When it is upgraded next March to a System/34, the system will even generate PRCA membership rosters, oversee Rocom's billing and automate the assessment of fines against cowboys who fail to appear at rodeos where they are scheduled to compete.

Alternative to Hats

Before the system was installed in January 1976, cowboys entered rodeos through Rocom's lone reservations secretary, who recorded entries for all 600 PRCA events held each year across the country. During a typical working day, the secretary manually took 400 to 500 rodeo reservations, McDonald recalled.

Two days before each competition began, a stock contractor dispatched a field secretary to the host city to record the name of each contestant. A local rodeo judge then drew each name from a cowboy hat to determine the com-

petitors' starting order and later repeated the procedure to select livestock for each cowboy.

On the following day, the contestants called Rocom headquarters to find out exactly when they were to compete and what animals they had drawn.

Under this system, reservations errors were common and clerical tasks like determining starting positions and selecting livestock often took 10 to 12 hours, McDonald said.

For the cowboys, the system also made rodeos difficult to enter because of Rocom's busy telephones. "A cowboy could spend six hours on the phone and never get through to our headquarters," he recalled.

In addition, cowboys often found themselves victimized by misunderstandings that arose during phone conversations between themselves and Rocom's secretaries. "If a cowboy thought he was supposed to compete at one time and a secretary thought he was supposed to compete at another time, he would spend a lot of money to get to a rodeo, only to discover that he had missed his event," the company president said.

Then, when a cowboy tried to explain to rodeo officials why he had arrived late, he had no record of his phone call to prove that he had received inaccurate scheduling information. "It was simply his word against the secretary's, and in such cases the cowboy always lost," McDonald said.

Since the system arrived here, however, most of these problems have

disappeared, according to McDonald. For the cowboys, the system has nearly eliminated delays in accessing Rocom's reservations secretaries and has minimized scheduling mix-ups.

It has also discouraged preferential treatment in assigning livestock and thus given each rodeo competitor an equal chance to win.

For Rocom, the system has cut reservations errors and allowed company clerks to perform their random drawings "in a matter of minutes."

Largely because of these benefits, the

computer system has received an enthusiastic reception from the cowboys who use it. "They're so nomadic that Rocom has become a kind of home for many of them," McDonald explained. "Often when they're on the road, they'll call us just to say hello."

In fact, the computerized reservations system has proved so popular with rodeo cowboys that the PRCA recently bought the service from Rocom.

"It's the one major thing that's happened to rodeos in the last 40 years," McDonald said.

Complete Security Ringlike

(Continued from Page 1)

adequate," he said.

Norman gave this advice at a recent security conference here sponsored by On-Line Conferences Ltd. of Uxbridge, England. He also provided users with an overall security plan.

Hardware Defenses

Redundant processing — achieved by use of parity bits — assuring the same results each time, is part of good hardware security, Norman suggested.

This is especially helpful in systems requiring "very high accuracy or where the consequences of an error are disastrous," he said.

In the area of telecommunications, Norman advised use of special codes containing large numbers of bits to accompany data sent across communications lines. These help detect the presence of errors and, if chosen suitably, can help locate the error in a long string of characters, he said. Even longer sets of check characters can actually be used to recreate the original message despite an error, he said.

As for software, Norman suggested that the system include a resident security officer who routinely checks the accuracy of the system, the authority of its users and the work it does.

It should also include procedures for recovering from breaches of security, whether they be accidental or intentional, he said.

The software should "identify the parts of the system hardware to restrict applications programs to those parts of the system they are authorized to use."

Secure software prevents one program from reading the contents of another with which it shares main memory, precludes one program from overwriting the files of another and checks to ensure that one terminal is not pretending to be another, he said.

The software also maintains the authorization tables that indicate what information shall be available to which user, he said. "If someone tries to do something he shouldn't, the surveillance system should raise an appropriate alarm," Norman said.

The applications programs can contribute to the accuracy of the system, but in all other respects constitute a threat, not a defense," Norman told his audience of users.

Physical Security

In the area of physical security, locks, bolts, fire detection and extinction equipment, guards and burglar alarms should be normal parts of the system's defense.

When possible, a computer should be

located away from hazards such as buildings without proper fire protection, aircraft flight paths and roads with heavy vehicles.

There should be only one access route to the computer room, and emergency exits with panic bars should be openable only from the inside, he said.

As for the other measures aimed at fire and natural disasters, Norman pointed out that safes that prevent magnetic media from being "cooked" are available. To use a safe that will not preserve data against the worst conceivable disaster is merely a "wasted insurance premium," he said.

He also recommended use of hand-operated fire extinguishers to battle small problems so that employees will not be exposed to harmful extinguishing agents in addition to the danger from the fire itself.

As for electronic bugs on transmission lines, Norman reminded users that systems are easy to bug since telephone junction boxes and similar facilities are normally sited and constructed to simplify maintenance, making it "not difficult" for a knowledgeable intruder to install a tap.

'Procedural' Ring

Moving out to the "procedural" ring, Norman emphasized that here, segregation of responsibilities is the key.

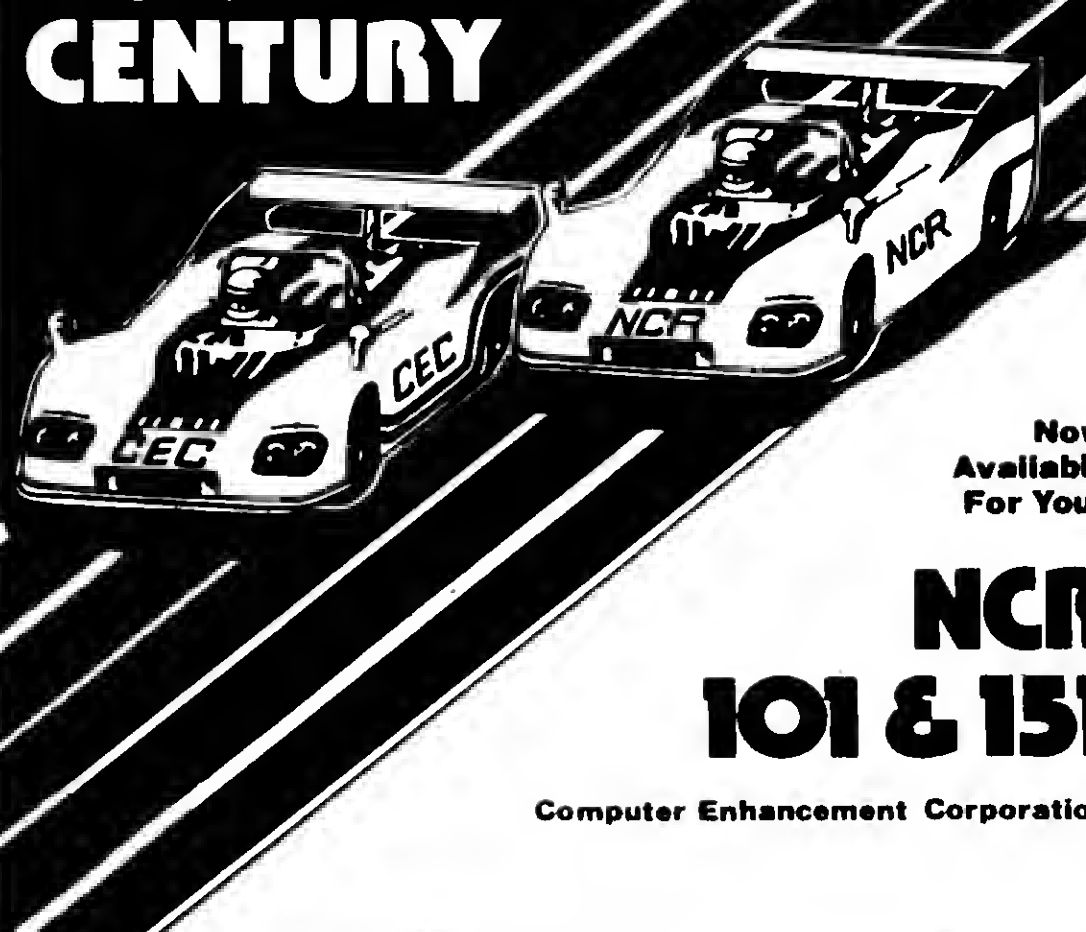
Procedures should be followed during system development as well as operations to ensure that none of the systems staff has the opportunity to compromise security. In a secure commercial environment, as opposed to engineering, analysts should be prevented from writing the programs they describe, and programmers at terminals should never be allowed to operate the computer or run programs they themselves have written, he said.

When programs are ready for testing against live data, the tests should be conducted by a group that neither specified nor wrote the programs.

As for limiting the abuse of trust by people with authorized access to computerized information, Norman suggested controlling the amount and classes of personal data collected. Facts remain facts in the environment in which they were collected but they may be inappropriate in the context of the uses to which they are put. Soon this will be controlled by legislation, he pointed out.

No matter how trustworthy you may think an employee is, it is essential that he always be required to follow the rules that have been laid down for the installation.

ADD RACING STRIPES TO YOUR CENTURY



Now Available For Your

NCR 101 & 151

Computer Enhancement Corporation

Memory For: 101 151 200 201 251 300 Criterion

☐ Urgent! Please Phone Me Ext ☐ Have Your Rep Contact Me ☐ I Want A Demonstration ☐ Send Me All Literature	Name _____ Title _____ Company _____ Address _____ City _____ State _____ Zip _____ Phone () _____ Ext _____
---	--

For further information call or write:
 COMPUTER ENHANCEMENT CORPORATION • 3189 E. Airway Ave., Costa Mesa, California 92626 • 714/754-0521

U.S. Asks OECD Group on Transborder Data

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The U.S. has proposed that the Organization for Economic Cooperation and Development (OECD) create a body to consider the legal, economic and social issues of transborder data flows.

The first task facing the group would be to develop "guidelines for harmonizing national privacy laws," according to the State Department's Morris H. Crawford, who heads the Interagency Task Force on Transborder Data Flows.

Because as many as 13 European countries have been reported considering laws to restrict the flow of information across their borders, the enforcement of privacy in international DP must receive immediate attention from the OECD group, Crawford said.

If formed, the group would first examine the Council of Europe's draft convention governing international privacy, Crawford said. The 18 members of that council are also members of OECD.

White House Honing Privacy Position

The Privacy Protection Study Commission's final recommendations, released last summer, have undergone close scrutiny by a small team on the White House Domestic Policy Staff, and a Carter Administration position on privacy is expected late next spring.

Congressional interest will dictate which parts of the commission's work receive attention from the legislature and Administration first. At this point, the need for legislation concerning medical records and federal law enforcement access to bank records seem uppermost in congressional minds.

Others involved in developing the Carter Administration's views on privacy include Ron Plessner, former general counsel of the privacy commission, and Henry Geller, former general counsel for the Federal Communications Commission and the President's expected nominee for the new post of Assistant Secretary of Commerce for Communications and Information.

Geller Expected To Fill Two Posts

Henry Geller, who is expected to be President Carter's choice for Assistant Secretary of Commerce for Communications and Information, will also be the administrator of the National Telecommunications and Information Administration (NTIA).

The new administration within the Commerce Department resulted from the President's first reorganization plan, which calls for the merger of the White House Office of Telecommunications Policy with Commerce's Office of Telecommunications.

Geller's actual nomination and confirmation hearings are expected to be made and held by mid-February, sources close to the White House said.

NTIA's initial efforts will emphasize telecommunications. However, October 1978 will see an increase in the Administration's budget, permitting treatment of additional issues, such as transborder data flows, electronic mail, electronic funds transfer and privacy.

Washington Update

Booster of FBI Plan Quits Justice Post

WASHINGTON, D.C. — Peter F. Flaherty recently left his job as U.S. Deputy Attorney General to seek the Democratic nomination for the Pennsylvania governorship.

During the eight months he served as Attorney General Griffin B. Bell's right hand, Flaherty gave the Federal Bureau of Investigation permission to go ahead with its plans to develop a

message-switching system.

The acting Deputy Attorney General, Benjamin Civiletti, is expected to be nominated by the White House to take over Flaherty's job permanently.

Administration Staffs DP Revamp Teams

The President's federal DP reorganization project has appointed several people to staff the teams that will examine DP in the government from many viewpoints.

Between 20 and 25 members of the public and private sectors are already "on board," according to Kenneth Allen, a staffer in the Office of Management and Budget's Information Systems Policy Division and a member of the reorganization project himself.

Among those appointed so far are Larry Dreeman, director of corporate information services at the Coca-Cola Co.; Robbin Hough, professor of economics and management at Oakland University; Philip Kiviat, technical director of the Federal Computer Performance Evaluation and Simulation Center; and Israel Feldman, director of the Reports Analysis and Statistical Operations Division at the Department of Housing and Urban Development.

Rare bird.

An editing CRT that's ideal for transaction processing.

Lower software costs. Easier programming.

System builders say our Model 1200 Editing Terminal is ideal for transaction processing. We agree.

The Model 1200 makes programming easier because it tells the programmer (and the host computer) the status at the terminal. Communications strap setting, printer errors, operator mode key setting, and more.

The Model 1200 also cuts down on host computer loading by automatically setting modified data "tags," whenever a field is updated, so the host computer can request only modified fields, and skip thousands of needless compare operations.

To further lighten the load on the host computer, the Model 1200 has programmable send keys that let the program regulate the amount of data returned to the computer as terminal loading varies.

More productive operators.

Thanks to a 9 x 12 character matrix, the Model 1200 has crisp, clear, strikingly sharp characters. So operators see their work better and make fewer mistakes. Data entry is incredibly accurate due to field attributes like low intensity, numeric only, blink, and inverse video.

Editing is fast and easy, too. Single keystrokes insert and delete characters and lines.

All our standard goodies. Only \$1383.*

A big, 12-inch screen, 128-character ASCII set, upper and lower case, 15 cps Typamatic repeat on all keys, and a 24-line display are standard. So is our exclusive No Hassle toll-free 800 number for service. One call gets you service. Where you need it. When you need it. World-wide.

So go ahead. Get a CRT terminal that's specifically designed for transaction processing. Perkin-Elmer's Model 1200 Editing Terminal.

PERKIN-ELMER | TERMINALS DATA SYSTEMS | DIVISION

Randolph Park West, Route 10 & Emory Ave.
Randolph, N.J. 07801
201-366-5550, TWX 710-987-7901

617-890-1404 Boston, MA
312-137-1547 Chicago, IL
214-244-8880 Dallas, TX
714-541-9093 Los Angeles, CA
201-229-1010 Oceanport, NJ
408-249-5540 San Francisco, CA

Quantity 75

New Yorkers 'Meet' Texans Via SBS Satellite Experiment

(Continued from Page 1)

a data base stored in an HP 3000 minicomputer in Houston. The data was transmitted at 1.544M bit/sec using high-speed Harris Corp. modems.

HP 3000 systems used at both Texaco sites utilized standard data base and data entry software compatible with the experiment despite the high data rate, an HP spokesman said. The satellite transmissions used the 12- to 14 GHz frequency band with special portable 8-foot antennas built by Nasa.

Since the CTS was designed for experimental use by both Nasa and the

Canadian Department of Communications, SBS said the demonstration was not a "preview" of SBS services. However, the frequency range and transmission rate were similar to those of the future services currently being described by SBS.

Project Prelude also includes demonstrations at corporate locations of Rockwell International Corp. Montgomery Ward.

In addition to SBS, eight vendors of DP and other equipment and services participated in the project. SBS refused to divulge costs of the satellite capabilities demonstrated.

Earth stations for the 12- to 14 GHz frequencies are not yet available commercially, although the HP systems and much of the other equipment used are generally available.

SBS plans to begin providing integrated satellite business services to

Says Dukakis Interfered

Sci-Tek Blames Governor for Lost Work

By Ann Dooley
CW Staff

BOSTON — Sci-Tek Associates, Inc. lost a Massachusetts merit rating board contract — even though its bid was three times less costly than the winner — because of pressure from Gov. Michael S. Dukakis, the firm claimed recently.

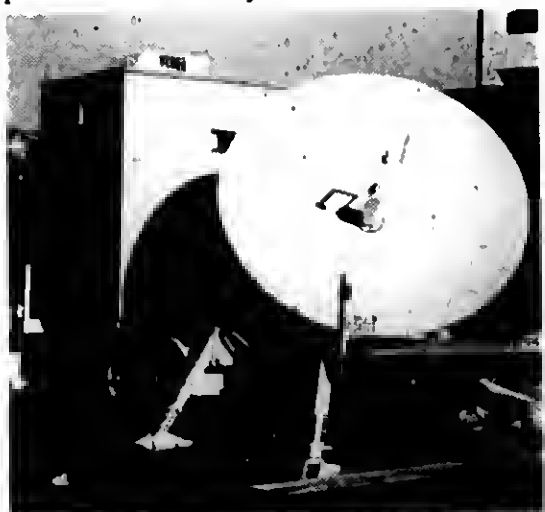


This graph of typical business data was accessed from an HP 3000 minicomputer in Houston, transmitted at 1.544M bit/sec via satellite and displayed on this terminal in Harrison, N.Y.

users in 1981, according to current plans. Project Prelude will conclude early next year, after demonstrations have been held at Montgomery Ward. Rockwell International sites were used

for demonstrations in November.

At each location, users are being asked whether the demonstrated services would help make their normal business activities more efficient.



CW Photos by R. Frank

This experimental, portable earth station includes a eight-foot antenna constructed by Nasa to operate at 12- to 14 GHz. When such earth stations become commercially available, users will have rooftop access to satellite services.



You've got a Computer Terminal on your desk.

With your push-button dial telephones and our P1-5 Data Concentrator, you've got a comprehensive interactive system to front-end your computer. The P1-5 will answer up to 16 simultaneous callers and record their key entries on to dual floppy diskettes, which eliminates the key punching process.

The P1-5 Data Concentrator offers:

- User designated field duplication
- Modulo 10 checks on user designated fields
- Audio response to callers
- Blank fill to the next field with the "...." key
- 3740 diskette compatibility along with automatic Time and Date recording
- Battery backup power supply
- Low monthly cost averaging \$300
- Optional 360/370 multiplexor channel interface for P1-5
- Optional CRT/Keyboard terminals for \$17/month

The P1-5 has almost unlimited applications including General Ledger, Payroll, Time and Attendance Reporting, Production Reporting, Receivables Control, Inquiries and many other uses.

Call us today and we'll tell you how the P1-5 Data Concentrator can help you get in 'touch' with your employees and customers.



PHONE 1
1330 East State St.
Rockford, Illinois 61108
Phone 815/962-8927

"We're in a good legal position to dispute the decision because of the governor's public statements and private interference," Robert Orr, Sci-Tek spokesman, contended. "But we decided it wasn't in anyone's best interests to stop the procurement."

Sci-Tek's allegations stemmed from a recent statement by Dukakis that the company should not be involved in any state business. That statement was made after a state Attorney General's investigation cited Sci-Tek for improper conduct in another recent contract award — a \$23 million Administration and Finance facilities management agreement [CW, Nov. 14].

Work in Mid-Stream

Sci-Tek had been working under a no-bid contract for the last six months installing the merit rating board computer system. "The company developed the system and could have

simply continued with operations, whereas any other company would have to undergo an orientation period," Orr said.

Sci-Tek was ranked fourth out of seven contenders in the technical assessment phase of the bid evaluation process, but its cost proposal was three times less than that of Control Data Corp., which was awarded the contract.

All the reasons for the decision have not been disclosed yet, according to Orr, who added, "We can't say anything for a fact, but there are rumors" that Dukakis interfered.

"We hope there won't be continued problems with state contracts, but only time will tell," he said.

Denying any government interference, the governor's press secretary, Alan Raymond, said the contract award was made by merit and "the governor was not in touch with the selection committee at any time."

payroll obsolete january 1, 1978?

The long form W-2 and the new SSA reporting format will obsolete lots of 360/370, Burroughs and Honeywell payroll software in 1978.

If you are not sure that your payroll software is ready for 1978, call Joe Hunter at (617) 851-4111 - Wang Laboratories, Inc., Lowell, MA 01801.

You can find out more...

U.S. to Draft Stand on Private-Line Charges

By Edith Holmes

CW Staff

WASHINGTON, D.C. — U.S. international carriers and multinational DP companies will meet this week to hammer out a U.S. position on efforts by European and Japanese administrations to end flat rates for private communications lines.

Representatives from General Electric Co., Control Data Corp., TRT and RCA and a member of the Commerce Department's Office of Telecommunications will be among those meeting at the Federal Communications Commission (FCC) on Thursday, Dec. 29 to draw up a U.S. contribution for Geneva meetings of the Consultative Committee on International Telephone and Telegraph (CCITT) scheduled for late April and early May.

The Italian government first suggested an end to flat-rate charges for transparent, leased circuits last February. The Italian proposal that the lines be priced according to the volume of messages sent over them gained support from several European countries and from the Japanese government during the May 1977 CCITT meetings [CW, May 16].

The U.S. National Committee of the CCITT, led by Earl Barbely of the FCC, registered its disapproval of Italy's idea during those meetings.

U.S.: DP companies fear their leadership in offering DP services to the rest of the world will end if pricing for communications lines becomes volume-sensitive, drastically increasing international communications costs, Brendon McShane of GE said during a Dec. 15 meeting of the U.S. CCITT committee. He estimated the U.S. has 90% of the DP business abroad.

While they are more sympathetic to foreign administrations' desires to realize more revenue from their public communications networks, the U.S. international carriers do not want to lose the U.S. DP companies as customers abroad. The carriers do believe, however, that flat-rate charges must be phased out eventually.

C&W Contribution

Citing a contribution to the CCITT from Cable and Wireless Ltd. (C&W), John O'Boyle of ITT Worldcom called it "one of the better expressions of the worldwide feeling that flat-rate charges must be phased out." He told the committee he "would bet on an end to flat rates for private lines as the reality of the 1980s" and urged an acknowledgement of the fears the rest of the world has.

A milder variation on the Italian theme, the C&W contribution stated that "the major difficulty which has arisen in recent years with this method of charging [flat rates] has been the use of dedicated customer leased circuit facilities by users other than the customer."

The European and Japanese governments specifically fear that U.S. DP companies lease private lines from them for a flat rate and then turn around and use the communications channels, not for data processing, but as ordinary message conduits, members of the U.S. CCITT committee said in interpreting the C&W contribution.

Volume-sensitive pricing suggestions stem from the concern of foreign ad-

ministrations that public traffic on their communications systems is being eroded through the actions of U.S. firms, C&W suggested, urging that the CCITT study this particular concern.

C&W would not support the Italians' reasons for wishing to eliminate flat-rate charging — that such pricing methods are out of date and that their original purpose was to relieve traffic pressure on Telex services.

The firm added the ominous note, however, that while it "would be unable at present to support any change in the monthly flat-rate charging principle as applied to customers using leased circuits for their own traffic," C&W would be interested in a study to refine the flat-rate system by examining the voice vs. data and the various

speed relationships of leased circuits.

GE's McShane believes that the foreign administrations may try a "two-step" move to volume-sensitive pricing for private lines. The first step would be to price lines according to speeds.

Speed-sensitive pricing is already under way in Japan, McShane said, pointing to a decision earlier this month by the Japanese Ministry of Posts and Telecommunications to raise international voice-grade leased circuit rates as requested by the Japanese carrier, KDD.

Effective in April, KDD will abolish private-line service and establish speed-sensitive rates. Using prices of the 2,400 bit/sec line as a base rate,

KDD will charge 10% more for 4,800 bit/sec and 20% more for 9,600 bit/sec lines.

KDD originally asked the Japanese ministry to approve increases in prices by 30% and 60%, respectively, for these higher speeds.

The Japanese have also offered discounts of 5% where six or more alternate voice data (AVD) lines are leased by a single customer. The monthly charges for leased telegraph services have also been reduced substantially. A.E. Schuamberger of RCA Globcom added.

By asking foreign administrations to document the problems they've had with DP firms, the U.S. has an opportunity to shape any study of these issues, R.F. Sabacek of TRT suggested.

Check It Out For Yourself

	TLMS <u>Release 4.</u>	<u>Other</u>
On-line updating and inquiry	Yes	_____
Alternate logging capability	Yes	_____
Protection of scratch and non-scratch status	Yes	_____
Audit and inventory reports	Yes	_____
Console sharing for multiple CPU's	Yes	_____
Automatic scratching of tapes	Yes	_____
Simple interface to OS	Yes	_____
Scheduling and control of tapes being moved to off-site location	Yes	_____
Automatic uncataloging of scratch tapes	Yes	_____
Non-queuing of tape jobs while backing up the master	Yes	_____
Unchanged JCL for users	Yes	_____
Non-degradation of system performance	Yes	_____

PLUS — On-site training and installation — at no extra charge.

What You

What You Want From A Tape Library System — You Get From TLMS Release 4.

When you want an easier way to do a tougher job.

For more information, write or call:
Gulf Computer Sciences, Inc.
1775 St. James Place
Suite 160
Houston, Texas 77056
Tele. (713) 627-9320

Member SIA Software Industry Association

IBM Seeks Two Trials in Catamore Round II

By Molly Upton,
CW Staff

PROVIDENCE, R.I. — The second trial of IBM vs. Catamore Enterprises, Inc. should be separated into two trials, according to a motion filed by IBM.

In its petition to the U.S. District Court for the District of Rhode Island, IBM asked for a separate trial of the issue of whether the 1969 written agreement between the two firms for IBM systems engineering services (SES) can be voided by Catamore and, if so,

whether the contract was rescinded duly and in a timely manner.

At issue is Catamore's claim that fraud by IBM voids the SES agreement and its limitations.

SES Agreement

The SES agreement indicates it supersedes all other agreements and also carries with it a statute of limitation of one year, which the appeals court cited in ordering a new trial.

The appeals court's order for a new trial overturned a jury verdict ordering

IBM to pay \$11.4 million in damages and Catamore to pay \$68,453 in back rent.

IBM had sued the jewelry firm, a first-time user, for the rent and Catamore countersued, charging IBM with breach of contract, breach of warranty, fraud and negligence.

If IBM's claims are determinative, then splitting the trial issues will have saved all concerned much time and effort, IBM said.

Catamore Objects

In its own brief, Catamore objected to the separate trial, asking for more time in which to formulate its reply. The jewelry firm stated a separate trial and the resulting multiplicity of issues will only further protract the matter and waste court time and resources.

The Catamore brief also stated Judge Francis J. Boyle had indicated his intention not to order a separate trial on

any issue if either of the parties objected.

IBM contends that issues in the initial trial are relatively simple to comprehend and rule upon. Thus the separate trial would "substantially reduce the grave risk of jury confusion inherent in a trial on all the issues herein involved," the petition stated.

Catamore acquired a System 360 from IBM and engaged the firm to aid in systems design, initially through oral agreements and later through the written SES agreement.

IBM said in its petition that "the court will appreciate that Catamore's argument amounts to nothing more than a contrived and wrong reading of a document, attempting to twist 'system design for production control' into an 'imagined promise of production control system, an entirely different thing by common understanding and admission.'"

Are Your DASD's Drowning ... in a Sea of Data?



DMS/OS the Wave of the Future in Data Management

DMS/OS has recently become the most widely accepted data management system available. For controlling the every day problems associated with DASD maintenance ... it is the wave of the future.

Here's why DMS/OS is now the number one data management system: it addresses major user problems; reduces DASD and CPU operating costs; user proven in supporting all DASD devices and operating systems; supported by DASD experts; well documented; easy to load, use and maintain.

The BASIC SYSTEM includes:

1. Management Reports
2. Archival/Retrieval
3. Data Set Retention Control
4. Migration of Sequential GDG's from Disk to Tape
5. Automatic Selective back-up/restore

6. PDS Management/Compression
7. Data Set History File
8. RACF Support
9. System Tasking
10. Self Diagnostics

SELECTABLE UNITS

1. VSAM Support
 2. TSO Command Processor
 3. DASD Space Billing
 4. Mass Storage Support* (Real to Virtual Migration)
 5. Volume configurator
- DMS/OS supports all IBM 360/370's under MFT, MVT, VS1, VS2, MVS and VM.

Let DMS/OS save your DASD's from drowning in a sea of data. DMS/OS is available for a free 30-day on-site evaluation. Call or write today for a free brochure, functional overview or for your on-site evaluation. DMS/OS ... the wave of the future in data management.

*MSS user group information available



SOFTWARE MODULE MARKETING

THE SUPERMARKET OF SOFTWARE

Crocker Bank Building/Penthouse 1007 7th Street Sacramento, CA 95814 (916) 441-7234 Telex SMMSAC 377-314 IN EUROPE: California Module Marketing, Ltd. c/o Country Formations, Ltd. 27 Kelso Place, London W. 8

Firms Tell Why They Said DP Jobs Difficult to Fill

NEW YORK — About 24% of the firms participating in a recent survey reported that DP jobs are among the most difficult to fill [CW, Nov. 21], but they didn't say why or what they are doing about it.

Now that information is available, according to Deutsch, Shea & Evans, the human resources consulting firm that conducted the survey.

Why are DP jobs hard to fill? The demand for programmers and systems analysts, like engineers and scientists, exceeds supply, for one thing. For another, qualified people are not available at the right price. Further, the turnover rate is high because DP skills are highly transferable to other companies.

How are companies tackling the problem?

About 72% of the survey sample answered this question. Fifty-four percent said they are increasing their recruiting efforts through more general recruiting (15%); college recruiting (11%); advertising (11%); other techniques (12%); and by increasing the geographic range of their recruiting efforts (5%).

Further, 20% reported internal efforts such as training, career development and upgrading existing employees. Seven percent said they are increasing salary offers, 3% reported lowering standards and 10% reported a variety of other approaches, such as redesigning jobs and paying relocation expenses, for example.

Split on Intervention

As for their opinions on various external measures such as federal government intervention, 50% of those surveyed answered that the federal government should take no action, and 23% felt it should.

Those that invited government action suggested tactics as tax credits and incentives for businesses. Others suggested the need for more government contracts as a means of building employment.

Regulatory agencies and regulations came under fire by the group, as did welfare and similar programs, the re-

searchers said.

The questionnaire was mailed to 902 companies, and the first 201 responses (22%) were tabulated, the consulting firm said.

About 45% of the responses were from organizations with fewer than 1,000 employees, and 55% were from larger ones. Responses were from predominantly business and industrial organizations.

Calendar

Jan. 23-25, Washington, D.C. — **Course in Tape/Disk Librarian Functions**, sponsored by the U.S. Civil Service Commission Bureau of Training. Contact: Director, ADP Management Training Center, Bureau of Training, Attn: TOA, U.S. Civil Service Commission, 1900 E. St., N.W., Washington, D.C. 20415.

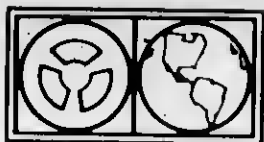
Jan. 23-27, Valparaiso, Chile — **Fifth Panel Discussion on Computation Topics**, sponsored by Chilean Association of Information Treatment. Contact: Aldo Migliaro, Director, Centro de Computacion, Universidad Catolica de Valparaiso, Casilla 4059, Valparaiso, Chile.

Jan. 30-Feb. 1, Washington, D.C. — **Data Processing Technology**, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Jan. 30-Feb. 2, New York — **Forms Design Course**, sponsored by American Management Associations. Contact: American Management Association, The American Management Associations Building, 135 W. 50th St., New York, N.Y. 10020. Also being held March 27-30 in Chicago.

Jan. 31-Feb. 2, New Orleans — **IWP Spring Symposium**, sponsored by International Word Processing Association. Contact: Rudolph Lang, Prestige Expositions, Inc., P.O. Box 3084, Stamford, Conn. 06905.

COMPUTERWORLD



...the one
weekly newspaper
that's designed to fulfill your
unique "need to know"...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress...
52 weeks of incisive news,
commentary and special
reports...subscribe today,
use the attached postage paid
order form.

Please enter my subscription
(actions on back)

I'm already a subscriber,
but I'd like you to
change my

address

to

make

other

My current mailing label is attached
and I've filled in new information
on the other side.

Put old label or label information here

Europe and Middle East — \$50 All Other Foreign — \$65

RATES: United States — \$18

Canada and PUAS — \$28

If charge we must have cardholder's signature:

Signature	
Expiration Date	

First Initial	Middle Initial	Surname
Your Title		
Company Name		
Mail To:		
City	State	Zip Code

Address shown is:
☐ Business
☐ Home
☐ Check here if you do not wish to receive promotional mail from Computerworld
☐ Check here if you're interested in receiving information on Computerworld's Index.



- 10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other
- 11 President Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor/Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other

Detach here, fold, and place in post-paid envelope attached through binding.

Regional Processing Centers Urged Competition in Medicare Services Held Lacking

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Too little competition exists in the data processing services provided by the private sector for the federal government's Medicare program, according to a report recently delivered to the U.S. Health Care Financing Administration's (HCFA) Bureau of Medicare.

The firms that process bills and claims for the nation's elderly and disabled under Medicare now perform full facilities management for the government. More competition would result if the government owned and monitored regional processing centers and then let the private sector run them, the study performed for the bureau by Systems Architects, Inc. (SAI) concluded.

Before the government regionalizes its Medicare processing, however, it must first develop long-range DP policies, including planning, performance standards and management control procedures, the report said.

These policies should be designed to bring Medicare processing in line with a number of federal DP guidelines — including the stricture that services provided by the private sector must be competitive, the study added.

At present, two firms — The Blue Cross Association and Electronic Data Systems Federal, Inc. — dominate the contracting for Medicare DP, according to the report.

Regional Concept

Regional processing of Medicare claims or bills would involve decentralized data entry beneficiary services and provider — such as physician or pharmaceutical — services, according to SAI.

The concept calls for the federal government to "centralize Medicare DP using distributive processing techniques." Both the hardware and software involved at all sites would be owned by the government.

In order to regionalize, the government must assume and maintain overall management responsibility for the Medicare program's DP policy, SAI added.

Each regional processing center would be a site used by more than one of the organizations that have contracted with the government to process bills or claims under Medicare. Those intermediaries that process bills under the Health Insurance Program (Part A), which serves the aged, and carriers that handle the claims received under the Supplemental Medical Insurance Program (Part B), which aids the disabled, would be responsible for performing the DP functions associated with Medicare claims processing, the report suggested.

Pilot Program Urged

In its survey of current Medicare claims processing systems, SAI concluded that clerical and data entry functions should remain decentralized and that claims-processing operations should continue to be accomplished by the private sector.

A regional processing center experiment should be performed, but only after the weaknesses of standard re-

porting, hardware and software acquisition and DP policy that plague the present Medicare system have been resolved, the report said. The prototype center should be undertaken in particular to determine what cost savings could be gained from regionalizing Medicare processing and to test new management control standards and performance reporting policies.

Finally, SAI recommended the Medicare Bureau establish a task force to document requirements for combining Health Insurance Program and Supplemental Medical Insurance Program data into a single data base for DP purposes.

Called the Medicare Regional Proc-

essing Feasibility Study, the four-volume report cost the federal government \$235,506 to produce.

In its quest to determine the feasibility and cost-effectiveness of consolidating Medicare workloads by using regional centers for claims and bill processing, SAI collected data on the way intermediaries and carriers currently process the nation's health benefit programs for the aged and disabled.

The contractor also studied the feasibility and economics of standardization and tried to come up with a model of Medicare run by regional processing centers.

The many reporting inconsistencies

of the program made it impossible to quantify the actual requirements of a regional processing center, SAI said. The contractor could "only observe the qualitative differences between the various types of systems and methodologies used by various intermediaries/carriers."

"Data that would enable us to determine the cost to operate, maintain and enhance the various systems in operation today and extrapolate savings to a new regional processing center environment is not available," SAI added in its report. Consequently, it is extremely difficult to determine the savings that could result from regionalization.

Register now for DataComm 78!



Call 800-225-4242*

Don't miss the one Data Communications Industry Conference and Exposition held in the city where DataComm policy and regulation are established!

Profit from vital information, insight, ideas brought to you by nationally known data communications experts! Be there in person. Don't get DataComm secondhand!

Call 800-225-4242

Take part in panels and sessions that let you ask your questions, share experiences, express your needs.

Make DataComm your personal conference, choosing your options each day — ranging from tutorials for the beginner to advanced networking panels for the sophisticated user.

Call 800-225-4242

And register for one, two, or all three action-packed days, including:

19 Vendor/User Rap Sessions • 3 Special Management Sessions • 6 Network Tutorials and Panels • All Day Government Miniconference — and MORE!

FREE! The Exposition at DataComm 78 will feature exhibits from manufacturers all over the country. Discuss your needs and plans with key representatives in a quiet-paced, informative atmosphere.

Call 800-225-4242

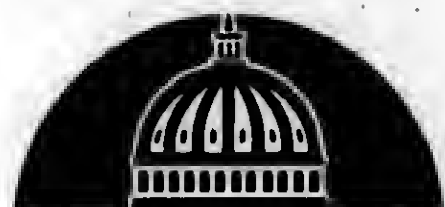
REGISTER NOW!

If this is the first news you've learned about DataComm 78, don't miss this chance to attend.

AFFORDABLE:

UNMISSABLE! Just \$115 for the whole DataComm Conference, or \$50 each for single days.

Don't delay! Master Charge, American Express, Visa/BankAmericard accepted. Call our toll-free number now to arrange your attendance at DataComm 78 — the ONE conference you don't want to read about later and be sorry you missed.



DataComm

78

**CONFERENCE
AND EXPOSITION**

**February 21-23,
Washington, D.C.**

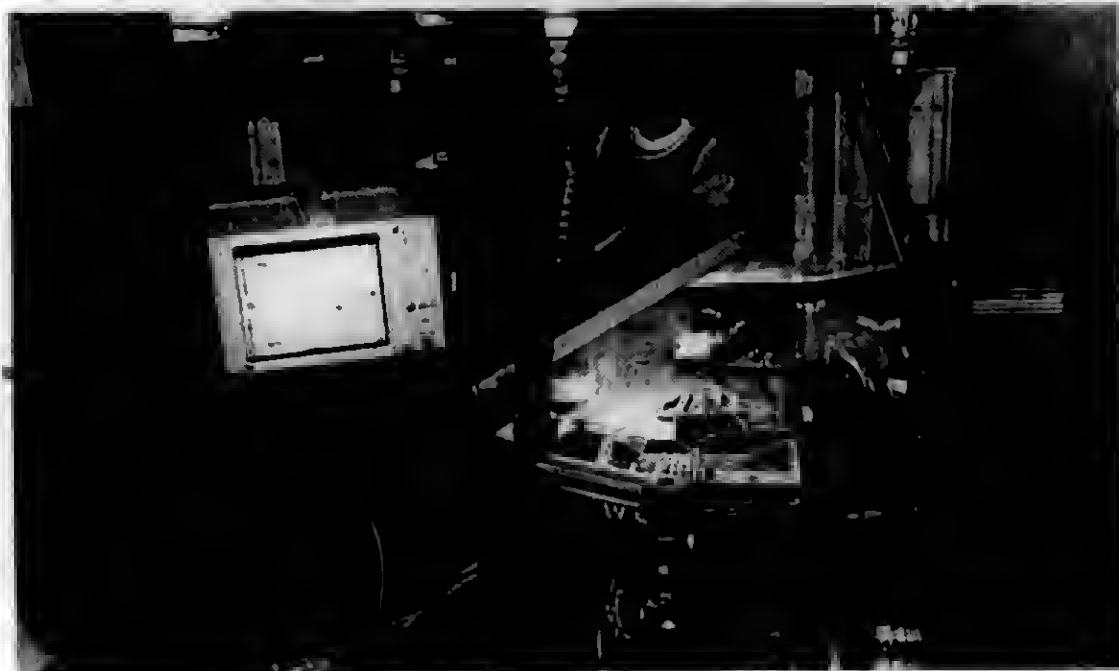
Inside Massachusetts,
call collect: (617) 964-4550.

Or write DataComm 78

Registration

**The Conference
Company**

60 Austin Street, Newton, MA 02160



At the primary Sight-I installation, machine operator Toshiko Smith loads a supply tray for the inspection machine. The inspected and accepted output assemblies move in metal cassettes to the next production station.

System at GM 'Sees,' Inspects Ignition Chips

By Catherine Arnst
CW Staff

KOKOMO, Ind. — A computer that can "see" is being used on the assembly line at General Motors (GM) to locate and inspect the integrated circuit chips used in the ignition systems of GM cars and trucks.

Sight-I, installed in January 1977, is said to be the first industrial vision system of its kind to go to work on a U.S. automotive production line. It was developed by Dr. Michael L. Baird of the computer science department of GM's Research Laboratories.

"I've developed a program that sharpens the sight of a computer so it can rapidly and reliably find nonoverlapping parts — even on visually confusing surfaces like conveyor belts which tend to camouflage the parts' outlines," Baird said.

The system is built around a Digital Equipment Corp. PDP-11/45 minicomputer with 16K memory and a solid-state diode array television camera. The image is picked up by the camera and converted to a mosaic of minute squares in varying shades of grey.

Within one second, the computer can fix the location of the chip by determining the coordinates of its four corners, for example. It can then inspect the chip for defective assembly characteristics, looking for such things as a chip that is tilted too much for automatic test equipment, off the edge of the heat sink or perhaps missing a corner.

Image Enhancement

The system processes about two chips per second in daily production, according to Baird. Before the Sight-I, GM used a human operator to visually determine the location of the chip, inspect for any defects and manipulate a set of electrical test probes over the base and emitter areas of the chip.

Using the digitized data from the camera, the computer is programmed

to work through a sequence of image enhancement operations to silhouette the part and emphasize its outline.

The intensity of the squares along the edges of the object is intensified. Then the data is smoothed by erasing the false edges caused by irregularities in the background and by inserting more edges along the object boundaries.

Further operations ensure that the boundaries of all the objects are closed and that any holes inside the connected parts are filled. From the well-defined outline, the computer can calculate the position and orientation of the object on the conveyor belt, Baird said.

During the inspection process, the chip assembly itself is not moved; instead, an electrical test probe mechanism is rotated into the proper position, based on information received by the camera. A "relational template matching" approach is used for location determination and a contrast detection scheme performs the inspection task.

A set of computer programs then performs the vision task in five steps. First, the object is digitized to obtain a 50 by 50 image of the assembly. The program then determines the approximate location of the chip on the heat sink through gradient direction analysis. Possible corners of the chip in the image are located.

The computer then determines the actual four corners of the chip; finally, inspection for chip integrity is done by looking for uniform contrast around the chip edges.

The automated system has increased chip quality and throughput, Baird said. The time and costs required to develop a workable system were kept within the limits set in 1974, when the project was started, he added.

The Sight-I inspection system was developed cooperatively by the General Motors Research Laboratories, GM Manufacturing Development and GM's Delco Electronics Division here in Kokomo.

Presenting the most dynamic business Opportunity since the Big Mac.™

A National ComputerLand Retail Franchise

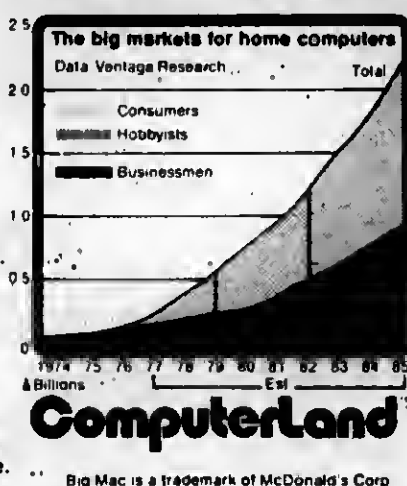
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising. And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



Mail to: E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW
San Leandro, CA 94577 (415) 895-9363

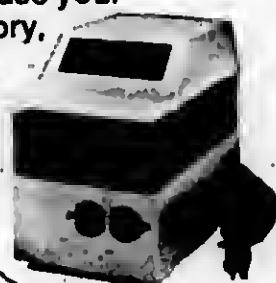
Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

IS YOUR COMPUTER ON A PARTY LINE?

Other equipment in your facility can cause your computer to make errors, lose its memory, wipe out a program, or stop operating.

The Topaz line 2 power line conditioner:

- Regulates incoming voltage
- Removes lightning spikes
- Removes equipment transients caused by air conditioners, elevators, X-ray equipment, office machines or factory equipment.



TOPAZ
line2

Now you can have clean, noise-free, regulated power without the expense and delay of installing an independent power source. The Topaz line 2 is a completely self-contained, portable line voltage regulator and Ultra-Isolation Transformer. Simply plug it into any 120 volt outlet, then plug your equipment into the line 2. It costs less than a "dedicated" power line and does so much more.

If you've been having random problems with your computer or electronic cash register, or are about to install one, find out how the Topaz line 2 can protect your equipment and provide the clean power you need. Send for our brochure or call today.

TOPAZ SOLUTIONS TO POWER PROBLEMS
ELECTRONICS

3855 Rutin Road, San Diego, California 92123—(714) 279-0831—TWX (910) 335-1526

DP Helps Test Engineers In Concorde Certification

LONDON — The British Aircraft Corp. (BAC), builder of the Concorde supersonic transport, used a computer to bring the Concorde through its certification program and qualify it as air-worthy.

According to a BAC spokesman, the system monitored more than 3,500 instruments that measured such variables as pressure, temperature and stress during test flights.

An ICL, Inc. 1904 analyzed data amounting to several million characters per test flight and converted it to actual measurements for use by test engineers, the spokesman explained.

The 1904 replaced an IBM 370-based system that used a GEC 9030 computer for ground replay and basic data analysis. The original system was set up to handle the comparatively low volume of flying planned for the Concorde.

However, it proved to be inadequate

to bring the aircraft through the certification program on schedule, the spokesman explained.

The present system includes 128,000 words of core storage, 18 interchangeable 30M-character disks, two disk controllers, six 160,000- and two 60,000 char./sec magnetic tape drives, several printers, card and paper tape readers, two on-line graph plotters and three teletypewriter terminals.

The system usually processed six to eight jobs concurrently with programs varying in size from 5,000 to 100,000 words. The computer operates under the George III operating system, which provides control of both batch and on-line jobs with little operator intervention, the spokesman noted.

Two teletypewriter terminals are used on-line for program development and maintenance while a third maintains the aircraft's instrumentation schedule, he said.

Result in Hasty Decisions

Vendor Ploys Can Trap Users, Report Warns

By Brad Schultz
CW Staff

WINTER PARK, Fla. — Vendors often trick users into buying more equipment than warranted and unknowingly committing themselves to future concessions.

Marketing personnel book a lot of business without having to negotiate contracts; they use "price protection" or "price increase coming" ploys that trick users into overbuying before the price rise hits, according to Issue 5 of the *Computer Negotiations Report* (CNReport).

Vendor representatives inform prospects that a price

rise is coming and suggest that equipment needs for the next year or two be anticipated and the material ordered now, the report said.

The pitch can be strengthened by convincing users that this anticipatory approach ensures higher priority on the vendor's production and delivery schedules, the report said, adding that vendors can assuage user hesitancy by noting that the price-protective agreements can be cancelled at any time — or within 90 days.

Many users are convinced by this "price protection" ploy and buy a variety of superfluous items — most frequently

peripherals, additional core memory and upgrade configurations — and some even contract for an entire new system, CNReport continued.

"The user frequently signs the price protection contract without any serious negotiations over price or terms. In most cases, the user simply signs the vendor's standard form agreement, without additions or deletions. Needless to say, the user leaves important legal, financial and substantive concessions lying on the table," the report said.

For example, it said, the user often ends up with a high-cost

rental agreement when a third-party lease is preferable.

Incomplete Review

The contract often is not properly reviewed by user senior management, with disastrous results if the transaction "blows up" or is learned about indirectly by a board member at a later date, the report indicated.

Cancelling the contract may be much more difficult than implementing it, the report warned, adding that the contract may not even mention cancellation or require the vendor to permit it.

Moreover, "if the user decides to change vendors or take other action against the incumbent vendor, the latter may resurrect the price protection contract and threaten to enforce it."

The price protection gambit

is generally used when user and vendor are not negotiating on some other transaction. The related "price increase coming" ploy is often used when negotiations are in progress, according to the report.

This entails rushing the user into overbuying while effectively ignoring considerations other than the impending price hike. Typically, a vendor marketing representative tells the user the hike can be avoided if the contract is signed by a certain imminent date; in a panic, the user signs without pursuing other points of greater value.

CNReport recommends that users follow two rules in resisting these ploys: "never sign a 'price protection contract' without full review, approval and negotiations" and "do not be rushed into acquiring ... when the vendor seems to be dangling a carrot."

Trade Bank System Lets Members Barter for Products and Services

By Tim Scannell
CW Staff

SCOTTSDALE, Ariz. — An idea born 12 years ago when L. David Fox decided to trade draperies for needed dental work has evolved into an association of more than 300 business members with transactions totaling upwards of \$1 million annually.

Fox created a computerized trade bank whose members can barter among themselves for products and services without having to exchange money. Members of the National Businessman's Association, Inc. (NBA) are issued their own trade credit checking accounts, which include check blanks and deposit slips, and are then given an account number, Fox said.

After that, transactions are carried out among members, through the NBA. The system's operation is not unlike that of an ordinary bank except for the absence of money, he explained.

The basic principle of the NBA, that of conserving money, was one of the main

reasons for its initial acceptance and growth, Fox noted.

"A lot of people like to trade and anytime a merchant can trade what he has for what he wants, it conserves his cash. It seems that most people today are long on products but short on money. If they take their product or service and use that as their medium of exchange then they don't have to have money, really," he explained.

Transactions in what he calls the "NBA barter-bank" are accomplished this way, he said. "Member A goes to Member B and, let's say, buys a set of tires from him. Well, he pays him whatever his retail price is but he writes him a trade credit check for it."

"Member B then fills out a deposit slip ... mails it in for deposit (to the NBA) and the computer credits Member B's account and debits Member A's. Member B then has these trade credits in his account that he can then spend with any of the other members in the entire association," Fox stated.

Currently, the NBA con-

tracts for computer services from a local business that also happens to be a member of the association, Fox said. Its installation uses a Prime Computer, Inc. 300 system with 64K of memory and a 12M-word storage capacity, a spokesman for the firm said.

As with any business or venture, the Internal Revenue Service (IRS) must be notified about income of any sort, a representative of the IRS said. "As a general rule, in instances where no money changes hands or there is only a partial exchange of money, the measure is the fair market value of what you receive over what you give up," any excess being taxable income, she explained.

The NBA does not accept the responsibility of reporting a member's income to the IRS, Fox said. It does send each member a monthly statement which includes such information as from whom he purchased, the date, check number, firm name and amount of purchase as well as

(Continued on Page 12)

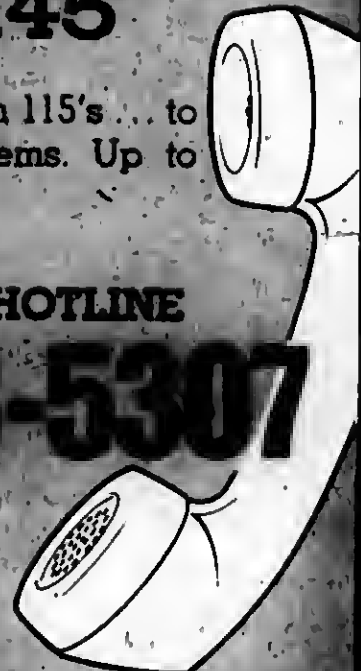
Short or Long Term Leases From RANDOLPH

370/138
370/148
370/135
370/145

... and all other 370's from 115's ... to 168's. CPU's or full systems. Up to 8-year lease available.

CALL THE 370 HOTLINE

800-243-5307



WANTED:

3420 Tapes: MOD 3's, 5's, 7's
135/145 Subleases or purchase

800-243-5308

Randolph Computer Company
537 Broadview Rd., Greenwich, CT 06830
(203) 881-4222

#2 IN DEC
WE'RE 2 IN DEC

MONTH to MONTH LEASES!

(3 MONTH MINIMUM)

11/45, 11/40, 11/05, 8e

•CPUs •PERIPHERALS •MEMORY
•CENTRONICS PRINTERS

WINTER '78

CATALOG

84 PAGES

Send \$1 for

1st class post/handling
DEPT CW-2

AMERICAN USED COMPUTER

P.O. BOX 68, KENMORE STATION
BOSTON, MASSACHUSETTS 02215

• 617-261-1100

Creates Too Much Waste

MIS Called 'Disease' of Centralized Systems

By Esther Surden

CW Staff

ANAHEIM, Calif. — Centralized systems suffer from management information systems (MIS), a "management disease" whose symptoms are voluminous planning reports, much wasted management time, millions of dollars down the drain and eventual disillusionment of users, according to Jacob Sternberg, president of Conversational Systems Corp.

Speaking about distributed processing at a recent conference here, Sternberg continued to say that most centralized DP departments as they stand today cannot implement local systems well.

The DP establishment "no matter how competent," is removed from the business structure of the company. In

contrast, the distributed structure satisfies local needs, he said.

Local systems are often designed by a Ph.D. sitting in an office far removed from the local operation who learned applications from a book and then generated those applications centrally.

Or else, the local unit requests certain reports from the central department. The central DP area then requests the user to prepare a detailed functions specification, which Sternberg described as a contract between the user and the implementer.

The DP department needs

this because every new system put on the large CPU must be checked for its impact on every other procedure and application on the system.

The result of all this checking, however, is a large backlog, long delays for the user and high costs, he said.

Further, the packages that result from this procedure are often generalized to accommodate all eventualities. Generalized packages can be equated to homogenized milk, Sternberg asserted; "you don't get the cream." The packages cannot account for local diverse needs.

With local implementation

of systems, however, planning can be simplified, he said. Applications only have local impact, so users can "try and fail and not affect the business."

The remote areas do need some central coordination, he acknowledged. Standards for the transmission of data to the central site, for example, could be developed by the central site, he said.

The other function of the central site is to monitor adherence to its standards. Standards provide uniformity across all systems, eliminate a lot of documentation, and make unnecessary a lot of the meetings between designers

and users that now take place.

Distributed systems could be implemented more easily through use of what Sternberg called plug-to-plug compatible software. Comparing software used in distributed systems to plug-compatible peripherals, he noted that the peripherals had two requirements — they had to adhere to a standard and they had to be pluggable without modification. So software that adheres to the standards set by the user can be plugged in and out of a software system to develop applications in a building block manner, he explained.

Storage Media Sold Via Direct Mail

By Joseph V. Popolo

Special to CW

The advent of the low-cost computer has left the minicomputer manufacturer faced with the problem of servicing what is dubbed the "after market."

Servicing implies two roles — equipment repair and providing supplies and media. The first role has been well addressed but up to a year ago, manufacturers chose not to become suppliers of media

and consumables. With customers investing \$100,000 and up in hardware and software, media dollars seemed insignificant.

But the installation of small computers has increased as system prices have decreased and the supply market has changed accordingly.

A survey of mini users conducted by *Modern Data* earlier this year determined the typical user spent \$500 to \$1,500 on all his consumable supplies and media each year. Because of this low figure, using the salesman who sells the hardware to sell the follow-up products is not economical.

Many manufacturers simply marked up products four or five times their normal market price to discourage sales without appearing to indicate they weren't supporting their customers.

One of the few manufacturers attempting to meet changing customer needs is Digital Equipment Corp.

With an estimated 50% of the installed U.S. minicomputer base, DEC has a captive built-in starting market for its media products. Instead of leaving the market to business and office supply companies, DEC decided to reach users through the direct mail approach.

Having a single source for products such as disk cartridges, floppy disks, cassettes, binders, ribbon and paper is a definite plus for the user. The customer can expect to be adequately serviced by a direct mail firm which can provide the variety of products he needs and at the same time give him quick delivery.

DEC apparently believes in the success of its new distribution method since it has already put out two additional catalogs.

There are several regional firms, one on the West Coast and another in Connecticut,

using the direct mail approach for mini users. There are other firms selling nationwide, but only to large computer users.

But the users will be exposed to some hazards in the direct mail approach. This is especially true with magnetic media products. Many manufacturers place their own labels on magnetic tape, cassettes and flexible disks even though they come from a variety of sources.

This is not the only area the user will have to guard against. Hassling with a direct

mail firm, be it erroneous billing or a leaderless cassette from a guaranteed compatible Brand "X" supplier, the user will face some headaches. It is probably best to stick with name brand products, pay the differential and save lots of problems. The relative differential between a \$16 top-of-the-line name brand magnetic tape and a \$10.95 special is worth a lot more in potential loss of data records.

Popolo is president of *Misco, Inc.*, a minicomputer supplies company.

CDP Exam Course Set

PHILADELPHIA — A refresher course for candidates planning to take this year's examination for the Certificate in Data Processing (CDP) will be offered here on six consecutive Saturdays.

Sponsored by the Data Processing Management Association (DPMA) chapter here, classes will be held each Saturday from Jan. 7 until Feb. 11.

The fee is \$50 for members of any DPMA chapter or other organization in the Institute for the Certification of Computer Professionals. Non-members will be charged \$50.

Applications should be returned by Dec. 31 to William R. Patterson, CDP Refresher Course, Philadelphia Chapter, DPMA, P.O. Box 2177, Philadelphia, Pa. 19103.

System Bypasses Cash

(Continued from Page 11)

what, if anything, was purchased from him.

The NBA, having recently celebrated its second anniversary, is still very young, Fox noted. Its membership includes doctors, dentists, accountants, certified public accountants, restaurateurs, clothing and toy merchants and contractors. There is even a veterinarian and a vasectomy center included in the association "... so you can get your cat spayed or your husband fixed," Fox said.

The NBA also offers such group benefits as legal counseling, group insurance, seminars, a directory and a monthly newsletter, Fox claimed.

Besides promoting a sort of camaraderie among its members, the NBA also stimulates business, Fox noted. If a member wants to buy a suit of clothes, he will more than likely do business with a fellow member even if that means traveling across town to do it, he said.

Membership in the NBA costs \$136 with the member receiving \$100 in trade credits. Semiannual dues are then \$36 and the NBA makes a 10% service charge on transactions — 3% on the trade credit portion and 7% on the cash portion, Fox continued.

Fox hopes to establish NBA branches in Dallas, Houston, Oklahoma City, Denver and Salt Lake City, he said.

OFF-THE-SHELF

Data General

microNOVA

Computers and Systems

Memories and Interface Boards

OASHER Printer and

CRT Terminals

The Computer Store has immediate delivery of entire systems, components and OASHER terminals.

the Computer Store, Inc.

120 Cambridge St.

Burlington, MA 01803

(617) 272-8770

63 S. Main Street

Windsor Locks, CT 06096

(203) 627-0188

Franchise Opportunities Available

ACQUISITION WANTED

Boston-based computer terminal lease/service Company would like to acquire Sales-oriented company with Fortune 1000 customer base. Our strong suits are administrative and financial expertise, plus excess cash flow from operations and lines of credit. Qualified organizations are invited to participate in our explosive growth — We double revenues every two years, and earn 10%+ profits. Contact PHILLIP K. CIOLFI, Pres.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300

DG Eclipse, Nova Word Processing?

Not quite, but would a text formatter solve your documentation bottleneck? Using simple format instructions imbedded in a source text file created by the standard DG editors, or any other method, DORIS produces an attractive upper and lower case document, letter or report. Features such as page numbering, title centering, margin adjustment, page headings, columnization and right-hand justification are just some of the capabilities of DORIS.

Contact David N. Langley

FINNING

FINNING COMPUTER SERVICES LTD.

555 Great Northern Way, Vancouver, B.C., V5T 1E2, (604) 872-7474.

DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals



Libbey-Owens-Ford Manages Rapid Changes with DL/1

"Our product now is technically more sophisticated and highly individualized, requiring many more stages of production. The part number count has zoomed from 400 to 8,000 and we're adding 200 new items a year."

The product is automotive glass. The speaker is Robert Whittington, executive director of management information systems for Libbey-Owens-Ford. He is describing why LOF turned to Data Language/1 (DL/1) for data base management on its IBM System/370 Model 158 at Toledo, Ohio. To control a network of IBM 3277 Display Stations, which handle online transactions from the factory floor and throughout the plant, LOF uses the Customer Information Control System/Virtual Storage (CICS/VS).

"We're constantly called upon for more variations of the product," Whittington notes, "such as embedded antennas or defrosting elements, tinted glass, edge bands and etched designs. In addition, production and delivery must be precise because our customers don't carry inventory. We ship directly to their assembly plants and must accept order changes up to the last minute."

"All this means constant rework of

our Production Information System," Whittington adds. "Before we had DL/1, a little thing like changing from seven- to eight-digit part numbers would require extensive reprogramming. Because DL/1 protects the program from any changes in data structure, we have complete device and data independence. Now we can direct the computer to track an entire new sequence of production stages simply by making an entry in our DL/1 data base. And the creation of data entry editing routines to catch errors is simplified."

"Through inquiry into the DL/1 data base, management and production control people can obtain a better picture of what's happening on the plant floor. The scheduling department can spot potential trouble before production is seriously affected and we consistently achieve better schedule compliance. Now we handle increased product complexity and volume without adding people to the scheduling department."

"We can readily apply the data base developed under DL/1 to such management functions as budgeting, cost control, and financial planning. But most important, we do more than cope with changes. We're able to manage them."

This heat-treating machine, called an autoclave, bonds auto windshield laminations. DL/1 helps Libbey-Owens-Ford control production to meet demand for a fast-growing list of part numbers.

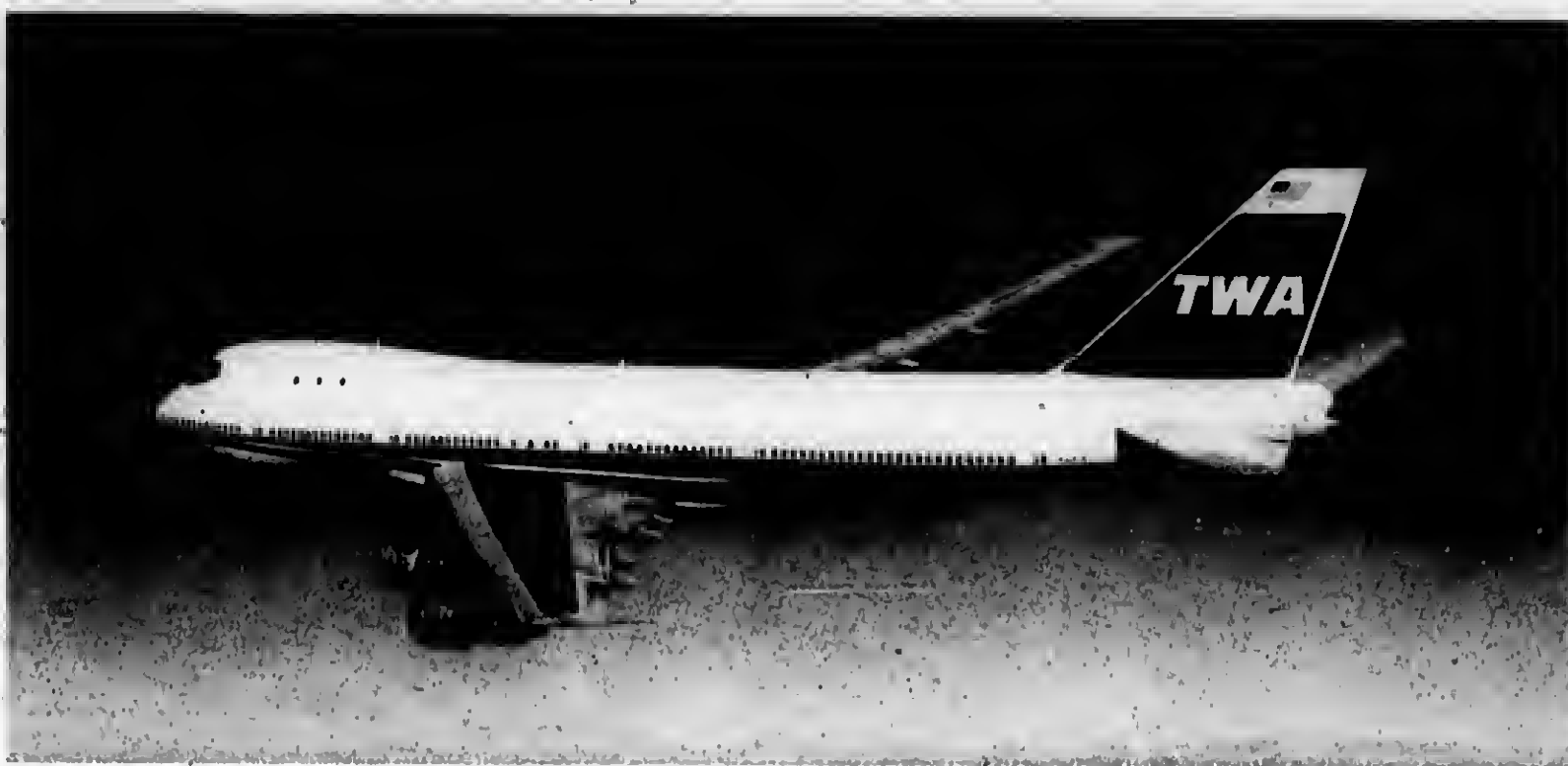
TWA Computes \$24 Million Yearly Fuel Saving

An IBM computer is helping Trans World Airlines conserve more than 70 million gallons of precious fuel a year. At current prices this means a yearly saving of \$24 million. Key to achieving this are an online flight planning system and a preferential fueling program.

With online flight planning, information on aircraft performance and routes is stored in the computer. The system analyzes payload, fuel requirements, allowable takeoff weight, flight time, weather and up to five different altitudes. The system then displays fuel consumption, flight time and operating cost for every possible route/altitude combination. The system also determines power settings for climb, cruise and descent.

A dispatcher reviews the alternatives and recommends the optimum least-cost route and altitude to the flight captain. The flight plan can be revised at the last minute should the weather or other conditions change.

"Manually calculating the best flight plan once took hours," says Roger R. Fischer, staff vice president, application development and maintenance for Trans World Airlines. "Our System/370 Model 168, located in Kansas City, Missouri, does it in seconds, with accuracy unobtainable any other way. And we plot over 1,500 flight plans a day for Trans World



An IBM computer, which plots over 1,500 flight plans a day, helps Trans World Airlines conserve more than 70 million gallons of fuel yearly.

Airlines' worldwide operations."

Preferential fueling helps TWA allow for wide variations in fuel costs at different points. The program helps TWA find the least-cost location to take on fuel along the route. Even though it takes

fuel to carry fuel, the computer will show if it pays to carry enough to avoid refueling at stops where costs are high.

"We've adopted other economy measures, such as flying at higher altitudes, flying slightly slower and taxiing

on fewer engines," Fischer points out. "But the computer has been a big factor in our economy drive. With fuel bills running over \$380 million a year, both the dollars and the precious fuel saved have been vital to us."

Editorial

Too Late Now

Having watched its highly promoted Consumer Communications Reform Act become caught in the gears of congressional machinery, the telephone industry has opened its second front.

This latest offensive comes from an industry task force that diligently formulated four proposals [CW, Dec. 12] that would uproot basic network configurations and undoubtedly raise costs to these users.

It is ironic that consumers were hard-pressed to identify with the noncompetitive concepts of the earlier "Consumer" Act, but are not directly affected by an industry proposal that makes no mention of them.

By recommending an industry structure that would eliminate private line service competition, that would do away with foreign exchange (FX) lines and that would eliminate Common Control Switching Arrangements (CCSA), AT&T and its allies have hit the user right in his wallet.

As one source stated, the data user has benefited directly from the churning caused by competitive services and equipment. The industry task force would cut off any real competition for all but point-to-point and tandem tie line facilities.

According to one interpretation, the latest framework would require any competitors that could manage to carve out a permissible niche to price their services under fully allocated (high) costs. At the same time, the existing phone companies would provide similar service under incremental (low) cost principals. The net effect would be the death of the competing carriers.

The proposal would also do away with the value-added carriers,

such as Telenet, which provide network services specifically for data users. Although members of the task force have said they do not intend to wipe out the value-added carriers, no amendment to the original four-point proposal has been made.

In fact, it appears the announcement of the task force proposal was carefully controlled so that pro-carrier segments of the trade press would first have their chance to present it in the most favorable light.

Despite the repeated assurances from AT&T Chairman John deButts that AT&T and its partners really want to get along with the competing carriers, there is little compromise in the latest proposal.

Perhaps AT&T should have looked at the record before it convened a puppet task force to turn back the clock. FX, CCSA and private line services were the brainchild of the existing carriers. But now that revenue is being impacted by the specialized carriers, it apparently feels it is time to shut off these services for everyone — including the user.

The Federal Communications Commission has rejected all the anticompetitive arguments; the courts all the way up to the Supreme Court have turned a deaf ear. There is little question that users will raise an outcry against the anticompetitive attempts.

The truth is that the telephone company is not willing to share the user's dollars with anyone.

It is time the telephone company paid a little more attention to providing better services to users and forgot this continuing futile attempt. Nobody is listening anymore; it is too late.

Data Past

Five Years Ago

Dec. 27, 1972-Jan. 3, 1973

NEW YORK — An internal IBM memo was uncovered that said an "intensive investigation" of IBM's pricing policies "would reveal the extent of price control and its supporting practices" in the computer market. "Such a revelation would not be helpful to IBM's monopoly defense," the memo stated. The document was one of 27 million filed in the various antitrust cases against the company.

BOSTON — The Massachusetts Privacy and Security Council was formed to oversee privacy considerations in police information systems. The council, made up of lawyers and "interested citizens" rather than users of computer-based criminal justice systems, was to consider whether the state's police agencies should tie into the FBI's Computerized Criminal History system.

Eight Years Ago

Dec. 31, 1969-Jan. 7, 1970

NEW YORK — The shakeout of the time-sharing business continued as ITT Data Services closed its computer facilities in Princeton, N.J., and at Broad St. in New York.

WASHINGTON, D.C. — Rep. Jackson E. Betts of Ohio warned that "individual dossiers on 33 million Americans would be prepared and housed in federal computers" if two proposed data banks were approved by Congress. The data banks were to be "integral but little-noticed parts of the Family Assistance Act of 1969 and the Manpower Training Act of 1969, in formative stages of consideration by House and Senate committees," according to Betts, who charged "there is no provision in either bill to protect the privacy of citizens whose personal histories will be in the dossier centers."



"Sorry We Can't Negotiate a Settlement of the Antitrust Suit — All Our People Are Tied Up Prosecuting It."

Letters to the Editor

Multiple Encryption

Even if Martin Hellman's contentions concerning the Data Encryption Standard (DES) are correct and the National Bureau of Standards' contentions concerning the impossibility of building Hellman's brute force code-breaking machine are incorrect ["Federal Encryption System Hit as Vulnerable," CW, Dec. 5], the very existence of an inexpensive device with the capability of the DES part would appear to me to offer a simple method of generating unbreakable code. At the prices quoted in the article, anyone who can afford encryption equipment can afford to use multiple encryption.

My Hewlett-Packard HP-21 calculator supports Hellman's statement that his hypothetical deciphering machine could try each of the 2^{56} possible key combinations in just under 21 hours of continuous operation.

However, if the data to be encrypted were run through two successive DES devices, each using a different code key string, then the number of possible combinations rises to 2^{112} , and the same hypothetical machine would require a continuous run of 1.645×10^{16} years to try all of the possible code key lists.

By carrying this idea through four more steps, (or running the data through six successive DES devices), the number of possible key combinations grows to something in excess of the range of my calculator — i.e., more than 9.99×10^{30} possible codes.

In addition, this method would probably negate the effects of any "rigging" of the basic algorithm by the National Security Agency.

I read *The Code Breakers* several years ago and no longer have a

copy, but I seem to remember that the only system rated as completely secure by the experts is multiple machine encryption with frequent (daily, for example) code key changes. The availability of an inexpensive DES-based part would seem to make this an easily achievable goal.

C.J. Morrell

Steilacoom, Wash.

Educators, Not Hucksters

I have difficulty accepting the guilt by association proffered by Mort Burdman ["End the Effluvia," CW, Nov. 14] and other CW letter writers.

Certainly there are those in this field who aim to profit financially by beating the drum of licensing/certification, etc., but I take exception to the view that those of us who run courses for candidates for the Certificate in Data Processing (CDP) are "hucksters."

I am coordinating an effort by the Philadelphia Chapter of the Data Processing Management Association (DPMA) to sponsor a refresher course for candidates for the CDP. I expect to teach for no more than one-sixth of the 36-hour course and will receive no more than the standard classroom-hour rate we pay all our instructors. If there is a profit in this course, it will revert to the chapter, not to me, to be used for professional programs.

I wish to disassociate our course from those who would drum up controversy for their own personal financial profit (Ken Lord runs a company that provides practice exams, etc.) but I also wish it not to be attacked by those who care to remain ignorant.

William R. Patterson

DPMA
Philadelphia, Pa.

Visit to ProgaMan

How Well Will Robot Programmers Do?

By Jack Stone
Special to CW

Unimate, Versatran, Millcron, Prab... these are the newest trade names to be added to the ever-growing roster of computer-based products. If they seem unfamiliar to you, it's because they refer to a class of very special-purpose machines called "industrial robots."

Jerry Knight of the Washington Post recently wrote an interesting article about these devices. In answer to the question "What is a robot?", he quoted Joseph Engelberger, first president of the Robot Institute of America, as saying, "I don't know how to define a robot but I know one when I see one."

He further noted AMF, Inc.'s claim that its "Versatran Series F—the world's strongest robot—could easily pass for an oversized, deformed drill press, dragging its hydraulic heart and an electronic brain behind it." He went on to say that a Unimation spokesman defined robots as "self-contained, computer-directed machines with memories capable of performing human functions."

To program the machine, "a skilled operator directs it through the desired task, manually moving the robot's arm and hand through the motion while feedback devices

record every motion in the robot's computer brain. Flip a switch from 'teach' to 'run' and the robot repeats precisely the movement it has been shown...."

... My friend Lamia Shaitan phoned me late one evening last week. She is a programmer/analyst and amateur inventor. I place her in the "amateur" category because she has yet to succeed in bringing a product to market.

"Hey, man!" she ranted. "Hurry on down here. I've got it! I've finally hit it! I have developed THE answer to the programmer productivity problem."

"None of that targeted 10% improvement stuff from structured this-and-that. I've got the real McCoy—total performance at all times! And no worries for the DP manager about bruised egos, weird working hours and acid rock Musak. It's all resolved!"

I sensed a potential follow-up for my column dealing with automation in the computer center [CW, Oct. 31] but was taken aback by lurid streaks of lightning running through overcast skies as I drove to her Georgetown mansion. I also noticed what seemed to be a tall, outside antenna though I had no memory of Lammy being a ham radio freak.

She ushered me into the garret. "Voilà!" she preened, pointing to a metal table on which there was an

object about eight feet long and two feet wide. "Let me demonstrate ProgaMan!"

I was startled as she opened the skylight, pushed me against a wall and threw a knife switch. A flash of light swept across the room, accompanied by a sharp boom. She twist-

The Human Connection

ed the knob on a small black box, waited for a green light to show, then twisted the knob again.

I noted that the knob was set to "RUN: Cobol Code; Start 9 a.m."

The cloth rippled. Two claw-like hands came out from under the covering and began to fold it back. What appeared to be some kind of synthetic human (bearing a faint resemblance to some people I've met) sat up, made a yawning movement and then scratched its backside.

The head was squarish and was wearing a dark brown hairpiece and a long, scraggly beard. It was dressed in a drooping tan sweater, faded baggy blue jeans and worn-out sneakers. There was a jagged scar on its forehead and two shiny steel knobs protruded from either side of the neck.

PMan appeared awkward as it struggled to its feet and rambled over to a desk. It opened a Cobol reference manual, pulled out flowchart and coding pads, sharpened a pencil, posted a sign saying "out for coffee—back in 5 min." and sauntered into the kitchen.

It returned about a half hour later, picked up the telephone, dialed a number and yelled, "Wake up, you guys down there! Where the blazes is my output? Don't you ever do anything right?"

Then PMan picked up a notebook titled "Systems Feasibility Study" and began to read it. I'm certain I heard it mutter, "I can't believe it! Another crazy user! This one wants the company's New Year's party fund accounting on-line!"

It then looked at its wrist as if checking the time and remarked, "Geez! 11 o'clock already. Better leave for lunch now to get ahead of the crowd. Maybe I'll do some New Year's shopping afterwards." It then started for the door.

Lammy quickly turned the switch to "SKIP 5 HOURS, THEN RUN." ProgaMan turned around, set down some make-believe packages, stepped over to the desk, grabbed a pencil, coded 11 MOVE statements during the next minute, and exclaimed, "Yessirree! Ten lines a day keeps the big boss away!"

HAPPY NEW YEAR!!

Unsubstantiated Output

Saks Billing System May Violate ICCP Code

A reader, Gerald Clarke, recently forwarded to me a balance statement he received from Saks Fifth Avenue. It contains an error that leads me to question the validity of the systems design of Saks' billing procedure.

Saks Fifth Avenue has a group of computer-flagged accounts called H3s. These are accounts that do not have the true account balance within the computer system at all. They arise particularly when merchandise is returned and credited, but the account then remains inactive. Under these circumstances, the credit is placed in some archives outside the system, and the computer flag, together with the minimum of information about the account holder, are all that is maintained within the system.

These accounts undergo no further activity (except for name and address changes) until some transactions reactivate them. Then out comes a bill like the one illustrated. This shows the new activity, prepares a balance line and prints everything. However, mailing is not automatic; the H3 stops it

and instead the bill is sent to research. In the case of Gerald Clarke, it was subsequently mailed to him, unaltered.

Sending the item to research, however, does not stop further processing. Statements come out, claiming that the person concerned owes all the current transactions but failing to give him credit for the true balance of his account still in the archives.

All of this brings us firmly up against the Institute for the Certification of Computer Professionals' (ICCP) Code of Conduct for holders of the Certificate in Data Processing (CDP). Saks insisted to me that what happened to Clarke does not indicate that there is anything wrong with its computer system design, but I think it does.

ICCP Code

The ICCP code, which applies to people who have been certified for systems design as well as for other specific subjects, requires that a CDP holder give a "conclusion on a subject in his field only when it can be demonstrated that it has been founded on adequate knowledge." Now, I know of no more formal statement of a "conclusion" than the systems design itself. Therefore, I regard any entry on the printed output that cannot "be demonstrated [to have] been founded on adequate knowledge" as a direct infringement of ICCP 2.2.

Now, looking again at the bill Saks put out, the key entry that no one even claims is "founded on adequate knowledge" is the fictitious entry "Previous Balance ..\$0.00."

The H3 system flag—printed above top left—indicates that the "previous balance" was some undesignated amount owed to Clarke.

(Continued on Page 16)

The Taylor Report

By Alan Taylor
CDP

Saks Fifth Avenue
811 FIFTH AVENUE, NEW YORK, N. Y. 10022

1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890

REGULAR ACCOUNT TERMS
FULL PAYMENT OF NEW BALANCE IS DUE UPON RECEIPT OF STATEMENT.
OPTION ACCOUNT TERMS:
YOU WILL AVOID ADDITIONAL FINANCE CHARGE IF YOU RECEIVE PAYMENT OF THE NEW BALANCE IN FULL AT THE ADDRESS APPEARING ON THE ENCLOSED RETURN. ANY LATE BEFORE THE NEXT BILLING DATE SHOWN BELOW PAYMENTS RECEIVED BY US AT ANY OTHER LOCATION MAY BE SUBJECT TO A DELAY OF UP TO 5 DAYS IN CREDITING YOUR ACCOUNT.

IF YOU CHOOSE TO MAKE A PARTIAL PAYMENT (NOT LESS THAN THE MINIMUM PAYMENT DUE AS SHOWN ABOVE), A FINANCE CHARGE WILL BE ADDED. COMPUTED PER THE SCHEDULE SHOWN ON THE PREVIOUS BALANCE AFTER DEDUCTING PAYMENTS, CREDITS, AND ANY REFUNDING ACCUMULATED FINANCE CHARGES. PAYMENTS ARE FIRST ALLOCATED TO ACCUMULATED FINANCE CHARGES. IF A FINANCE CHARGE IS SHOWN BELOW IT WAS COMPUTED IN THE SAME MANNER YOU MAY AT ANY TIME PAY YOUR TOTAL DEDUCTIBLES OR ANY PART THEREOF.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT

CHARGES	CREDITS	PAYMENTS
48.37		
0.00		

CHARGING DATE: 11/05/77
PREVIOUS BALANCE: 7.00
PAYMENTS & CREDITS: 7.00
BALANCE DUE: 0.00
FINANCE CHARGE: 0.00
OPTION ACCOUNT: 0.00
CHARGES: 0.00
NEW BALANCE: 0.00

TO ORDER MERCHANDISE OR FOR SERVICE, SEE REVERSE SIDE FOR ALL STORE LOCATIONS AND TELEPHONE NUMBERS.

OPTION ACCOUNT: SCHEDULE OF FINANCE CHARGES
FINANCE CHARGE: 18%
ANNUAL PERCENTAGE RATE: 18%

The bill above shows the output when an H3 account is processed.

Saks Procedure OK?

1. The Saks System creates a fictitious "prior balance." Is it correct to do this

(a) At all? ☐ Yes ☐ No

(b) For internal purposes to help research? ☐ Yes ☐ No

(c) For outside distribution? ☐ Yes ☐ No

(d) For carrying forward to the next statement? ☐ Yes ☐ No

Comments _____

2. Taylor equates a system's authorized output with the system designer's formal conclusions and says they are, therefore, subject to professional codes.

Do you agree? ☐ Yes ☐ Only Partly ☐ No

Comments _____

3. Does your professional society, or professional certification, have any codes equivalent to ICCP 2.2?

☐ Yes ☐ No ☐ Don't Know

Organizations concerned _____

Name _____

Professional Position _____

Street Address _____

Town/State/Zip _____

Please return the completed form to Alan Taylor, c/o Computerworld, 797 Washington St., Newton, Mass. 02160. Thank you.

System Violates Code of Conduct

(Continued from Page 15)

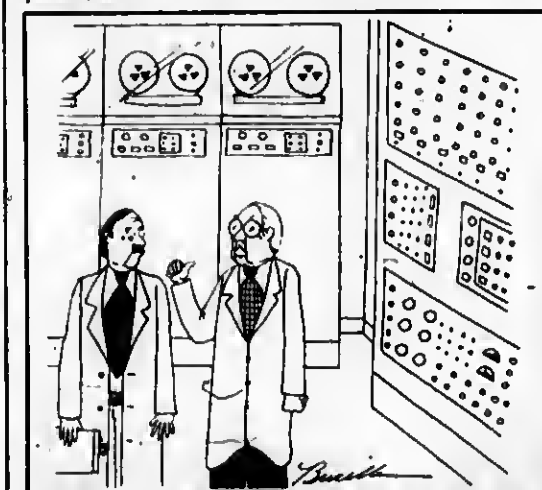
So, the \$0.00 entry, created probably by an initialization routine, not only fails the test of "being able to be demonstrated [to] have been founded on adequate knowledge" but is also directly contra-indicated by the information in the record.

The correct entry in such a case would have been "unknown." This should have been printed in both the "Previous Balance" and "New Balance" fields at the bottom of the invoice and also in the top right-hand entry under "Regular Account Cycle 2." Certainly there is no adequate knowledge that a \$57.00 payment is "Due" — because that springs from the grossly wrong assertion the prior balance was zero.

Now I don't know if the systems design was ever signed off by a CDP, in the way that a set of architectural blueprints are signed off by a certified architect. I don't even know if it was signed off by a member of any of the other professional societies who have adopted similar codes of conduct. I don't know if it was signed off at all or whether Saks should be questioned about why it was running a system without professional sign-off, if in fact it was.

All these things are important in themselves but at the moment I simply want to stress that Saks created computer output both on a bill and on a statement where there simply was no "adequate knowledge" that could support it. I think it's wrong; Saks thinks it's OK; now it's your turn to speak. I look forward to your responses by letter or by answering the questionnaire.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.



'Just Our Luck . . . It's Into Transcendental Meditation.'

DON'T THROW THEM AWAY!!

We realize your first impulse will be drastic when you see our 700/UETS (Universal Emulating Terminal System) in action — but remember that other less demanding terminal users may have an application for your outdated machines. And why should you have so many different terminals when ONE UETS can do all the work — and do it better and more economically.

IF PARTING WITH OLD FRIENDS IS PAINFUL, JUST THINK WHAT THE UETS WILL DO FOR YOU.



- Communicate with numerous different host computers.
- Replace any number of different terminals with ONE machine, greatly reducing overall equipment expenditures.
- Reduce training time and enhance operator efficiency; no jumping from machine to machine and procedure to procedure.
- Reduce down time and maintenance complexity; you deal with only ONE service organization, and all spares are provided by ONE source.

No matter what your application, the MEGADATA UETS — with its 15-inch diagonal display, full-scale 12-bit microprocessor, and 126-station keyboard — will provide the right hardware plus the complete software to meet all your requirements TODAY and in the FUTURE.

Forget your old machines, and find out more about the programmable intelligent UETS terminal.

MEGADATA CORPORATION

35 Orville Drive • Bohemia, New York 11716 / Tel. 516-589-6800 • Telex 14-4659

Central Regional Office • 2200 E. Devon Avenue • Suite 217 • Des Plaines, Illinois 60018 • Tel. 312-296-1900
Western Regional Office • 15910 Ventura Boulevard • Suite 800 • Encino, California 91436 • Tel. 213-990-9777

SPEEDY automatically reblocks both tape and disk files during normal DOSVS processing. The end result is typically a 20-40% improvement in processing time and a 50-75% reduction in CPU overhead. Reblocking reduces the number of input/output operations and cuts down on supervisor overhead time. It also reduces disk arm movement which can be the most serious bottleneck in DOSVS multiprogramming.

■ 30 DAY FREE TRIAL ■
DATACHRON CORPORATION
174 Fifth Ave., New York, N.Y. 10010
(212) 377-8333

In Software/Services World Past Year Interesting But Not Dramatic

By Don Leavitt
CW Staff

Sometimes specific events give shape to a year; sometimes they don't. In the world of software and services, 1977 seems to have been one of the shapeless years.

That sounds far more negative than it should. The year was an interesting one, even if it didn't see any truly dramatic product announcements or widespread battles of users vs. vendors.

The "maturing of the marketplace" often seems like an over-used phrase, but it was appropriate for the 1977 software/services scene.

That showed up early in the year in connection with *Com-*

puterworld's special report on application packages. In past years CW received numerous articles describing, quite usefully, the detailed scoring system a user employed to evaluate various packages.

In '77, however, the stories focused on concerns (sometimes problems, but often just "the best way to...") that came into play after the package was selected.

User Selectivity

Other sources indicated a similar situation. Packages were apparently accepted as a logical way to get work up and running, but as a May headline on an

Auerbach survey put it, "Users Happy, Not Ecstatic With Packages." But they were using them.

And much the same sort of thing happened in connection with CW's October report on data base systems. Instead of a few pioneer-like stories, CW received so many manuscripts from "real live" users — and from those who finally rejected "data base" for their installations after studying the other options — that CW still hasn't run all of them.

The users' selectivity was reflected as well in the 1977 Datapro Software Honor Roll. Out of the hundreds of packages on the market, only 32 met the

strict but not overwhelming thresholds set by the researchers to earn a place on the honor roll.

Vendors showed equal restraint. Over the past year, the news releases CW received described enhancements or extensions to established packages.

In some cases, the package built for a large CPU was adapted to a smaller one. The financial application packages from Software International, for example, were converted to run on small Burroughs systems.

And the Fortran subroutine library from International Scientific and Mathematical Libraries now includes a subset for Data General users.

IBM itself began to recognize its small systems needed more software than it provided at first. In January, the company offered Fortran for the System 3; by March and April, both IBM and independent software firms were offering goodies for the Series/1.

Micros to Arrays

Microcomputer software showed up consistently during the year, most dramatically, perhaps, when the UK's CAP Microsoft introduced Microcobol in late February. National Semiconductor announced Nibl for its micros and Altair began offering business application packages for its unit in March.

At the other end of the scale, a package was introduced to help users of the Cray-1 and other array processors "vectorize" their Fortran problems.

That seems to complete the spectrum in terms of machine sizes. The planning currently under way for a "First World Computing Services Industry Conference," scheduled for Barcelona, Spain, next June and including both software and service company representatives, indicates the geographic scope of the user and the vendor ties that became evident in 1977.

'Pride-Logik' Adapted to General Use

CINCINNATI — Pride-Logik, a data and system dictionary package developed by M. Bryce & Associates, Inc. (MBA) for use with its Pride system design methodology, has been adapted by the vendor for more generalized use, a spokesman said.

The package enables a user working with any of several CPUs to show the logic behind "virtually all" of an organization's systems and data flows, taking into account people, places, documentation, files, records, systems and procedures, he said.

Pride-Logik provides cross-referencing, search techniques, design integrity analysis and redundancy checking. Display commands range from single component requests to requests for the entire set of stored components related to a given design effort, he claimed.

For forms and report control, Pride-Logik stores data used in both manual and automated systems. Its ability to trace data and logic flows and to identify all control reports designed into a system make the package useful

to internal and external auditors, MBA added.

Pride-Logik is said to be able to run on any CPU with an ANS Cobol compiler and direct access storage facility. Versions are currently operational on Honeywell, Burroughs and IBM mainframes,

requiring 40K words, 70K words and 128K bytes respectively.

The package costs \$20,000, which includes manuals, forms training and consulting in addition to the software. MBA is at 1248 Springfield Pike, Cincinnati, Ohio 45215.

SAS Users Set Meeting

LAS VEGAS — Leaders in the computer performance measurement and evaluation field will be among those presenting invited papers to the SAS Users Group meeting at Caesar's Palace here late next month.

SAS is a general-purpose data management, analysis and report writing system that is heavily used for reduction and analysis of computer performance data. Performance analyst Barry Merrill of Suntech, Inc. will detail the steps involved in using SAS to tune an IBM MVS environment.

Kenneth W. Kolence of the

Institute of Software Engineering will discuss the use of software physics in sizing workloads with SAS, while Mario Morino of Morino Associates, Inc. has chosen the topic "SAS: The Necessary Utility for Computer Performance and Control."

The conference, which will be held Jan. 30-Feb. 1, is sponsored by the SAS Users Group International.

The registration fee is \$40 per person (\$45 after Dec. 31); attendance is not limited to installations currently using SAS. The group can be reached at P.O. Box 10066, Raleigh, N.C. 27605.

But we need your help ... let us know where you are by filling out the coupon below and mailing it off today. (Better yet, just call us collect at 212 355-3333!)

We'll rush you -- by return mail -- the famed Quick Guide to VM/370 software published only by Computer Associates. In it you'll find systems that will far out perform any comparable ones you're using now! For example:

● **SYMBUG:** A completely integrated symbolic debugging system for the interactive debugging of COBOL, Fortran and Assembler programs.

● **IDOS/VS:** An interactive DOS/VS programming

facility for VM/370 systems that allows DOS and CMS environments to exist concurrently in the same machine.

● **VSORT:** Implementation of OS sort compatibility for CMS. Functions as a stand alone utility, as support for COBOL sort verb or callable from PL/I or Assembler routines.

● **VM/370 ISAM:** CMS simulation of OS ISAM. It also

VM/370 USERS:

We have a free software systems catalog for VM/370 users...and we would like to send it to you!

MAIL THE COUPON OR
CALL COLLECT TODAY!

YES! Rush my personal copy of the Quick Guide to VM/370 software systems. CW 12/77
No obligation, of course.

Name _____ Title _____
Company _____ Address _____
City _____ State _____ Zip _____
Telephone _____ Computer Model _____ System _____
(include area code please)

CALL COLLECT (212) 355-3333 655 Madison Avenue, New York, NY 10021

COMPUTER ASSOCIATES

provides a CMS ISAM utility command to create, dump and reorganize an ISAM file.

And these software products and systems are from Computer Associates -- one of the world's largest and most distinguished software research and development organizations in the world.

(212) 355-3333

IEBCOMPR IS DEAD

If you've always wanted IEBCOMPR to

- Underline Unequal Bytes
- Print Hex and/or Character
- Compare Specific Records or Fields
- Predefine Error Record Quantities
- Compensate for Missing Records
- Print Portions of a Record
- Process VSAM Files

Then call us for a free 15 day trial of ACCUCHEK.

ARKAY COMPUTER INC.
24 Manor House Road
Newton Centre, MA 02159
(617) 964-1894

"Towns you've probably never heard of" are now key locations in major data communication networks. And they're big in using terminals in many local applications.

That's why Trendata expanded its nation wide service facilities to cover places such as Victoria, Texas. Any data communications terminal manufacturer could have shipped a system there. We backed up a recent Victoria installation with a full training and service program.

We like towns like Dublin, Georgia because we offer everything from a system for wide flexibility and high production to a single reliable machine for limited applications. We handle the purchase, lease or rental program to keep it simple. And we

provide peripherals and supplies to avoid further complications.

Trendata communication terminals are designed to be as reliable and trouble-free as possible, but when you do need service, our factory trained serviceman will be there in a matter of hours... because we realize that downtime on a system in Las Vegas, New Mexico can be just as costly as one in New York City.



**Applied Magnetics
Trendata**

610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086
(408) 732-1790

**Our service reaches
towns you've probably never heard of**



Mexican Baker Whips Up Total MIS by Mixing Mini, Young Programming Team

MONTERREY, Mexico — Few companies are as aggressive in switching from an archaic manual recordkeeping method to a computerized management information system (MIS) as Galletera Mexicana S.A. (Gamesa), the largest producer of cookies and crackers in Latin America with annual sales of more than \$70 million. And fewer companies still have achieved such spectacular results in so short a time.

Last year, Gamesa's young management team began to implement an ambitious plan to apply computers to its operation, which, until then, had been run on often outdated and incomplete information. To set the plan into motion, Gamesa assembled a team of 20 systems analysts, programmers and computer operators — mostly young graduates of Monterrey's own Institute of Technology — and bought a Hewlett-Packard Co. 3000CX, the first to be installed in Mexico.

"Less than a year later, the team had completed enough programs to justify the exchange of the 128K-byte HP 3000CX for a new, more powerful 512K HP 3000 Series II," according to Gerardo C. Tamez, Gamesa's director of data systems, who at 28 is the oldest on the team. The computer was installed in September.

Initiation Rite

The initiation of the programmers came in the form of transferring payroll computation from a small, dedicated minicomputer to the larger HP 3000. "Payroll is a large task, considering there are 2,700 employees, of which 2,000 are laborers who are paid daily," Tamez said. "To compound it all, there are graduated pay scales for about 500 different positions."

With payroll data and information on available workers collected from supervisors, the first step toward production planning could be taken — the compilation of daily work schedules assigning the right worker to the right job.

"Order backlog and management of inventories of packing materials and staples such as flour, sugar, oil and chocolate are handled by the computer now," Tamez said. "We have yet to include in our data base the status of the machines and ovens and what types of products can be made on them."

Since these important phases of production planning have not yet been completed, Gamesa has had, at times, to endure the annoyances of rescheduling its workers, which means shifting higher paid workers to lower paying tasks.

With more than 450 metric tons of baked goods emerging each day from 17 ovens the length of football fields, the completion of production planning gets first priority at Gamesa.

Centralized Planning

The implementation of the new system required a lot of reeducation, particularly of supervisors who were accustomed to manual recordkeeping. At present, production supervisors call in information to a central planning department where the data is entered via CRT terminals.

Later, they will be asked to mark cards to be read by an optical reader until eventually there will be CRT terminals at all data entry points.

Perhaps the programming team's greatest success so far has been in the area of distribution. From order processing, inventory control, truck scheduling, loading and shipping to invoicing, all are now working on-line. One result: faster turnaround of orders and improved customer service, Tamez said.

"We are also more than one-third along toward giving management a full financial report," he added. Sales forecasts, sales statistics, accounts receivable, sales commission records and expenses and costs are now available on the 3000.

Last month, tax files were added; they will soon be followed by accounts payable. By next year, Gamesa's management will be able to make decisions based on up-to-date production and financial reports called up via CRT terminals.

The effort of centralizing information parallels decentralizing of operations. At present, information from Gamesa's two outlying plants in Obregon and Mexico City and its 15 distribution centers is gathered manually and mailed to the headquarters in Monterrey once a month to be processed.

However, plans call for HP 2640 CRT terminals to be installed by the end of this year to enable daily transfer of pertinent data via modems and telephone lines to and from the HP 3000 data base. By the end of 1977, five more distribution warehouses are projected.

In its present configuration, the computer system consists of the 512K HP 3000 Series II, one 15M-byte disk, two 50M-byte disks, a 200- and a 1,250 line/min printer, three 120 char./sec teleprinters, a 600 card/min card reader, one 800- and one 1,600 bit/in. tape unit and 14 HP 2640 CRTs.

Process Control Next

What's ahead? Tamez and his department are already looking beyond their present goal of a total MIS to another major area: the use of minicomputers in process control.

"Speed of the belt, which controls baking time, and temperature within differently heated sections of the 100-meter long ovens are controlled manually," Tamez said. "Feedback for continuous belt control now comes via telephones from the end of the ovens. A controller will be much faster and more sensitive in making adjustments."

A recent 700% jump in the price of natural gas for industrial users has given new urgency to the project. When implemented early next year, minicomputer-controlled ovens are expected to save fuel by burning more efficiently.

Interconnection of the controllers with the HP 3000 will enable gas volume data to be included in up-to-date production cost computations and will yield extensive data on oven temperature studies.

Neat/3-Cobol Conversions Offered in North America

SAGINAW, Mich. — Four agents have been named by Computer Software Facilities Ltd. to market the Neat/3 to Cobol (Necol) package [CW, July 11] in the U.S. and Canada.

One of the distributors, Curry Computer Center here, is now offering the package on a service basis, keyed to number of lines to be converted from NCR's unique Neat/3 to ANS Cobol 74. The other agents have not yet announced their plans for Necol.

Curry will accept users' Neat/3 programs and do the conversion on the NCR Century 200 at the center, or it will ship a disk-based copy of the program to the user's site.

When it is shipped, the software is modified to be inoperative after it has converted a predetermined number of lines of code, a spokesman noted.

The technique Curry uses to "turn off" Necol is tolerant, however. The conversion of a program will continue until it is finished, even if the line limit is passed during the operation. But Necol will not accept any more work after that, the spokesman said.

Curry charges 10 cent/line for the Necol work with a minimum charge of \$4,000, whether the work is done at

the center or at the user site. Special help for instructions that can't be converted by Necol is available at extra cost, a spokesman said from 4600 Seidel here in Saginaw, Mich. 48602.

Canadian users can contact Curry through P.O. Box 2177, Niagara Falls, Ont. L2E 6Z3.

The other distributors include, for the northeastern states, James D. Hallman, P.O. Box 304, 335 E. Orange St., Lancaster, Pa; for the Southeast, Interactive Business Systems, P.O. Box 7207, 11616 Wilmar Blvd., Charlotte, N.C. 28217; and, for the western states, International Computer Technology Corp., 465 California St., San Francisco, Calif. 94104.

'Logout' Options Added

FAIRFIELD, N.J. — The Logout package, which reportedly routes DOS/VS console messages to a line printer to speed up most operator functions, has been enhanced with a pair of separately priced options, according to the vendor, Macro 4, Inc.

The Console Reply Queueing (CRQ) feature is said to treat any messages that require an operator response separately from the routine "status report" type of messages. CRQ stores the vital messages in a buffer and enables the operator to check if there are any outstanding.

In addition, the routine also prints a prompting message of its own on the console if any DOS/VS message

is left unanswered for more than three minutes, a spokesman said. It provides an audible warning if messages from the DOS/VS Logical Transient area are pending, he added.

Analog, the second enhancement option, supports the creation and analysis of a file of historic log data. With Analog in place, the user can work through this file, applying his own selection criteria of what should be analyzed.

The base price for Logout remains \$90/mo, while CRQ and Analog add another \$15/mo and \$10/mo respectively, he said from Gothic Plaza, 376 Hollywood Ave., Fairfield, N.J. 07006.

Spooler Eases DG Print Work

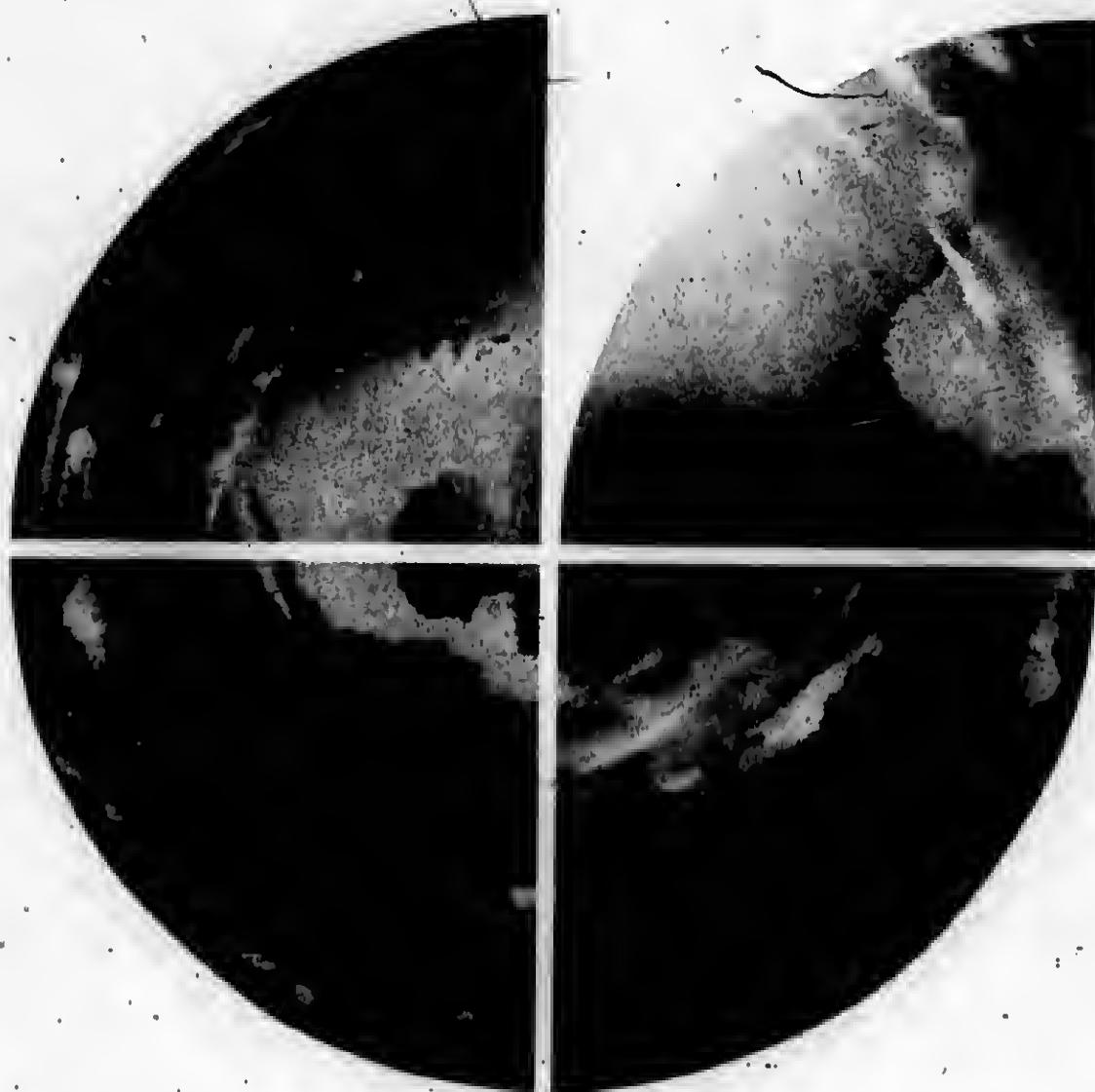
ATLANTA — The Spooler Utility now available from Technical Analysis Corp. (TAC) was designed to route printer output generated by Data General Corp. Novas and Eclipses to intermediate disk storage.

This not only avoids delays that sometimes occur because of the slowness of the target printer compared with the speed of the CPU, but also eliminates conflicts caused by more than one program needing the printer at the same time, a spokesman said.

It also permits printing to be done apart from the run that created the output, which may relieve pressure on the operators. Since the text of the reports are available on disk until they are overwritten, extra copies of the output poses no problem, he added.

Written in Business Basic, the spooler carries a license fee of \$500, which covers the programs on magnetic tape and printed operator instructions.

TAC is at 120 W. Wieuca Road N.E., Atlanta, Ga. 30342.



IT'S A CHANGING WORLD

And nowhere has major change been more evident than in the data processing industry. We have experienced generations of expensive equipment conversions. Frequent programming language changeovers. And increasingly complex operating systems. This dynamic environment has created an unprecedented challenge for top management to insure that each data processing dollar yields the maximum return to the organization.

Over 2,000 clients, in 18 countries, have utilized Cincom Systems' software products and services to harness that change and to provide the foundation for their management information systems.

Cincom's TOTAL Data Base Management System is a prime example, a proven DBMS, serving a large diversified installation base with one common denominator—the stability of the information resource.

It's a changing world. And that's good. Because if change is constructive and anticipated, if it is implemented in a managed environment, progress, productivity and improvement will result.

If you are concerned with your organization's position in the world of data base/on-line information systems, contact any one of Cincom's 35 worldwide support offices or write for further information.

Cincom Systems, Inc.

2300 Montana Avenue, Cincinnati, Ohio 45211 513/662-2300



Disk Space Manager Eases Work at DOS Site

TORONTO — "We now have effective on-line capability for testing, something we could not achieve before. That's an important asset when you consider we have some 700 homegrown programs that are continuously changing and we're developing others to meet the changing needs of the company."

That's Frank Farrell, program supervisor of the DP Department of Guardian In-

surance of Canada, describing the results of his company's installation of a disk space allocation package.

The company offers all lines of general insurance throughout Canada; effective and rapid program testing on a configuration consisting of an IBM 370/138 is a response to the ongoing growth in the life and general insurance sectors.

"We face very tight deadlines and the requirement to

test rapidly and effectively is always with us," Farrell explained. "What interested us in Easyspace, therefore, was the enhanced flexibility it gave us to move easily in several directions without impeding ongoing operations."

"Today not only can we perform effective on-line testing — something we could not do prior to acquiring the package from Valve Computing, Inc. — but we can test several times a

day without disrupting schedules. In short, we have been released from 'conventional constraints.'"

Heavy Tape User

Farrell pointed out that the DP Department is a heavy tape user and testing of the programs requiring tapes had to be run in batch mode. To do the job it is doing now, the department would have had to acquire four additional tape

drives.

"We could also see our disk scratch space requirements growing, and Easyspace immediately cut those requirements," he added.

Easyspace is a system enhancement for DOS/VS users that allows runtime allocation of scratch disk work space from a pool of available space and the conversion of files from tape to disk without program changes. It addresses the problem of assigning disk workspace to applications and reportedly eliminates the programming effort required to interchange tape and disk files.

Previously, the DP Department defined the physical disk pack and track extent areas to be used for scratch space; because this resulted in contention between programs for disk space, the system would "prohibit" some jobs from running concurrently.

Since the installation of Easyspace, however, all scratch space is retained in a pool and is assigned as needed on a nonconflicting basis. Scratch disk files are made partition-unique at runtime, Farrell noted.

Clarification

The evaluation of the Cray-1 array processor at Los Alamos Scientific Laboratory (LASL) [CW, Dec. 12] took place from March to October 1976, when the software, supplied by Cray Research, was as the story showed. Since then, however, an operating system and a compiler have been developed and refined, a Cray spokesman stressed.

A final, detailed report of the LASL Cray study (identified as publication LA-6456-MS) was written by the lab's Tom W. Keller and is available free as long as supplies last from LASL, Los Alamos, N.M. 87545.

The report is also available (for \$5) through the National Technical Information Service, P.O. Box 1553, 5285 Port Royal Road, Springfield, Va. 22151.

TI's 745 Portable Data Terminal can make the difference between closing doors and closing deals.

Sometimes, getting back to your customers tomorrow or next week just isn't good enough. It can mean a closed door now. And more closed doors to future business.

TI's Silent 700* Model 745 Portable Data Terminal gives you all the facts and figures you need to close your sale. On the spot.

All you need is a telephone and an electrical outlet. And you're ready to send or receive information from your home office computer that's configured for remote-dialed

communications. Immediately. Plus, you get an instant printed copy of the information for your records.

TI's 745 Portable Data Terminal weighs only 13 pounds. So, you can easily take it with you wherever you go. And get virtually silent printed copies of

critical orders at 30 characters-per-second. Inventory. Pricing. Deliveries. Listings. Policy analysis. And budget impact analysis.

With a TI microprocessor at the heart of the unit, the 745 is unbeatable for performance and reliability.

And with a price of only \$1995†, the 745 is several hundred dollars below



competitive models. With larger quantity discounts available, too.

So, if you're in real estate, insurance, finance, manufacturing, wholesale, retail or any other business with field operations, put our 745 to work for you. And start closing more deals.

For immediate response, contact your nearest TI office, or call Data Terminal Marketing, Texas Instruments Incorporated, at (713) 491-5115, extension 2126.

Or for more information, simply return this coupon.

TEXAS INSTRUMENTS
INCORPORATED

Yes! I am interested in the Model 745 Portable Data Terminal.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name
Title
Company
Phone
Address
City State Zip
Mail to: Texas Instruments Incorporated, P.O. Box 1444, M/S 784
Houston, Texas 77001

SILENT 700
electronic data terminals

12-1-CW

*Trademark of Texas Instruments

Copyright © 1977, Texas Instruments Incorporated
†U.S. Domestic Price

TEXAS INSTRUMENTS.

CalComp. Zeta.

Super Plotters. Tough Choice.



Zeta Research

While Bell Bill Suffered SNA, Interfaces Stirred Debate in '77

By Ronald A. Frank
CW Staff

Network architectures, interface standards and anticompetition legislative efforts were among the major issues affecting data communications users during 1977.

IBM's Systems Network Architecture (SNA) became a controversial subject when at mid-year, Howard Frank, president of the consulting firm Network Analysis Corp., said the IBM architecture had serious limitations and would require major modifications if it were to overcome its inflexibilities.

Several months later, a *Computerworld* survey showed that out of 20 large communications users, only 20% had made a commitment to SNA and 25% had rejected it. The survey also showed that 40% were uncertain about the impact of SNA.

In November, consultant Dixon Doll said DP vendors had not properly accepted the existence of the public packet networks. Doll cited SNA's limited compatibility with the CCITT X.25 protocol as an example of interfacing that had to be improved.

By the end of the year, most major mainframe/terminal vendors had introduced their own versions of a network architecture. But in many cases these were constructed mainly to encourage use of the vendor's equipment rather than optimize packet network interfacing for the user.

NCR introduced its architecture in August and joined others such as IBM, Univac, Digital Equipment Corp. and Burroughs Corp. in trying to establish an X.25-compatible environment for both present and future network users.

In April, Raytheon Data Systems Co. became one of the first terminal suppliers to provide a direct X.25 interface when it introduced an intelligent CRT that utilized software developed by Cambridge Telecommunications, Inc. Shortly thereafter, Telenet introduced X.25-compatible concentrators for use in its packet net.

Datapac Begins Operations

And in Canada, Datapac finally began operating using its Standard Network Access Protocol (Snap) version of the CCITT X.25 standard. Although at communications conferences there were some impressive intercontinental demonstrations linking various packet nets, packet technology was still far from general use by users.

In the meantime, some users perceived a threat that existing private-line flat-rate facilities might be shifted to measured time services. This concept was first raised by the Italian postal, telephone and telegraph authority at a meeting of the Consultative Committee on International Telephone and Telegraph (CCITT) and other evidence de-

veloped during the year.

Although the Consumer Communications Reform Act was regarded as a threat to competition at the beginning of 1977, its impact appeared blunted as the months went by. In February, a joint resolution was introduced in Congress by Rep. Timothy Wirth (D-Col.) and others counteracting the intent of the Bell-sponsored act and reaffirming the concept of Federal Communications Commission (FCC)-approved competition.

In December, a telephone industry task force came up with a new proposal that was regarded as slightly more liberal than the reform act, but specialized carriers and other industry sources said it would still eliminate many of the service choices now available to domestic network users.

Throughout the year, the question of where communications stopped and DP started remained unsolved despite the reopened Computer Inquiry before the FCC. Even the issues of whether the Bell Data-speed 40/4 was a DP device or not remained open after a U.S. appeals court heard oral arguments on the issue.

In September, CW published specifications of the still-unannounced Bell Data Network (BDN) which, most observers agreed, looked more like a DP service than an offering provided by a common carrier. At year's end, there was still no announcement from Bell about BDN and it was generally accepted that its introduction

would depend on how the Computer Inquiry defined the boundary between DP and communications.

During the year, the American National Standards Institute (Ansi) began work on a datagram addition to the X.25 standard and this was meant to provide a second interface alternative to users along with the X.25 virtual circuit approach. Although detailed in nature, it was said that the datagram approach would give users more end-to-end control over their packets on public data networks.

One of the most important instances of user involvement in communications issues occurred when the Tele-Communications Association (TCA) took a united stand in opposition to Bell's Consumer Communications Reform Act. Unlike other user organizations, which kept out of the limelight, the TCA decided that the only way user interests could be protected was for it to speak out. The user group issued several position papers and sent representatives to Washington to testify about user needs.

Despite the promise of improved services and equipment, the year ended with users depending mainly on the same types of networks that had been available for a number of years. Satellite Business Systems (SBS) began to discuss the services it would be providing to users, but this capability was not scheduled to be available before 1981.

Paradyne Modem-Sharing Unit Handles Four Data Terminals

LARGO, Fla. — Paradyne Corp. has introduced the Model 835 modem-sharing device (MSD) which lets up to four stand-alone intelligent terminals or four clustered terminal control units communicate through a single modem.

The modem-sharing device reportedly allows users to lower their line costs through point-to-point communications links between remote locations and a central site. Modem-sharing allows users to save the cost of the multiple lines which would otherwise have to be run, a spokesman said.

The Model 835 MSD is said to reduce the number of stand-alone modems required in data communications networks by up to 75%. The unit acts as a serial distributor that accepts control signals required for data transmission from I/O devices and passes them along to modems, the company said.

Intelligence provided in the modem-sharing device accepts only one request-to-

send signal from one modem at any time. The other modems are locked out until the modem at the other end of the line has received an end-of-transmission message.

A rotary switch on the front panel of the modem-sharing device allows operators to manually halt transmission from any of the four modems connected if a modem enters the streaming mode.

Most modem-sharing devices currently on the market either depend on a network control system to handle streaming conditions or else require that the streaming device be physically disconnected, the spokesman said.

Terminals or control units can be linked to the Paradyne modem-sharing device through RS-232 connectors, and the device can be attached to any of the four modems.

The Model 835 MSD costs \$550 or rents for \$50/mo on a two-year lease. Deliveries are 30 days from Paradyne Corp., 8550 Ulmerton Road, Largo, Fla. 33540.



DEALERS... AJ WANTS YOU

Anderson Jacobson, a leading manufacturer of data communications products, would like to introduce you to our new minicomputer, the AJ System 1500. And we need your expertise to make our small business system successful.

Here's what we have to offer:

- Good margins
- Exclusive territories
- Business BASIC
- A small business nucleus of application software at no charge to you

- Excellent client accounting software, also at no charge
- A multi-programming, multi-terminal system that is fully expandable
- AJ field service available in selected areas of the United States
- Floppy or hard disk systems

If you are interested in being a part of AJ's successful future, call or write Bob Reed, National Marketing Manager, for more information.

Computer Systems Division



**ANDERSON
JACOBSON**

Anderson Jacobson Inc., 821 Charcot Avenue
San Jose, California 95131 • (408) 263-8520

COMMUNICATIONS

At Large-Scale Installations Multiple Micros Ease Front-End Processing

By John R. Laughlin
Special to CW

Microprocessors continue to revolutionize the computer industry—but primarily the revolutions are in small-scale devices which give credence to the "micro" aspect of "microprocessors."

Although microprocessors are increasingly associated with network switches and data controllers, it is only recently that serious thought has been given to their use in large-scale installations. In order to function in this environment, it was necessary to design multiple-CPU systems that could work in conjunction with other computers to distribute a large-scale processing

load.

Design criteria for facilitating a distributed processing system with a minimum of user-disruption include:

- The system must continue to employ the user's mainframe to eliminate program conversion—but must off-load the mainframe to reduce cost.

- The front-end communications processor must not only serve as a terminal handler, but also must be able to serve as a sophisticated switch in a network of CPUs as well as an independent minicomputer system.

- The data base management system (DBMS) itself would be executed in firmware (microcode) as an independent processor accessible by all CPUs

connected through the front-end processor.

Such a configuration would be more flexible, less costly and far more efficient than conventional solutions to these related problems, since "processing" of a variety of functions would be done by dedicated microprocessors specifically chosen and programmed for that function. The system would consist of three modules, each of which is a multiple-microcomputer system (see diagram on Page 23).

The specific microprocessor-based modules are:

- A powerful minicomputer system which provides terminal handling capability and serves as the data con-

troller to the DBMS processor.

- Multiple medium-speed channel interfaces between the minicomputer and the mainframe computer(s).

- A DBMS processor linked to the minicomputer via a variable speed channel interface.

The minicomputer is composed out of a network of microprocessors and offers a full complement of both system-level and application-level pro-

(Continued on Page 23)

AJ Brings Out Coupler/Modem

SAN JOSE, Calif. — Anderson Jacobson, Inc. (AJ) has unveiled the AJ 1245, a Bell 103 and 202 mode-compatible acoustic coupler and modem in one unit.

The 1245 was designed to handle the transfer of low- and medium-speed data over the normal voice-grade telephone lines using a telephone handset, AJ said.

The AJ 1245 will interface with any EIA terminal and communicate acoustically up to 450 bit/sec in 103 mode and to 1,200 bit/sec in 202 mode. The user can switch-select between these two models with the coupler automatically adjusting speed and interface protocol, according to a spokesman.

In the acoustic mode, the 1245 automatically switches to the manual Data Access Arrangement (DAA) modem when the DAA cable is connected. The AJ 1245 costs \$795.

AJ also announced a lower price of \$595 for the Adac 1200 acoustic data coupler and a 36-month lease plan at \$30/mo.

The Adac 1200 transmits and receives data at 1,200 bit/sec either acoustically or over the dial-up telephone network with a DAA.

AJ is at 521 Charcot Ave., San Jose, Calif. 95131.

Can off-the-rack software fit you like a glove?

A special report on *Applications Packages* in the
January 30th *Computerworld*.

When the applications program you write yourself costs five times as much as a package you can buy off the shelf, "canned" software has a lot of appeal. Off the shelf software has become more attractive for vendors, too. Many small system manufacturers, for example, have found that applications software sales can add 15% or 25% to their hardware revenues. And more companies than ever before are entering the market with new software products for a wider range of applications — with ever greater modularity.

We'll be taking a close look at the subject in our January 30th special report, titled *Applications Packages*. Edited by Don Leavitt, this report will summarize the latest information available — including products, vendor strategy and market activity. In problem/solution format, the report will feature user experiences in the evaluation, selection, installation and use of applications packages, as well as topics like these:

- Converting programs and files from one hardware or operating system to another — examining the effort required.
- A statistical evaluation of commercial software — survey analysis.
- A review of vendor support for training and installation, and for installed packages affected by government regulations.
- Applications options offered to users through remote computing services.
- An overview of the industry — how vendors are expanding into new applications areas; adapting current lines to different CPUs; or consolidating product line to concentrate in selected areas of expertise.

If you're an MIS executive, DP Manager, Supervisor or Lead Programmer, our January 30th special report should be on your reading list. If you market programming products or services, you should put this report on your ad calendar. Ad closing date is January 13. Your *Computerworld* salesman can give you complete details. Or reserve your ad space today with a call to Terry Williams at (617) 965-5800.



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486

MORE BPS



From . . .

OMNI-TEX

Get the System
Standardization You Need
with Our 212A Compatible
701R Acoustic Telephone
Coupler!

The 701R is fully compatible with high-speed terminals operating in excess of 300 baud (600 baud optional) and 212A. Add simultaneous interface output on both TTY and EIA (RS232C) plus acoustic or hardware coupling and DAA tie-in capability and you have one of the most versatile couplers on the market today. For more information call

(602) 252-2083
collect or write:
Dept. 1212



"New Dimension in Data" 2405 South 20th Street • Phoenix, Arizona 85034

Multiple-Micro Front End Developed for Large Users

(Continued from Page 22)

grams in addition to its communications processing function.

Among the features of the minicomputer which would be critical to an efficient system are multiple central processing elements, each of which shares all of main memory; multiple microprocessors to serve as I/O channel controllers and terminal handlers; and field-upgradability of all components, including CPUs.

The channel interface between the minicomputer and the installed mainframes must offer throughput of up to 200,000 char./sec. From the mainframe side of the channel-to-channel interface, the minicomputer (and its peripheral devices) must look like a high-performance tape drive to the mainframe computer so programs running on the mainframe can use standard access methods and can thus effect either batch or interactive data transfers.

A variety of interface configurations must be available to increase throughput and maximize configuration flexibility. When traffic between a single mainframe and the minicomputer reaches a high-volume level, additional channel-to-channel interfaces may be connected between the CPUs.

In addition to providing multiple links between the two mainframes, a single minicomputer will serve as the center of a "star" configuration through which multiple CPUs are linked. Not only will the minicomputer thus serve to switch traffic between these CPUs, it will also serve as a central data base accessed by a variety of distributed processors.

Of course, in such a star configuration, each mainframe processor can have more than one channel link to the minicomputer.

Heterogeneous Processors

Each DBMS central processor will consist of up to 16 independent processors. Each of these processors has its own read-only memory and executes an instruction stream completely independent of the other processors.

In addition to the memory directly associated with an individual processor, all processors share a common memory used for passing information between the processors, primarily in the form of buffers.

Unlike other "multiple-CPU" systems, the central processors in the DBMS processor are heterogeneous: each of them has varying characteristics which make them each optimally suited for their specific function. Not only do the performance characteristics of each processor vary, so do their instruction sets.

For example, the specific processor which handles the "sort" function in the DBMS processor will be a very different piece of hardware than the processor that would handle the "lookup" function.

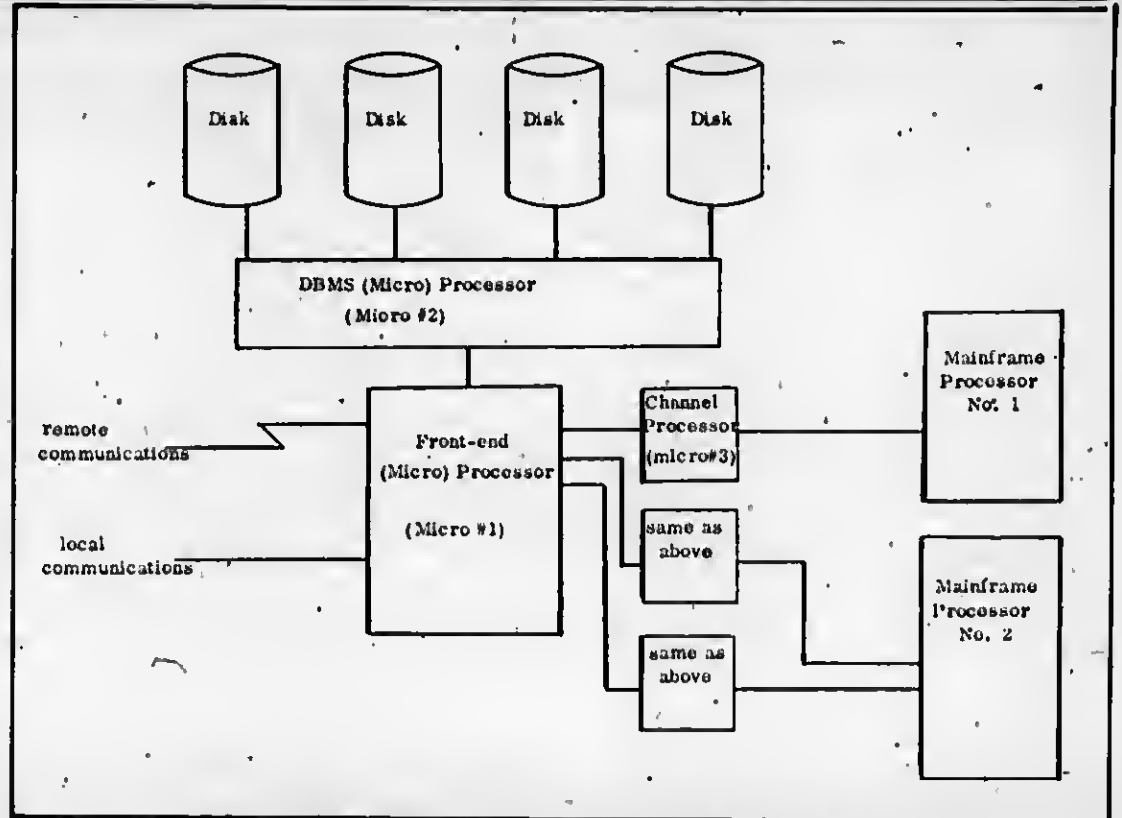
Once the individuality of the processors is understood, it becomes apparent why it is difficult to differentiate between "hardware" and "software" in the DBMS processor system. For example, the function known as "sorting" is no longer performed by code executed by the "CPU," but

rather is the specific function of a microcoded "processor" which does nothing but perform this function.

Several important concepts should be apparent from the foregoing. Of some importance is the relevance of micros to large mainframe users.

More significant, however, is the change that microcomputers will effect on our thinking about what constitutes a "computer." A "computer" is no longer simply a monolithic device for fast arithmetic; instead, it is a series of unique, related processors, each contributing to the efficient management of the system.

Laughlin is president of Digital Systems Corp. of Walkersville, Md.



Multiple-Microcomputer Front-End System

The \$6,000* DP Center.



IMSAI Introduces the VDP-80

Until now, owning real computing power meant paying unreal prices. Announcing the IMSAI VDP-80 Video Data Processor, a complete computer, intelligent terminal and megabyte floppy disk mass storage system. All in one compact cabinet. All for just \$5995. A complete desk top DP center.

For small business applications, the VDP-80 places a stand-alone computer at your fingertips. And, our full line of add-on peripherals, assures that the system can be expanded as your needs do.

For the large business user, with an existing central mainframe, the VDP-80 is the ultimate remote processor. You have the advantage of powerful local processing capability, plus the epitome in cost-effectiveness for implementing a distributed data communications network.

Take a close look at the following features. Then you'll know why we call our VDP-80 the desk top DP center.

□ **Powerful, High-Speed, Central Processor.** 3 mHz Intel 8085 microprocessor. 32K RAM memory (expandable to 196K). Parallel and serial I/O. Asynch, synch and bisynch communications. Programmable baud rates (.05-56 KB).

□ **Megabyte Mass Storage.** PerSci dual floppy, double density disk drive standard. One million byte storage capacity. Three floppy disk drives can be added-on, providing 4 million bytes of on-line storage.

□ **Drives Printers, Plotters, Terminals, Modems and Tape Drives.** Supports up to six terminals or modems, and four tape drives. Drives plotters, serial printers and line printers (up to 300 lpm).

□ **12" CRT, 24x80 Field, User Programmable Font.** Character and line insert/delete allows fast program correction and text editing. Inverse video and programmable field allows highlighting or enlarging graphics of information display. Titled fields protect information blocks from being written over accidentally. Programmable font (up to 256 different characters) allows foreign language and special purpose character forms.

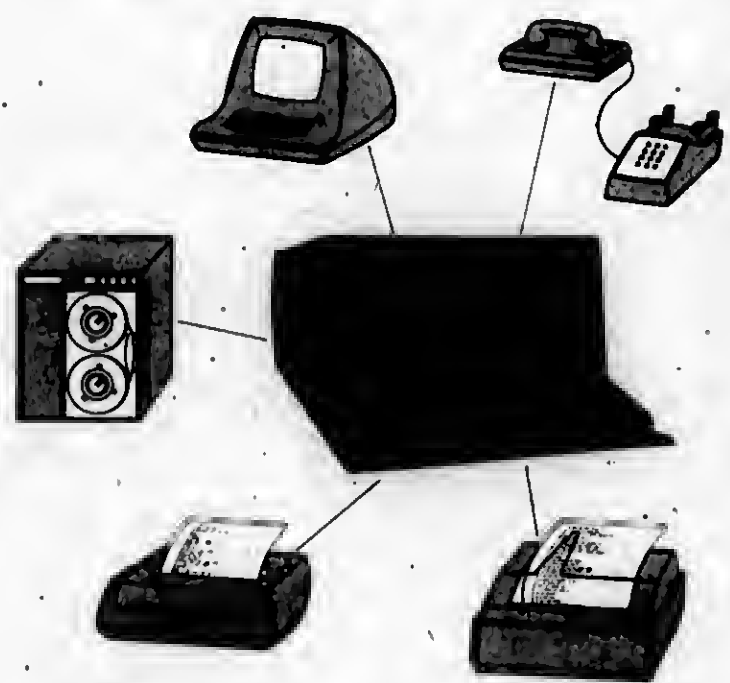
□ **Alphanumeric Intelligent Keyboard.** 62-pad main keyboard. Programmable 12-pad numeric keyboard. 12-pad control keyboard. Standard typewriter and calculator keyboard layouts. "N" key roll over reduces operator error during high-speed data entry.

□ **Commercial BASIC, FORTRAN IV, DOS Software.** Built-in ROM monitor allows extensive debugging and diagnostics. BASIC, interactive or compiler version. FORTRAN IV level 2 ANSI compiler. DOS-enhanced CP/M.**

Distributed processing, financial reporting and analysis, word processing, whatever your application, the VDP-80 is your answer.

Dial (415) 483-2093, and we'll tell you how you can put our \$5995* DP Center on your desk top. When it comes to small business computers, Just Ask IMSAI.

*Base price VDP-80/1000, \$5995, with 32K RAM memory and dual double density floppy disk drive. U.S. Domestic Price Only. Features and prices subject to change without notice. **CP/M is a trademark of Digital Research Corporation.



IMSAI®
The Standard of Excellence
in Microcomputer Systems

IMSAI Manufacturing Corporation
14860 Wicks Blvd.
San Leandro, CA 94577
(415) 483-2093 TWX 910-366-7287

Response Monitor Handles Multidrop Nets

SALT LAKE CITY, Utah — Questronics, Inc. has introduced a monitor that is reportedly capable of keeping track of response time on asynchronous and bisynchronous multidrop terminal networks.

The Model 300 response time monitor can be connected to a terminal either through an optical coupler, where indicator lights display a transaction in progress, or via an

RS-232C bridge connection, the firm said.

The unit maintains a running average of response time, the number of transactions that have occurred, minimum and maximum response time and the last transaction time. These are shown on a four-digit LED display along with the name of the particular category involved, a spokesman noted.

Data rates of 75-, 110-, 300-,

600-, 1,200-, 2,400-, 4,800- and 9,600 bit/sec can be monitored with response time monitoring on either half- or full-duplex circuits, the spokesman said.

In the bisynchronous mode, the control unit and device addresses are switch-selectable into the monitor and response time information is received by observing the data flow on the communications link.

Resolution of the monitor is

said to be .1 sec with a maximum display of 9,999 possible.

The monitor and interfacing

cables cost \$1,500 from Questronics at 3565 South West Temple, Salt Lake City, Utah 84115.

Tiger From Micon Turns TV Into T/S Terminal

OAKLAND, Calif. — A unit that can reportedly transform a standard television set into a time-sharing terminal via the

antenna input has been announced by Micon Industries.

The Television Interface General-Purpose Economy Remote (Tiger) terminal contains an acoustic coupler for communications with remote time-sharing computers, a full Ascii keyboard and an RS-232C connector as a computer interface, according to a spokesman.

Up to 1,024 characters can be simultaneously displayed in switch-selectable formats for eight or 16 lines or 32- or 64 char./line, he added.

The Tiger unit sells for \$500 from Micon at 252 Oak St., Oakland, Calif. 94607.

Trivex Has CRT 3277-Compatible

COSTA MESA, Calif. — A 480-character CRT said to be plug-compatible with IBM 3271-2 and 3272-2 controllers is available from Trivex, Inc.

The Model 0771 is organized into 12 lines of 40 characters each. It offers a variety of enhancements including local display-to-print, 10-key numeric pad, light pen, optical character recognition wand, operator prompting line, cursor position display, cluster diagnostics and response time indicator, Trivex said.

The response time indicator displays average response time, number of transactions, maximum response time and number of responses above a preset response time threshold. The response time threshold is variable from 0- to 30 sec, the firm said.

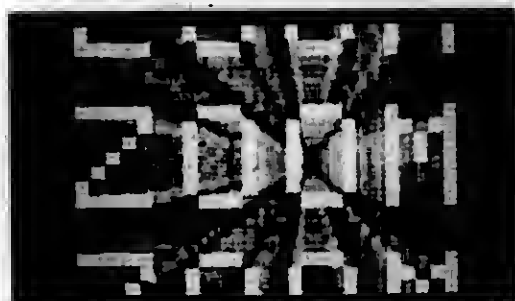
The price of the Model 0771 480 character display is \$2,950. The three-year lease rate is \$79/mo including maintenance. Trivex is at 3180 Red Hill Ave., Costa Mesa, Calif. 92626.

Most graphics terminals are too dumb for words.

Even expensive models get tongue-tied when it comes to alpha-numerics. But now there's a bright new graphics terminal that has a lot to say for itself.

Alpha-graphics: the perfect combination.

It's the Hewlett-Packard 2648A alpha-graphics terminal. For just \$5500*, it will dazzle you with a



virtuoso display. You'll see zoom and pan, area shading, pattern definition, rubber band line, scientific plotting and graphics text composition. Having independent memories for graphics and alphanumeric, you can do auto-plots with or without words and figures on the screen.

And when you need a smart alphanumeric terminal for on or off-line work, stay right where you are.

How smart is smart?

Ever seen a graphics terminal scroll 200 lines of interactive dialogue? And store up to 220K bytes of data (words and pictures) on twin cartridges? And cut out repetitive routines by storing up to 80 characters on each of eight "soft keys"?

The HP 2648A can also edit with the best of them. Communicate with a computer at rates up to 9600

baud. And accept a plug-in forms drawing mode to generate just about any form your company uses.



Strong as well as intelligent.

Like all our terminals, the HP 2648A has a clean, tough, modular design. Open it up like a suitcase, and you'll see the neat row of plug-in PC boards.

That makes it easy to add options or take care of maintenance. Not that downtime is a problem. Our terminals have such a good track record that we've lowered our maintenance price three times in the past two years. When you do need service, more than 1000 Systems and Customer Engineers worldwide are ready to take care of you.

So why settle for any dumb graphics terminal when ours can figure in your picture? See for yourself by calling the Hewlett-Packard office listed in the White Pages. Or send us the coupon and give our 2648A alpha-graphics terminal a screen test.



Yes, give me the good words (and pictures) on the HP 2648A terminal.

☐ I'd like a demonstration. ☐ Send me information.

Name _____ Title _____
Company _____
Address _____
City/State/Zip _____
Phone _____

Mail to: Ed Hayes, Marketing Manager,
Hewlett-Packard Data Terminals Division,
19400 Homestead Road, Dept. 314, Cupertino, CA 95014.

*U.S. domestic price

HEWLETT  PACKARD

42501HPT5

**CalComp.
Zeta.**

**The
Performance
Plotters.**



Zeta Research

100 Stanford Dr., Suite 100, A 452
Sunnyvale, CA 94086
(415) 331-0000

Peripherals Area Quiet Processors, Price Moves Led '77 Action

By E. Drake Lundell Jr.
CW Staff

Processors and price were the key words for the mainframe manufacturers during 1977, while the usually turbulent world of peripherals seemed to pause during the year.

Clearly, IBM's announcement of the three members of the 30 Series family topped off the processor news, but most other major mainframers also had spectacular announcements of their own.

And all the while, the plug-compatible CPU manufacturers — Amdahl Corp., ITEL Corp. and Control Data Corp. — were getting enough systems out in the field to show that they could be viable forces in the computer marketplace.

This in turn may have forced IBM into the drastic price cutting on its 370 line of equipment, which also marked the past year.

But while all of this was going on in the world of mainframes, there was very little activity in the peripherals marketplace in terms of new products or concepts. Rather, the competitors that have made it through the turbulent shakeups in that field in the past continued to fill orders — probably glad that the furious pace of innovation has slowed somewhat.

On the mainframe front, Honeywell Information Systems, Inc. started the action in January with the introduction of the 66/85 and three mid-range machines in the 64 series.

Then, in February, Burroughs Corp. brought out the 7800 to compete with IBM 370/168 class machines.

While the mainframe area was quiet in March, the action really picked up in April, when IBM took a meat cleaver to the prices of its entire 370 line and introduced the 3033 processor, the first machine in what was to become the 30 Series.

Like the others to come in this series, the 3033 was just a processor announcement, with IBM apparently deciding to keep the 370 family of peripherals in operation for a while longer through processor-only upgrades.

Most of the industry reacted to the IBM

Micrographics '78 Slated for Boston

WASHINGTON, D.C. — The National Micrographics Association (NMA) has announced that its 27th Annual Conference and Exposition, "Micrographics '78: Building Information Bridges," will be held in Boston on May 9-12 at the Sheraton-Boston Hotel and the adjacent John B. Hynes Auditorium.

Following the opening of the general session on Tuesday, May 9, afternoon seminars will be devoted to micrographic applications in such emerging markets as banking and finance, engineering systems, health and medicine, insurance and retail/wholesale areas. Preconference seminars on May 8 will offer information on the fundamentals of micrographics for those less familiar with the technology.

The 23 educational sessions tentatively scheduled for Wednesday and Thursday will feature such topics as competing system technologies, equipment analysis and system design.

Wrapping up the conference on Friday will be a discussion on the role of micrographics in the "Office of the Future."

Information on the conference may be obtained from the association at 8728 Colesville Road, Silver Spring, Md. 20910.

price changes with juggling of its own, bringing a whole new — lower — price structure to the computer marketplace.

Also in April, the AS/5 from ITEL received its first customer checkout which showed it was competitive with the IBM 158.

In May, NCR Corp. brought out three mid-range machines in the 8000 series and CDC moved into the plug-compatible CPU market with the Omega 480, in two versions, to compete with the IBM 138 and 148.

CDC's entry upped to three the number of firms chipping away at IBM's market by offering users cheaper CPUs that could run IBM software with no changes.

The summer was a quiet time for the mainframers, but October brought announcement after announcement.

IBM began it all with the long-awaited introduction of the 3031 and 3032, which drastically shifted the price/performance ratio in the industry.

ITEL quickly reacted with the introduction of the AS/6 to compete against the new price/performance standard, while Amdahl

stood pat with its line in processors.

Univac also reacted in October with the largest new product announcement in its history — five mainframes, two in the 90 series and three in the 1100 series. All were pegged to the new IBM price/performance levels.

Burroughs also chose October for the introduction of the B6817, perhaps giving that month the record for mainframe introductions, with nine machines being launched.

In November, HIS finally caught up with the others and announced a restructuring of its 68 line with the introduction of the 68/Distributed Processing System. The firm said the new machines were more powerful than their IBM counterparts, but didn't release any technical information to back up those claims.

And then as the year drew to a close, NCR topped off its 8000 Series with the V8580 to compete in the 370/148 market and the V8590 to go into the market for IBM 3031 class machines. The two are the most powerful NCR processors yet.

EMM Add-On for IBM 370/148 Helps First User Cut Downtime

LOS ANGELES — The first user of Electronic Memories & Magnetics (EMM) add-on memory for an IBM 370/148 mainframe reports having virtually no downtime caused by memory failures.

CMS Industries, Inc., a service bureau that features on-line teleprocessing, found that it outgrew its 370/145 and decided to go to a 370/148. At the same time, the company made the decision to include independent add-on memory in the replacement system, a spokesman explained. The firm needed additional memory capacity and felt that installing independent add-on was the least expensive way to get it.

"Our increased growth rate required a more powerful machine than the 370/145 we've had for the past several years. We decided to go with the 370/148 because the cost/performance ratios met our criteria," according to Tosh Nakahiro, president. We hurriedly put in an order to EMM for add-on memory. We knew that it had just announced the product, but we wanted to be the first in line. We agreed to be the engineering test site because of [EMM's] past performance record with CMS."

CMS installed the 370/148 with 2M bytes of IBM memory and an additional 1M byte of EMM memory.

The CMS DP operation utilizes 3350 disk

drives and 1403 printers. More than 100 terminal locations are spread throughout the U.S. and Canada. The terminals, manufactured by IBM, Sycor, Inc., Olivetti Corp. and Four-Phase Systems, Inc., communicate over a telephone network.

Two Major Benefits

One of the main considerations in selecting and staying with EMM memory was that it is compatible with the IBM system, Nakahiro noted. "We are getting two major benefits with [the] memory. First, we can give our users improved terminal response time and we can evaluate Multiple Virtual Storage (MVS) on the 148," he said, adding that running MVS efficiently on the 148 will be beneficial to both CMS and its customers in the long run.

CMS is an on-line operation and, therefore, installation time was an important factor. EMM installed the 1M byte in 12 hours. "We have had an excellent record of support from EMM and always good response time on service," Nakahiro noted.

CMS is now handling more than 4 million transactions per year, and the installation of the 148 and add-on memory will allow the firm to keep up with growth projections. In fact, the firm plans to add another 1M byte of EMM memory, Nakahiro reported.



EMM's add-on memory cabinet is located next to the IBM memory at CMS.

SYSTEMS & PERIPHERALS

Switches Designed for IBM Users

ANAHEIM, Calif. — California Computer Products, Inc. (Calcomp) has announced the availability of IBM plug-compatible peripheral switches and associated energy-saving devices. The products are designed for users of multiple IBM systems.

The peripheral switch, Model 1000, is architecturally and operationally compatible with IBM 360s

and 370s, according to a spokesman. The switch is available in matrix sizes from 2 by 4 through 8 by 24 and is designed to allow switching of up to eight channels between 24 controllers.

The Model 1010 energy control subsystem lets users centrally control power on/off functions for all control units, according to the spokesman.

Both models are manufactured by Dataswitch Corp., East Norwalk, Conn.

Prices for the Model 1000 range from \$26,000 to \$350,000, depending upon switch configuration and the number of energy control subsystems required. Lease terms are also available. Calcomp is providing maintenance, the firm said from 2411 W. La Palma, Anaheim, Calif. 92801.

Bendix Has Digitizer, Mapping System

ANN ARBOR, Mich. — An Interactive Design, Drafting and Mapping System and a microprocessor-controlled digitizer have been announced by the Bendix Corp.'s Aerospace Systems Division.

The Datagrid II mapping system is an expandable 20K random-access memory (RAM) microprocessor unit that allows the interactive

placement and editing of lines, circles, arcs, symbols and text, according to the firm. The unit features a "menu" picking function and free-moving cursor to assist the operator in drawing applications and also has a CRT terminal with keyboard to permit editing and annotating, a spokesman said.

The system can also be interfaced to several available plotters for final output, he added.

The Datagrid II Digitizer incorporates an expandable 16-bit, 8K RAM microprocessor, a large grid work surface, a powered lift pedestal base, a keyboard display console, cassette-loaded software and an applications software library, the firm said.

A digitizing program is included to guide the operator through the set-up procedure and then monitor the work for procedural errors by providing a display of prompting messages, a spokesman said.

The Interactive Mapping System costs \$38,990 and the digitizer is priced at \$18,990 from the firm at 3621 S. State Road, Ann Arbor, Mich. 48107.

MDS 2300 Gets Drum Printers

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) has introduced two drum printers designed for remote job entry (RJE) and document processing applications on its System 2300 computer.

The models 2441 and 2442 use a 64-char. set rated at 600 line/min and 900 line/min respectively and a 96-char. set rated at 435 line/min and 660 line/min, a spokesman said. Both printers offer a 132-column format, he explained.

Price of the 2441 is \$20,600 or it can be leased for \$685/mo. The 2442 rents for \$930/mo or can be purchased for \$30,000 from MDS, 1599 Littleton Road, Parsippany, N.J. 07054.

SYSTEM 2000 Puts your resources to work

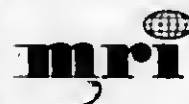
Data is a valuable resource. Without proper management, it becomes inefficient and impacts the productivity of your other corporate resources.

MRI's SYSTEM 2000 can put your data to work. It can make it serve your company in many, many beneficial ways, and can take some of the workload off those other valuable resources.

SYSTEM 2000 is a versatile data base management system designed for users of IBM, CDC, Univac, and Amdahl computers. Working with a wide variety of applications, with data bases ranging from 300,000 to more than 1.5 billion characters, with non data processing personnel as well as highly skilled programmers, SYSTEM 2000 provides flexibility and efficiency in even the most complex environment.

To find out how hardworking your resources can be, contact our nearest marketing representative or MRI corporate headquarters. Find out how resourceful and hardworking our people are in ensuring that your needs are met. Ask about the new DOS/VS version and CONTROL 2000, MRI's data dictionary.

Put your resources to work
and take advantage of ours



SYSTEMS
CORPORATION

HARDWORKING
THE DATA BASE MANAGEMENT COMPANY
12675 Research Blvd., Austin, Texas 78759 (512) 258-5171

CalComp. Zeta.

Decisions.
Decisions.



Zeta Research

OUR ECLIPSE SPEAKS FOR ITSELF.

	DATA GENERAL COMMERCIAL ECLIPSE	11/70 RSTS/E	11/70 IAS	3000 II MPE
COBOL	✓	✓	✓	✓
RPG	✓	✓		✓
DATA CAPTURE LANGUAGE	✓			✓
BUSINESS BASIC	✓	✓		
EXTENDED BASIC	✓	✓	✓	✓
FORTRAN IV	✓	✓	✓	✓
ASSEMBLER	✓	✓	✓	✓
DATA FILE ACCESS	✓	✓	✓	✓
FORTRAN 5	✓		✓	
SYSTEM PROGRAMMING LANGUAGE	✓			✓
ALGOL	✓			

Comparisons based on most recently available information supplied by vendors and an independent industry research group.

Call (617) 366-8911, Extension 4735 or write for more information.

ECLIPSE is a registered trademark of Data General Corporation © Data General Corporation, 1977.

Data General

We make computers that make sense.

Data General, Westboro, MA 01581 (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61, rue de Courcelles, Paris, France, 766.51.78.
Data General Australia, (03) 82-1361. Data General Ltda., São Paulo, Brazil. © Data General Corporation, 1977.

Air Force Picks Halon With Workers in Mind

TINKER AIR FORCE BASE, Okla. — The Air Force has begun using Halon 1301 as a means of chemically smothering a fire in a computer facility without exposing workers to the possible health hazards of a chemical fire suppressant.

Halon 1301 is an odorless, colorless, electrically non-conductive gas known to the chemist as CF₃Br, or monobromotrifluoromethane. To Air Force fire protection and DP personnel, it's one of the most promising improvements

since the automatic sprinkler, they said.

The chemical is so effective that an average concentration of only 5% by volume, reached in 10 seconds, will extinguish most fires, an Air Force spokesman noted. This figure is even more significant when compared with the 40% concentration required for the commonly used carbon dioxide.

Halon 1301 is also safe and effective against all three classes of fires — Class A, cellulosic material; Class B, flam-

mable liquid; and Class C, electrical, he said.

No Residue

The 552nd Airborne Warning and Control (Awac) Wing chose Halon 1301 because the chemical's two greatest advantages — cleanliness and personnel safety — were suited to protect high-value, high-voltage areas, according to the spokesman.

Water and other liquid agents were ruled out of the question; foam would have left a residue and might cause equipment damage.

"Products of combustion" methods unleashed corrosive agents, which are dangerous to both people and equipment, the spokesman pointed out.

So Halon 1301 was selected. As a vaporizing agent, it leaves no residue and it has no effect on the data which is stored on magnetic tapes, the spokesman said.

In addition, a single molecule of Halon 1301 is smaller than a molecule of air and will easily clear the head on a disk.

Following a 1301 discharge, there are only slight traces of smoke and a faint, acrid smell. Visibility is unimpaired and the low toxicity (Underwriter Laboratories classifies Halon 1301 in Group 6 — least toxic) means personnel can reenter the area where a fire has occurred and resume operations immediately.

The most intriguing part of the Halon 1301 story is how it actually puts the fire out, according to the spokesman. It extinguishes by chemical action; it does not "smother" the fire by oxygen exclusion or cool the combustibles below the flame point or separate the fuel from its oxidizer.

Instead, the Halon compound reacts with the transient combustion products responsible for rapid and violent flame propagation. This reaction terminates the combustion chain reaction.

Halon 1301 is actually dispensed from pressurized, rechargeable storage containers through corkscrew-shaped nozzles. A blasting cap type of mechanism causes spontaneous release.

Being heavier than air, the gas moves down from ceiling to floor, "flooding" the area and rendering it inert. This method is appropriate for fixed enclosures such as computer rooms where underfloor areas containing wiring also require protection.

Halon 1301's low toxicity has been confirmed by the U.S. Army Chemical Center, Kettering Laboratory and others. All tests show the 5% concentration, for 10 seconds, to be extremely safe, the spokesman noted.

In fact, only at 7% concentra-

tion and higher, for prolonged periods, is slight difficulty in mental concentration observed, he said.

Safety Margin Proved

This safety margin was twice proven in actual operations at Tinker. Once the Halon 1301 system activated in the wing's flight simulator, the spokesman recalled, probably because of a power surge during a strong electrical storm.

When the fire department arrived three or four minutes later, Joe K. Clanton, the shift station chief, remarked "I didn't smell anything — no odor of smoke at all. A faint haze in the room looked like smoke, but there was no damage, no residue and no

signs the gas had actually been released."

When Halon 1301 was discharged in the mission simulator (activated manually when a fire was suspected, a witness described the event like this: "I heard what sounded like a well-muffled shotgun blast. A few feet in front of me, I could clearly see the dispersal nozzle and a narrow beam of grayish fog spilling out.

"But three feet from the tip, the gas became invisible. The flow lasted about three seconds, then nothing.

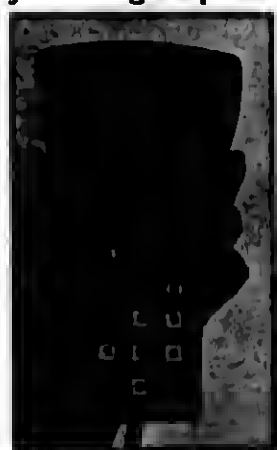
"Only a slight odor remained, not overpowering, but it reminded me of fish and burnt rubber and lingered for an hour or more."



A silent guardian, the Halon 1301 dispersal nozzle, is seen in the upper right hand corner. The computer tape storage vault requires careful fire protection.

Telxon puts a family of data terminals in the palm of your hand!

When your business requires the fast movement of data from remote locations to your computer facilities, the Telxon data terminal system offers telecommunication Accuracy, Speed, Convenience, Ease of Operation all at your fingertips.



TELXON 919 is capable of storing large volumes of collected data before transmission. 919 provides:

- Proven Reliability
- Permanent Data Record
- 150,000 Character Data Storage
- Wand Scanning
- Attractive Optional Features



TELXON WAND — Hold it like a pencil and you are ready to scan. Your Wand unit offers Plessey, UPC and Codabar scanning capabilities. Your present Telxon System can be easily upgraded to Wand scanning.



TELXON 717 is a proven solid state expandable memory data terminal. The 717 offers:

- Low Cost
- Solid State Reliability
- Ease of Operation
- Wand Scanning
- Minimum Training Time

Telxon
CORPORATION
Headquarters Houston, Texas

Specify the Telxon family!
Call Telxon 1-(800)321-0516

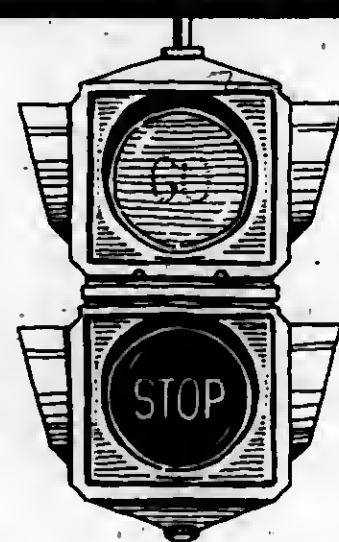
In Ohio, Call 1-(216) 666-6751.
Systems Division • Ghent Square • Bath, Ohio 44201



A close-up of the corkscrew shaped nozzle shows how Halon 1301 gas is dispersed. The gas is broken into a 120° discharge cone of mist, heavy enough to settle from ceiling to floor and completely fill the room in approximately five seconds.

Introducing Shockwatch*

It works like this:



Red means stop. And the Shockwatch impact detector turns brilliant red when subjected to a potentially damaging shock.

Attached to a disk pack, Shockwatch can identify damaged media before insertion into a drive. And that can reduce head crash probability by as much as 50%.

Get head crash protection that's as simple and effective as the corner stoplight. Ask your disk supplier about Shockwatch. Or call us at 214-350-5725. We're Detectors, Inc., a division of Media Recovery, 2550 Electronic Lane, Dallas, Texas 75229.

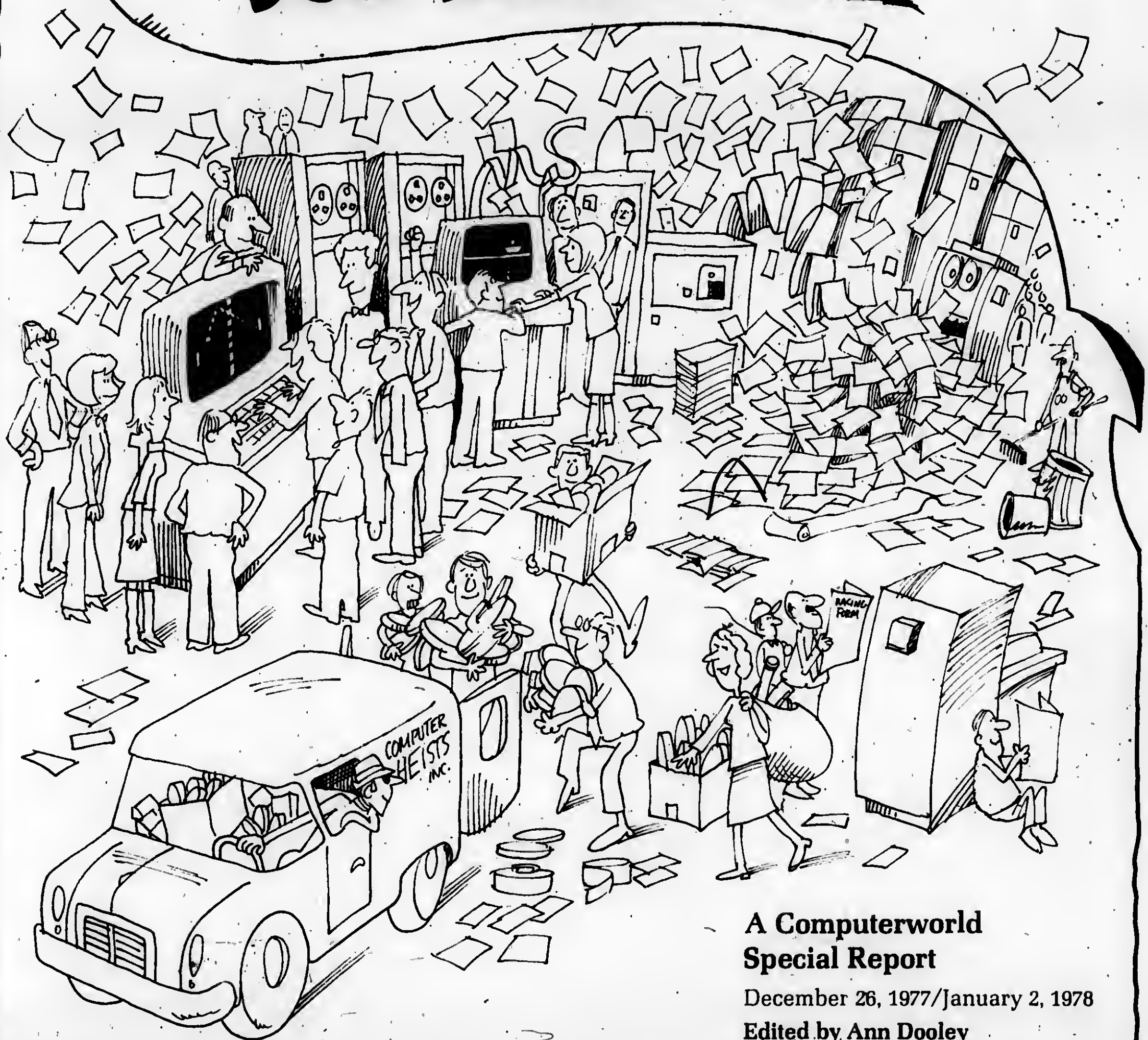
Internationally, call your field engineering sales manager at the local Burroughs subsidiary head office.

SHOCKWATCH
Protection.
Pure and simple.

*Patent Pending

SUPPLIES AND SECURITY

Look what's happening right under your nose...



**A Computerworld
Special Report**

December 26, 1977/January 2, 1978

Edited by Ann Dooley

Need Information Safeguards

DP Protection Goes Beyond Physical Security

By Stanley J. Murawski
Special to CW

Today, almost every organization has a physical security system to control access to the computer system in the data center. However, breaches of security that can have the most dramatic impact on a firm are directed at the information within the system, not the computer system itself.

It is estimated that today there are over 200,000 computers worldwide. By 1985, this figure will grow to over 450,000. The major growth area of computer usage is on-line and time-sharing networks where remote access to the system is widespread. And by 1980 it is estimated that more than 3 million terminals will be in use around the country.

If computer usage rises, as estimated,

and computer abuse grows proportionately, it is estimated that in the U.S. alone, we will incur an annual loss of well over \$100 million from breaches of security.

Many managers have too much confidence in their computer systems. They do not realize the value of the information maintained by the computer system and have no true concept of how vulnerable that information is.

It is therefore important that data center management continuously assess their operations to ensure achievement of the proper balance between the operation of computer systems and the control of information assets.

The problem of increased system security arises out of a combination of management's information needs, new government regulations and the ad-

vancement of computer technology.

Managers at all levels have become increasingly dependent on the DP system for the information they need to plan, evaluate and control their organization's activities. Today's advanced economy has evolved to a point of extreme sophistication and so have the bases for our assets. We have moved from business based on physical assets to business based on a virtual asset — information.

Most of this information is stored magnetically within a computer system. In the banking industry, for example, banks hold assets of deposit on computer files. Most of the money in our economy does not really exist. Many of the stocks and bonds also do not physically exist.

Since in these instances computerized

information represents the business, it has, in fact, become the business. This means that running the computer system efficiently may be one of today's most important organizational functions.

However, how much upper management attention is placed on the security of this operation and its information? Generally, very little; yet its loss could put them out of business.

Finally, the changes within the DP industry's technology have been rapid in order to keep pace with management's information needs and government requirements. For example, the phenomenal growth of data base and data communications systems is at the heart of a rapidly increasing ability to store and process information. The amount of information available for on-line access in many organizations would have been staggering to the imagination 10 years ago. On an IBM 360, today's systems would have been declared economically, if not physically, impossible.

Areas of Vulnerability

Vulnerability to computer abuse can come from many quarters.

Functional vulnerabilities include poor controls over manual handling of input/output data; weak or nonexistent physical access control, computer and terminal operations procedures; and weaknesses in business ethics. Others include weaknesses in the control of computer programs, poor controls over access through impersonation to time-sharing services and

(Continued on Page S/4)

End-User Education Essential

Quality of Supplies One Factor in Security

By Robert Phillip Baker
Special to CW

Security for a DP installation depends on whether the end user can become educated to the realities of the DP supply industry and marketplace. This education will ultimately lead to optimum performance at the computer site and conscientious management efforts. An operational axiom that can serve and benefit both a vendor and end user in achieving this education in security can be established.

The marketplace for DP supplies has matured and is now declining. Relative to most large industries, it has been volatile and swift in its evolutionary process. But here is the snag. Service to the end user has never been a reflection of the consumer's needs, but more often than not a reflection of the vendor's capabilities.

The marketplace is becoming increasingly competitive, supply being greater than demand, while at the same time the total service capabilities existing within the industry are not on par with the exact needs of the consumer. A sales and service organization is needed to fill the gap between what end users actually need and what they have been getting for products and service.

In an attempt to demystify these diverse products and bring some common denominator of quality, service and pricing into effect, the directors of Computer Supply Corp. began research into all areas of DP supplies.

Recycling Developed

Several years ago in this country, there was a sudden shortage of magnetic computer tape. Panic gripped the industry and was evident in almost every computer site in the country. During this panic an important yet extremely simple and virtually unknown concept was developed; recycle magnetic tape.

The basic logic of all recycled products is the reuse of the raw materials involved in manufacture. In this instance, recycling was made as simple as possible because the basic structure of the product did not have to be altered, only a duplication of the last stage of manufacture: cleaning, cer-

tification and packaging.

The existing quality standard for this product was researched and found to be inadequate. New product testing procedures and policies were adopted and refined, resulting in far greater performance. Today, "recertified" magnetic tape is being recognized as a viable and sometimes preferable alternative to the purchase of new tape.

Although as logical and necessary as magnetic tape recycling is, the rehabilitation of the disk pack poses some minor manufacturing problems

and some major marketing problems. The product itself is more complex and is, overall, what might be called a mechanical device, rather than a passive device such as magnetic computer tape.

If remanufactured improperly in any one of several stages, a reconditioned pack can cause severe damage to the drive upon which it is mounted. In recognition of these factors, careful consideration must be given to quality control and adherence to the exact specifications of manufacture of the

(Continued on Page S/4)

Shared Backup Facility Reduces Investment

By Louis Scoma Jr.
Special to CW

How long could your company stay in business should your computer center be destroyed? What would happen to your momentum? Your cash flow? Your competitive edge?

Answers to these questions could determine whether your company should establish a recovery operation center (ROC). One of the latest developments in contingency/recovery planning, a ROC provides a company with an off-site facility from which it can continue its computer operations es-

sential to the firm's success.

Off-site backup facilities were not necessary in the past because companies agreed to share their computers with one another. Typically, a company would line up two or three firms that would be willing to back it up should it have a problem — whether fire, explosion or machine trouble.

This arrangement is not practical for many companies today because they simply don't have the time on their computers to share. They generally depend on their computers around the clock, seven days a week.

Also, most computers are unique in their configurations and operating systems. It would require major changes and time to make two different systems compatible.

Companies with identical systems also could find themselves in a dilemma. For example, let's assume a computer operation requires on-line processing (i.e., the company's computer is connected to either another computer or a remote terminal at another workstation). While the user might be fortunate to locate a company

(Continued on Page S/6)

On the Inside

DP Protection Goes Beyond Physical Security.....	S/2
Quality of Supplies One Factor in Security.....	S/2
Shared Backup Facility Reduces Investment.....	S/2
Off-Site Backup Systems Need Careful Plans.....	S/3
Bank Backup Ensures Confidence.....	S/3
Good Security Based on Detailed Risk Analysis.....	S/7
Wide Range of Tape, Disk Capabilities Offered.....	S/10
Simulated Bomb Threat Uncovers Security Holes.....	S/11
Mag Cards, Cassettes Provide Storage Options.....	S/13

Off-Site Backup Systems Need Careful Plans

By Eric Vesely
Special to CW

Most computer installations and users maintain backup capability in the form of tape copies of disks and tapes, usually stored off-site. This simple procedure was established years ago in an effort to protect the user from hardware malfunction, operator error and the like, which can destroy data essential to the everyday operation of the facility itself and/or manufacturing processes.

While most companies are now protected from loss of essential data, more

and more concern is pointed toward:

- Loss of computer equipment.
- Loss of computer facility.
- Loss of programming/operations staff and their facilities.

These possibilities all exist today — when one considers the possibilities of sabotage, natural calamity and energy failure. What does a company do if its entire computing capability is wiped out by, say, a major flood of the sort experienced in Kansas City this year? The disk and tape copies stored off-site provide no assistance if there is no computing equipment and staff to

process it.

An event of this magnitude means destruction of the computing arm of the company. It can also slow down or completely halt assembly lines, marketing efforts, billing/accounting and financial measurements.

Every top executive must be concerned with this possibility — the possibility of catastrophe — and plan for such an occurrence.

One method of avoiding a disaster to the recovery process is to provide a backup capability with an identical

configuration to the original. (If it is not identical, then plans must be made to convert all existing programs immediately so they can execute on the backup configuration.)

As new programs are developed, they too must be converted. Of course, the objective is to minimize the conversion costs. Also, where the concern is for a catastrophe of larger proportions such as a major earthquake affecting a large area, backup capability might also be arranged outside of the local area.

Another method is to establish operations staff contingency planning. Under a catastrophe condition, do they move to the backup facility? What are the costs, be it a local or distant backup facility?

A third method of disaster recovery is to provide programming and analyst capability. In order to continue program maintenance and development, a backup site (not necessarily the same as the computer backup site) must be planned for.

These are only three major considerations which should be of utmost importance to any executive concerned with the well-being of his company. Obviously, there are many more such methods, and many of these will relate directly to the specific type of computer operation being handled.

Don't tell yourself you have a handle on the problem until you can respond yes to all the following questions:

Do I have storage that protects my off-site data from partial (i.e., warp, water damage) as well as complete (i.e., fire) destruction?

Do I have signed agreements for hardware backup, specific hardware and detailed personnel plans in case the unthinkable happens?

Have I run tests on my backup hardware, checked for mismatches in the system and corrected these?

Do I continually review my plans, look for problem areas and update regularly in light of changing conditions?

Vesely is vice-president of Systems 37, a software and service firm.

Bank Backup Ensures Confidence

By Fred G. DaCosta
Special to CW

The banking community is unusually dependent upon the public's confidence, not in any one particular banking corporation, but in the industry as a whole, to withstand the winds of monetary, fiscal, political and social change. Within the DP world, the industry also recognizes the potential for confidence loss caused by an interruption in banking operations of any one member of that industry.

Thus, many members of the banking fraternity have recognized it is in their respective best interests to ensure that the very financial institutions with whom they compete will be allowed to process critical bank applications on one another's compatible hardware/software in the event of an emergency.

We know, of course, that procurement of computer time at a compatible site (possibly that of a competitor) is dependent upon a number of conditions, not the least of which is the availability of unused system time at the donor site in view of the latter's daily work requirements.

The term "competitor" is employed here with deliberation, for it is essential to remember that most banks are dependent upon magnetic ink character recognition (Micr) reader/sorters for the input processing of their high volume applications; thus the building of input files cannot necessarily be accomplished at just any CPU-compatible location. This competitive condition is alleviated when the backup (donor) site is located at a point outside city, county, state or other regional competitive barriers.

In any event, peripheral requirements may dictate the selection of another bank data center over that of a manufacturer with whom the distressed institution had maintained a healthy business relationship.

Preconceived Idea

Thus it is critical that the distressed bank have a preconceived idea of what applications are the most important in order to continue operations the following business day. Perhaps only four, six, or eight "wall-clock" hours of computer time will be available to the troubled institution. Thus, the need arises to determine which modules, programs and software are extraneous, relative to users' minimum requirements.

The same logic applies to the donor bank. There is a reciprocal aspect to the relationship between the two banks in question. Internal or external

emergencies may require "today's" donor to be "tomorrow's" user of "borrowed time." The need to accommodate the distressed bank today requires some degree of imagination on the part of the donor installation, perhaps some compromise of its ordinary processing cycles. It is, therefore, equally important for the potential donor installation to assess its minimum requirements and forego the execution of certain jobs ordinarily processed.

The establishment of priorities of system and application processing is not a spontaneous one, to be made under crisis conditions. In fact, the sophisticated organizational structures of many financial institutions prevent such a decision, or at least the authorization and approval of same, from being made by any one individual.

The bank's DP department, functioning as a user servicing division, may likely recommend actions from a hardware utilization standpoint. But the senior management representatives of demand deposits, commercial loan, payroll/customer services, savings, trust, mortgage, etc., have been known to discuss at length the relative importance of each of these applications

prior to determining the processing sequence of those systems.

In particular, the issues of which programs are to be deleted, and which reports are not absolutely necessary to users, constitutes an area of much contention. On the other hand, contractual arrangements with customers may preclude certain deletions.

In addition, certain constraints are introduced when the programs of one system, e.g., payroll, require access to the files of another system, e.g., savings, demand deposit, automated clearinghouse.

Still another by-product of such decision-making exists in the utilization of this "game plan" within one's own environment, following recovery from conditions which earlier had deprived the center of its ability to process. That is, the same priorities can be employed in-house to provide users with not less than a minimum of required data within hours.

As with all aspects of contingency processing plans, it remains that sufficient forethought and periodic review of these matters is warranted to ensure the concept's continued applicability.

DaCosta is a national bank examiner at the office of the Comptroller of the Currency of National Banks.

NOTICE

The world's most successful
computer data security system is

Secure.

It's available now from
Boole & Babbage.

Boole & Babbage, Inc.
Operations Division
510 Oakmead Parkway
Sunnyvale, CA 94086

In California:
(408) 735-9550
Outside California dial toll free:
(800) 538-1872

Data Protection More Than Physical Security

(Continued from Page S/2)

weaknesses of tape control.

Violations in these areas can produce loss of data integrity, loss of data confidentiality and loss or delay of system availability.

Considerable sums of money have been and will be invested in physical security — both physical access and fire protection. Basic physical protection is an absolute necessity. However, far too much of the security investment has been made in these areas of relatively low exposure.

About 50% to 80% of all losses are due to errors or omissions. Ten percent to 15% of the losses are the result of disgruntled or dishonest employees. These statistics illustrate the relatively

low importance of physical security.

In the area of data integrity, management must consider those times when data has been exposed to accidental or malicious alteration or destruction as well as incomplete data. Data confidentiality can be violated by the misuse of information by those authorized to use it for limited purposes or by lack of protection from unauthorized exposure.

Finally, system availability should be considered. This is when the system isn't available and functioning to fulfill information needs.

The next step beyond physical security is the establishment of controls over access to and updating of important information within the computing

system, or "logical security."

Since the vast majority of losses are accomplished by the organizations' own employees (either through errors or intent), it is logical then to limit the capacity of users to access information they might consider "their data."

This means specific functions should be authorized as opposed to the users of that function. For example, the jobs in the payroll system should be allowed to access the payroll master, but only if they are running payroll programs and only at the time these jobs are scheduled.

This concept of "functional" authorization is quite different from authorizing the people in payroll to do anything within the payroll master.

Considerable discussion has been carried on regarding logical security. However, it is a bit like the weather. No one has done much about it.

One of the reasons for this lack of action has been a failure to specifically identify the heart of the problem to be solved. The other, of course, has been the lack of reasonable solutions in terms of implementation, operational cost and ease of use.

Some noble experiments have been conducted and some impressive systems developed. However, few have proven generally feasible when evaluated for long-term use by commercial organizations.

A logical security system must be able to fit into the existing organizational and DP structure with a minimum amount of disruption. It must be flexible enough to allow for

existing shop standards on data sets and users names as well as accounting information structure.

The user should be able to migrate into a protected environment in a step-by-step fashion as data is added to the body of protected information.

Possibly the most important information to protect is the software system. This includes both vendor-supplied software as well as in-house applications programs. An organization's software investment is enormous. Its loss could easily cause the failure of a company.

Because of this, the operating system load libraries — those libraries essential to the operation of the computer — should probably be the first items protected. The next order of priority should be the general system libraries and critical production load libraries.

Once this is done, a continuing comprehensive protection scheme should be developed.

The ultimate question to be answered by data center and corporate management alike is how well will the company function without some, part or all of its computerized information.

If the answer to this question is poorly or not at all, then it's time to look at the total computer security picture. That goes beyond locks on the doors. It includes protection of the information within the system — a company's most important and valuable asset.

Murawski is product manager for Boole & Babbage's Operations Division.

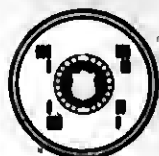
COMPUTER DISASTER.

95% of the computer contingency/recovery plans surveyed failed to work.

Would yours?

This startling fact has been revealed again and again in our review of the computer emergency recovery plans of many of the nation's top corporations. In our role as an independent computer security consulting firm for over 250 major companies, we have also found that only a few have even undertaken a formal risk analysis survey.

Considering what's at stake, perhaps you'd like to know more about our services. They include risk analysis, data security, physical protection, emergency/recovery plans, theft and fraud control as well as facility design. For more information contact: J. C. Matlock, Jr., Dept. C, 235 Northeast Loop 820, Hurst, Texas 76053, (817) 589-2244.



DATA PROCESSING SECURITY, INC.

Atlanta Chicago Dallas/Fort Worth Los Angeles New York Washington, D.C.

Winchester Data Module Carrying Case

Featuring foam interior contoured to fit data module for complete protection, heavy duty aluminum tongue and groove construction, piano-type hinge, double handle, strong claw-type latches, molded from tough, high-impact ABS with rounded corners, including 2 locking clasps.

Time's Running Out
Sale priced at

\$69.95

Regular \$84.95
offer good to 12/31/77



AMERICAN COMPUTER SUPPLIES, INC.

255 Alhambra Circle, Coral Gables, Fla. 33134 • Phone (305) 442-1300

Gentlemen: Enclosed is a check for _____ (unit(s)) at \$69.95 each.

COMPANY NAME _____

ADDRESS _____

CITY/STATE/ZIP _____

Please add \$5.00 for postage, handling and insurance. Florida residents add an additional 3% sales tax. No orders accepted without accompanying check or purchase order. Allow 10 days from receipt of order for delivery.

Quality of Supplies Plays Role in DP Site Security

(Continued from Page S/2)

original product.

The third and last recycling concept is one that at the time was not "new," but presented several challenges in the way of quality enhancement and more competitive pricing and delivery. The product and an industry-wide negative concept was termed "reprocessing." As stated, the basic logic of the recycle was already in existence, but with more research it was found that the current remanufacturing process was extremely limited and entirely unsatisfactory, resulting in a "second class" product and an industry-wide negative stigma. This necessitated the development of certain proprietary techniques, again reaching that place where the recycled product was to perform at least as well as the original product, if not better, as in the case of printer ribbons.

Recycling Vital

The logic of recycling included the common denominators of quality and pricing. The recycling process enables end user unit costs to be lowered anywhere from 50% to 300%. Here we have "smart" selling and reflectively "smart" buying. Recycling is not only logical, based upon materials utilization, i.e. cost savings, but becomes vital when conceptualized as an overall philosophy toward supplies and security.

One-half of the project to identify consumers' needs and how to fulfill

them was completed in that now the DP supply user was educated to the benefits of recycling and could opt for recycled products, thus obtaining optimum value and performance.

Before total security could be guaranteed, however, a still larger void had to be filled. The specification and application of the product consumed ran parallel to a tenet of total commitment of service. A simple and honest guarantee was needed that reflected the esteem of the DP personnel and the integrity of a supplier. Any product, for any reason, at any time could be returned for replacement or refund.

The archetypal sales manipulation, where a customer must be concerned with being misled or taken advantage of by a salesman, was no longer necessary. Rather a customer should be able to learn and gain understanding through the salesman's expertise, though objective analysis by the salesman of a customer's need might result in directing the consumer to purchase from a more qualified vendor, one that could even better serve the customer's needs. This is the salesmanship of a sales professional.

The best way for the consumer to obtain a product, then, is to deal with an organization that will be objective about his needs and will supply him with accurate and informative data to help him answer any and all questions.

Baker is president and chairman of the board of Computer Supply Corp.

The original name in magnetic media is the name to look for in information processing... BASF.



Back in 1932, BASF invented magnetic tape . . . the forerunner of all of today's magnetic media. Since then, we've had plenty of time to put together the best-performing, most comprehensive line of information processing media on the market.

Whatever you need in magnetic media, BASF makes it and makes it better. Ask our customers . . . most people who choose BASF make it their only choice. And, BASF quality costs no more than the competition. For details on BASF information processing media, write BASF Systems, Crosby Drive, Bedford, Mass. 01730; or call our nearest regional office: in Los Angeles, (213) 451-8781; in Chicago, (312) 343-6618; in Clifton, N.J. (201) 546-9111; in Montreal, (514) 341-5411; in Toronto, (416) 675-3611; in Dallas, (214) 233-6607.

 **BASF** The Original.

Computer Tape Hard and Flexible Disks Cassettes Mag Cards

Shared Backup Facility Lowers Investment

(Continued from Page S/2)
with time to share and with a compatible configuration and operating system, the user would still be unable to operate the on-line processing job because its communications system would not be connected to the other computer.

Many managers also think computer manufacturers can supply them with a computer and have it installed in a "couple of days."

Unfortunately, managers who operate on this assumption do so with a false sense of security. Although computer manufacturers will try to get a

computer to a company as quickly as possible, it will take them longer than a "couple of days" to set it up — and that's only one piece of the puzzle.

When disaster strikes a computer center, it often means electricians, communications specialists, contractors and other suppliers must be called in to rebuild the facility. A firm might have a new computer, but no place to install it for several weeks or even months.

Contingency Plan

Before setting up a ROC or becoming a member of a group that plans to share in a

center, the user should conduct a thorough risk analysis of the company's needs and develop a contingency/recovery plan.

The risk analysis will determine the effect and losses the company would have in its business momentum, competitive edge and cash flow should its DP center be destroyed. The study also should reveal the essential data necessary to operate during an emergency.

To help define, quantify, set priorities and put into perspective the major objectives for development of an overall corporate plan, a five-phase approach is recommended. Typically, a phased approach tailored to meet the needs of a company is beneficial from the standpoint of resource utilization and establishment of objectives. It also provides

• Update and finalize project schedule to completion.

Phase III — Analysis

• Problem resolution(s).
• Cost analysis.
• New or revised procedures as required.

• Outline for emergency recovery documentation.

Phase IV — Preparation of Plans

• Emergency actions, training and recovery checklists.

Phase V — Test Plan

• Develop scenario, conduct recovery exercise, post-exercise workshop.

By compiling this information, a user will be able to decide if a ROC would be a feasible investment. If it is, the next step would be to evaluate data pertaining to cost, operational requirements and location.

Cost is a factor. The user might find it's too expensive

\$39,000 for each member after taxes, if all costs are shared equally.

This makes it a reasonable investment for a corporation to prepare a ROC to back up its computer operations.

Operational requirements for each member firm would vary. For example, one member might need 10,000 sq. ft. of raised floor space while the others might be able to get by with a minimum of 2,500 sq. ft. of raised floor space.

Location is important. It should be within reasonable proximity to its members and it should be in an area reasonably safe from earthquakes, tornadoes, floods, hurricanes and power shortages.

Additional questions which must be answered include: How many personnel will be assigned to the center? How

If you see the name of your terminal

HEWLETT  PACKARD

CCSID

ROC



COMPUTER
DEVICES INC.



**ANDERSON
JACOBSON, INC.**

get sensitive.

You are probably paying more than you should for thermal paper. We can change that. Try us. Send for free roll. Come to the Sensitive Paper People.



GRAPHIC CONTROLS
COATED PRODUCTS DIVISION

sensitivity coupon

CW-12-26

Send one free roll to fit:

Terminal Name _____ Paper Number _____

Annual Usage: _____ rolls

Name _____ Phone _____

Firm _____

Address _____

City _____ State _____ Zip _____

Mail to Coated Products Division, Graphic Controls Corporation,
P.O. Box 1309, Buffalo, NY 14240

Or call for free 800-828-7978.

(In New York State, call 716-847-7500.)



If a fire destroyed your company's computer center, how quickly could you recover?

periodic milestone reporting of progress and problems to senior management.

The five phases are:

Phase I — Initial Planning

- Orient staff on contingency/recovery planning.
- Develop objectives, goals and responsibilities.
- Determine scope of activities.
- Develop initial task/task force work matrix.
- Review and analyze existing documentation, studies and reports.
- Develop initial milestones, project definitions and resources.

Phase II — Fact-Gathering

- Assemble inventories of files, systems, applications, documentation and other computer-related components.

- Define problem(s).

- Specify guidelines for non-DP requirements such as insurance, legal and auditing.

to build an off-site computer center only for his company as insurance on a "what-if" basis.

ROC Network

To reduce that expensive initial investment, several companies are planning to participate in a national ROC network in their own areas.

The ROCs will provide each member with its own necessary data communication network for on-line processing, electrical power, air conditioning, raised flooring and equipment that will require a long lead time to order such as communication modems, scanners and check sorters — all of which are essential for some corporate computer operations.

The cost to prepare a ROC is estimated to be approximately \$750,000. However, with 10 members sharing the facility the cost per member would be \$75,000 before taxes, or

many shifts will be required? What services — such as security guards, janitorial and parking — will be needed?

The manner in which a ROC is used varies from company to company. Some groups plan to use it only until their primary computer centers are repaired and in operation. Other groups are thinking about installing a computer in their ROC to use for testing and systems development projects. This will enable them to take a load off the day-to-day demands made on their primary computers.

Of course, all companies don't need a ROC.

But for companies that can't afford to operate without their computers for any given period of time the ROC may be a whole new approach to security.

Scoma is president of Data Processing Security, Inc., a computer consulting firm.

Using Cost-Effective Methods

Good Security Based on Detailed Risk Analysis

By T.Q. Stevenson

Special to CW

Concern for security has grown rapidly in the past several years. Good security is based on a risk analysis, which helps determine where possible exposure is and how much there is. It also helps tell the manager what could be done to reduce the exposure and how much the reduction will cost. However, risk analysis can itself be expensive. So it should be performed with careful forethought and use of cost-effective methods.

The general activities in risk analysis are:

- Gaining a commitment by management to undertake the study and to act upon its recommendation.

- Setting up a risk analysis team which represents the key units involved in data processing. The team should have a clear charter and corresponding authority to conduct the study.

- Defining need for security. Defining security needs includes evaluating the sensitivity of items in the DP environment to compromise. The data and software, the processing of data and the capital investments in facilities and equipment have certain values to the DP organization and to the owner of the data or software.

A possible intruder may also assign a worth to these items. Compromise may be by disclosure for data and software or by modification or destruction of data, software, processing operations, facilities and equipment.

Sensitivity Categories

A compromise may also be just a slowdown in processing certain data. Sensitivity should be measured in four categories: data integrity, data confidentiality, operational reliability and asset integrity.

Defining a need for security should also include evaluating potential costs of loss if a compromise should occur in the four sensitivity categories. These costs should also relate to values to the DP function, user (subject or data owner) and to any possible intruder. Does data value decrease with time, is a program proprietary, is money handled or is inventory data processed? Answers to these, and other questions are required to properly evaluate costs of loss.

Another aspect is evaluating possible threats which may cause compromise to occur in the four sensitivity categories. These should be lists of reasonable types of occurrences. The lists should include those small, apparently harmless problems such as temporarily lost files, misrouted output, etc. Complete scenarios and simple events should be considered.

Calculating the annual cost of loss is yet another aspect. This value is often labeled the Annual Loss Expectancy (ALE). The ALE is the sum of the products of potential costs of loss and frequencies of compromise for each sensitivity category. The installation ALE is the sum of the category ALEs.

- Evaluating existing security by the four categories — data integrity, data confidentiality, operational reliability and asset integrity. One must know current conditions to make improvements. The results of this activity

should correlate and be compared with those of evaluating sensitivity. Weak areas are easily identified as well as areas which may be overly protected.

- Designing protective measures from the results of the sensitivity, threat, frequency and ALE evaluations. These measures will identify which applications or assets will have average or high protection, as well as where risk exposure will be tolerated.

The strategies may separate or combine treatment of the risk by sensitivity category. Then the specific detailed safeguards can be analyzed.

Finally, the specific protection measures should be assembled into two or more proposed systems of protection.

The costs and loss reductions for each proposal are required along with cost per dollar of loss reduction.

- Reporting to management is the final step, but communication to management should not be limited to this activity. It is required throughout the analysis to inform and to help develop a prudent security system. The final report should propose at least two options.

These general activities are sometimes combined or rearranged depending on the particular method of risk analysis. A good method considers all items in the DP environment, but requires minimal labor and time while yielding valid results. There are several

possible techniques for reducing costs, including simple sensitivity ratings, sampling procedures and order of magnitude estimation.

An important concept related to risk analysis is that it is a task which should be conducted periodically. Conditions change from year to year and the first study may yield results which are hard to validate. Subsequent studies will accommodate changing conditions and refine and support prior work. Objectivity and reasonableness of estimates are essential also for validity.

Stevenson is a computer specialist with the U.S. Department of Agriculture.



Digital Cassettes are many and varied. Quality is important, but compatibility is just as important. High quality cassettes on the wrong units don't make for quality performance.

Syncom offers more machine compatible cassettes than any other supplier. For the right cassette, ask one of our "cats" in the field.

Disk Cartridges, Disk Packs, Data Modules, Computer Tape, Flexi-Discs, Digital Cassettes, MC/ST Magnetic Cards, Toners for Xerox & IBM Copiers.



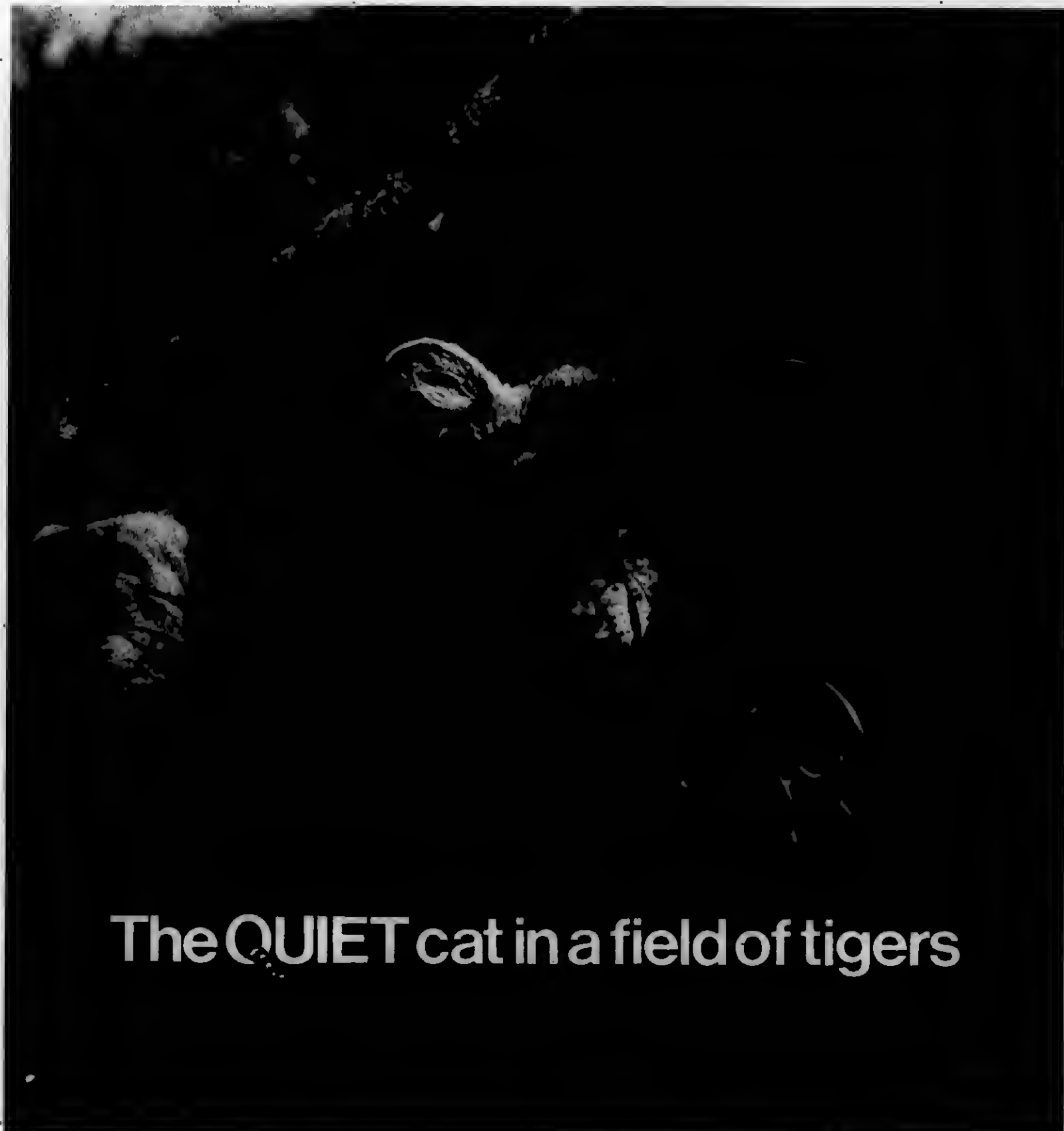
SYNCOM
INCORPORATED

ONE SYNCOM PLACE
ORCHARD PARK, N.Y. 14127
TEL. 716-662-2181
TWX 710-264-1953

OFFICES IN MAJOR CITIES

DISTRICT OFFICES:

Atlanta (404) 325-8767, Cleveland (216) 228-6691,
Dallas (214) 436-0231, Detroit (313) 341-0685,
Greensboro (919) 273-1933, Houston (713) 661-1219,
Los Angeles (213) 332-2193, New Orleans (504) 729-3691,
San Carlos (415) 591-2686, San Diego (714) 496-4605,
San Francisco (408) 629-9666, Toronto (416) 622-6660.



The QUIET cat in a field of tigers

3270/3790 Users: Why wait for 3274s or 3276s? Raytheon's PTS/1200, the highly does much more. And you can get it

Waiting for the next new product advance can often make a lot of sense. Unless there is an immediately available alternative that has far more capabilities and can produce far greater cost savings and productivity benefits.

Raytheon's PTS/1200 system is such a product. It is a fully-programmable distributed processing system that uses an easy-to-use English-language compiler, has a main memory capacity of up to 128K bytes, handles up to 32 operator displays—plus dozens of additional downline displays in a multipoint network control mode—and can have a large peripheral equipment complement and local data base as well.

And the PTS/1200 operates in a fully compatible mode with IBM 3270 operator display devices. It not only emulates every 3270 function, but it performs total batch processing and spooling functions as well—simultaneously—and with no degradation in response times in either interactive or batch mode.

If you are waiting for the next 3270-type product to come on the market, wait no longer. For the PTS/1200 is far more powerful, cost efficient and adaptable—in a 3270 environment—than any product you can find today. And you can take delivery in just 30 days.

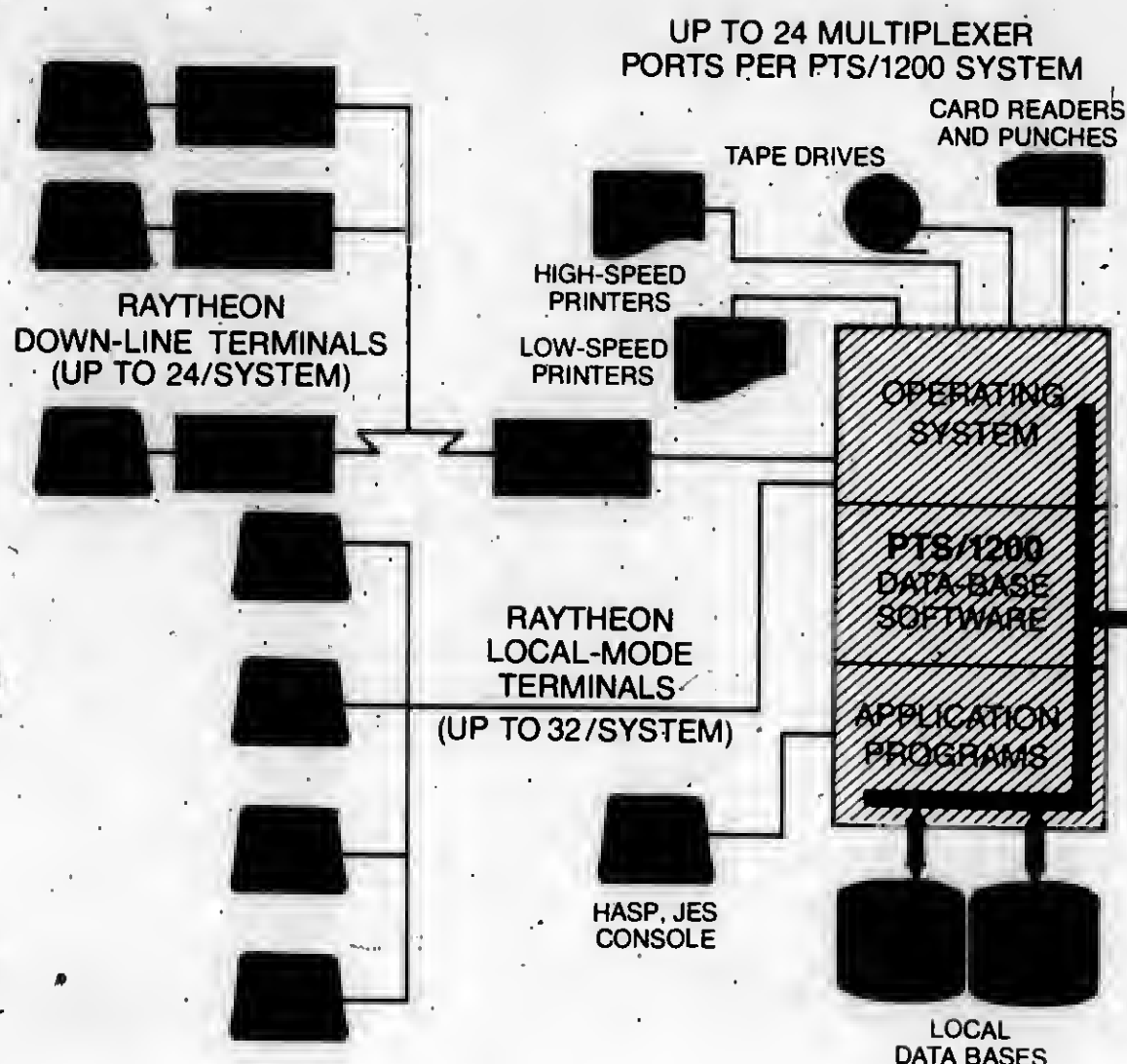
Look at what else the PTS/1200 can do for you:

- ✓ Operate in full 3270-compatible mode
- ✓ Control up to 32 operator displays
- ✓ Perform local batch processing concurrently with 3270 interactive processing
- ✓ Attach up to 24 peripheral devices
- ✓ Attach a large local data base
- ✓ Perform all 3270-type data entry tasks
- ✓ Perform all 3270-type inquiry/response tasks
- ✓ Operate as a HASP/JES workstation at the same time it is performing 3270 emulation
- ✓ Perform multiprogramming functions
- ✓ Control, in addition, a multipoint network of up to 24 terminals in 3270 mode.

Consider these five benefits, and you'll look a lot harder at the PTS/1200:

1. No Change To Host Processor

The PTS/1200 installs immediately within your existing network with no change required in your host CPU, in the 370X front-end, in your existing applications software, or in your Emulation Program. It goes to work under 3270 bisynch protocol the day you install it.



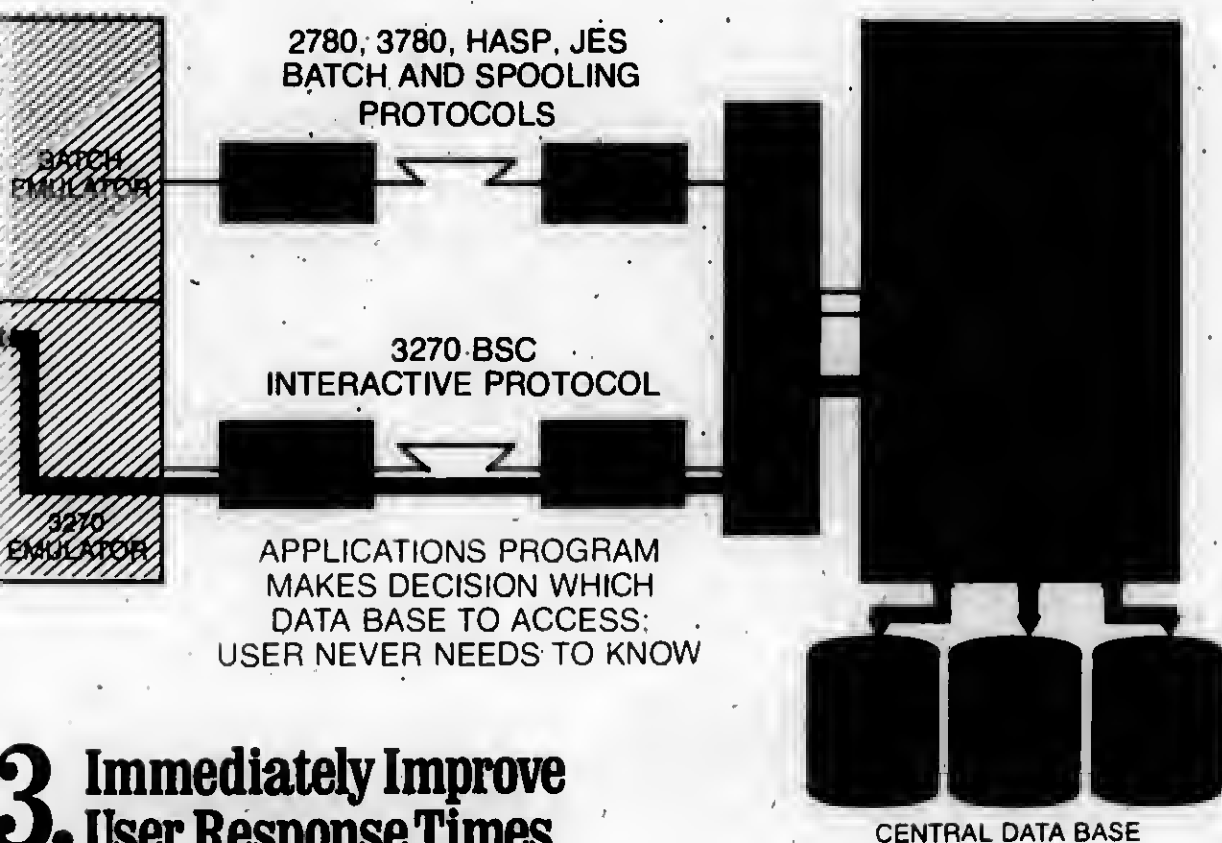
2. Cut Mainframe Overhead

The enormous power of the PTS/1200 permits you to develop and store local formats and perform advanced data editing prior to transmission to the host CPU. This one feature alone can reduce your mainframe overhead by 30 per cent or more. The PTS/1200, in addition, runs its own multipoint network of up to 24 Raytheon terminals in 3270 mode—saving even more CPU time.

Intelligent terminal system, in just 30 days.

4. Reduce Communications Line Loading

With the PTS/1200, you perform a high percentage of the data entry and inquiry functions of a 3270 locally. In many cases, that can eliminate up to 90 per cent of the wasted communications overheads involved in polling, ACKing and NACKing, and in retransmitting. Your system becomes much more efficient in its use of communications lines.



3. Immediately Improve User Response Times

The busy times that often degrade each operator's response time from the host CPU disappear when you install a PTS/1200. Instead of operator waits of 20 or even 30 seconds when the network is busy, with the PTS/1200 the response is instantaneous for every operator, with every transaction. Multiply the number of operator stations by the number of messages by the average degradation delay and you get some feel for the productivity advantages that the PTS/1200's local format and data base storage features offer you.

- ☐ Tell me more about the PTS/1200. I am currently planning to develop _____ 3270-type links, with about _____ terminals, using Model _____ mainframe equipment.
- ☐ I need immediate delivery of _____ 3270 emulation terminals. Tell me how fast I can get them. We'll talk about PTS/1200 features later.

Name: _____

Title: _____

Company: _____

Street: _____

City: _____

State: _____ ZIP: _____

- ☐ I'm also interested in:
- _____ PTS-100 intelligent terminals
 - _____ Raytheon's packet network systems
 - _____ Your New OEM/Dealer Support program

Why wait? Get PTS/1200 today to solve the capacity problems you have today. Order now, and Raytheon will ship you a basic PTS/1200 system — or just basic Raytheon terminals in 3270 mode — within 30 days. And when Raytheon delivers, you get more than just a product. You get the experience of having installed more than 50,000 2260/3270-type terminals world-wide. You get a field service organization that spans the globe. You get a commitment to customer support that is second-to-none. You get the sense of security that comes from dealing with one of the world's largest corporations. You get the back-up of an aggressive technological pioneer in data communications network development. And you get Raytheon's pricing leadership — which means savings of about 20 per cent or more over major competitive products. Raytheon: our job is to anticipate your network needs and fill them before anyone else can.

Intelligent Terminals, Minicomputers, and Distributed Processing Systems

RAYTHEON DATA SYSTEMS

1415 BOSTON-PROVIDENCE TURNPIKE • NORWOOD, MASSACHUSETTS 02062

Call Director, Field Marketing, at (800) 225-9874 (toll free)

Inside Massachusetts call (617) 762-6700 • TWX: 710 336-0646 • TELEX: 92-4408

ATLANTA (404) 321-3064 • BOSTON (617) 237-4190 • CHICAGO (312) 694-4420 • DALLAS (214) 661-9722 • DENVER (303) 371-0990 • DETROIT (313) 358-3990 • GREENSBORO (919) 294-5811 • HARTFORD (203) 243-2939 • HOUSTON (713) 771-5851 • LOS ANGELES (213) 770-4240 • MIAMI (305) 592-3884 • NEW YORK CITY (212) 661-2790 and (212) 895-2567 • PHILADELPHIA (609) 665-8466 • PITTSBURGH (412) 281-2117 • SAN FRANCISCO (415) 692-4640 • SEATTLE (206) 453-0650 • TULSA (918) 663-7852 • WASHINGTON, D.C. (703) 979-6100.

RAYTHEON

Wide Range of Tape, Disk Capabilities Offered

By S.H. Tullman

Special to CW

The evolution of computers into machines of various looks, sizes and applications has brought a corresponding growth in magnetic media such as computer tape, disk packs, disk cartridges, data modules and floppy disks.

The important difference between tape and disk is in the way the information is organized and stored and conse-

quently used by the computer. On computer tape, information is stored and has to be processed in sequence, whereas on disk products, information is stored in specific places on the disk and can be reached at random.

A simple example is processing the information on a name and address file. On tape, all names would be listed alphabetically from Aaron to Zwicker, and if you want to

change Zwicker's address you would have to read all the way through the tape to find Zwicker. But on a disk you would skip all of the areas with names from A to Y and look only where the Zs are stored, so you would find Zwicker in a fraction of a second.

So time is a key factor to consider when deciding which type of storage medium to use. Whereas tape can store much

more information for the money than a disk can, tape is quite slow. A tape recorded at 1,600 bit/in. could contain as much information as a whole disk pack and cost as little as 10% of what that particular disk pack costs, but it may take much more computer time to process tape-stored information.

The most common and oldest of all the media products is computer tape. It is

generally 1/2 in. wide and comes in lengths from 200 ft to 3,200 ft and a common version is a 2,400 ft roll on a 10-1/2 in. tape reel.

Today most tape is written at a density of 1,600 bit/in. on 9 tracks. If one compares that with the familiar punched card it means the 2,400 ft reel can store as much data as 250,000 punched cards.

Most manufacturers offer a premium and a regular grade of computer tape. The usual difference between the products is how thoroughly and to what standards the product has been tested or certified. Certification generally means data has actually been written on each reel and then read back to make sure there were no errors.

Tape is manufactured by coating wide rolls of polyester film with an oxide mixture, which looks like light brown paint. This coated roll is then slit into 1/2 in. wide tapes which are then wound into individual reels.

The slitting process is an especially critical manufacturing step. Since oxide is like paint, a sloppy job of slitting tape will literally produce a ragged edge of oxide which can shed debris on the tape during use and produce errors.

After slitting, the tape is cleaned and checked to make sure it will meet all necessary specifications. The coating, slitting, cleaning and testing of computer tape is all done in special "clean room" manufacturing areas.

Over the last 10 years tape has generally become less expensive while improving in quality. Prices are not expected to fall any further and at approximately \$10 to \$15 a reel, tape is what *Consumer Reports* might call a "best buy" in magnetic media.

Disk Media

The other most common media products are disks, which include disk cartridges, disk packs and data modules. Disk cartridges generally consist of one platter or disk inside a sealed plastic housing. Disk packs have stacks of platters, as few as three or four or as many as 12.

Data modules are the latest generation of disk packs and these have read/write heads and access mechanism built right into the unit. (Regular disk packs do not.) Disk packs are just stacks of platters the read/write heads and access mechanism are part of the drive.

A disk works in much the same way as a record. Let's say that you only want to hear one line of a song and that line is in the 10th groove. You could put the tone arm right into the

(Continued on Page 5/12)



Seek. In seconds the Bruning 96 sorts through thousands of pages to find the page you need.



Copy. The Bruning 96 makes a hard copy for distribution and follow-up.



File. The Bruning 96 automatically returns the microfiche to the file cartridge.

We've got it all buttoned down. The Bruning 96 retrieval/printer.

The Bruning 96 is your versatile off-line link to the on-line world.

It allows a much broader data base than a computer terminal, at lower cost. And it accommodates photographs and illustrations.

The Bruning 96 gives you push-button access to any of up to 8,000 microfiche frames in a cartridge, in an unlimited number of cartridges.

Once the page you want is up on the big, bright screen, you can make a hard copy in seconds.

And the fiche is returned to its place in the cartridge automatically.

The Bruning 96 is the economical alternative to

computer terminals. But it's not a compromise. For your growing needs, it's an improvement.

The Bruning 96 is another innovation in our reliable line of microfiche retrieval systems.

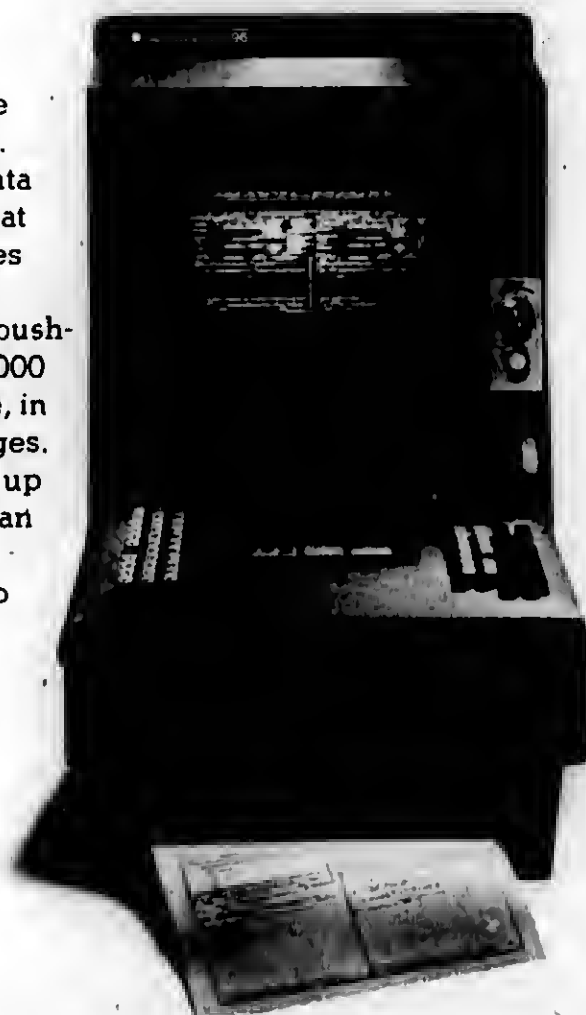
There's a Bruning retrieval system tailored to your needs.

Call your local Bruning Sales Office for a demonstration. Or write Bruning Division, 1834 Walden Office Square, Schaumburg, Illinois 60196.



BRUNING

DIVISION OF
ADDRESSOGRAPH MULTIGRAPH



'Planted' in Cabinet

Simulated Bomb Threat Uncovers Security Holes

By Ken Lord
Special to CW

Many companies have an emergency disaster plan to protect their computer equipment and data, even though such a plan is rarely or never tested.

Other companies do not even have a plan. One such company was concerned about security and protection of its facility and in 1975 hired an investigator to study its security needs.

One section of that investigation simulated a bomb threat emergency and occurred as follows:

The investigator planted a small package — a white jewelry box tied with a pink ribbon and containing a note — inside the communication cabinet of the facility's computer.

The next morning, the investigator advised an employee of the existence of a simulated emergency and presented him with a list of persons to be assembled in a meeting. Representatives of all departments met with the investigator in the facility's conference room, where he announced the existence of a planted "bomb" and stated the group had 45 minutes to find it.

It would seem logical that the facility should have:

- Had a plan for such a contingency — other than just notification of civil facilities. No such plan existed.
- Planned for leadership for the search of the facilities for the device. No search assignments were made.

The search had been localized by the investigator as being in or around the computer facility, in the manner of a telephone call which might have been received from a perpetrator. Among the non-DP personnel present, there seemed to be general confusion as to what they should do. Some communication was passed to areas under their supervision, but generally those people merely took part in the search — with no concept of what they were looking for, the areas in which they should look for it or how to go about it. Their interest was admirable, but the following things were observed:

- Rumor ran rampant through the facility.
- People had no concept of how to open cabinets to look inside them.
- Cabinets that could be searched were searched several times by various people.
- There was no organization to the search, either on the part of the DP people or non-DP people.

Search Narrows

At this point, the search was localized a second time by the investigator. He declared data entry, user areas and the tape library free areas and further ruled out the necessity for above-the-ceiling and beneath-the-floor searches. This may well be a luxury not permitted by the perpetrators of such an incident.

When half the allotted time had been used up, or the point at which the facility should have been evacuated, the investigator terminated the exercise and located the parcel for the searchers. It should be noted that it was subsequently determined that at least two people had searched in the cabinet where the parcel was located, in the back of a wide-open cabinet. The meeting was reconvened in the

conference room.

In the subsequent meeting someone pointed out that the investigator could easily place the parcel since he had easy access to the facilities. But the investigator contended the parcel was placed in a cabinet approximately three feet from the computer's CPU, a distance roughly equal to the distance between the CPU and the outside wall of the computer facility (on the assembling side) where the "bomb" could have been planted by a perpetrator without access to the computer facility itself.

Is such an incident possible? The preponderance of evidence suggests it is. The facility has had some bomb scares.

How valid are bomb scares and bombing incidents nowadays? Merely four days after the inspection, 10 incendiary bombs were placed in various department stores in a nearby city. Admittedly these were planted by a group of militants during a convention. Not relevant? Perhaps. Suppose such a group chose to demonstrate its demands in an action against this company?

On the day following the simulated incident there was, among facility personnel, keen interest as to when the planting of the package had taken place — in other words, "Whose fault was it?" Fault is not at all the question. Clearly, everyone was at fault. There

was ample opportunity for the investigator to place the package in any place at any time on any shift.

It should be noted that some of the managers had little understanding of what was important to remove in time of crisis. One person, for instance, in a later discussion with the investigator, indicated she had no idea what records should be removed should a real incident occur. The woman who handles payroll indicated she did know what documents to remove, but observation of those documents gave no indication of their importance in order to permit someone else to evacuate the "books of record," should she not be available.

(Continued on Page 5/13)



superb quality of Verbatim® removable magnetic storage media is now on a dealer's shelf not far from you.

The reason Verbatim is now so accessible is that so many of you like the Verbatim idea: noticeably better quality and durability that show up in tough everyday use. The reason? We make almost everything ourselves, because we found that we could improve on the quality that we were getting from our suppliers.

Being demanding isn't always easy. But it's good for the people who buy and use Verbatim, and it's good for the scores of companies who specify Verbatim for the equipment they make. And we enjoy doing business that way.

Information Terminals Corp., 323 Soquel Way, Sunnyvale, CA 94086. (408) 245-4400. TWX: (910) 339-9381.

In the Far East:
ITC—Far East
404 Roppongi Skyheights
3-2-21 Roppongi, Minatoku
Tokyo, Japan
Telephone: (03) 583-1981
Telex: J 47879

In Europe:
Information Terminals S.A.
Case Postale 296
1215 Genève 15
Switzerland
Telephone: 41 (22) 34-90-55
Telex: 22647 ITGE CH

For your nearest sales office call toll free: (1) 800-821-3648 (in Missouri call: 800-892-7655, Ext. 515)

Ask for it by name.

Verbatim

minidisks

Verbatim

Dear Verbatim people:
Tell me where my nearest Verbatim dealer is.

My name is _____
Title _____
Department _____ Tel. _____
Organization _____
Address _____
City _____ State _____ Zip _____
And while you're at it, send me literature on _____

Information Terminals Corp., 323 Soquel Way, Sunnyvale, CA 94086 (408) 245-4400
89-12-26-77

Wide Range of Storage Capabilities Available

(Continued from Page S/10)

10th groove and play it. Now just consider a stack of 10 records bolted together with perhaps an inch of space between the records. You put this package on an unusual looking record player with 9 tone arms and two needles (top and bottom) on each tone arm. This player can play all records simultaneously. That is a picture of what looks and functions like a disk pack and a disk drive.

These disk packs spin as fast as 3,700 rev/min while the heads fly across the disk without actually touching it to locate a precise spot on any one disk and read the information.

Disks can store tremendous amounts of information. Disk cartridges store from 500K bytes to more than 3M

bytes, while the largest disk packs can store 300M bytes. A 100M byte pack, for instance, can store the names and addresses of the entire population of Switzerland. And the disk drive can retrieve an address on that pack in about .03 sec.

The first step in making a disk pack is to coat aluminum disk with an oxide (paint-like) formulation. These disks are then baked to bond the coating to the aluminum and finally polished to remove any irregularities. The coating and polishing operation is a very sophisticated and usually highly guarded secret of each manufacturer, for it is here that the recording capabilities of the disks are determined.

Finished disks are assembled into

various disk pack models, which are further tested or otherwise prepared for use in a computer system. Disks are very sensitive and require a clean and air conditioned environment. Because the read/write heads fly over the fast spinning disks on an air cushion much smaller than the diameter of a human hair, a particle of dust or some other contamination can abruptly end that flight in a crash onto the disk surfaces and in the process destroy a lot of stored information.

There are many kinds of disk models. Disk cartridges, for example, come as "front loaders" and "top loaders" which of course refers to how they are "loaded" into the computer.

Disk packs also come in many models that are referred to by names

like "11 High" and "12 High" (refers to the number of disk in the stack) or 3330s and Trident (refers to the name or model number of the drives that the pack fits on.)

Data modules are a special kind of disk pack which have the heads built right into them. Data modules are expensive, but can process the data extremely fast so that they are in fact a rather efficient storage device.

Disk pack prices range from as little as \$100 for some cartridges to more than \$1,500 for data modules.

Flexible Disks

A product that offers the best feature of tape and disk storage is the floppy disk, also known as a diskette or flexible disk. It is an inexpensive storage medium like tape but provides addressable information storage like a disk.

The floppy disk (the most common version today is recorded on one side only) holds as much information as 2,000 punched cards and can provide information from anywhere on the disk in less than half a second.

The disk, about the size of a 45 RPM record, is cut from a plastic film, much like computer tape film, and is placed and sealed into a special PVC jacket. This jacket serves as a loading device and has a liner which continually cleans the disk.

The head (the read/write magnet) moves across the diskette and unlike the "hard" disk, the head actually touches the flexible disk. Consequently, the ability of the media to perform without wearing out (rubbing the coating off the disk) is an important product quality.

There are a number of flexible disk models available. Some of the newest models have achieved greater recording densities by either one or two changes to the standard floppy disk: one model doubles the data stored on one side by writing twice as much information per track (referred to as a double-density model) or by using both sides of the disk a new model is doubling the data that can be stored on each diskette (referred to as a double-sided diskette).

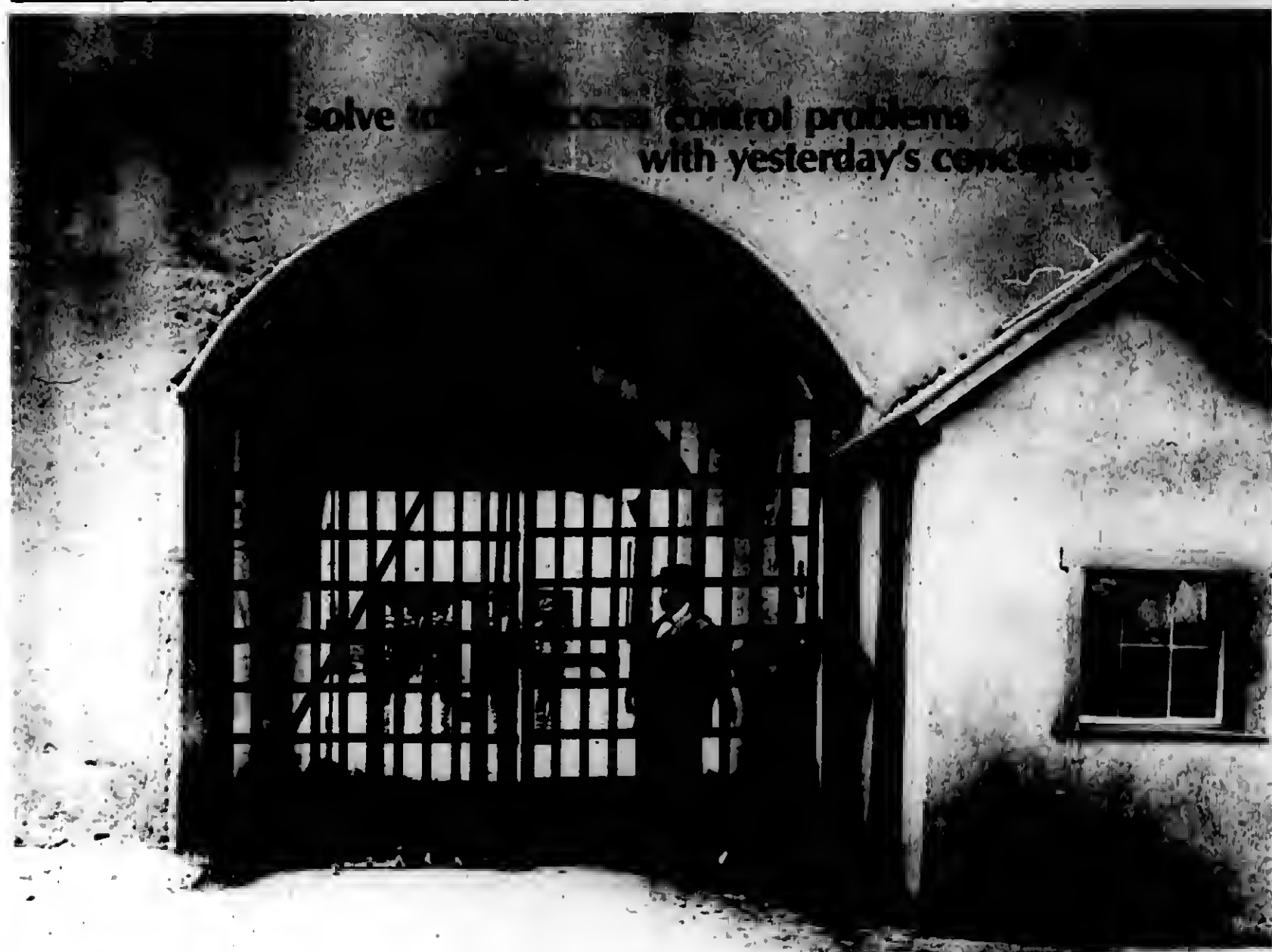
There has also been something called a "flippy" floppy. It can be used on both sides, but the user actually pulls the diskette out of the drive, turns it over and puts it back, whereas a regular double-sided diskette is written/read on both sides by the drive and does not need to be removed and turned over. This is like playing both sides of a record without having to flip it.

Future models will allow double the data on each side of the disk and will use both sides — in essence quadrupling the available storage capacity.

Prices for the floppy disks fall into the \$5 to \$8 range. Double-sided, double-density and mini diskettes cost slightly more.

Magnetic media products are like people. They are not always perfect and need special care. They only like to function in climate controlled and clean environments. Dirt, dust and rough handling are not welcome. But if properly cared for they can do an incredibly efficient job for a very long time.

Tullman is product manager of Computer and Business Products for BASF Systems.



Consider the hidden alternative — Schlage Electronics Access Control System

Schlage Electronics introduces an access control system that not only eliminates the need for guards and conventional keys, but for card slots or pushbuttons as well. It's the "hidden alternative," the first practical application of electronics technology to control access for business, industry, even residential complexes. Easy to use and install. Regulates and records access by door, time and individual. The Schlage system operates by proximity. A hidden sensor scans a credit card-size command card and transmits signals to a control unit, which regulates access, and to a printer, which records access and attempts. You program the system to suit your needs. Planning and installation is as close as your nearest Schlage Electronics dealer, backed by over 50 years of security service. You can start solving today's access control problems by calling toll-free, (800) 538-1755. In California call (408) 736-8430.

When a valid command card passes within 4 to 6 inches of a concealed sensor, the door is activated immediately. Command cards may double as employee ID cards and can be used to activate the Schlage system while remaining in a pocket or purse.

SCHLAGE ELECTRONICS

A Schlage Lock Company
1135 E. Arques Avenue
Sunnyvale, California 94086
(408) 736-8430



Instead of Tapes, Disks

Mag Cards, Cassettes Provide Storage Options

By S.H. Tullman
Special to CW

For the user who is looking for an alternative to tapes and disks, digital cassettes and magnetic cards could be the answer.

The Phillips-type digital cassette looks like the very familiar audio cassette for cassette tape players and is used for data entry, data storage, point-of-sale terminals, archival retrieval and power-typing applications. The only differences between audio and digital cassettes are in the tape used and in the internal design.

Digital cassettes are loaded with computer tape, not audio tape. And the accuracy and speed demands made on the digital cassette are met by a much more precise tape guide system, pressure pads and a sturdy housing which

can always be opened by removing the five screws.

Besides the regular Phillips-type there are two other kinds of digital cassettes available. One is the 3M Corp. data cartridge — about the size of an 8-track audio cartridge — and the other is the mini digital cassette — simply a miniature version of the Phillips-type cassettes.

Cassette Features

Digital cassettes record information much like a computer tape and can store the same amount of data as 4,000 punched cards. These cassettes are easy to load, easy to mail and quite rugged and costs about \$10.

Last but not least is the magnetic card, which is used on IBM's Magnetic Card Standard Typewriter and similar machines. Although the "mag" card is mostly thought of as a "word processing" rather than a "data processing" medium, it is a digital storage medium and manufactured like computer tape. The coated film is slightly thicker than tape and instead of being slit into ribbons, cards are punched from the film.

The most common use of cards is on "automatic" typewriters. Here the card functions like the paper roll in a player piano. The letter instead of the song is recorded by magnetic pulses rather than holes and after the card is put into a slot, the typewriter cranks

out a letter or whatever.

The magnetic card is the same size as the popular punched card. But the important difference is that the information is electronically recorded on the mag card, while on the punch card the pattern of punched holes determines the retrievable information. Each card has enough storage capacity to record up to an average two-page business letter. But the actual capacity is dependent upon the design of the machine.

Most cards are sold in file boxes of 25 cards and cost anywhere from \$15 to \$25 a box.

Tullman is product manager of Computer and Business Products for BASF Systems.

Firm Discovers Security Holes

(Continued from Page S/11)

On the subject of payroll records, it should be remarked that the cabinet in which these records are maintained is anything but secure. While the cabinet may offer some fire resistance, albeit marginal and dependent on the correct functioning of the overhead sprinkling device, the cabinet itself is not secure and its plastic front can be opened with a common jackknife. It was observed by the investigator that there seemed to be in other areas little knowledge of what records to remove or any program of common marking for identification of such records for evacuation.

Some recommendations for improving security include:

- More concentration on security concerns by either the present security officer or other officer designated for the purpose.
- Establishment of rumor control procedures.
- The immediate development of organized searching methods and training of people in those methods.
- The immediate development, in association with the police, of a comprehensive security program.

This article was excerpted from the book *The Data Center Disaster Consultant* by Kenniston W. Lord, Jr. and is available from Q.E.D. Information Sciences, Inc., 141 Linden St., Wellesley, Mass. 02181.

DATA ENTRY PROBLEM SOLVER

World's leading authorities present—Key to successful Data Entry operations. New 275 page Manager's "How To" guide—"DATA ENTRY PROBLEM SOLVER"—Tells how to

- INCREASE KEYSTROKING RATES
- SELECT SUCCESSFUL OPERATORS
- DECREASE COSTS AND COMPLAINTS
- STOP CONTINUAL ABSENTEEISM
- REDUCE OPERATOR TURNOVER
- BUILD DEPARTMENT MORALE
- SUPERVISE WITHOUT PROBLEMS

FREE DETAILS

DATA ENTRY DIGEST
10522 Ridgeway Dr., Santa Ana,
Calif. 92705, (714) 838-2060



The Powerful Difference in Business Computers

Let's face it. Since we're going up against some pretty tough competition in the data processing industry, we had better have powerful points of difference to set us apart from the other guys. We do!

MCS—your single source. We offer a total computer systems package including: the MICOS® Operating System; proven hardware; generalized applications software; and responsive maintenance; all backed by top computer professionals with years of experience in the industry.

MICOS® offers you expandability. Whether you're a \$2 million company or one of the Fortune 500, MCS has a MICOS® computer system which provides a user with all the power and flexibility he needs for today and tomorrow.

MICOS®—operating system power. Ours is the most powerful and sophisticated

operating system available on a mini today. MICOS® provides multi-terminal capacity on distributed or stand-alone processing systems. It can support up to 256,000 characters of main memory and 320,000,000 characters of disc capacity. MICOS® uses a high level, interactive language putting the user in constant two-way communication with a computer.

MICOS® applications depth. MICOS® systems are running applications such as order entry, inventory control, receivables, payables, payroll, general ledger, and, of course, program development, to name just a few.

All the benefits of the MICOS® factor can be yours for far less than you might think.

Call or mail the coupon today.

Mini-Computer Systems CW-1-2
525 Executive Blvd., Elmsford, N.Y. 10523
(914) 592-8812

I'm ready for the Micos® Factor

- ☐ Send me more info.
- ☐ Have your sales representative contact me.

Name

Title

Company

Address

City

State

Zip

Tel.

Mini-Computer Systems, Inc., 525 Executive Blvd., Elmsford, N.Y. 10523 • (914) 592-8812
Atlanta (404) 981-1442 • Boston (617) 933-8670 • California (714) 870-7660 • Canada (416) 624-0320 • Dallas (817) 640-8800.
Houston (713) 493-9580 • Miami (305) 920-5313 • New Orleans (504) 454-6193 • New York (212) 355-3160
Pennsylvania (215) 648-0880 • Tampa (813) 877-5331 • London (06) 2836136 • Paris 8997143



When I buy Digital's concept of distributed data processing, how will it affect my DP staff?

Some distributed data processing systems can mean new additions to your DP staff. New people to hire. New languages to learn. New ways to work.

Our concept is different.

Digital's systems are designed to be operated by clerical personnel who can enter and retrieve data as it occurs.

System implementation is faster. And *your* people can work with tools they already know. Like COBOL. RPGII. And industry standard communications protocols. What's more, we give them a set of additional tools that are easy to learn. Including CODASYL-compatible database management capability. State-

of-the-art screen formatting and data manipulation utilities. Plus the broadest range of compatible interactive minicomputers in the world.

With these tools, your staff can start giving your company the benefits of DDP without expensive or extensive retraining. They can turn out more programs in less time than it takes now. Because our programs take less time to write. They can respond to specific requests faster. Because they're programming on-line. They can save mainframe time for mainframe work. Which means they can take on more responsibility to do more work. And take more pride in the

work they do.

In short, Digital's concept of distributed data processing can give you the chance you've been waiting for, to be more responsive to your users' changing needs.

If that sounds good to you, contact us. We'll tell you even more. Write Digital Equipment Corporation, Commercial Products Group, Merrimack, N.H. 03054. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital

As 1977 Ends Users Confront Myriad of Alternatives

By Esther Surden
CW Staff

During 1977, a myriad of product introductions confronted the user and prospective user of both minicomputers and small business systems. Vendors presented numerous alternatives to catch the user's eye, but also succeeded in presenting an increasingly confusing picture.

This year, like many others, witnessed technological progress,

but "people-oriented" problems still remained to plague users. Many were dissatisfied with maintenance and software support provided by their manufacturers, citing the traditional problems of software bugs that crash a system, unreliable hardware and poor documentation as major concerns.

For small business system users, the highlight of the year had to be the introduction of

IBM's System 34 in April. The 34, IBM's solid entry into the transaction processing, on-line small business system arena, was not to be available to users until January 1978. The mainframer's offering reinforced what small business system users knew all along — they need today's information today.

After the product was introduced, it faced criticism about its limited capabilities and some

vendors of small business systems felt secure that their users had a more capable system.

Then, later in the year, IBM increased the storage capacity and number of remote terminals that could be attached to the forthcoming system, correcting some of its major weaknesses and offering users a very strong contender for their consideration.

With the System 34, IBM also followed up on its policy of unbundling, a first move in the very small systems area for the firm, with much of the operating software priced separately. In most small systems, operating software is bundled into the price of the system since without it the system is unusable. Later in the year, NCR Corp. followed suit with its unbundled small systems introduction, the I-8100 series.

Users of the larger IBM 3/15 got increased storage — to 512K bytes — and enhanced communications capability as the mainframer also upgraded this line. In addition, it continued to add capabilities to its Series/1 19-in. rack-mounted mini.

32-Bit-Word Machines

For users of minicomputers, another highlight of the year was Digital Equipment Corp.'s entry into the 32-bit word minicomputer arena, which gave users an upgrade path from its high-end 11/70 and presented more processing power in a minicomputer-sized machine.

Joining other 32-bit-word processors, the VAX-11/780 is a hybrid system with not all data paths 32-bits wide. Signaling a trend toward very powerful superminis with 32-bit words, the DEC VAX system only runs a version of Fortran that takes advantage of the 32-bit architecture. All other languages run in 16-bit emulation mode.

Another vendor provided a system with a 32-bit word this year.

(Continued on Page 30)

DG Ups CS/40 Disk Capacity

WESTBORO, Mass. — Data General Corp. has increased the amount of disk storage available on its CS/40 small business system to 760M bytes with the introduction of two additional models.

The models. — CS/40-C4 and CS/40-C6 — can accommodate from one to four 96M- or 190M-byte DG disk storage subsystems. They are also configured with magnetic tape drives for file backup, a spokesman explained.

The two models increase almost 20 times the amount of disk storage accommodated by the CS/40 system, a spokesman claimed. The models are designed for users who need very large file capacities or who must keep a large number of smaller files on-line, he added.

Already-installed CS/40 systems can be upgraded to the C4 and C6 in the field with the addition of an upgrade kit. The kits vary in price, but to upgrade from a C5 without magnetic tape to a C6 with a 96M-byte disk would cost \$42,850. The upgrade kit includes all necessary hardware, a magnetic tape subsystem, the disk, an expansion chassis and a two-bay cabinet, the spokesman continued.

With an addition of communications options, the CS/40

models introduced can communicate with other DG or IBM systems, the firm noted.

All models use DG's interactive Cobol language.

A C4 with one 96M-byte disk storage subsystem, four CRTs, one magnetic tape drive and a 300 line/min printer costs

\$79,060. The C6 with two 190M-byte disk subsystems, magnetic tape, eight CRTs, one 60 char./sec printer, a 300 line/min printing terminal, remote job entry communications capability and a synchronous line interface costs \$138,845. DG is located in Westboro, Mass.

DEC PDP-11/34 Gets Cache Memory Option

MAYNARD, Mass. — A cache memory option will be available soon to users of the Digital Equipment Corp. PDP-11/34 minicomputer, according to the vendor.

Called the KK11-A, the cache memory consists of a 1K-word random-access memory mounted on a single full-width board. The cache reportedly has an 86% hit rate, permitting an increase in processor performance of up to 60% over the 11/34 processors without cache.

The increase in performance brings the high end of the 11/34 into the low end range of the 11/45 and 11/60, the firm admitted.

Users can have their systems upgraded to the option in the field; one board is simply

plugged into the backplane of the system. No software changes are necessary to take advantage of the increased performance, a DEC spokesman said.

A high-speed data path used with the system's floating-point processor serves as the interface between the cache and the CPU, DEC explained. The floating-point processor option can be used with cache without degrading the performance of either option, the company claimed.

A processor with factory-installed cache, called the PDP-11/34C, will also be available.

Priced at \$3,900, the KK11-A will be ready for installation in June 1978 while the 11/34C, also available in June, costs \$18,900. DEC is in Maynard, Mass. 01754.

Tired of being last on the routing list?
Subscribe yourself.



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

MINI-TWO-RTD

Demand for System Flexibility Seen Growing

By Esther Surden
CW Staff

ANAHEIM, Calif. — System reliability and flexibility are buzz words that clearly mean different things to different people.

That much was evident at a recent conference here as several users, vendors and a consultant addressed the topic of reliability and flexibility in future systems.

Flexibility in operations was the main reason New York's Citibank turned to minicomputers, according to Victor Krasan of the institution's Technical Communications Department.

The bank, which has been in the forefront of distributing processing power to users, ultimately wants to reduce DP operations to "one workstation, so that one clerk will

handle one customer" and be responsible for all the activities of that customer.

Formerly, Krasan explained, many functions at Citibank were performed in an assembly-line fashion so the chances were that the customer with a problem would never find out which person or step along the way was causing that problem.

Achieving its ultimate goal may be more difficult than the bank originally anticipated, he continued, because although the technology to handle the applications in a single system is available, training an individual to learn all banking processes may be impossible.

At Citibank, reducing paper work has increased the institution's reliability, he indicated.

The Missouri Pacific Railroad Mopac is another large

user of minis whose distributed network has attracted much attention.

The railroad is very concerned about equipment reliability because when a system goes down, the operations of a yard can be stopped and it can take a day before operation is back to normal, according to John Brennan of Mopac. Equipment reliability is important because some of the units are put in out-of-the-way places.

"We use receive-only printers in printer shanties," he explained. The printers, located out of the middle of nowhere, print out work orders for work crews. "We usually don't know if they are down until after the work crew has been there," he added.

According to Brennan, Mopac would like to see more diagnostics available so that a

malfunctioning printer could send a message back to a minicomputer to alert management that the printer isn't working.

Admitting that the conditions these printers have to withstand are unusual, Brennan pointed out that they should be designed to withstand nonair-conditioned environments and places subject to vibration.

Reliability of Peripherals

Taking the vendor's point of view, Ralph Gabai, corporate vice-president of Pertec Computer Corp., said that systems — and especially peripherals — will have to become more reliable and flexible. Because of the labor-intensive nature of business, downtime will have to be lessened because "we can better afford to have computers waiting for people than people waiting for computers," he said.

With LSI and microprocessor circuitry, manufacturers will have more tools to make peripherals more reliable. Improved reliability can be attributed to the elimination of weak points in a system through the use of fewer connectors, and the peripherals can be programmed to perform error detection and self-correction, he continued.

In disk drives, functions such as error correction and track reassignment will be programmed into the system to compensate for media defects, he predicted.

Systems will also be more flexible, because the host of interfaces available with minicomputers will become one unit, microprogrammable to the various mini specifica-

tions. Plug compatibility then will become a "matter of programming within the peripheral," Gabai said.

Representing another vendor, Vernon Smith of Microdata gave the traditional definition of reliability that "the mean time between failure [MTBF] of individual components determines the MTBF of the system."

But that is too simplistic a view for a number of reasons, he indicated. For one thing, the system may not fail each time a component fails and not all failures to perform are the result of hardware component failures. Factors such as noise, marginal components getting ready to fail and power fluctuations can cause failures, he noted.

Users can help improve system reliability by providing a clean environment for their expensive computing systems. (Continued on Page 31)

AKD (402) 392-2606
VOLUME DATA ENTRY SERVICES...
TAPE OR CARDS
"QUALITY AT A LOWER COST"
AMERICAN KEY DATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Users' Alternatives Grow Throughout '77

(Continued from Page 29)

The top-of-the-line superminis from Wang Laboratories, Inc. have the larger word length as well as virtual memory capability.

Top-of-the-line announcements demonstrated a trend toward vendors providing systems into which their users can grow. For example, Prime Computer, Inc. introduced the 500, while Interdata announced the 8/16 to fill out its 16-bit line. Systems Engineering Laboratories added the 32/75 for high-speed computational applications.

Datapoint Corp. came up with the 6600, General Automation, Inc. unveiled its 16/550 dual-processor system and Four-Phase Systems, Inc. unwrapped the IV/90. All of these products seemed to put increasing importance on preserving the user's software investment.

First-time users and those upgrading from accounting machines received a good deal of attention from manufacturers trying to sell their wares. Companies like NCR and Basic/Four Corp. offered systems that users could not program, limiting user options, but also cutting costs. Firms like Qantel Corp. and Basic/Four spoke of parameterized software that could be easily adjusted to a user's needs.

For First-Time Users

First-time users were wooed by an array of equipment so varied that not even the vendors could tell the difference without a second hand. While minicomputers were contained in single workstations or CRTs and desktop units

abounded.

New lines of small business systems were unveiled, such as Univac's BC/7 and Data General Corp.'s CS/40, further adding to the confusion. And almost every small business system that came out was designed not just for first-time users but to fit into remote offices operated by those Fortune 5000 firms as distributed processing continued to become less of a buzzword and more of a reality.

This year showed growth in the mass storage area as well; at least two vendors came out with bulk core storage modules. Described as a replacement for fixed-head disk, the core storage modules presented a different alternative for users with large data base or swapping requirements.

Charge-coupled device (CCD) memories were also made available for end users this year with at least one maker bringing out a CCD-based system that directly interfaced to various popular minicomputers.

Older product lines were also enhanced this year. DEC added three new models to its PDP-8 line and increased memory to 128K. Companies like Texas Instruments took their barebones minis and configured them for commercial users.

Surely not all vendors who followed or initiated trends this year could be named in so short an article, but all of the products introduced this year combine to create a collage of systems suited to almost any user's needs. But by the end of this year's offerings don't fit your requirements, there's always next year. . . .

Our American Economic System is ☐ good ☐ bad.

(check one)

Most Americans (about 80%) believe that our economic system—with its individual freedom—is the best in the world, yet some changes are needed. To help give you a clearer picture of our system on which to base decisions, a special booklet has been prepared. For a free copy, write "Booklets," PO Box 1887, New York, N.Y. 10001.

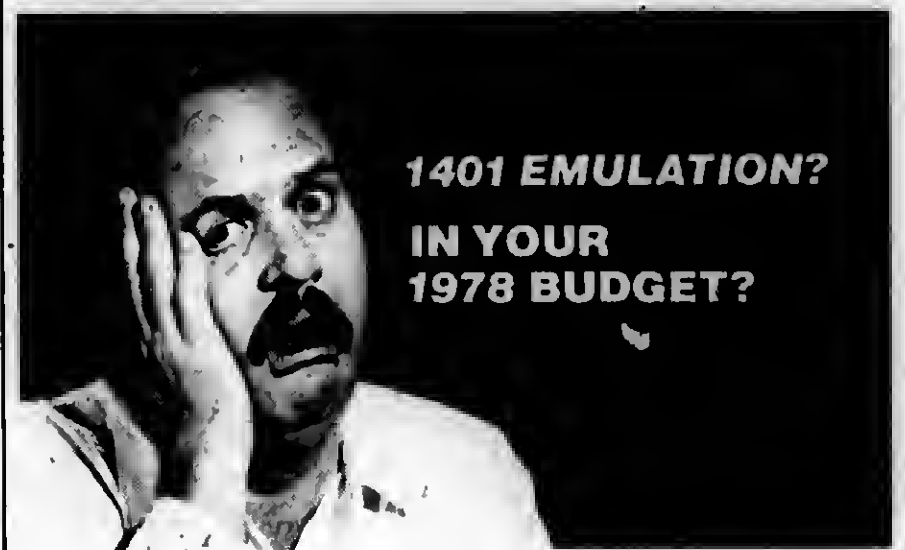


A public service of The Advertising Council & U.S. Department of Commerce presented by this Magazine



MORE FREE SOFTWARE

Why pay thousands of dollars for Gen'l Ledger, Payroll, A/R, A/P, Inventory, etc. software. We are one of the largest software houses in the U.S. and as in our previous FREE Software ads you can purchase this volume for just a little more than the cost of the paper on which it's printed. Volume VI-Ledger-\$49.95 (Inc: A/R, A/P, Inventory, Depr, Payroll, P/L, more) CASH/CK / MO / BAC / MC / NO P.O.'s. Send to S.R.I. 220 Knollwood, Key Biscayne, Fla. 33149. Phone orders call (800) 327-6543. Information and Fla. residents call (305) 361-1153.



CS-TRAN converts 1401 object code to ANS COBOL for IBM 360/370, UNIVAC, and RCA.

Over 400 users have eliminated emulator rental and the costs of system slowdowns caused by emulation.

Can you afford not to join them?

C-S COMPUTER SYSTEMS INC.
Systems and Software Consultants

90 John Street, Suite 1602, New York, NY 10038 • 212/349-3535

Member SIA Software Industry Association

By Improving Operations DDP Seen Easing Department Managers' Jobs

By Esther Surden

CW Staff

ANAHEIM, Calif. — "Distributed processing is a technology that — although very old in theory — is just becoming practical due to advances in hardware technology," Roger E. Billings, president of Billings Computer Corp., told a group at a recent conference here.

Although it is an idea whose time has come, distributed data processing (DDP) is encountering some opposition, he pointed out. Some long-established DPers are well set in the direction that worked for them last year, he explained.

Describing one analysis his company did of a Fortune 500 company that has an IBM 370 mainframe, Billings said many gains can be made with DDP. For one, the management of various departments can have a better knowledge of what goes on in their departments.

In this particular case, the managers of the departments have run their areas "almost as a small business." DDP will help improve that operation, he said.

As part of the analysis, the managers were asked to show the consultants what parts of the printouts prepared by the large system were most valuable to them. The results of this



Photos by E. Surden

Roger E. Billings

exercise showed that the managers did not understand the printouts and in many cases didn't understand the accounting manipulations that

produced the various numbers on the printouts.

The managers were also asked what numbers they would like to see on the printouts, but the analysts found the information the managers most wanted was already available to them, although not in an easily accessible form. DDP can make information easier to get, he indicated.

To overcome fear of the system, the company let each manager learn how to run a simple conversational pro-

gram. "They all became excited," he said, at the system's possibilities.

Although the system is not yet implemented at the company, when it is the firm expects several benefits to take place as a result of DDP. "The department managers will find out what's going on in their departments," Billings said.

In addition, the system will probably eliminate 250 employees now employed in either card input functions or not adequately producing for the firm.

Users Told Not to Underestimate Cost of Installing Small Machines

By a CW Staff Writer

ANAHEIM, Calif. — When it comes to costs, putting in a minicomputer is just like putting in a mainframe: "You have to do your homework," John M. Weir, president of Accounting Datamation, Inc. told a session at a recent conference here.

Installation costs are important because they often exceed hardware costs, he cautioned about 200 attendees at a session on the criteria used in selecting and evaluating a minicomputer.

The installation includes the planning and system design phase, the programming of the system to meet the objectives outlined in the planning phase, implementation of the system and both hardware and software maintenance.

One of the most important cost-cutting hints an organization installing a system can follow is to make a plan and stick with it, Weir said. Following a plan requires the

involvement of the people in the firm where work habits are to change because of the system, such changes should be anticipated, he said.

The most important change that will take place when the mini is installed will be the increased efficiency of management, he added.

'Pay as You Go'

In order to follow a plan, the organization should be aware of the areas that need to be automated. Some applications may be of marginal value to the business, he told the group.

The best way to make sure a system is cost-justified is to adopt a "pay-as-you-go" program of savings, he said.

Management should be heavily involved in the study of which system to choose and the implementation plan, he noted. All the design work should not be left to others; if management is to make the final decisions, there is "no

substitute for you in management of the business to get involved."

System design should be undertaken by the people who know why an application should be performed a certain way. Final responsibility for how an application is run should lie with its user, who should sign off on a description of what work is wanted, he recommended.

Programming of the system can be done by an in-house programmer, software consultant or by the vendor who sold the system. If the user chooses to go to a person outside his organization to write the programs, he should look for someone who is familiar with his business.

The user should go visit an installation, Weir advised. Even if that particular installation is not doing exactly what the user wants to do, "you'll come out of the place with good ideas," Weir said.

Demand for Flexibility Growing

(Continued from Page 30) he said, and by keeping temperatures steady within given ranges.

In addition, operators should be trained in handling disks and tapes, he advised.

To an end user, reliability means having access to the system when needed, Smith pointed out, so this requires a system whose data base is protected against loss if system failure should occur. Manufacturers, he noted, must make a trade-off between cost and reliability. If too much reliability is built in, the system can be overpriced while "too little will also get a manufacturer in deep trouble."

It is possible, Smith asserted,

to have negligible downtime in the face of a nonnegligible failure.

With tongue in cheek, Thor Thorenson, a consultant with Advanced Computer Techniques, said that flexibility is like rope — the more you have, the easier it is to hang yourself.

Flexibility means a system can accommodate a wide range of user environments and arrangements and the user is free to configure equipment to meet his needs, he continued, noting that for users to be able to configure systems in any way they please, interfacing will have to be standardized.

"To unite manufacturers on



Thor Thorenson

this issue will probably be easier than getting a settlement in the Middle East," he continued.

Available Immediately For SHORT TERM LEASE

370/138 370/148 370/145
3330's and OEM 3330's
360/30 360/40 360/50 360/65's
Greyhound Phoenix ICA's
CALL US COLLECT

United States		
Austin	Ron Geil	(512) 451-0121
Boston	Tom Ryan	(617) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dave Hyland	(415) 283-8980

International		
Canada	Don Maunder (Toronto)	(416) 366-1513
Mexico	Andres Contreras	(905) 543-8850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joe Gold (Geneva)	(022) 61-27-54
Austro-Asia	John Hallmark (Dallas)	(214) 233-1818

Non-IBM:		
UNIVAC or	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**

GREYHOUND TOWER, PHOENIX, ARIZONA 85077

Before you buy a PDP11T03, consider the GRC CD/X3.

	PDP11T03	GRC CD/X3
CPU	LSI-11*	LSI-11*
MEMORY	32Kbytes	40Kbytes
CPU EXPANSION SLOTS	1	7
DISK PLATTERS	2	4
DISK STORAGE	7.5Mbytes	20Mbytes
PRINTER SPEED	30 cps	60 cps
SOFTWARE	none	RT-11*
PRICE	24,500	22,500
DELIVERY	ASK DEC	60-90 days ARO
WARRANTY	30-90 days	1 year

*TM of Digital Equipment Corporation



GENERAL ROBOTICS CORPORATION

57 North Main Street, Hartford, Wisconsin 53027

TEL (414) 673-6800 TLX 269686

Represented and Distributed Worldwide

A Step Ahead With Quality Component Computer Systems

Rapid Advances Predicted in Mini Storage Area

By Esther Surden
CW Staff

ANAHEIM, Calif. — A tape drive with 15,000 bit/in. density and vacuum buffering, auto-loaded with speeds up to 250 in./sec; floppies interfaced for under \$500; nonremovable 300M- to 500M-byte drives at prices 30% less than today's removable 100M-byte drives; and bubble memory emulators of 10M-byte drives — all are in store for users, ac-

cording to a paper presented at a recent conference here.

Randy Knapp, president of Western Peripherals, Inc. maintained that "one has only to glance through IBM's or Univac's or Burroughs' latest catalog to see what's coming for the mini/micro field."

Magnetic tape is still around despite its predicted demise in the early 1970s, he said. "Its low media cost and almost universally accepted formats

leading to informational interchange between all mainframes" have allowed it to hold its own, he indicated.

During the past year, about three different manufacturers introduced 6250 rack-mountable drives and several also introduced 125 in./sec drives "of the more common 1,600/800 bit/in. type," he said. Another innovation was a 45 in./sec tension arm drive, while still another develop-

ment was the redesign of low-speed 7-in. and 8-in. units by another manufacturer.

Users are attracted to mag tape because a 2,400-ft roll of tape can hold from 20M bytes to 40M bytes of storage for less than \$20, he pointed out.

In addition, a local IBM, CDC Burroughs or Honeywell service bureau can read the tapes. Tape also takes up about a third of the space of a cartridge disk and "tape heads

don't crash," he said.

"I think mag tape is here to stay for at least the next 10 years, although its place in the market will continue to grow at a decreasing rate." The tape people, he predicted, will still have "a few aces up their sleeves" such as speeds to 250 in./sec and densities of up to 15,000 bit/in.

Floppies' Future

Whether or not floppies will continue to be "the darlings of the industry" will depend on who buys microcomputers. The picture of microcomputers and floppies being "catapulted" into homes of the future may or may not come true, he indicated.

The area of head-per-track units has stayed stable with "one exception" — bulk core memory emulators of disk systems. This application could be extended to bubble memories, he said.

Cartridge disks are showing a "slow shift upwards in density" to 4,400 bit/in. and are now available with 40M bytes of storage.

Tektronix 4051 Has File Manager

BEAVERTON, Ore. — Tektronix, Inc. has a flexible-disk, mass-storage device designed to give its 4051 graphic system random-access file management capability.

Using double-density recording, the 4907 file manager provides up to 1.89M bytes of user-available storage in the triple disk drive configuration, the firm said.

Variety of Configurations

The 4907 is available in single, double and triple disk drive configurations. The single disk drive is contained in a single cabinet; a second cabinet is required for the double-or triple-drive configurations, Tektronix added.

Base U.S. price for the single-drive, 630K-byte configuration is \$3,900. Tektronix can be reached at P.O. Box 500, Beaverton, Ore. 97077.

acm is...

your computer society

AN ORGANIZATION OF PURPOSE
THE SOCIETY FOR PROFESSIONALS
RESPECTED PROFESSIONAL JOURNALS
COMMUNITY INVOLVEMENT THROUGH CHAPTERS
SPECIAL INTEREST GROUPS
MICRO PERIPHERALS
SPECIAL PUBLICATIONS
RECOGNITION OF ACHIEVEMENT
EDUCATION AND PROFESSIONAL INVOLVEMENT
CONFERENCES, SYMPOSIA, WORKSHOPS
LIVELY COMMITTEES

JOIN NOW

Since 1947, ACM has served as the educational and scientific society for computing professionals—35,000 strong and growing.

WRITE TODAY

For regular and student membership information send the attached coupon to ACM headquarters. With special interest groups covering every major computing discipline and local chapters in most metropolitan areas, ACM is probably the organization you're looking for.

Association for Computing Machinery
1133 Ave. of the Americas, N.Y., N.Y. 10036

I would like to consider joining ACM.
Please send more information.

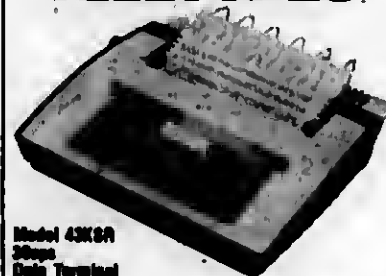
Name _____

Company _____

Address _____

City _____ State _____ Zip _____

TELETYPE[®]



Model 43K6A
30 cps
Data Terminal

New and Reconditioned
Models 28 • 32 • 33 • 35
40 • 43

FEDERAL Communications Corporation
11105 Shady Trail #107
Dallas, Texas 75229 U.S.A.
(214) 620-0644 TELEX 732211

Brought to Public in Grand Style Hobby Micro Comes of Age in 1977

By Frank Vaughan
CW Staff

Someday, historians may look back on 1977 and decide 1977 was the year when the hobby microcomputer came of age.

Certainly, the micro saw some use before 1977, but it was never paraded before the public in such a grand style as it was this past year. This was truly the year of the micro show.

The historian who looks back on 1977 will most certainly feel the first of the microcomputing shows took place on the national level, beginning with the First West Coast Computing Faire. Other significant shows during the course of the year took place in Atlantic City, Boston, New York and Chicago.

Wild West Show

As with all emerging ideas, the microcomputing scene seemed like part of a Wild West show during the past year. Foolish claims concerning shows were met with even more foolish rebuttals, and observers from the more "established" areas could only shake their heads and mut-

ter that "they'll get over it ... someday."

One thing about 1977 the historians are certain to note with dismay is that this was not the year of the user. In many cases, it was

"... this was not the year of the user. In many cases, it was the year for everyone but the user."

the year for everyone but the user.

What made it that way? For one thing, the very nature of the industry, with firms introducing nonexistent products, hoping to sell enough of the idea to actually be able to manufacture the product.

Unbelievable lags in delivery times and, in many cases, an unfortunate tendency to ignore user complaints of nondelivery, nonexistent documentation and unobtainable performance claims also contributed to the user's mayhem.

But the hobbyist is still pushing to the front of the booths, check-

book in hand, hoping to buy the ultimate system for the least amount of money. The reasons for this? Certainly the major products that have been announced for the hobbyist this year can be

given credit for sparking more and more of the interest in the hobby.

Among the major products making their debut were Radio Shack's TRS-80, Heath Co.'s H-8 and H-11 and Commodore's PET. These products helped change microcomputing's reputation, from being the elite hobby of electronics and ham radio enthusiasts to a hobby which a nontechnical person can enjoy.

The increased interest in microcomputing as a hobby spawned several hundred hobby clubs throughout the country,

several boasting membership in the hundreds. The clubs played an important part in the development of microcomputing as a hobby and began to play a role in developing user "clout" with the vendors.

In addition, many of the clubs began subdividing into special interest groups or user groups for each of the major microprocessors, aiding in the development of software and diagnostics.

This growing user clout was especially evident in the area of programmable calculators, where users were able to develop capabilities unknown to the manufacturers ... and the vendors responded by coordinating activities with some of the user groups.

What else was 1977? It may have been a lot of different things to a lot of different people, but most of all it was the year when the micro came of age for the user — and the user began to exercise some control over the way the hobby shaped up.

Static Memory Modules Introduced for PCM-12

SAN RAMON, Calif. — Three static memory modules have been introduced by Pacific Cyber/Metrix, Inc. for use with its PCM-12, a 6100 microprocessor-based, 12-bit microcomputer system.

The first, the 12020A, is a 4K-word by 12-bit memory element that constitutes one full field of memory. Each board reportedly carries 59 integrated circuits, of which 48 are low-power, 1K static memory devices, and all the necessary bus interfacing logic.

This unit costs \$289 assembled and \$199 in kit form.

The 12160 holds 1.5K 12-bit words of read-only memory in the highest pages of its field and,

in its lowest pages, 512 12-bit words on n-channel random access memory (RAM).

With a memory extender module, the 12160 can be used in any 4K field of memory in the PCM-12, the vendor said. It costs \$455 assembled and \$385 in a kit.

The 12210 is a nonvolatile memory organized as 4K, 12-bit words. It is comprised of 48 1K CMOS RAMs with an automatic battery backup that retains the contents of its memory up to 30 days when the system power is turned off, the firm claimed.

The unit also contains all the TTL necessary to interface it with the PCM-12's system bus. This memory module is priced at \$580 assembled and \$490 in kit form.

Pacific Cyber/Metrix is at 3120 Crow Canyon Road, San Ramon, Calif. 94583.

Book Details Basic Games

ROCHELLE PARK, N.J. — A collection of games and puzzles that have been written in Basic has been published by the Hayden Book Co.

Game Playing With Basic, written by Donald D. Spencer, contains over 60 computer games and puzzles. The book is written in a nontechnical style, with information on the history and theory behind many of the games, the publisher said.

Program listings, flowcharts and diagrams are also included.

The 166-page book costs \$6.95 from Hayden at 50 Essex St., Rochelle Park, N.J. 07662.

LOS ANGELES — Four product development systems that are based on the Zilog, Inc. Z-80 microprocessor unit (MPU) have been announced by Futuredata Computer Corp.

The Microsystem 12, 15, 20 and 30 include an MPU that can accommodate up to 56K with available memory modules. A 960-character CRT, Ascii keyboard, dual floppy disk or cassette tape unit and operating system software and documentation are also included with the systems.

Features include two RS-232 serial ports, an 8-bit parallel TTL I/O port, a real-time clock, a bootstrap in programmable read-only memory, a write protect feature under software control, 8-level vectored interrupts and a direct memory access (DMA) capability, the firm said.

Basic Microsystems include 16K of memory with the exception of the Model 15, which has 32K of random-access memory (RAM).

The Microsystem 15 includes a monitor/debugger and an editor

and assembler in memory along with source and code workspace; it is priced at \$5,275.

The Microsystem 12, which has a Microtape/2 dual cassette tape unit, costs \$4,325. The Microsystem 30 comes with an 8-in. floppy disk unit and costs \$7,675; the Microsystem 20, with a 5-in. mini floppy disk drive, sells for \$6,475.

Additional RAM modules for the systems start at \$475, Futuredata said from 11025 S. La Cienega Blvd., Los Angeles, Calif. 90045.

SC/MP II Gains Development System

SANTA CLARA, Calif. — National Semiconductor Corp. has introduced the Low-Cost Development System (LCDS), intended for use in hardware and software development, for its SC/MP II microprocessor.

The SC/MP and SC/MP II microprocessors are object-code compatible, both having built-in multiprocessor capability.

The firm regards the SC/MP II as a faster, lower power, n-channel, upgrade of the original p-channel MOS SC/MP, running twice as fast and requiring less than 200 mW of power.

Existing user hardware can be channelled into the LGDS and programs not exceeding a certain level of complexity can be entered in hexadecimal

and executed from any point in memory, National Semi said.

Instructions, memory data, control values and contents of various registers can be displayed and modified. Programs can be single-instruction stepped, executed at speed or executed in sections broken by dynamically inserted halt instructions, a spokesman added.

The firm is currently working on an SC/MP "In-Circuit Emulator" card and a bipolar programmable read-only memory (Prom) programmer card for the LCDS to be available by the end of the year.

The LCDS is priced at about \$500 from National Semi at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Development Units Based on Z-80

MICROCOMPUTING



PRONTO. The biggest booster

Nice system, your 3270's and 370.

But PRONTO, the Sperry Univac distributed data processing system, boosts its cost efficiency by taking care of all your remote computer needs. And freeing your 370 host to do the work it does best.

PRONTO is a software package that runs on a V77 minicomputer, equipped with peripherals such as line printers, video terminals, and disks.

PRONTO boosts the computer power

at your remote branches by migrating computer services to meet their individual needs. Without changing host hardware and software.

When you add PRONTO to your current 3270 network, you suddenly find yourself able to concurrently perform local tasks you never could before.

Local and remote on-line processing. Local and remote batch processing. You can create new remote data bases. Not just for



your 3270 network ever had.

simplistic tasks, but for complex data base management services.

PRONTO speaks your mainframe's language. Whether it be COBOL or FORTRAN. And the system can even accommodate RPG-II.

1000 host computers already use TOTAL[®], our data base management system.

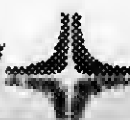
With PRONTO, you won't use as much costly mainframe time or as many dedicated communications lines.

You get all this. Plus all the service and

support of Sperry Univac around the world.

And it's those things that will turn a lot of 3270/370 users into Sperry Univac boosters.

Write to us at Sperry Univac Mini-Computer Operations, 2722 Michelson Drive, Irvine, California 92713. Or call (714) 833-2400.

SPERRY  UNIVAC

SPERRY RAND CORPORATION

CORE — Refers to tiny "doughnuts" of magnetizable metal that can be in either an on or off state and can represent either a binary 1 (on) or binary 0 (off). Commonly called magnetic core and used as the basic type of main memory for many computers.

CROM (CONTROL READ-ONLY MEMORY) — Refers to a specific ROM that has been designed and microprogrammed to decode control logic. It is a major component of several types of microprocessors.

CROSS-ASSEMBLER — 1. Refers to a program run on one computer for the purpose of translating instructions for a different computer. 2. Programs are usually assembled by the same assembler or assembly program contained within or used by the processor on which they will be run. Many microprocessor programs, however, are assembled by other computer processors whether they be standard, time-shared, mini or other microcomputers. This process is referred to as cross-assembly, and the programs are not designated for specific microprocessors but are to be used on other computers. They are known as cross-assemblers.

CURSOR — 1. Refers to various position indicators frequently employed in a display on a video terminal to indicate a character to be corrected or a position in which

data is to be entered. 2. A solid underscore which may appear under any character location on the screen. In some systems the cursor always appears under the location where the next character will appear.

DAISY CHAIN — Some microprocessor manufacturers use bus lines that are interconnected with units in a manner such that the signal passes from one unit to the next in serial fashion. The architecture of the Fairchild F-8 is an example of daisy-chained memory chips. Each chip is designed to connect to its associated unit to accomplish daisy-chaining of interrupt priorities, beginning with the chip closest to the CPU.

DATA — 1. A general term that is used to denote any or all facts, numbers, letters, symbols, etc. which can be processed or produced by a computer. 2. In a more restricted sense, data refers to numerical information as contrasted with nonnumerical information. 3. Implying source data or raw data as contrasted with information which is then defined to mean the knowledge obtained by the processing of data.

DATA BUS — Most microprocessors communicate externally through the use of a data bus. Most are bidirectional, e.g., capable of transferring data to and from the CPU, storage and peripheral devices.

LEARNERS

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc. 207 Kenyon Road, Champagne, Ill. 61820.



COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

MINI-COMPUTER SUPPLIES In stock for all systems - diskettes, mini-diskettes, cassettes and cartridges. Dealers only. Computer Resources Co., 1437 Gordon St., Allentown, PA. (215) 439-1717

Microsoft ("Altair") BASIC for 8080/280/8052 and FORTRAN IV for 8080/280 now available to OEMs, end users. 8080/280 BASIC has random, sequential files; double precision; IF ... THEN ... ELSE and more. FORTRAN produces optimized relocatable code, meets ANSI66 except complex, CP/M and ISIS-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 San Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 282-1488.

TRS-80 DESIGN FORMS Copy these quality, 8-1/2 x 11 originals and save valuable design and coding time. Send \$8.00 check to Micro Media, 541 Ninth St., Lake Oswego, Oregon 97034.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02180.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02180.

I have read the rules, and would like to place my ad as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (_____) _____

Revenues, Earnings Up for Most Industry Experiences Boom Year in '77

By Molly Upton
CW Staff

For the computer industry, 1977 was a boom year, reminding many industry veterans of the salad days of the late 1960s. Revenues and earnings were up for most firms and most were predicting that the good times would carry over through at least the first half of 1978.

Everyone in the mainframe business reported profitable results, led, of course, by IBM, which continued to set earnings and revenue records at a methodical pace.

At the lower end of the industry, a trend toward acquisitions which began last year proceeded at a steady pace throughout the year, with a flurry of activity coming in the last quarter.

The services firms continued to cast their nets for smaller fish, and some of those fish were not really so small. ADP fed its ever-voracious appetite with First Data Corp. and several other firms. Itel, too, was on the march.

In other areas, terminal makers of various sorts seemed to be ripe for takeovers. In-coterm, after an ill-fated attempt at a union with Data General Corp., found Honeywell Information Systems to be an acceptable suitor.

Sycor was snapped up by Northern Telecommunications, Inc., which also picked up a piece of Data 100 Corp.

And then there was Shugart — now part of the Xerox conglomerate along with Diablo. Shugart had survived some hard times when the market was slow in developing and the founders had ideas about entering other product areas.

It managed to stake itself to a sizable piece of the floppy disk pie and developed head technology that should enable it to produce for Xerox an entry in the Winchester-type market. Could it have made the bigger time alone?

These were but a very few of the multiplicity of acquisitions that happened in 1977.

Pricing Moves

On the pricing front, mainframers gave the distinct impression they were reluctant to pass cost decreases on to the consumer until the other guy made the first move.

In at least one instance, IBM was the first to make the move, and the others followed suit rather quickly. Although analysts expressed concern about the effects on the

others' profit margins, no adverse effect surfaced. Perhaps there was more fat there than met the eye.

But with decreased prices on hardware, the mainframers turned to other areas. Consider, for example, the pricing on maintenance and software.

In the mini arena, Control Data Corp. continued to be very competitive with its OEM peripherals.

As happened last year, printers continued to be a field with allure, and many firms unveiled slow, medium and fast printers at the National Computer Conference in Dallas.

It had been five years since there were semiannual industrywide conferences sponsored by the American Federation of Information Processing Societies. Dallas was full to overflowing, and the 1978 show at

Anaheim is not only sold out for the convention center, but also for a parking garage, which will be enclosed for the occasion. Time for two a year?

Micros, which have certainly been around on the OEM scene, emerged this year as a consumer market that more than a few began investigating.

And then there were the minis. As before, the lines between mainframe and mini and mini and micro continued to blur to the point where one wondered if the different monikers served any useful distinction.

The mini makers decided 32-bit machines weren't strictly for the scientific crowd, and the bets are on the table for which firm will effectively market a true 32-bit architecture and software designed specifically for business data processing.

F&S Sees Product Mix Changing As Communications Grows 20%

NEW YORK — While the data communications marketplace will show substantial growth over the next five years, that growth will be marked by a great deal of change in the product mix, a Frost and Sullivan, Inc. (F&S) report indicated.

The market will grow at a rate of over 20%, the market research firm said, adding, however, that "in the early '80s we expect this market to be subject to major redefinition."

Depending on that redefinition of the market, it could either grow rapidly or shrink from that point on, the firm said.

What will happen is that "data communications, and for that matter DP itself, will gradually become less of a highly specialized, sterile technical discipline, but more of a commonly accepted facet in our daily life," F&S said.

Looking at specific product areas, the report predicted "the modem market in general will remain stable with very moderate growth. But the various modem types will fare differently in the years ahead.

"Low-speed modems will lose ground to high-speed modems as technological advances permit higher speed transmission using the voice grade line, but both categories, together with medium-speed modems in between, will suffer from the increasing

market share for digital transmission facilities that do not require modems."

The multiplexer market, however, "will be more interesting. While the future of the multiplexing function is not altogether bright (the function could be taken over by common carriers), multiplexers now tend to become more sophisticated and to encompass certain functions heretofore fulfilled by communications processors.

"By the same token, some limited multiplexing chores are being fulfilled by modems," the report said.

"The market for communications processors will remain a major segment of the data communications market and will continue to grow, but will be subject to redefinition. It may even be redefined away altogether," F&S said.

"Assuming we will still have a 'communications processors' product category in the mid-'80s, we predict minicomputers will take a greater role, and packaged communications processors will become more of a peripheral for the mainframe. IBM will remain in control over this market.

"It is possible that much of the communications processing functions will be either made a standard feature of the mainframe or taken over by common carriers," the report added.

The leader in IBM processors can now give you the best deal in IBM peripherals.

Re-

THINK

COMDISCO

THE LOGICAL CHOICE

SEL Sees Established Areas Its Major Strength

By Molly Upton
CW Staff

FORT LAUDERDALE, Fla. — The upswing in Systems Engineering Laboratories, Inc.'s (SEL) order rate reflects increased demand from the firm's established market areas rather than the recent excitement about 32-bit machines, according to Sam Bosch, director of product marketing.

The firm expects to earn over \$4 million while increasing shipments to more than \$50 million during the year ending June 30 compared with shipments of \$31 million last year, he said.

SEL's principal marketing thrust is to OEMs supplying equipment for simulation, scientific computation, energy management and data acquisition, he said. The firm also intends to

focus on improving productivity, he added.

Although the government was once SEL's predominant customer, sales to the government now account for 50% of the firm's business.

"Simulation has caught the fancy of people for no matter how expensive a simulation system, it is cheaper than testing to destruction, Bosch observed.

SEL machines are used to simulate power plant operations, and space shuttle and aircraft flights, for example, he said.

The value of the average SEL unit is more than \$120,000, he said. SEL provides its OEMs with systems level capabilities such as CPU, memory, disk, tapes and peripheral controllers.

Software includes Fortran IV, a real-

time monitor, program development executive and terminal support subsystem, he explained.

The firm plans to offer some capabilities for multiuser functions, but is not chasing the general business DP market, he added.

Demand for 32-Bit Machines

One reason for the rise in demand for 32-bit minis is the decreasing difference in price between them and 16-bit machines, he indicated. The cost differential once was 50% to 100% more but is now between 10% and 20%. None of the major vendors got into the 32-bit field as they were booming with 16 bits, he added.

Commenting on Digital Equipment Corp.'s entry into the field, he said,

"I'm not really tickled pink. In the long term we'll be competing with them, but for a couple of years they'll protect their 16-bit base and also will be selling to their current base."

SEL has the fastest I/O bus on the market — 26M byte/sec vs. DEC's 13M byte/sec, he added.

The firm has increased its production rate from four CPUs per week to eight and plans to be turning out 10 per week by June, he said.

Whereas a year and a half ago the firm had about 500 employees, it now has over 900, he said. SEL runs a second shift and next year will obtain 40,000 sq ft of office space so it can increase its production area. Currently the firm has around 150,000 sq ft.

In addition, the firm is "investigating the addition of a facility in Puerto Rico."

SEL has offices in 18 cities in the U.S. and 12 international sites through subsidiaries.

At the firm's annual meeting, President Asa Randolph unveiled the \$40 million projection but observed that as of the end of October, the firm's backlog was \$34.5 million of which \$32 million worth — 132 computers — must be shipped by June.

SEL was quoting delivery times of 150 to 180 days and is attempting to reduce that to 90-120 days.

The first-quarter earnings rose 461% to \$875,000 from \$156,000 in the same period the previous year on a 63% rise in revenues to \$9.8 million from \$6 million.

Randolph said the firm is converting from wire wrap technology to etched printed circuits throughout the 32 series line, which should expedite production and improve reliability.

The last big year SEL posted was fiscal 1970, when it showed \$1.8 million in earnings on \$20 million in revenues.

**Keep in mind, your prime prospects will be at
Computer Expo '78... so will your competition.**



Exhibitor List

Control Data	IBM	Applied Digital Data	Sperry Univac
Datapro	General Computer	Epic Data	Terminal Rentals
Printnrix	Alliant Research	McCormick & Dodge	Applied Data Communications
Codex	Telefile Computer Products	Sykes Datatronics	Data Forms Company
Laar Siegler	General Electric	Cummins Allison	Imperial Technology
E M & M	Quma	American Microprocessor	Mathematica
The Morley Company	Moore Business Forms	International Data Corp.	Rianda Electronics
Vanier Graphics	DataMedia	Programs, Inc.	Computer Corp of America
Total Typography	Texas Instruments	Beehive International	AT&T
Wang Labs	Computerworld	Intertec Data Systems	Cullinane
Computer Devices	NCI	Software AG	Hawlett Packard
Ann Arbor Terminals	Dellak	Creative Engineering	Pansophic Systems
Datapro Research	Kodak	Graphic Controls	General DataComm Industries
Inforex	BASF	Mini-Computer Systems	Continental Peripherals
Rerkin-Elmer	Western Union	Tandem Computer	Computer Associates
Telcon Industries	Anderson Jacobson	PCC/Pertec	Qantel
Versatec	Computer Input Services	Computrend	Diablo Systems
Computer Performance	Paradyne	Extel	Marketechs
Advanced Systems	ComData	Mentel	Racal Milgo
Delta Data Systems	Genesis One	Sycor	Data Systems Specialists
Inform	Data Processing Sciences	Digitronics	Key Tronic
Computer Decisions	Applied Computer Systems	TRAC Associates	Administrative Management
Infosystems	Agile	Computer Services	Small Business World
T-Bar	Woodford Systems	Datamart	American Terminal Leasing
Corporate Systems	American Used Computer	Courier Terminals	Journal Systems Management
Dynatech	Business Forms Service	Small Business Computers	Optical Business Machines
Midwest Marketing	Computer Roomers	Shasta	Datamation
Logabax	Customer Priorities	Mostek	

**42,178 buyers attended the 1977
Computer Caravan 9-city tour...
that's an increase of 32%**

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

For complete information on how the 1978 Computer Expo can work for you, use the coupon below or call Kim Wichert, toll free 800-225-4242. In Massachusetts, (617) 964-4550 (collect).



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
- ☐ Have Sales Representative call me
 - ☐ Send Reservation Agreement
 - ☐ Send Copy of 1977 Attendee Analysis

☐ I like to attend, please send more info.

Southern California Computer Expo	Anaheim/LA	March 21-23
Northwest Computer Expo	San Francisco	March 28-30
Southwestern Computer Expo	Houston	April 11-13
Southeastern Computer Expo	Atlanta	April 18-20
Gateway Computer Expo	St. Louis	April 25-27
Midwestern Computer Expo	Chicago	May 2-4
Mid-Atlantic Computer Expo	New York	May 9-11
Great Lakes Computer Expo	Detroit	May 23-25
New England Computer Expo	Boston	May 30-June 1

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (____) _____

Canadian Firm Acquires Sycor, 12% of Data 100

MONTREAL — Northern Telecom Ltd. here went on a buying spree south of the border, agreeing recently to purchase Sycor, Inc. and pick up a 12% interest in Data 100 Corp.

Northern, with revenues of \$1.1 billion (Canadian) in 1976, is the largest manufacturer of communications equipment in Canada and second only to Bell in North America.

Under the deal with Sycor, the firm would pick up all the Sycor stock at a rate of .9 share of Northern for each Sycor share with a minimum value of \$22 per Sycor share. The agreement must be approved by Sycor shareholders and the boards of each firm.

The 12% purchase of Data 100 stock is part of an agreement between the two firms that will permit Northern to eventually purchase up to 35% of Data 100. The price for the one million shares of Data 100 stock was set at \$15 per share; Northern has the option to pick up another one million shares by the end of 1978.

In addition, Northern will invest \$5 million in a joint research and development effort with Data 100, the firms said.

Aggressive Program Planned Varian Gives Univac New Market

By Esther Surden
CW Staff

IRVINE, Calif. — When Univac acquired Varian Data Machines last spring, it continued the trend of mainframers moving into the lucrative minicomputer business.

Joining IBM and Honeywell, which now manufacture their own mini systems, Univac acquired the company to "attack a market it was not in before." This market consists of users who need systems that fall beneath the firm's BC/7 small business system and its somewhat larger 90 series, according to Jerome J. Meyer, vice-president and general manager of Univac Minicomputer operations.

The move to minis has given the firm the ability "to capture those buyers who normally buy products out of that sector," he explained, as well as the opportunity to protect the low end of the Univac line from erosion by other vendors.

Is Univac going to stay in the mini business? "Our strategy is not to buy out our competition," Meyer answered.

Although the division is still in a state of transition, ambitious plans to beef up operations are already under way. Estimating the minicomputer industry's growth rate at 40% per year, Meyer said "we have to beat that growth."

Univac will continue to serve the two market areas already developed by the Varian organization. As Meyer explained, the Varian systems were used by scientific users in high technology industries "or incorporated into specialized systems such as numerical control units. Just prior to the Univac takeover, the firm had taken a step into the commercial end-user marketplace.

"We are trying to get a balance" between the scientific and commercial marketplace, he said.

Announcements Planned

Univac plans an aggressive program in product announcements over the next year. New products will be coming out at a fairly frequent rate, Meyer said.

Hinting that at least some of these announcements will be products designed to work with larger Univac systems in distributed data processing applications, Meyer added the firm also "has a lot of people looking at the embedded mini" that is, using the systems as components.

Univac, having acquired a mini manufacturer, "intends to exploit it to

the maximum."

When Univac took over Varian, "we kept it intact except for two areas," Meyer continued. The small Varian operation in Europe was moved to Univac International, and the customer engineers were moved into the larger Univac customer engineering group.

Cross-Training Underway

All customer engineers are in the process of being cross-trained on all the equipment, he said. Before, "there were cities where Varian just couldn't make a sale" because service was so far away, he stated.

Presently the hottest selling item in

the Univac product line is its V600 system, "but that may be because that's what we are asking our people to sell," Meyer noted.

Minis for Lease?

Although there is a dedicated sales force for the minicomputer product line, the system is also available through the regular Univac catalog. The Minicomputer Operations Division is also eyeing the possibility of leasing the minicomputer equipment.

Part of the reason no such plan has been released is that the firm expects an upsurge in business when the minis are available on lease, he indicated. This might tax the company's present



CW Photo by E. Surden

Jerome J. Meyer

capacity, he noted, since it has not achieved the industry-standard 90-day delivery rate for its systems. It is working on the problem, he said.

Discover the Caribbean with the ships that discovered the Caribbean.

The tall ships. Sleek sailing vessels out of another age. Ships which were the prized personal schooners of the millionaires Onassis, Vanderbilt and the Duke of Westminster.

Now, you can sail them through the mystical Caribbean. To well-known islands as Nassau, Antigua and St. Maarten. And to places the 12 story oceanliners never touch.

To magic islands with names like Sabo, Corriocol, Anegada, Bligh's breadfruit isle, Stevenson's Treasure Island. They are all here, waiting to be discovered again. With unforgettable beaches, forgotten forts, hushed volcanoes, picturesque towns and our island friends.

Join us in your barefeet, bikinis, or shorts. Start off with your morning eye opening Bloody Mary or a hot steaming cup of coffee, and brace yourself for a day unlike any on earth. This is the sea.

A special place of rainbows, iridescent sunsets, living reefs, rainbow fish and pink and white sand beaches.

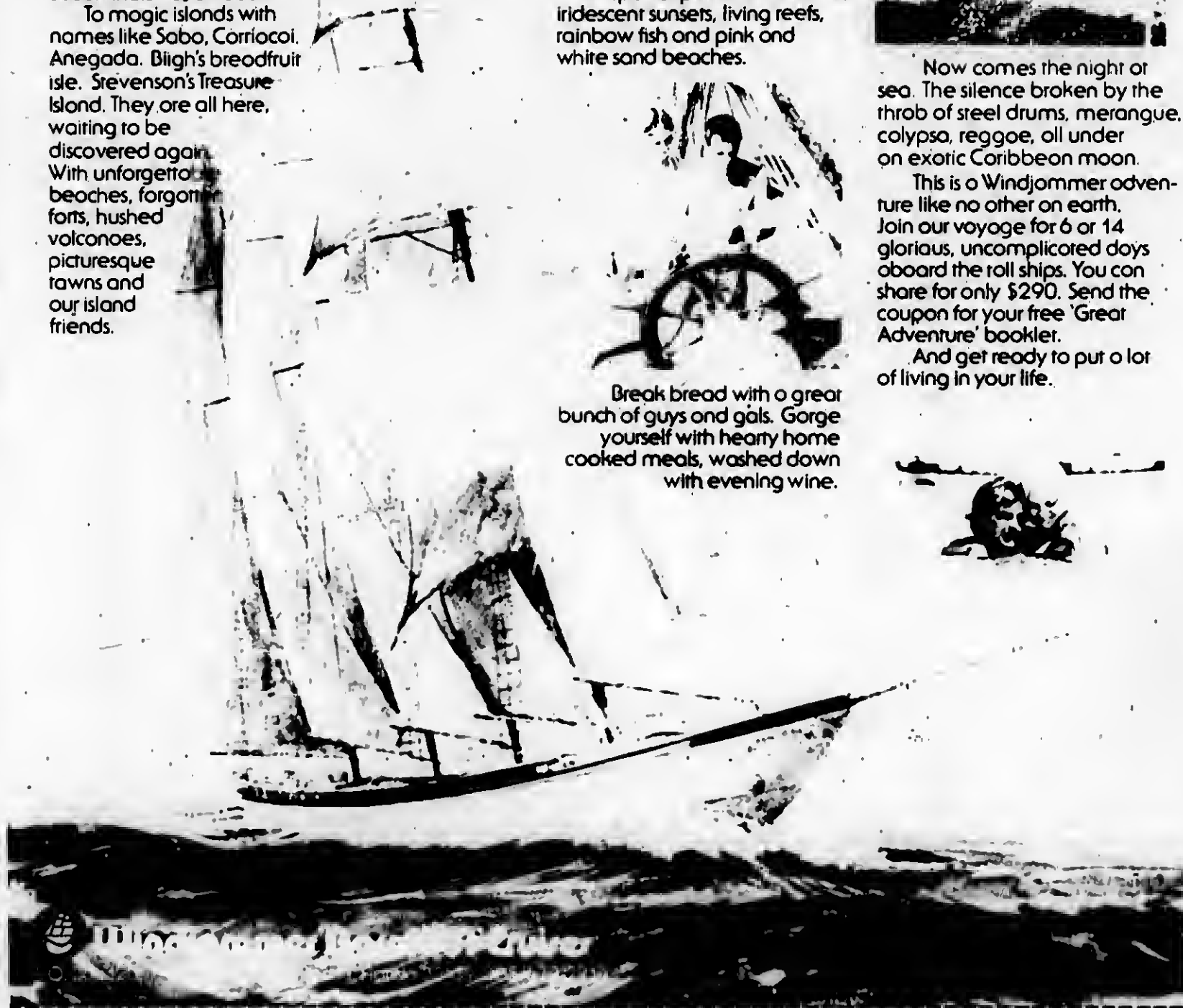


Now comes the night of sea. The silence broken by the throb of steel drums, merengue, colypsa, reggae, all under an exotic Caribbean moon.

This is a Windjammer adventure like no other on earth. Join our voyage for 6 or 14 glorious, uncomplicated days aboard the tall ships. You can share for only \$290. Send the coupon for your free 'Great Adventure' booklet.

And get ready to put a lot of living in your life.

Break bread with a great bunch of guys and gals. Gorge yourself with hearty home cooked meals, washed down with evening wine.



Capt'n Mike, Windjammer Barefoot Cruises, P.O. Box 120,
I'm ready. Send my free full color 'Great Adventure' booklet.

Miami Beach, Florida 33139,
339

Name _____

Address _____

City/State/Zip _____

FOR SALE/LEASE

DEC LSI 11[®]
PDP 11V03 SYSTEMS
LA 36 DECwriters
LA 180 * VT 52

In Stock For
IMMEDIATE DELIVERY
Call: Glenn Burnett



UNITRONIX CORP
1081 U.S. Hwy 22
P.O. Box 6515
Bridgewater, N.J. 08807
(201) 725 2560

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION

ANNOUNCEMENTS

EDP NATIONWIDE SPECIALISTS SINCE 1957

Partial Listing

SYSTEMS PROG	
3 yrs. BTAM, TP	20K
PROG/ANALYSTS	
Cobol, PL/I, BAL, NEAT 3	18K
EDP AUDITOR	
Acct Deg, Cobol, TSO	24K
MIS Director	
370/115, DOS, BAL, COBOL	25K
MGR DEPOSIT SYS	
370/OS, Bank, Supr 5 prog	25K
Sr. Sys. Analyst	
370/135, OOS, MRP, CICS	24K
SYSTEMS ANALYSTS	
Deg, OS, MFG or FIN	23K
TELEPR SPECIALIST	
MVS, TCAM, BTAM, TSO	23K
Asst. DP Director	
370/158, OS, University	22K
SOFTWARE DESIGN	
PDP 10, 11, Micros, Cobol	25K

All positions are fee paid
Attn. Bonnie Murphy

**J.W. Willard
Associates, Inc.**

One Lincoln Center
Syracuse, New York 13202
(315) 422-5111

LSI

**CAD SYSTEMS ANALYSTS & PROGRAMMERS
SENIOR LSI DESIGN ENGINEERS
CIRCUIT DESIGNERS
APPLICATIONS ENGINEERS
TEST ENGINEERS**

Build your future in Connecticut at the ITT LSI Systems Support Center



Newly relocated to Connecticut, the ITT LSI Systems Support Center is planning on further expansion... and your career can grow right along with it. Corporate funded, our specialized technology center is charged with providing the means for optimum use of LSI in wide ranging ITT telecommunications, space, defense, automotive and commercial product areas. The increasing demand for LSI technology within the ITT system dictates our continued need to add to our highly qualified professional staff.

Positions are now available with unusual reach into the future, offering excellent "ground floor" opportunities for professional development and career advancement for those who qualify.

CAD SYSTEMS ANALYSTS & PROGRAMMERS

Responsible for the development and maintenance of software systems for various CAD applications including automatic placement and routing of circuits, checking art work, logic simulation program, and transient analysis for custom LSI chips. Requires BS in Engineering, Mathematics or Computer Science and minimum of 3 years CAD experience.

SENIOR LSI DESIGN ENGINEERS

Responsible for custom LSI design using state-of-the-art MOS and bipolar techniques. Activities include feasibility studies, chip design, characterization and qualification studies. Requires MSEE and 4 years experience using sophisticated computer-aided design layout and analysis techniques.

CIRCUIT DESIGNERS

Experienced designer in advanced LSI technologies. Responsible for design of complex LSI circuits in latest bipolar and MOS technologies. Requires BSEE and 2 years design experience using sophisticated computer-aided techniques.

LSI APPLICATIONS ENGINEERS

Direct interface with equipment division engineering personnel to identify and promote LSI design and application opportunity. Capable of assessing, analyzing, and coordinating the long range systems concept combining long range technology forecasting. Experience in telecommunications equipment highly desirable.

SENIOR TEST ENGINEERS

Interface with ITT equipment and systems divisions in testing philosophy and testability for new applications. Generate and debug test and characterization programs for custom and standard LSI circuits. Requires BSEE and 4 years in product and test engineering. Sentry experience and knowledge of MIL-38510 qualification techniques preferred.

Please send your resume including salary history in full confidence to Mr. M. Starratt.

**ITT LSI SYSTEMS
SUPPORT CENTER**

1351 Washington Blvd., Stamford, Connecticut 06902

An Equal Opportunity Employer, M/F

Come To The Pacific...

...Security Pacific,
that is

EDP AUDITOR

minimum 1-2 years experience in bank EDP audit

DP GENERALIST

LONG RANGE PLANNER

Both positions: minimum 10 years experience, preferably including: systems analysis, data base design, equipment evaluation, systems software and applications programming, DP operations and data control, as well as report writing from technical analysis to conceptual presentation. Engineering or contract negotiation a plus.

Please send your resume and salary history in confidence to: L.R. Masi, 611 N. Brand Blvd., Glendale, California 91203.

M/F Equal Opportunity Employer

SECURITY PACIFIC BANK



position announcements

position announcements

position announcements

position announcements

position announcements

Arkansas

Dunhill

1985 North College
Fayetteville, Ark. 72701
(501) 521-8040

California

Dunhill

200 New Steine Road—Suite 280
Bakersfield, Ca. 93309
(805) 834-6280

Dunhill

2422 Arden Way—Suite 28
Sacramento, Ca. 95825
(916) 929-3475

Dunhill

525 B. Street—Suite 418
San Diego, Ca. 92101
(714) 238-1331

Dunhill

235 Montgomery Street
San Francisco, Ca. 94104
(415) 956-3700

Connecticut

Dunhill

111 Founders Plaza—Suite 313
Hartford, Conn.
(203) 528-4181

Dunhill

500 Summer Street
Stamford, Conn. 06901
(203) 357-8288

Florida

Dunhill

3733 University Blvd. W.—
Suite 104 C.
Jacksonville, Fla. 32217
(904) 731-5566

Georgia

Dunhill

3445 Peachtree St., NE—Suite 815
Atlanta, Ga. 30326
(404) 261-3751

Illinois

Dunhill

180 No. Michigan Ave.—Suite 1700
Chicago, Ill. 60601
(312) 346-0933

Michigan

Dunhill

2500 Packard Road—Suite 201
Ann Arbor, Mich. 48104
(313) 973-0955

Dunhill

920 N. Fairview Ave.—Suite B
Lansing, Mich. 48912
(517) 482-6223

Michigan

Dunhill

755 Big Beaver Road—Suite 423
Troy, Mich. 48064
(313) 362-3115

Minnesota

Dunhill

730 Second Ave. South—Suite 1135
Minneapolis, Minn. 55402
(612) 335-6451

Missouri

Dunhill

101 W. 11 Street
Kansas City, Mo. 64105
(816) 471-0300

New Jersey

Dunhill

1280 State Highway 46
Passaic, N.J. 07054
(201) 263-5500

New York

Dunhill

342 Madison Avenue
New York, N.Y. 10017
(212) 986-0100

Dunhill

Long Island
535 Broad Hollow Road
Melville, N.Y. 11746
(516) 293-0055

Dunhill

1 North Broadway
White Plains, N.Y. 10101
(914) 761-8900

Oregon

Dunhill

806 S. W. Broadway
Portland, Ore. 97205
(503) 224-1850

Texas

Dunhill

11211 Katy Freeway—Suite 430
Houston, Tx. 77058
(713) 932-0040

Virginia

Dunhill

7900 West Park Drive
McLean, Va. 22101
(703) 790-5393

Dunhill

7015 Keene Mill Road
Springfield, Va. 22150
(703) 569-3410

Wisconsin

Dunhill

305 E. Walnut Avenue
Green Bay, Wis. 54301
(414) 432-2977

Why limit your career horizons?
The whole market, coast-to-coast, is open to you through

Dunhill

The National Personnel Agency Network for DP Professionals . . .
dedicated solely to filling jobs and finding people . . .
in salary ranges from \$13K all the way up . . . in all 50 states!

☐ INSTRUCTORS PROGRAMMERS
\$13 TO \$22K

SEVERAL POSITIONS FOR PROGRAMMERS TO
TRAIN AS INSTRUCTORS FOR PRIVATE
CORPORATIONS. EXPERIENCE IN ASSEMBLER,
COBOL AND/OR FORTRAN DESIRED.
"STATE-OF-THE-ART" KNOWLEDGE IS A PLUS.

☐ SYSTEMS ANALYST/TO \$24K

SOLID MANUFACTURING OR GENERAL
BUSINESS. COBOL EXPERIENCE. ANY
HARDWARE. FULL BENEFITS.

☐ PROG.—PROG/ANALYST/TO \$21K

2+ YEARS COBOL OR ASSEMBLER IN BANKING,
DISTRIBUTION OR MANUFACTURING. GROWTH
OPPORTUNITY. FULL BENEFITS.

☐ HARDWARE/SOFTWARE SPECIALISTS/
\$15 TO \$35K

DIGITAL/MICROPROCESSOR. SUPERVISORY
MANAGEMENT LEVELS AND ABOVE WITH
"FORTUNE 500" CORPORATION

☐ PROJECT MANAGER/TO \$23K

OPPORTUNITY TO TAKE SYSTEMS FROM USER
SPECS THRU DESIGN AND IMPLEMENTATION IN
STATE-OF-THE-ART MANUFACTURING CO. 3-5
YEARS IN DP. DEGREE NECESSARY.
RELOCATION PAID.

☐ SYSTEMS PROGRAMMER
IMS DB/DC SPECIALIST/\$19 TO \$21K

FAST-GROWING MANUFACTURER NEEDS
AGGRESSIVE, INTERNALS TYPE TO STUDY AND
EXPAND ITS NATIONAL NETWORK.

☐ SOFTWARE ENGINEER TO \$30K

EXPANDING COMPANY REQUIRES PROMOTABLE
ENGINEER EXPERIENCED IN STRUCTURAL
DESIGN, CODING, TESTING AND
DOCUMENTATION OF PROGRAMS.
DEVELOPMENT OF DATA BASE ON MULTI-FILE
COMPUTERS AND REAL-TIME SYSTEMS.

☐ D.P. SPECIALIST/TO \$25K;
EDP AUDITORS/TO \$25K

FOR \$MULTI-MILLION ORGANIZATION ENJOYING
UNUSUAL GROWTH WITH STATE-OF-THE-ART
HARDWARE.

☐ SYSTEMS PROGRAMMER TO \$22K

(YOUR CHOICE OF SEVERAL COMPANIES)
INDIVIDUALS WITH IBM OS, COBOL AND
ASSEMBLER EXPERIENCE. IMS OR CICS A PLUS
GROWTH POSITION OFFERS EXCELLENT
BENEFITS WITH OPPORTUNITY TO STAY
TECHNICAL OR MOVE INTO MANAGEMENT.

☐ SOFTWARE SPECIALIST \$18 TO \$25K

MANY LOCATIONS. OPERATING SYSTEMS SUCH
AS RSX-11D M RSTS, RT-11. LANGUAGES USED
INCLUDE FORTRAN, RPG, BASIC, COBOL AND
ALCOL.

☐ SYSTEMS SOFTWARE SPECIALISTS
SALARY OPEN

SEVERAL ATTRACTIVE OPENINGS FOR
EXPERIENCED SYSTEMS PROGRAMMERS WITH
IBM 370 MVS OR 370 DOS SYSTEMS EXPERIENCE.

☐ SYSTEMS PROGRAMMER TO \$28K

IBM OS VS INTERNALS. SYS GEN. CICS. HASP.
IMS (ON LINE), WILBUR.

☐ VICE PRESIDENT OF DATA PROCESSING
TO \$35K

LEADING BANK KNOWN FOR AGGRESSIVE AND
INNOVATIVE APPROACH SEEKS CANDIDATE
WITH IBM 370 158 OR 168. IMS
TELEPROCESSING.

☐ IMS DB DC SPECIALISTS

REQUIRING BOTH SYSTEMS AND APPLICATION
PROFESSIONALS TO DEVELOP AND INSTALL A
SIGNIFICANT NEW DATA BASE FOR A MAJOR
CLIENT. SALARY WITH PROFIT SHARING AND
OTHER INCENTIVES TO \$30K.

☐ PROGRAMMER ANALYST TO \$16K

PROMOTABLE PROGRAMMER WITH ADAPTABLE
SKILLS INCLUDING COBOL WHO CAN STEP UP TO
PROGRAMMER ANALYST. NATIONAL FIRM HAS
4TH GENERATION HARDWARE. WILL ADD
DISTRIBUTIVE PROCESSING. TWIN CITIES
LOCATION.

☐ SALES MINI COMPUTERS TO \$24K TOTAL
PKG. \$40K

MFR. WITH AN ADVANCE STATE-OF-THE-ART
DESIGN. 2-3 YRS. SUCCESSFUL TRACK RECORD
REQ'D IN EITHER SOFTWARE OR HARDWARE
SALES. WITH A LEANING TO PROBLEM-SOLVING
OR APPLICATIONS.

Regardless of your geographic preference, simply contact the
Dunhill agency nearest you listed on this page. Naturally, all
inquiries are held in strictest confidence. We'll take it from there!
No cost or obligation, of course.

Demand Dunhill wherever you are.

Dunhill

A National Personnel Service

position announcements

position announcements

position announcements

position announcements

position announcements

**CASE WESTERN
RESERVE UNIVERSITY
CASE INSTITUTE
OF TECHNOLOGY**

Director Andrew R. Jennings
Computing Center
Nominations and applications
are sought for the position of
Director of the Andrew R. Jen-
nings Computing Center. Duties
will include assuring adequate
computing services for faculty,
staff and students by supervising
the center; administering the op-
erations of CWRUNET, the dis-
tributive computing network pre-
sently being developed; and acquir-
ing needed computer equipment.
Experience in academic comput-
ing is required. Administrative ex-
perience in operating a computing
facility is desirable. The position
may carry a faculty appointment
in the appropriate academic de-
partment. The salary will be com-
mensurate with qualifications and
experience.
Inquiries and applications
should be addressed to:
Prof. Glenn M. Frye, Jr.,
Chairman
Search Advisory Committee
Rocketteller Building
Case Western Reserve University
Cleveland, Ohio 44106
Application deadline is February
1, 1978.
Case Western Reserve University
is an equal opportunity/affirma-
tive action employer.

FIELD SERVICE

SYSTEMS 370/360, H-200,
XDS, Univac, CDC
Alt Large & Medium
CPU's
MINI's PDP, NDVA, G.A.,
HP, etc. All Mini
Systems

I/O STC, TELEX, CDC,
ITEL, CALCOMP,
etc. All Peripheral Ex-
perience

MTTR

(312) 547-6582

MTTR ASSOCIATES
1107 Mannheim Road \$12.30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

Colgate University

Computer and Information
Science Program
Hamilton, New York 13346
Richard G. Rahberg,
Acting Chairman

A position is available as of Fall
1978 at the level of instructor.
Responsibilities include teaching a
large variety of undergraduate
courses including some of the fol-
lowing: Systems and Simulation,
Computers and Language, Oper-
ating Systems, Data Base Man-
agement Techniques, Assembly Lan-
guage, and structure of Informa-
tion in digital computers.

While a strong background in
Computer Science is required for
this position, it may have been
obtained through a variety of dis-
ciplines in addition to Computer
Science, including Mathematics,
Statistics, Geography, or some
other Social Science.
Applications from women or
members of minority groups are
encouraged.

PLASMA PHYSICS LABORATORY

A directed research arm of Princeton University funded by
the United States Department of Energy, is engaged in
CONTROLLED THERMONUCLEAR FUSION RESEARCH
You will work with foremost scientists and be exposed to
a broad interdisciplinary spectrum. Our sophisticated
facility is exceptionally equipped. Our continuous growth
has created the following opportunity....

SOFTWARE MANAGER

Princeton Plasma Physics Laboratory is looking for a Manager of
Software with responsibility for a CDC CYBER 172 dual processor
system, a DECSYSTEM-10, several PDP-11's and other minis. Plans
are underway to link these and other computers through high
speed links.

This position requires at least three years management experience
with a systems group. Experience with NOS internals and commu-
nications protocols, such as ADCCP, CDCCP, CDCPP, DDCMP, or
HASP, is highly desirable. An MS or BS degree in Math, Engineering,
or Computer Science would be an advantage.

This opening represents an opportunity in a new computer facility
servicing an advanced group of users. PROJECT T-3

We offer an excellent salary fully commensurate with your ex-
perience, exceptionally comprehensive benefits, and a stimulating
and sophisticated environment.

For prompt consideration, please send detailed resume and salary
requirements in confidence. Please indicate PROJECT NUMBER
in your response.

Manager of Personnel

PLASMA PHYSICS LABORATORY

POST OFFICE BOX 451
PRINCETON, NEW JERSEY 08540

An Equal Opportunity /
Affirmative Action Employer M/F

Princeton
University

MGR. TECH SERVICES

New Eng. Corp. offers excellent
oppty. to indiv. with suprv. and
tech. IBM bkgd. to provide T.P.
& D. B. guidance to dev. staff.
Salary to \$27,000. (Fee Paid)
Contact Stan Durbas.

**ROBERT HALF
PERSONNEL AGENCIES**

111 Pearl St.
Hartford, Conn.
(203) 278-7170

SYSTEM PROGRAMMER

Immediate openings now available
with a young growth-oriented
company located in the lovely
Williamette Valley. Profit-sharing,
paid insurance, employee stock
option program, and many other
fringe benefits. Applicant must
have

Experience in the design and
implementation of operating, real
time, or process control systems
Assembly language program-
ming

Resume and salary requirements
to: JFC, Box 604, Corvallis, OR
97330

PROGRAMMER ANALYSTS

An investor-owned public utility
serving the Gulf Coast, Central
and Northern area of Florida, has
positions available for Program-
mer Analysts to participate in the
development and maintenance of
engineering oriented application
teleprocessing systems and pro-
grams. The candidate must be
knowledgeable of two computer
languages (FORTRAN, COBOL,
or BAL) and have a minimum of
two years programming experi-
ence. A B.S. degree in engineering
or computer science is required.
Send resume and salary require-
ments to:

Michael S. Reeder
Supervisor, Employment
Florida Power Corp.
P.O. Box 14042
St. Petersburg, FL 33733

MANAGER

SYSTEMS/PROGRAMMING
To \$28,000

Prestige Phila SVC BUREAU
has asked us to identify a re-
sults oriented ADMIN w/bkdg
in PROO SCHEO & PROJ
CONTRDL. MINI bkdg very
desirable (our client has
PRIME 400 & MICRO DATA
REALITY). Challenging oppty
to join exciting growth firm.
(Our fee paid.)
For confidential attention,
please send resume immedi-
ately to:

**ROBERT HALF
PERSONNEL AGENCIES**

2 Penn Center, Suite 706
Philadelphia, PA 19102
(215) 568-4580

PROJECT MANAGERS, ANALYSTS, PROGRAMMERS and MARKETING CONSULTANTS

SEI Corporation, the industry leader in on-line real time
bank trust department accounting systems seeks profes-
sionals to fill key positions in Systems Development and
Marketing.

We are looking for self-motivated individuals with a
demonstrated record of accomplishment in on-line and
data base systems design or those who have had a
successful prior career in consultative marketing.

Candidates for Project Managers, Analysts or Program-
ming must have a strong business applications back-
ground or experience in the development of financial
systems plus proficiency in FORTRAN.

Marketing Consultant candidates should have had experi-
ence in the Data Processing Service industry.

Send resume in confidence to:

SEI CORPORATION

680 E. Swedesford Road
Valley Forge Executive Mall, Bldg. #7
Wayne, Pennsylvania 19087

PROGRAMMER/ANALYST CICS

Growing Florida Corporation
seeks two experienced analysts to
work in OS/VS - OS/VS1 en-
vironments. Candidates should
have either good working knowl-
edge of ALC or strong experience
in ANS COBOL. CICS experience
is definitely a plus. Current CPU
is 768 K 370-145. Negotiating for
3 MEG Level 158 type CPU. En-
vironment also includes TP net-
work of about 175 terminals.
Please contact:

Kermit E. McKinney
Manager, Data Processing
Lawyers Title Services, Inc.
P.O. Box 3588
Orlando, Florida 32802

COMPUTER ANALYST:

Includes some supervision of
junior programmers, application
systems designs, and program-
ming. Support computer in May
1978 - an IBM 3033.

Qualifications: College degree
plus 1-1/2 years of senior level
data processing experience plus a
strong background in COBOL.

Please send confidential resume
to: Dr. John M. Tyler, Louisiana
State University, System Network
Computer Center, Baton Rouge,
Louisiana 70803. An Equal Op-
portunity Employer.

PROGRAMMER ANALYSTS

WHAT ARE YOU WAITING FOR?

If you are waiting for an opportunity of a lifetime for career growth
and challenge, you don't have to wait any longer. ASC is a leading
D.P. consulting firm in need of talented and dedicated technicians
and we can give you a better deal.

WE HAVE THE:

- Highest Salaries
 - Per diem income
 - Paid Vacations and Holidays
 - Company paid Major Medical In-
surance
 - Life Insurance for you and your family
- Call us Monday-Saturday and ask about
our numerous D.P. job openings in 5
national offices.
(800) 543-7583

ALLEN SERVICES CORP.

DAYTON AIRPORT OFFICE
212 West National Road
Vandalia, Ohio 45377
In Ohio Call collect
(513) 890-1200

An Equal Opportunity Employer M/F



position announcements

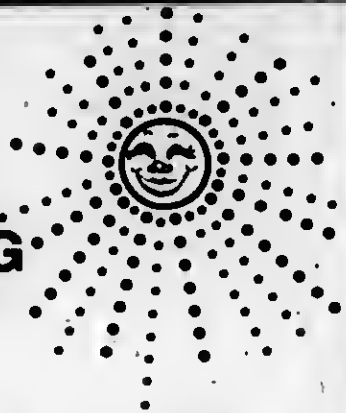
position announcements

position announcements

position announcements

position announcements

FLORIDA OPPORTUNITIES FOR DATA PROCESSING PROFESSIONALS



COME GROW WITH US...

Expansion of our local West Palm Beach, Florida facility has created several growth opportunities in our Business Systems Group:

ANALYST/PROGRAMMER

3-5 years' experience using COBOL and RPG II. To provide analysis skills for planning, developing and implementing computer systems. Strong manufacturing/business background. HP 3000 system experience preferred but not necessary.

PROGRAMMER

Minimum 2 years' experience using COBOL, RPG II, SPL and Image data base to support a HP 3000 system in a manufacturing environment. 2 years' college training preferred.

These positions offer a great deal of responsibility, challenge and individual growth. In turn, we offer excellent salaries and a complete company paid benefits package. If you are qualified and interested, please send your resume, including salary requirements, in confidence to:

Mr. Michael Servais
Employment Manager
Northern Telecom, Inc.
1601 Hill Ave.
West Palm Beach, Fla. 33407



An Equal Opportunity Employer M/F

WANT TO BE A CONSULTANT

... In Hi-Growth Firm ...

... Working Out Of Your Home?

Small consulting firm, combining systems and behavioral disciplines will grow 70% next year by building OR models of actual client organizations. Then we design install on-line computer-based training and management information/control systems, based on those OR models. We are NOT a body shop.

Seeking ambitious programmer-analyst with 2-6 years experience designing on-line systems who speaks FORTRAN with OR background. Some knowledge of POP-10 and comfortable talking to users/clients.

Work out of your home mostly on original system designs or customization of existing models/reporting systems; few "enhancements". Some travel. Own car and NY metro resident preferred. Freelancers OK; previous consulting work a plus. Any graphics experience makes you perfect.

Salary 16-24K plus eventual profit-sharing and possibly even stock. Contact: John Censor, CENSOR & CO., 201 East 25 St., New York, N.Y. 10010 (212) OR-9-5662.

PROGRAMMER SYSTEMS ANALYST

Will function as a senior level Programmer/Analyst for the development and implementation of an inventory system for the book collections of our 19-campus libraries. Project is part of a plan to automate selected function and service activities performed in our libraries.

Requires 5 years experience in the development and implementation of large scale mechanized computer systems utilizing data base management systems. Working knowledge of ANS COBOL required. Position is located in the Los Angeles/Wilshire Miracle Mile area. Salary range is \$20,388 to \$24,588 annually. Please submit your resume to:

CALIFORNIA STATE UNIVERSITY & COLLEGES

Personnel Services Ref P11
400 Golden Shore Suite 112
Long Beach, CA 90802
Equal Opportunity/
Title IX Employer

Now Is the Time To Join WANG!

You'll be joining a financially sound company that has 26 years of solid growth behind it ... growth in dollar volume (we anticipate \$200 million in sales this year), growth in personpower (we've increased our staff fivefold to 3600 since 1971) and growth in leadership (we lead the field in state-of-the-art in minicomputer and word processing systems). The atmosphere at WANG is fast-paced, demanding and very rewarding in terms of job satisfaction and recognition. If you are a real contributor, your place is at WANG.

Business Systems Analyst

Wanted for our corporate systems group: a creative individual who has proven ability to analyze policies and procedures, propose solutions to users' problems and implement improvement. Two years of EDP systems experience in a business environment required. Experience with order entry, billing and accounting systems are preferred. On-line data entry systems is a plus. The job demands someone who can communicate with administrative and technical people at all levels.

Excellent salaries and earning potential plus superior company benefits. Please send resume, including academic background and salary history and requirements to:

Stephen E. Pitt
Manager, Professional Recruiting

(or call our toll free number)
1-800-225-0654 (West Coast area)
1-800-225-0630 (East Coast area)

(when using toll free number, please specify account number 02179)

WANG

LABORATORIES, INC.

One Industrial Avenue, Lowell, MA 01851

We are an equal opportunity/affirmative action employer.

Systems Programmers

San Francisco Bay Area

Challenging career opportunities exist at our computer center in Merin County for individuals in a large MVS environment running 168's MP and AP. This is an opportunity to utilize the latest hardware and software technology. 1978 plans include MSS, 3033 and MVS/SE. A minimum 3 years' systems programming experience, strong ALC skills, and a good understanding of MVS and system 370 concepts are essential. Experience in MVS internals, SMP, measurement and tuning, dump analysis, design and implementation of system software is highly desirable.

If qualified, please send your resume including salary history to Jose Geray, Employment Representative, Fireman's Fund Insurance Companies, 1600 Los Gatos Drive, San Rafael, California 94911.



FIREMAN'S FUND
Insurance Companies

An affirmative action/equal opportunity employer m/f

VICE PRESIDENT DATA PROCESSING (EXCLUSIVE) To \$40,000

We are recruiting for a major Del Val Insurance Firm seeking a sophisticated EOP problem solver w/high degree mgmt expertise in PRODUCTION SCHEDULING, PROJECT CONTROL, REPORTING SYS & MGMT BY OBJECTIVE. Co has 370/135 OS/VS & Honeywell 2020. INSURANCE exp highly desirable. (Our fee pd.).

For confidential attention, send resume immediately to:

ROBERT HALE PERSONNEL AGENCIES
2 Penn Center, Suite 706
Phila., PA 19102
(215) 588-4580

COMPUTER PROGRAMMER

We are looking for a Computer Programmer with 1-2 years experience in BAL and COBOL. Finance and OS experience would be helpful. Salary will be commensurate with experience. Send resume to:

Old National Bank
Human Resources Dept.
P.O. Box 3588 TA
Spokane, WA 99220
Equal Opportunity Employer

E.D.P. DIVISION

NATIONAL PERSONNEL CONSULTANTS

Register with any of us
COVER NEW ENGLAND
... and the U.S.A.

Live, Work, and Play, in
NEW HAMPSHIRE

Are you tired of high taxes and expressway jams? Then you should consider the numerous critical positions that we have here in N.H. for MFG SYSTEMS ANALYSTS with supervisory experience and PROGRAMMER ANALYSTS with manufacturing experience. All positions with dynamic growth oriented firms here in N.H. Salaries from teens to low twenties. Contact:

David J. Osgood CEC
availability
PERSONNEL CONSULTANTS
160 South River Road
Bedford, New Hampshire 03102
16031 669-4440

SOUTHERN NEW ENGLAND

Openings for PROGRAMMERS, ANALYSTS and SOFTWARE PROFESSIONALS. Clients include INSURANCE CORPORATE HEAD-QUARTERS MFG BANKING CONSULTING

ACCESS GROUP
Suite 303 37 Lewis Street
Hartford Connecticut 06103
(203) 527-9107

Client companies represent all industries and assume all costs. Confidential Handling. Over 90 affiliated offices nationwide

M. David Lowe
PERSONNEL SERVICES

LUCRATIVE AND CHALLENGING ENERGY COMPANY POSITIONS

U.S. or Overseas Operations

Our client, a prestigious oil and gas concern, offers an opportunity for professional growth within one of the largest and most sophisticated DB/DC environments in the world.

HOUSTON AREA POSITIONS WILL OFFER:

... An opportunity to be involved in the start-up of an IBM 370/15B installation which will go to an IBM 3033 within two years.
... Salary scales and benefits which are highly competitive even within the energy industry.
... The personal rewards of life in a dynamic and prosperous Sunbelt city.

OVERSEAS POSITIONS WILL OFFER:

... Professional development in a state-of-the-art environment with multi-mainframes and over 500 remote terminals on IMS.
... Financial compensation packages which allow you to actually bank from ten to twenty thousand dollars per year.
... Rapid promotional opportunities due to anticipated 100% increase of staff within two years.
... Paid family housing, medical and education costs within an American community of thousands.
... American style housing, hospitals, schools, supermarkets, golf course, movie theatres, television and other amenities.
... Six weeks paid vacation yearly with the option of company paid travel expenses - worldwide or to U.S.
If you are qualified for these unusually appealing positions, contact Connie Hanlon or Tom Fischer at:

(713) 658-9898

ALL FEES ASSUMED BY CLIENT COMPANIES
NEVER A CONTRACT TO SIGN

400 Houston Natural Gas Building
1200 Travis, Houston, Texas 77002

position announcements

position announcements

position announcements

position announcements

position announcements

Computer Science

Anticipated Faculty Vacancy. Teaching business-related Computer Science courses primarily for majors in Business Administration. Date of vacancy: June or Sept. 1978. Experience and/or graduate training in Business Information Systems is required. Preference earned doctorate. Initial screening of applications, Feb. 1; final application deadline, March 15. Send letter of application, resume, letters of reference, and transcripts to: Martha A. Farver, Associate Director of Personnel, Alpha Hall, Elizabethtown College, Elizabethtown, PA 17022. For additional information call Miss Farver. An affirmative action/equal opportunity employer.

**H6000 COMP OPERATORS
LEAD/SENIOR
12 OPENINGS
(EXCLUSIVE)**

We have been selected to recruit for Prominent Phila client seeking 12 OPERATORS at LEAD and SENIOR levels. Requirements include LGE SHDP, H6000 ENVIRON. Depending upon exp sal range \$9,000 to \$14,000. PHILA AREA apps prfd. (Our fee pd.) To arrange initial intv appt, call or forward resume immediately to:

**ROBERT HALF
PERSONNEL AGENCIES**
2 Penn Center, Suite 706
Philadelphia, PA 19102
(215) 568-4580

We are in the top 20 of Companies like us in the USA. Our Growth last year was in excess of 60%.

We are expanding throughout the Southwest & West.

We seek the following:

SYS 3-15 DP MGR

Seek 2-1/2 yrs. RPG Oka.

EDP AUDIT MANAGER.

Locate to Oklahoma or Texas.

PROGRAMMER ANALYST

Seek 370 DS or DOS COBOL and/or BAL experience. Locate to AL, GA, FL, TX, OKLA.

*Our employees are aware of ad. Send your resume in strict confidence to:

P.O. Box 60128

Oklahoma City, Okla. 73106

San Diego opportunity in EDP SYSTEMS DEVELOPMENT

Want to combine the ideal career opportunity with your favorite lifestyle? NCR Special Systems Division needs your help now in developing advanced, high-technology, EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, Le Jolle and downtown San Diego. You can live in the setting of your choice — beach, valley, mountain; country, small-town or urban — and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too — from mild coast to dry desert. San Diego is a place of extraordinary choices — and right now the choice is yours.

COMPUTER PROGRAMMERS

The Special Systems Division has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- Telecommunications Software
- File Processing
- Network Development
- Large Mainframe, Mini and Micro Processor
- Operating Systems
- COBOL Applications
- Assembly Language

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems; both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.

NCR

Thom Harris, Employment Specialist
SYSTEMS ENGINEERING/TORREY PINES
4046 Sorrento Valley Blvd., San Diego, CA. 92121
An Equal Opportunity Employer

**Programmers
Software
Specialists**

Experience desired in:
*MINI/MICROCOMPUTERS
*Assembly language
*Real Time systems

Solid State COMMUNICATIONS SWITCH Manufacturer offers a technical SOFTWARE challenge. Utilizing minicomputers (PDP-11) disk and tape drives, this product line allows switching versatility for large & small customers around the World - this versatility provided by sophisticated and advanced systems software philosophies. We are the undisputed Technical & Sales Leader - Internationally!

Should an advanced, intricate, multifaceted series of software challenges spur your interest - and match your experience, please drop us a note with your qualifications. We, in turn, will send you our product literature, annual report and excellent Employee Benefits package. We are located in beautiful, historical suburban Maryland. Please contact S. Spire, Division Representative, P.O. Box 1052, Mt. View, CA 94040.

EDP SALESPERSON

Mainline computer services company needs professional salespeople for Data Center sales, Mini Computer sales and Contract Systems/Programming sales - sales track record for Data Center and Minis sales - a solid D.P. background for Systems and Programming sales.

Computer Task Group, Inc. is a progressive and expanding full services company - planned personal growth - excellent compensation plan - full benefits - opportunity available in Baltimore, Buffalo, Chicago, Rochester, Pittsburgh and Syracuse. Call (716) 634-9090 or rush resume:

Computer Task Group, Inc.
5501 Main Street
Buffalo, New York 14221
An equal opportunity employer M/F

SYSTEMS ANALYST SALES SUPPORT

(Chicago Based)

WHEN IT COMES TO SMALL BUSINESS
COMPUTER MARKETS
WE'RE SECOND ONLY TO IBM...

...and getting BIGGER all the time! With a growth rate that exceeds 43% annually we're rapidly closing the gap on the industry leader. Cited as one of the ten outstanding growth companies in the U.S. since 1965 - last year #5 - we're always on the lookout for technical talent capable of supporting our expanding sales efforts which has now breached the \$164,000,000 mark.

Right now we're looking for a Systems Analyst who can step immediately into significant responsibilities for coordinating and monitoring the full range of technical support functions for the central area in both the computer and word processing product lines and including telecommunication applications for Fortune 500 accounts.

In order to meet our standards you'll need a minimum of 5 years experience in mainframes, proficiency in COBOL and a background that includes software and data communication systems such as: TC ACCESS METHDDS, PROTOCOLS, (BTAM, VTAM) and (BSC, HASP, 3270, SDLC). In addition you'll also need some prior technical sales support experience, preferably with large national accounts. The ability to communicate plans and recommendations is essential.

Join us and you'll discover a highly progressive environment oriented towards the needs of the technical professional, as well as an excellent salary, benefits and expense package that reflects your standing as a professional. For confidential consideration, forward a letter or resume including salary requirements and earnings history to WANG LABORATORIES, 444 N. Michigan Ave, Chicago, IL 60611.

WANG

Equal Opportunity Employer M/F

Data Processing**SYSTEMS
PROGRAMMER**

Progressive organization seeks an individual to join a group of professionals dedicated to quality results. The ideal candidate should possess proven experience in DDS VS and CICS VS systems programming.

**SYSTEMS
ANALYST**

We also seek an analyst who has proven performance in systems design, implementation, application planning, plus the ability to evaluate and direct programming efforts. Proficiency in both oral and written communications is a must.

Besides offering continual growth, we also offer a salary commensurate with experience and ability. Send resume with salary history in confidence to:

(312) 797-3229

MacNeal Memorial

Hospital

3249 S. Oak Park Avenue

Berwyn, Illinois

Equal Opportunity Employer

EDP AUDITOR

Opportunity to grow with subsidiary of one of the largest commercial banks in U.S. Accounting degree, able to program in COBOL and instruct programmers. All public OK. \$24,000 FEE PAID.

**ROBERT HALF
PERSONNEL AGENCIES**
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

**SYSTEMS
PROGRAMMER**

We are looking for a Systems Programmer with PDP-10 or PDP-11 experience. Networking experience is desirable. We are a private University developing a campus mini-computer network to provide resource sharing and access to our two KL10 systems.

Send resume including salary history to:

Engineering Computer Lab
Powell Hall 204

University of

Southern California

University Park

Los Angeles, CA 90007

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

- SYSTEMS ANALYSTS
- PROJECT LEADER
- SENIOR PROGRAMMERS

Candidates should have a college degree or equivalent, and a minimum of 4 years' experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and knowledge of JCL for OS/MVT is desirable.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If interested and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C

EG&G Idaho, Inc.

Box 1625, Idaho Falls, Idaho 83401

U.S. Citizenship Required

We are an equal opportunity employer M/F/H

EG&G

position announcements	position announcements	position announcements	position announcements	position announcements
POSITIONS AVAILABLE NATIONWIDE CALL TOLL FREE 800-426-0342 We have scores of openings in every major city in the United States. Our clients are all equal opportunity employers who need qualified computer professionals. Start the New Year out right by sending us your resume for confidential attention. Sys. Progs., DS/CICS Exp to 25K Sys. Progs., DS, MVS to 26K Prog./Anal. to 24K Honeywell & IBM User Anal., Insurance to 20K Sys. Anal., Mfg. to 25K Chemical & Retail CALL BILL ISGRIG PARKER PAGE ASSOCIATES P.O. Box 12308 Seattle, WA 98111 Offices in Wsh., D.C., Chicago, Atlant & Portland, OR.	3rd JOB CHALLENGE STAGNATION 2nd JOB BIG \$ Low \$ Pay \$ 1st JOB TRAINING! EXPERIENCE! GO EDUCATION	4th JOB STABILITY BORED aci We're a group of professional people dedicated to solving data processing problems... a consulting firm providing the best. ACI has immediate positions available throughout the country. Because of the variety of our projects we need people with a variety of talents, so give us a call! automation consultants, inc. 1700 Needmore Road, Dayton, Ohio 45414. Call Collect Joanne Peterson, 513-278-4861 An Equal Opportunity Employer M/F	aci CHALLENGE MONEY ADVANCEMENT SECURITY !!!! MICRO MINI MAXI Software + Applications Development For Fortune 500 Customers In An Independent Atmosphere	DATA BASE CONSULTANT Professional career opportunity with a high technology consulting firm based in St. Louis. Responsibilities will include technical assistance in applications data base design, tuning, client training, etc. In addition to exciting challenges and a variety of responsibilities, you can expect an attractive compensation and benefits package. Interested candidates may submit resume and salary history in confidence to: CW Box 1369 797 Washington St. Newton, Mass. 02160

Programmer/Analyst

Individual to assist in the analysis, development and programming of computer systems. Prepare necessary systems and program documentation. Must be able to communicate effectively with users; and program proficiently in COBOL, BASIC Language helpful. Teleprocessing a plus. Degree preferred with experience in programming and system analysis. Salary mid teens.

Please call Mrs. Pemberton (804) 288-3081 or send resume to
Robertshaw Controls Co.
 P.O. Box 27606, Richmond, VA. 23261
 An equal opportunity employer

OPERATIONS MANAGER

We are seeking an individual to manage data entry, computer operations, and distribution at a facility which services seven divisions of Cessna Aircraft Company.

This position reports directly to the manager of data processing and includes supervisory responsibility for two exempt and approximately sixty non-exempt employees.

Prior supervisory experience in operations is required. Operations experience in an IBM 370-158 environment operating OS/VS1 is also a requirement.

To obtain more information pertaining to this challenging management opportunity with the leading aircraft manufacturer in general aviation, please submit your resume and salary history in confidence to:

Employment Manager
 Cessna Aircraft Company
 Pawnee Division
 P.O. Box 1521
 Wichita, Kansas 67201

An Equal Opportunity Employer

cessna pawnee

DATA PROCESSING PROFESSIONALS 18K to 25K

Programmers & Systems Analysts
 Large retail chains - fully integrated MOSF processing systems. Installing POS network. IBM 370/135 and 370/158 with Systems 3 and 7 and 3270 equipment at distribution centers. OS/VS2 and OOS, COBOL, BAL, CICS, RPG. Two years plus experience in a large computer environment. This is a prime opportunity to advance your career. Excellent benefits. Moving costs paid.
 Call (617) 964-7725 or send resume to:
ABC Professional Division
ALAN LERNER ASSOCIATES
 210 Boylston Street
 Chestnut Hill, Ma. 02167
 Accounting Business & Computer Professional Placements
 All fees company paid

SYSTEMS/PROGRAMMER

Assembler and communications background, along with substantial experience in Operating Systems and System Software in IBM 370/138 or 148 environment are required. Successful candidate should be seeking a long term opportunity in a key and challenging position in mini-maxi computer environment.
 Contact D. Pellert collect at
 (518) 458-7666
 between 1:00 - 4:00 P.M.

FACULTY POSITION IN COMPUTER SCIENCE
 Applications are invited for a faculty position (Assistant Professor) in the Department of Computer Science starting in August, 1978. Candidates should have a Ph.D. in Computer Science but applicants with a Master's Degree in Computer Science will also be considered. Experience working with mini-computers, micro-computers, operating systems and data structures is desirable. Outlets will include teaching undergraduate Computer Science courses, committee work and some research. A Master's program in Computer Science is currently under consideration.
 Salary dependent upon qualifications and experience, and other benefits will be competitive. Applications should be received by March 1, 1978.
 The University of North Dakota is an Equal Opportunity/Affirmative Action Employer.
 Send resume to:
 Dr. Mok Tekko, Chairman
 Computer Science Dept.
 University of North Dakota
 Box 51 St. University Station
 Grand Forks, N.D. 58201

Career Opportunities For EXPERIENCED SYSTEMS PROFESSIONALS

YORK IS LOOKING FOR A

SYSTEMS MANAGER to direct Business Systems development for one of the major Product Groups.

DISTRIBUTION SYSTEMS SPECIALIST to develop the Division's future systems path in Product Distribution, Service Parts, and related Warehousing support.

SYSTEMS ANALYST to analyze and design information systems supportive to Finance, Marketing and Manufacturing.

Minimum 2-5 Years Systems Experience in one of these specialized functions. Prior Programming Experience and a Degree Preferred. IBM 370/DOS or DOS/VS Background Required.

Send Resume to:

Mr. N. J. Gainer
 Mgr. Professional/Technical Employment
 York Division, Borg-Warner Corp.
 P.O. Box 1592
 York, PA 17405

An Equal Opportunity Employer, M/F

YORK BORG-WARNER

SYSTEMS ANALYST

Foremost Insurance Company is the nation's leading mobile home and recreational vehicle insurer with over 1-1/2 million policies in force. Our corporate office complex is situated in a suburban area of Grand Rapids, Michigan.

We utilize ANS COBOL, Panvalet, Roscoe, Com-Plete and programming techniques on an IBM 370/158 operating under OS/VS2.

Our current needs require that a person have 2-3 programming and 2-3 years systems analyst experience in an insurance environment. We also require that candidates have good written and verbal communication skills; ability to plan projects, maintain the scope of projects, and the candidates must be able to work well with users and work on large scale systems design. Exposure to ADABAS, IMS, TOTAL, structured programming and data dictionary would be a definite plus.

Foremost offers attractive starting salaries and a new, improved benefit package. Call collect: (616) 942-3311, or send resume with salary requirements to B. Jourdan.

Foremost
 INSURANCE COMPANY

P.O. Box 2450
 Grand Rapids, MI 49501

AN EQUAL OPPORTUNITY EMPLOYER M/F

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER PERSONNEL PROGRAMMER/ANALYSTS

Business Applications, Scientific Applications

Real time processing systems experience desired. Software development support duties. Degree in Computer Science with three to five years experience preferred, although some entry level positions are available.

We have been engaged by our client companies to fill the above positions.

These and other key opportunities are fee paid. Please send resumes for consideration to:



TVN ASSOCIATES
P.O. BOX 602
MARBLEHEAD
MASSACHUSETTS 01945

Representing America's Foremost Companies
For Over Fifteen Years

ASSEMBLY LANGUAGE PROGRAMMERS Florida

HARRIS COMPOSITION SYSTEMS DIVISION, one of the leaders in the development of newspaper composition and electronic typesetting systems is seeking senior level Assembly Language Programmers with mini and micro computer experience. Design and development of software systems for highly sophisticated communications terminals. PDP-11 experience desirable.

Please send your resume and salary history to Mr. J.E. Jensen, HARRIS COMPOSITION SYSTEMS DIVISION, P.O. Box 2080, Melbourne, Florida 32901.



HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

An Equal Opportunity Employer, Male and Female

TECHNICAL SUPPORT OPPORTUNITIES

We have recently reorganized and expanded our corporate information systems function, creating several challenging career opportunities. These positions include technical support responsibilities for an organization involved in shifting the emphasis of its activities from a large-scale IBM batch environment to an online/interactive environment based on large minicomputers networked with the IBM system.

INFORMATION SYSTEMS' TECHNOLOGIST Responsibilities include providing technical support for the data processing activities of corporate staff, including evaluation and implementation of software engineering developments and other computer technology advancements, education and training, standard and consulting.

SYSTEMS PROGRAMMERS: Responsibilities include operating software systems programming support for the online/interactive environment, development and use of configuration and network measurement and management tools, performance of periodic capacity planning reviews, etc.

Applicants should have a broad background in areas relating to computer technology and systems development, including hardware, operating systems, communications, online/interactive environments, several high level programming languages, compilers and interpreters, etc. Computer Science Degree and minicomputer exposure are desirable.

Please send resume and salary history and requirements in confidence to:

HUMAN RELATIONS DEPARTMENT
TRW, INC.

23555 Euclid Avenue
Cleveland, Ohio 44117

An Equal Opportunity Employer, M/F/H.

TRW

We can give you 3 good reasons to call Robert Half for data processing positions:

1. Robert Half has been in business for about 30 years. Can you name an EDP personnel service that's been around longer?

2. Robert Half specializes. We've been an integral part of the data processing community through all its generations.

3. Robert Half's offices are staffed by experts in the EDP field.

and if 3 reasons aren't enough, we can give you 55 more:

55 offices. Robert Half is a network throughout the U.S., Canada and Great Britain. One call and you've searched the local market... or the world.

and if 58 reasons aren't enough, we can give you Half a reason more:

Robert Half. Where integrity is a lot more than just HALF.



Look in the white pages.

COMPUTER PRO

If you are a professional and have the "state of the art" data skill, we want to talk to you. The market is right, all we need is you! Below is a sample of some of the positions available.

RELOCATE CHICAGO AND SUBURBS

Chicago Asst Mgr.	25-28K
Oakbrook Fin Svcs	19-22K
Wisc Sr Syst	22-24K
Hinsdale Mgr Sys	25-28K
Oakbrook OS Software	20-22K
Chicago Software	23-25K
Wisc. Prog	16-18K

SYSTEMS

Mfg. Specialist	22-24K
Profit Sharing	20-22K
Receivables to Travel	19-21K
Administrative IMS	22-24K
Consultant	20-22K

PROGRAMMER ANALYST

RPG II Mod. 15	15-16K
Cobol Morfevwell	15-17K
DO5	15-16K
OS Cobol to travel	20-22K
BAL Learn new Appic	16-18K

PROGRAMMERS

OS/Cobol Heavy	18-20K
BAL Go Systems	15-18K
Cobol	15-16K
BAL Insur.	16-18K

All Fees Paid by Employer
E.D.P. Specialist
Call Tony Manconi C.E.C.
(312) 325-7660

INSONOMICS INC.

15 Spinningwheel Rd.
Suite 228, Hinsdale, IL 60521

PROGRAMMERS AND SYSTEMS ANALYSTS

Put Your Experience To Work For You
In Building A Better Career Opportunity

Sperry Univac has a variety of challenging opportunities waiting for you at one of our Minneapolis locations. These openings exist within our Airline Industry Development Center which designs and supports applications such as reservations, ticketing, cargo, departure control, message switching, check-in, hotel and fare quote. We are searching for candidates with 2 to 8 years experience in the following disciplines:

- Design, implementation and support of real time applications,
- Acceptance testing of application programs,
- Technical support in the customer environment.

In addition to requiring experience within the areas mentioned above, it is also desirable to have a background in FORTRAN, end/or general UNIVAC 1100 series exposure.

We offer highly competitive starting salary, a comprehensive benefits program and outstanding professional and personal growth opportunities.

FOR IMMEDIATE ATTENTION,
PLEASE CALL COLLECT OR
DIRECT YOUR RESUME TO:
P.Y. Peterson

SPERRY UNIVAC

Univac Park
P.O. Box 3525, M.S. U1F28
St. Paul, MN 55165
(612) 456-2309

An Equal Opportunity Employer M/F

DATA PROCESSING

PROGRAMMERS

Leading pump manufacturer is currently looking for 2 Programmers to join their System 3/15D shop. Applicants must have:

- 3-4 years practical experience in RPG II
- Experience on IBM S/3
- Must have had exposure to CCP (IBM workshop is acceptable)

Our progressive shop offers applicants opportunity in various applications. Competitive salary and outstanding benefits (including dental). For appointment call (213) 692-0211 Ext. 208, or send your resume to the Personnel Department.



Goulds Pumps, Inc.

P.O. Box 1254
3951 Capitol Avenue
City of Industry, Calif. 91749

Equal Opportunity Employer M/F.

Health Care Data Processing Consultants

Expanding hospital management consulting firm is seeking an experienced professional for its St. Louis office. Candidates should have the following qualifications; three years experience in an automated hospital financial systems development and implementation (including patient accounting); Bachelor's degree; good communications skills.

In addition to exciting challenges and a variety of responsibilities, you can expect an attractive compensation and benefits package. 30-40% travel should be anticipated.

Qualified candidates should send their resume and salary history in confidence to:

CW Box 1369
797 Washington St.
Chicago, IL 60601

position announcements

position announcements

position announcements

position announcements

position announcements

OPENINGS EXIST FOR THE FOLLOWING

EDP AUDIT TRAINEE \$18-24K

Seek degree and 3 yrs heavy exper
in programming with desire to
become EDP Auditor

SYSTEMS PROGRAMMER \$18K

Will train on new 3031 for sysgen
If you have heavy BAL exper
move to Oklahoma

MFG ANALYST \$18K

Major corp with 40% growth rate
seek general applications exper.

EDP AUDIT to \$35K

We have over 80 openings.



WHY EDP SEARCH?

Your life will be placed in our
computer aided search system.
When a position comes up in the
area and discipline you desire it
will automatically respond.

We have greater than 400 posi-
tions open across the U.S. Posi-
tions are available in most every
major city! 120 associates coast
to coast! Contact:

EDP SEARCH
AND EXECUTIVE PLACEMENT
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

The University of Texas

Medical Branch at Galveston has an immediate opening for an experienced Systems Programmer. Join a progressive data processing staff of 70 persons working for the largest, oldest and most prestigious medical school in Texas. UTMB is involved in some of the most advanced research being done in the medical field today. This 1100-bed health care facility provides a constant challenge for the development of new systems. The innovative data processing department offers each employee the opportunity to develop through internal and vendor education programs. On-line, real time, health care support applications provide the backbone of the development environment. Working with a group of four, the person selected will share responsibility for development, testing and maintenance of systems software. This is a dynamic growth environment currently moving from OS/MVT HASP to MVS/JES 2 on a four meg. 370/158. A large teleprocessing network is managed by CICS using DL/I as the DBMS. Qualifications should include a good working knowledge of ALC and 3 years experience with similar systems and equipment. The position provides excellent benefits and a salary commensurate with experience. 50 miles south of Houston, Galveston Island sits just off the Texas coast in the Gulf of Mexico. The town's unique combination of historical (late 1800's) architecture and coastal beach advantages provide a delightful living environment for the employees of the large medical school/hospital complex. Leave your cold weather worries behind and join us in one of the highest growth areas in the U.S.

Send your professional resume to:
Service Computation Center
c/o Mr. Bernard Curran, Personnel Office
P.O. Box 146

University of Texas Medical Branch
Galveston, Texas 77550

For more information concerning specific duties, call (713) 765-3800. We are an equal opportunity m/f/h employer.

Programmer Analysts

New York, New Jersey, Atlanta,
Miami, Houston & California Locations

Growth is nothing new at COMPUTER HORIZONS CORP. Having just opened our fifth branch office in California, we have become one of the fastest growing and most diverse EDP service organizations in our industry, specializing in systems design, programming, mini computer turnkey systems, and customized computer terminal manufacturing. We are currently looking to expand our N.Y., N.J., Miami, Atlanta, Houston and California branch locations.

We currently seek qualified technical people in the following areas.

OS/COBOL

Solid background in OS/COBOL environment, design or implementation experience. Opportunity to learn CICS and IMS in very near future thru our in-house training programs.

CICS

Requires design or implementation experience in a DOS or OS environment under CICS using COBOL or BAL language.

IMS

Requires design or implementation experience under IMS, using COBOL, BAL or PL/I.

PDP/11

1+ years experience working with DEC PDP/11 under RSTS-E, or RSX and Basic Plus.

Along with working on a sophisticated, diverse environment, we offer a complete benefits package, tuition refund and above average salaries.

If you would like to expand your movement and diversity with a career oriented data processing company, please contact Mr. Bob Palmieri, Director of Personnel at (212) 371-9600 or send resume to his attention.



COMPUTER HORIZONS CORP.
747 Third Ave., N.Y.C. 10017
An Equal Opportunity Employer M/F

PROGRAMMERS...
IF YOU CAN BE
HERE...

WHY STAY
HERE
?

Now, you can
move up. Just
contact office
nearest to you.
No obligation.
No charge, ever.

National Computer Associates

DALLAS
Dallas Personnel Consultants
4250 LBJ Freeway
Suite 182
Dallas, Texas 75234

DETROIT
Electronic Systems Personnel
Prudential Tower Center
3000 Town Center, Suite 2500
Southfield, Michigan 48075

FLORIDA
Data Sciences Personnel, Inc.
Suite 205, 15400 N.W. 7th Ave.
Miami, Florida 33180

HARTFORD
Compucon, Inc.
300 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Consultation Enterprises
Suite 800, 3250 Wilshire Blvd.
Los Angeles, California 90010

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
801 Nicollet Mall, Suite 1710
Minneapolis, Minnesota 55402

NEW JERSEY
Systems Search II
75 South Orange Avenue
South Orange, N.J. 07075

NEW YORK
Data Associates, Inc.
405 Lexington Avenue
New York, New York 10017

NORTH CAROLINA
Techforce, Inc.
1948 I. Woodlawn Ave.
P.O. Box 8888
Greensboro, N. Carolina 27405

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa. 19086

PITTSBURGH
Electronic Systems Personnel
108 Cypress Building
270 Forbes Avenue
Pittsburgh, Pennsylvania 15219

SAN FRANCISCO
The Computer Resources Group
Agency, Inc.
353 Sacramento Street
San Francisco, California 94111

ST. LOUIS
CRA Associates Personnel, Inc.
(Agency)
1520 James Street
St. Louis, Missouri 63104

WASHINGTON, D.C.
ISP Systems Corporation
Suite 210
1211 Connecticut Avenue N.W.
Washington, D.C. 20036

FLORIDA

Int'l Corp. asked us to locate
DOS/VS CICS applicants from
P/A to mgr-major expansion -
mail resume to Stan Allen -
TODAY!

Systems Prog. needed by Flori-
da division Fortune 500 Co -
HURRY! with your resume to
Stan Allen.

ROBERT HALF
PERSONNEL AGENCIES

1311 N. Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

Software Project Manager

Assume full responsibility for development of a software operating system. Define and implement staffing plan and project implementation strategy. Schedule, organize and report project status. Meet the project objectives for schedules, performance and cost. Position also has budgetary and salary administration responsibility.

Competencies required: Computer Science degree or equivalent. Minimum of four years' software engineering experience, including development of operating systems, with a minimum of one year of management experience. Experience with both high level and assembler languages. Excellent oral and written communications ability. Familiarity with microprocessors and digital hardware desirable.

Tektronix, Inc., develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Mary Walhood, TEKTRONIX, INC., P.O. Box 500, C53, Beaverton, Oregon 97077.

An Equal Opportunity Employer M/F/H.

Tektronix
EXAMINER TO EXCELLENCE

ANALYST PROGRAMMERS

M.I.S. International, an internationally known computer systems integration organization, requires specialized professionals for top assignments in southeastern Michigan and Ohio areas.

MIS is developing advanced systems in:

- Energy Management, Process Control, Communications, Data Base Management

Knowledge of the following computers is desirable:

- MINICOMPUTERS: ModComp IV, CAI/LSI-11, PDP-11
- LARGE COMPUTERS: B6700/4700, IBM 370, H6000

Top salaries, fully paid fringes include life, health and dental insurances, moving allowance and educational benefits. To arrange an interview, call or send your resume to Mr. Gene Bryant.

M.I.S. INTERNATIONAL, INC.

31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010

PROGRAMMERS

Join A Leader In The
Hardware/Software DP
Applications Industry

Hennepin County, the site of Minneapolis, one of the prime quality of life areas in the country, is a unique year-round 4-season area that provides the ideal blend of recreational activities, excellent educational and cultural activities and outstanding residential areas.

The Data Processing Department of Hennepin County is committed to maintaining its leading position in the Data Processing Applications industry for both hardware and software. Our continued growth and achievements have created a dynamic and challenging opportunity for the individual who is seeking unparalleled growth and development in a highly professional and demanding environment. This position requires a minimum of 1 year COBOL programming experience and offers excellent opportunities in a large-scale IBM shop (370/168, MVS, IMS).

In addition we offer a liberal salary that is commensurate with your experience, a comprehensive benefits package and many outstanding opportunities for both professional achievement and personal growth within our organization.

WRITE IN CONFIDENCE TO:

Hennepin County

David R. Sier

A-3 Government Center
Minneapolis, Minnesota 55487

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS PROGRAMMER APPLICATION PROGRAMMER/ANALYSTS

Our data processing organization offers a professional environment and is flexible to the individual talents of its staff. If you are seeking an opportunity where your total experience can be utilized in a state-of-the-art shop ... read on!

CURRENT ENVIRONMENT:

Presently our dual operating consists of IBM 370/158 2 MEG; 370/145 1 MEG with the new IBM 3032 on order under OS. Peripherals include 3420's, 3330's, 3350's, 3211 and 1403. Our operating system is VS-1 with a large nationwide telecommunications on-line network.

SYSTEMS PROGRAMMER:

This outstanding opportunity is perfect for a progressive individual who wishes to exercise full range of systems programming skills. No chance to get weighed down in only one area of responsibility. We are small enough for an individual to be thoroughly challenged and recognized yet large enough to provide opportunities for advancement.

To qualify you must possess experience in the following areas: assembly language coding, SYSGEN-VS-1 or SVS, VS-1 or SVS internal, and JCL. Additional experience in interactive, time-sharing, performance measurement and evaluation, and hardware and software evaluation is a definite plus.

APPLICATION PROGRAMMER/ANALYSTS

We have immediate needs for individuals who enjoy to participate on projects from the ground floor up, analyze the needs of the user, investigate options, and complete the program. Qualifications include a strong COBOL background (1-3 years) in a manufacturing environment under OS/VIS-1. JCL knowledge essential. Formal education in data processing plus assembly language coding desirable but not necessary.

Signode is a leader in the industrial packaging field and one of Fortune's 500. Our sales volume well exceeds \$400 million. Our data processing organization will be relocating to a brand new building in Glenview, Illinois within 12-18 months. All these positions offer an outstanding salary and excellent opportunities for advancement based on performance. Company benefits include: company paid insurance for the family (Blue Cross/Blue Shield and dental care), profit sharing, 100% tuition reimbursement, and cost of living increases. Qualified applicants should call (312) 276-8500 ext. 524 or send your resume including salary history, in confidence to:

PAUL DUSKI

SIGNODE
CORPORATION

2600 N. Western Ave.

Chicago, Ill. 60647

We are an equal opportunity employer and encourage females and minorities to apply

GORDON JEWELRY CORPORATION

is
expanding its Data Processing
Department and has
requirements for personnel in
the following areas:

PROJECT LEADERS

• 5+ years experience including project management/design responsibilities

• COBOL

• CICS

• DLI or other DBMS is a plus

PROGRAMMER/ANALYSTS

• 2+ years experience in program design and coding using ANS COBOL, CICS is a plus

• DLI or other DBMS is a plus

SYSTEMS PROGRAMMER

• DOS/VIS

• POWERVS

• CICS

• DLI

• VS AM

• Assume total responsibility for System Software and Software package installation, maintenance and tuning.

Applications to be developed include:

• Accounts Receivable

• General Ledger

• Inventory Control

• Sales Analysis

Current hardware is a 2M IBM 148 with an on order 3031.

APPLY DIRECTLY TO:

Ms. Gaila McLoughlin

820 Fennin

Houston, Texas 77002

(713) 222-8080 Ext. 276

Equal Opportunity Employer

PROGRAMMER Las Vegas, Nevada

Two to five years experience in both COBOL and FORTRAN. COBOL 6000 or CYBER experience preferable. Bionvironmental background required, BS degree in mathematics or related sciences field. Statistical knowledge helpful. Responsibilities include design and implementation of Retrieval System for Personnel Radiation History and development of Bionvironmental Studies Data System.

Excellent Fringe Benefits
Must be a U.S. Citizen
Interview and retention expenses
Equal Opportunity Employer - M/F
Send resumes to: L.W. Bennett

Reynolds Electrical

& Engineering Co., Inc.

P.O. Box 14400

Las Vegas, NV 89114

WANTED:

MARKET REP

For the Chicago area. If you currently sell software to IBM/OS installations and want to increase your income, we have a proven system utility that every IBM/OS installation needs. Excellent arrangement. Call Mr. Fred Mueller, Vice-President, Chicago Data Systems, Inc. (312) 774-6923

PROGRAMMER/ ANALYST

Leading manufacturer, involved in the high technology electronics field, seeks a responsible, aggressive, professional to join in the development of manufacturing systems. Rapid growth requires staff expansion and offers challenging and rewarding opportunity for the successful applicant.

Qualifications should include three years Cobol programming experience, working knowledge of IBM 370 and OOS/VIS, JCL, RPG II and experience in the development of manufacturing systems using Oompt for such things as inventory control, work in process, labor costing and MRP. Knowledge of CICS is desirable. Starting salary commensurate with experience, education and ability. Excellent benefit package. Contact in confidence E.M. Sisson, Ampere Electronic Corporation, Slatersville, R.I. 02876, (401) 762-9000, An Equal Opportunity Employer.

PROGRAMMERS AND ANALYSTS

Free Employment Service Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Watton Road
Blue Bell, Penna. 19422
(215) 629-0395

RSVP SERVICES

Employment Agency for Computer Professionals

DEC PROGRAMMER/ANALYST

Dynamic, upstate New York marketing organization is looking for a Programmer/Analyst with at least two years experience with DEC RSTS Basic-Plus System; preferably on 11/70. Commercial background desired in order processing, inventory control, and accounting applications. Ability to deal with user groups is essential.

We can offer you a friendly working environment, good starting salary, excellent benefits and profit sharing. Send resume and salary history in confidence to CW Box 1366, 797 Washington St., Newton, MA. 02160.

EQUAL OPPORTUNITY EMPLOYER

LAUNCH A MORE REWARDING CAREER IN DATA PROCESSING AT THE MORE STORE

Lechmere Sales, a subsidiary of the Dayton Hudson Corporation, is expanding its M.I.S. department. These growth oriented opportunities require varied degree of expertise.

- Project Leader
- Programmers
- Programmer/Analysts
- Systems Analysts

Responsibilities to include design, and implementation of new and existing financial and marketing applications in an ANSI COBOL operation. IBM 370 experience with exposure to O.S., O.O.S., V.S., and C.I.C.S. preferred. Expansion of our Data Processing department has brought about the installation of an IBM 370 computer with the plans to obtain a larger in-house unit within six months. Our accomplishments include the installation of an IBM Point of Sale system with 168 on-line terminals and completion of a new MIS facility. Future objectives will be:

- SNA tele communications system
- IMS data base application

For those who qualify a Data Processing career with assured upward mobility, and a generous and comprehensive compensation package is offered.

Forward detailed resume with salary history and expectation to:

Central Personnel Manager
LECHMERE the More store

88 First St., Cambridge, MA. 02141

An equal opportunity employer M/F

ADMINISTRATIVE ASSOCIATE

Management Information Specialist
\$15,000-\$22,000

1) To analyze the management operations and to identify and implement mechanisms to aid decision-making. 2) To provide general administration support. This responsibility entails an increasing degree of working contact with administrators in resource management and budget preparation and administration. M.B.A. with emphasis on use of computers as management tools, another master's degree with emphasis on administration, or a bachelor's degree and a minimum of three years experience in an administrative capacity. Highly developed interpersonal skills enabling work with individuals and groups in problem solving are necessary.

Resume's must be in by January, 1978

Charles W. Tandy

Office of the Dean of Medicine

University of Texas Medical Branch

Galveston, Texas 77550

UTMB is an Affirmative Action Title 9 Employer

EDP SALES District Manager

Immediate openings in the Dallas and Chicago areas for two dynamic sales executives. If you're a self-starter, with degree, a broad background in computer marketing, and a proven track record in hardware sales, CIG offers unlimited earning potential plus a substantial benefits package.

We're a national leader in the sale and leasing of IBM systems and plug compatible peripherals; AMEX-listed; with strong history of continuity and customer service.

Please send detailed resume, including earnings requirements to:

Bob Applegate
CIG COMPUTER PRODUCTS, INC.
303 Cameron Street, Alexandria, VA 22314

CIG

PROGRAMMERS THIS TITLE MAY BE HOLDING YOU BACK? 15.5-25.5K

Caught in this game of semantics, where your job is nothing like the title implies? Outlets are of a much more diverse nature? Then you should avail yourself of our service, "not to change jobs", just to find out where you stand in the game. You may be shocked to find out that your current position in the market place is worth much more to you in dollars than your present salary. If you would like to determine if your title and salary match what others are getting, our data base is available for you to make that determination. "NOT TO CHANGE JOBS". For more input call collect in Boston (617) 423-1900, in Houston (713) 961-5500 or in San Francisco (415) 981-7000.

MANAGEMENT CONSULTANTS IN D.P.
ALL REPLIES HELD IN STRICTEST CONFIDENCE.

NAME _____	ZIP _____
ADDRESS _____	
HOME PHONE _____	
COMPANY _____	TITLE _____
RETURN TO:	
PERRI-WHITE ASSOC. 50 FRANKLIN ST. BOSTON, MASS. 02110 (617) 423-1900 ATTN: CHARLIE WILKINS	PERRI-WHITE & ASSOC., INC. 5373 W. ALABAMA PLACE HOUSTON, TEXAS 77056 (713) 961-5500 ATTN: TOM MEEHAN
PERRI-WHITE & ASSOC., INC. 44 MONTGOMERY ST. SAN FRANCISCO, CAL. 94104 (415) 981-7000 ATTN: TERRY MC MAHON	

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMERS

OAD Corporation is seeking computer programmers for long term contracts in the Atlantic City area. These positions are in support of projects at the FAA National Aviation Facilities Experimental Center (NAFEC). Candidates for programmer positions require 3 to 7 years experience, while 7 or more years experience is desired for senior programmers. Experience in one or more of the following areas is desired:

- IBM 9020 or 360 COMPUTER SYSTEMS
- STRUCTURED PROGRAMMING
- REAL TIME SYSTEMS
- ASSEMBLY LANGUAGES
- JOVIAL OR OTHER HIGH ORDER LANGUAGES

OAD offers professional candidates an unusual opportunity for growth, excellent employment benefits and salary commensurate with experience.

Submit resume in confidence to:



P.O. Box 666
Pleasantville, New Jersey 08232

An Equal Opportunity Employer, M/F

Microprocessor Systems Analyst

Design, debug and maintain various microprocessor systems in an engineering support environment. Qualify users requirements for microprocessor hardware/software support. Evaluate microprocessors as candidates for support systems and implement standardized debugging facilities for selected microprocessors.

Must have experience with language related software: computers, assemblers, linkers. Requires BSEE or BSEE or two years' experience.

Salary is open. Benefits include educational support, insurance and profit sharing program.

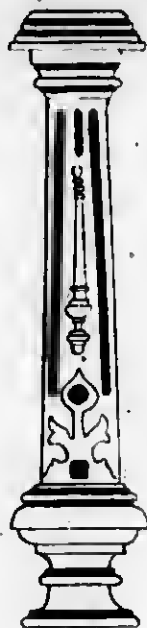
Send detailed resume and salary history to Mary Walhood, TEKTRONIX, INC., P.O. Box 500, C58, Beaverton, Oregon 97077.

An Equal Opportunity Employer M/F/H.

Tektronix
COMMITTED TO EXCELLENCE

APPLICATIONS

OUR SAN FRANCISCO ENGINEERING CLIENT HAS ASKED US TO FILL A SENIOR OPENING FOR A BUSINESS PROGRAMMER. YOUR RESPONSIBILITY WILL BE TO WORK ON FINANCIAL & ACCOUNTING SYSTEMS. CONFIGURATION INCLUDES AN UNIVAC 1100. REQUIREMENTS ARE 8 YEARS OF COBOL. KNOWLEDGE OF STRUCTURED PROGRAMMING. BACKGROUND IN SYS 2000 DBMS PREFERRED. FAMILIARITY WITH UNIVAC SOFTWARE WOULD BE A PLUS. SALARY UP TO \$30K. PLEASE CALL: 415/781-5260.



COMPUTER PROFESSIONALS
UNLIMITED AGENCY, 418
CLAY STREET, SF CA 94111

CPU

SUNBELT OPPORTUNITIES

Fees Paid By Client Firms
SYSTEMS PROGRAMMER
To \$22,000 Range

Major division of NYSE corporation located in West Tennessee needs Systems Programmer for implementation of CICS systems. Prefer manufacturing applications experience in assembler utilizing IBM hardware. Will advance into DP management slot on completion of project. Contact Jim Morgan.

SR. SYSTEMS ANALYST
To \$22,000 Range

Large manufacturing operation located in the Mid-South needs DP pro for technical expertise and direction in computerized business & manufacturing applications. Prefer on-line and/or CICS systems background. Will advance to manager of systems & programming after initial orientation. Contact Jim Morgan.

Call or Send Resume
EXECUTIVE PERSONNEL CONSULTANTS
5050 Poplar Suite 1601
Memphis, TN 38157
(901) 767-6800
(State salary information)

SOFTWARE/BRAINS

If you are a talented, software professional with a proven record of accomplishment the following may be of interest:

Our client is one of the best known names in the computer industry. Their location provides easy access to city and country living, as well as excellent schools for those wishing to pursue advanced degrees. Due to a combination of promotions and expansion the following positions are open:

Software R&D Mgr 34K
manage large group with \$1,000,000 budget in the design and development of mini-computer software.
Software Mgr 30K
manage dept engaged in the design of communications software for intelligent terminal products.
Software Mgr 27K
manage dept engaged in compiler/language development.
Project Leader 23K
supervise 2-4 people in new QA dept that will use mathematical techniques to prove the validity of mini-computer software.

Tech. Writer 17K
new position that will allow for some teaching and programming duties as well as normal writing responsibilities.

Software Engineers 15-23K
to participate in the design and development of operating systems, data bases, compilers, languages, firmware, communications handlers, diagnostics, interrupt driven systems, emulators and utilities. Jr. and Sr. level positions.

For a confidential appraisal of your background relative to these positions contact Ron Bell

Management Recruiters
2929 Plymouth Rd #202
Ann Arbor, Mich. 48105
(313) 769-1720

OPPORTUNITIES FOR COMPUTER PROFESSIONALS IN BUSINESS COMPUTER APPLICATIONS

SYSTEMS PROGRAMMER

We are seeking Systems Programmers with TP background to work in a rapidly growing TP environment. We are a 370-168/158 MVS shop with CICS, TSD and TCAM applications.

ANALYST PROGRAMMERS

Do you consider yourself a thorough professional in any of the following:

System design and architecture, leader of large system programming teams, programmer in large scale 370 MVS environment? Do you accept the concepts of hard specifications, deadlines, and tight cost controls? You may find our environment challenging (PL/I is our language).

Please submit an up-to-date resume including salary requirements to:

Mrs. Linda Heldenis
NORTHEAST UTILITIES
P.O. BOX 270, HARTFORD, CONNECTICUT 06101



Conn. Light & Power
Hartford Electric Light Co.
Western Mass. Electric Co.
Holyoke Water Power Co.
Northeast Utilities Svcs. Co.
Northeast Nuclear Energy Co.

START AN EXCITING NEW YEAR WITH

data services
western union

CAREER OPPORTUNITIES NATIONALLY

We are a full line computer terminal company. Our exciting new "Smarts" terminal has opened up new markets and created new job opportunities in many locations for both technical and sales personnel. This is a stimulating environment offering personal growth for the imaginative and creative person who enjoys a customer service oriented company.

SALES

This base salary + commis. position requires an end user sales background in a systems application environment. Excellent sales support offers great 1st yr earning oppy. Conn., Pittsburgh, Chicago, Los Angeles and other locations Available.

SR. SOFTWARE SYSTEMS DESIGNERS

These are multi tasking operating systems development positions requiring dedicated designers - 2270, 2780, 3770, 3780, 3741, 3270- Protocols, 8085-280-6800 Micro Systems. Salary Hi \$20's +

ENGINEERS

Several positions available for communications equipment engns with circuit analysis, design, product evaluation, microprocessor and/or applications engineering exper. Sel. \$17-25K.

CUSTOMER SERVICE ENGINEERS

Many locations available due to company growth. Requires exper. in testing, installation, repair and maintenance of teleprinters, CRT's and Data Com peripherals - Salary Open.

To Explore These Opportunities, Call Personnel Toll Free, (800) 631-7050 or write

data services
western union
70 McKee Drive, Mahwah, NJ 07430
An Equal Opportunity Employer m/f

SYSTEM SOFTWARE MANAGER, Mid \$30's

Mini/Micro Processors
Well known high technology company needs a manager with strong self-motivating qualities to lead a competent team of software engineers. BSEE or CS, MS preferred. Required knowledge of mini & micro system software including real time operating systems, language processors (i.e. PL/M, FORT, PASCAL, ASSMBL). A real growth opportunity.

Call or write (in confidence) to:
David B. Meyer, Consultant

Dunhill PERSONNEL INC.
1551 Oak St. Eugene, OR 97401
(503) 484-9242

D P Programmer Analyst

Experienced with RPG2 and manufacturing/financial applications. Acquaintance with COBOL valuable. Report directly to president. Excellent employee benefits. Call:

Industrial Relations Dept.
WASHEX
Machinery Corporation
(817) 855-3990

SENIOR SYSTEM ANALYSTS \$18,258 to \$26,022

The U.S. Bureau of the Census located in the Maryland suburbs of Washington, D.C., needs several persons with extensive experience on UNIVAC 1110, Internal EXEC 8, and panic dump analysis installation experience with 1100 EXEC 8 & TIP System desired. The U.S. Department of Commerce, Bureau of the Census is a major Federal computer center with four large scale systems including two 1110 multiprocessors. These positions are in the Career Civil Service at grades GS-11, GS-12, or GS-13, depending upon qualifications.

Send resume or SF-171 to:
U.S. Bureau of the Census
Personnel Division, Rm. 3253-3
Washington, D.C. 20233.
Attn: Ronald Rokoff

An Equal Opportunity Employer M/F

buy sell swap

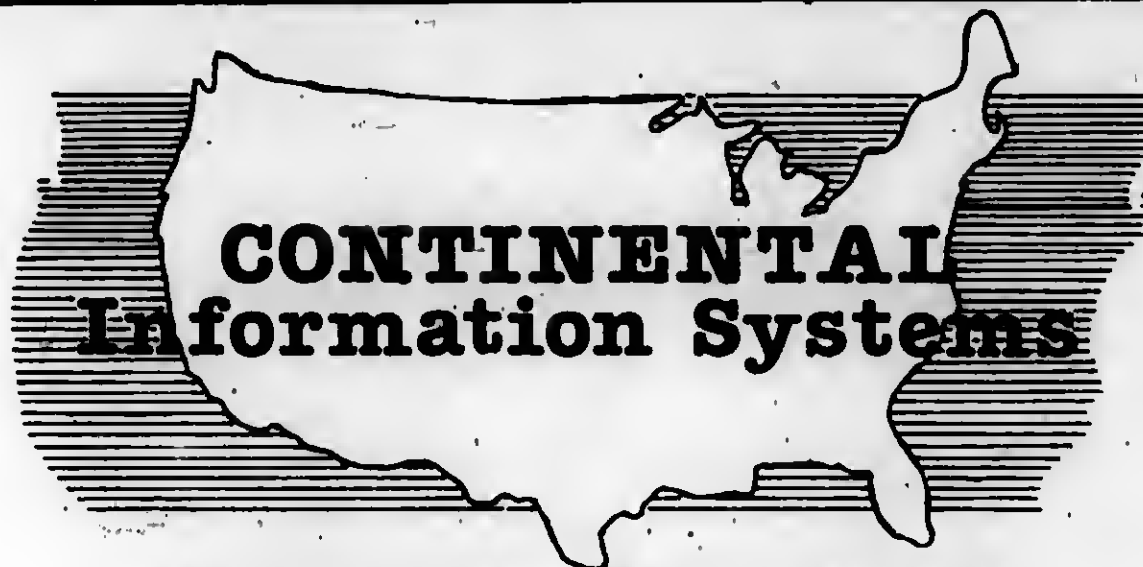
buy sell swap

buy sell swap

buy sell swap

buy sell swap

**BUY
SELL
SWAP**



BUY, SELL, LEASE, SUBLEASE, AND TRADE
NEW AND PRE-OWNED IBM EQUIPMENT

WERE YOU A WINNER IN THE IBM LOTTERY?

IF NOT, CIS is having a supplementary drawing for winning alternatives to the 3031, 3032, and 3033. We can deliver the following IBM 370 equipment to meet your needs:

Jan. 78 155-DAT available
165-DAT available
158-New, ITC qualifying
168-New, ITC qualifying

Mar 78 158
158-New, ITC qualifying
168-New, ITC qualifying

Feb 78 158
158-New, ITC qualifying
165-DAT available
168-New, ITC qualifying

Apr 78 155-DAT available
158-New, ITC qualifying
168-New, ITC qualifying

Several 370 systems available beyond April, 1978.

If you hold a winner in the IBM lottery, we will buy your currently installed IBM equipment from you.

Call Us!



CIS Corp.
600 MONY Plaza
Syracuse, NY 13202
Tel: 93-7435

315-425-1900

FOR SALE DISK

Available April 1978
2 3333-11 W/8150,
2 3333-11
10 3330-11

DISK PACKS

19 3M 3336-11 Type

Contact Monte R. Hutchinson
Blue Cross and Blue Shield
of Kansas
1133 Topeka
Topeka, Kansas 66601
(913) 232-1000

FOR SALE

Data General Nova 2 Based
Real-Time System. 32K core,
Real Time clock, A/D converter
w/16 channels, Hardware floating
point & multiply/divide, 2 car-
tridge disk drives of 2.5 meg each,
4 line TTY MUX. Additional pe-
ripherals with interfaces if de-
sired.

Software includes: Data General
RDOS, FORTRAN IV, ALGOL,
MACRO ASSEMBLER, BASIC,
TEXT EDITOR, relocatable
Loader, Utility Routines, \$26,000
(50% of new price).

Contact Willard H. Gerdner,
Brigham Young University, Com-
puter Services, 167 TMCB, Provo,
UT 84602, (801) 374-1211 Ext.
5026. Immediately Available.

WANTED

BASIC FOUR COMPUTER

Model 400 or 500
MUST BE UNDER
SIBUS MAINTENANCE
ISLAND SUPPLY CO. INC.
Firm Delivery
Ponce, P.R. 00731
(809) 843-4141

BUY-SELL TRADE

For Computer
Call Action Write

CAC

P.O. Box 80572
404/458-4425 Atlanta, Ga. 30366



dearborn giveth:

370 CPU's; 370-155J w/out dat. avail. feb 1;
370-145J, avail. may 1.

360 CPU's; 2050I 2 chan., avail. feb. 1;
2040H avail. feb. 15.

peripherals; 2821-1; 2804-1; 2401-1; 2401-2;
3411/3410-3 single.

dearborn taketh: 370/145's, 370/155's;
all tapes, disk and card equipment.

Call Tom Millunchick: (312) 827-9200 or any
dearborn office



dearborn
computer company

dealer-IBM computers
systems software
leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788



Have a
HAPPY
and
PROSPEROUS
NEW YEAR
from
Pioneer Computer Marketing

BUY • SELL

TELETYPE MODELS

43 • 33 • 32

NATIONAL
TELETYPEWRITER CORP.
207 Newtown Rd.
Plainville, N.Y. 11803
(516) 293-0444

call... the
**Match
makers**

BUYING • SELLING • LEASING • TRADING

1-800-654-9179

TOLL FREE!

CST COMPUTER
SALES INTERNATIONAL INC.

Fold and insert order form (attached through binding) and remittance here.

USE THE ATTACHED
ORDER FORM AND
THIS ENVELOPE FOR

a new subscription
new address
new title
new industry

first class
no post. no 40760
newton ma

no postage stamp necessary if mailed in the United States



797 Washington Street
Newton MA 02160

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

We are buying, selling, & leasing!

Buying: 3830, 3420
Selling: 360/65, 360/40
Leasing: 370/155, 360/65

Please contact:

Linda Vaughn/(415) 955-0220
Tommy Talbot/(415) 955-0238

ITEL
CORPORATION

SALE OR LEASE

370/155 J or K With DAT

Serial #10078 - Jan '78
Serial #10556 - Mar '78

2 Year Lease as "K" \$20,000/Month



PCM CORPORATION
1165 Empire Central Place
Suite 232
Dallas, Texas 75247
214/630-6700

For Sale or Lease

2701-1

with 7698 Bi-Sync
January Availability
Contact:

MBR Computer Corp.
313 E. Normal Lane
Wheeling, IL 60090
(312) 537-0970

FOR SALE

UNIVAC 9300 \$16,000

Complete 32 K system
with 4 tape drives
Was under Univac maintenance
until December 1, 1977.
Contact: Ralph Triggs
Automated Office Systems
P.O. Box 1516
Albuquerque, NM 87103
505/296-7665

IBM EQUIPMENT FOR SALE OR LEASE

3420/3 Tapes (1x4)
3505/3525 Reader & Punch
370/125 HO w/PA & Byte MPX
2501/B2 Card Reader
2821/5 w/PFR

3330/3333 Model 1 & 11 Disks
3830/2 Controller
3410/3411 Model 1
2520/B2 Card Punch
1403/7 600 LPM
Printer

WANT TO BUY

3270 Display Equipment
3340/A2 w/Fixed Head & RPS
3340/B2 w/Fixed Head & RPS
3420 Tape Drives-All Models
3830/2 Disk Controller
370/145/12 Processor

Call

**FORSYTHE
McARTHUR**

(312) 943-3770

Dealer &
Lessor In IBM
Computers

FORSYTHE/McARTHUR ASSOCIATES, INC.
919 North Michigan Ave. Chicago, IL 60611



IBM RENTAL CREDITS

We will pay for your
rental credits on
FTP, ETP, and MAC
machines. Call us be-
fore sending your
machines back to
IBM.

IPS

Computer Market, Inc., 1460 Elmwood Avenue, Fort Lee, N.J. 07024

FOR LEASE

14510

available immediately on
long or short term lease

FOR SALE

165K II

DATed, up to megabyte
For Sale or Lease

155J

available now with
or without new DAT

14512 or J2

available now with ISC

3420-3's, 5's & 7's

available now with
controllers

I/O Sets

all combinations available
for sale or lease

360/501

Priced to move now

WE WANT TO BUY

370/168, 165, 158, 155's
IBM Tape Systems
and Disk Systems
All 370 Memories

PURCHASE/ LEASEBACK

370/125 Systems

Save rent starting today
Call for a quote



SALE OR LEASE

1130-2D CPU
1133 Model 1
1403 Model 2
1442 Model 7

METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg
1111 W. Mockingbird Lane
Dallas, Texas 75247 TWX 910-851-4171
(214) 634-2750

FOR SALE IMMEDIATE DELIVERY DEC PDP8E COS300

System 16K
RK05 Drives

Centronics 101A Printer
VT05 Terminal
DEC Maintained
(516) 443-9191

BASIC FOUR EQUIPMENT DATA PRODUCTS PRINTER

240 - 1100 LPM \$5900
IOMEC DISK DRIVE
4.2 mb \$6900
HAZELTINE VDT
\$2000

GRAPHIC RESOURCES CORP.
Offices Located In:
Los Angeles, Houston,
Denver, Washington, D.C.
CORPORATE OFFICE:
(213) 598-3318/(714) 698-3584
5442 Research Drive
Huntington Beach, CA 92649

DIRECT FROM FACTORY • TESTED • WARRANTED

MODEMS

Used ICC Modems at Significant Savings

Now you can buy or lease dependable ICC modems at a special low cost. We have a stock of modems, largely from customers who upgraded their data communications networks with our latest modems. These modems have been factory tested and are under warranty, ready to be installed in your system. Quantities are limited. Prompt action can assure you of these substantial savings.

		Original Price	Special Price
2000 bps		MODEM 20 LSI Dial-up or dedicated operation. Bell 201A compatible.	\$1585 \$48/mo.*
2400 bps		MODEM 3300/24 2/4 wire dedicated line operation with built-in test pattern generator.	\$995 \$35/mo.*
3600 bps		MODEM 3300/36 Dial or dedicated operation with reverse channel. Built-in auto-answer on dial-up.	\$3620 \$85/mo.*
4800 bps		MODEM 4400/48 Manually equalized for dedicated unconditioned lines.	\$4800 \$135/mo.*
7200 bps		MODEM 4800/72 Dedicated line with optional multipoint operation for up to three 2400 bps channels.	\$6900 \$165/mo.*
9600 bps		MODEM 5500/96 Dedicated line with optional multipoint operation for up to four 2400 bps channels.	\$7990 \$185/mo.*
			\$1050 \$42/mo.*
			\$595 \$24/mo.*
			\$950 \$38/mo.*
			\$995 \$40/mo.*
			\$1995 \$80/mo.*
			\$2995 \$120/mo.*

Prices apply to sale or lease in U.S. only.

*Based on 30 month lease

Guaranteed Price Protection: Send in the form below, attached to your letterhead, and we'll reserve the modems you select at these prices. This does not commit you to buy. It simply allows us to reserve your modems for up to 30 days until you return our purchase or lease agreement. We'll rush the forms by return mail.

Racal-Milgo Special Offer Division, 8600 N.W. 41st St., Miami, FL 33166
Reserve now. Phone Collect (305) 591-5535 or send in this form.

Reserve the following modems for
30 days without obligation.

MODEM NO.	QUANTITY

Firm _____

Address _____

Attention _____

☐ Send
Lease Form

☐ Send
Purchase
Form

☐ Add me to
mailing list

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WANTED

BURROUGHS 'L' Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299

Boynton Business Systems
87 Rota 208
Wallkill, N.Y. 12584
914-895-2007

SALE IBM Unit Record
Equipment
129 & 029's
East Coast
(717) 564-8870.
West Coast
(415) 332-6262
Unit Record
Leasing Company
110 Hivista Road
Sausalito, Calif. **LEASE**

**IMMEDIATE
DELIVERY**
OEC LSI - 11
KO 11 - F

\$755

Mini Computer
Suppliers, Inc.
25 CHATHAM ROAD
SUMMIT, N.J. 07901
(201) 277-6150
Telex 13-6476

TELETYPE

Telex - TWX
New & Used
Model 43-33-32
Large Selection Model 28 & 35
Dec Writer
LA 36-120-180
Sell or Lease
Immediate Delivery
Before you lease, rent or buy, give
ABLE a try!
ABLE COMMUNICATIONS
20142 State Rd.
Cerritos, CA 90701
213/924-3378 714/761-5661

**FOR SALE
BY OWNER**

IBM System/3
Model 10 48K/
CPU 5444 &
5445 Disks
Contact Paul Spriggs
Norwalk Furniture Corp.
Rt. 18 & 20 Bypass
Norwalk, Ohio 44857
(419) 668-4461

Short Term Lease
or Sale

370/155-II
2MB, DAT

Serial #10132
Available 12/10/77
COMMONWEALTH COMPUTER
ADVISERS, INC.
707 Main St.
Richmond, VA 23219
Contact Hal Gosnell
(804)643-9123

FOR SALE
UNIVAC 9300
4 tape system
Priced to Sell
318/235-8301

CMI BUY LINES**BUY-SELL-LEASE-TRADE****3031/3032/3033**

(Lease Only)

John Mills
(313) 642-8000

370/165 370/168

Bob Van Hellemont
(313) 642-8000

370/158

Ron Baker
(313) 642-8000

370/155

Gary Smith
(313) 642-8000

**370
148/145/138/135**

Pam Hoban
(313) 642-8000

370/115/125

Bob Southwell
(313) 642-8000

3420 3803**3333 3830****3330 3340**

Darryl Hastings
(313) 642-8000

IN CANADA
IBM 360 370

System / 3
Don DuPuis
CMI Company
P.O. Box 893
Windsor, Ont.
N9A 6P2
(519) 258-8910

1403 2821**2501 1442****1443**

If you rent any of these and
are returning them to IBM call
me. I'll show you how to
make money using your rental
credits. We buy and sell all of
these units.

Kathy Housey
(313) 642-8000

**360
30/40/50/65**

Gary Smith
(313) 642-8000

3270 CRT's

Printers/Controllers
Jim Carleton
(313) 642-8000

129-029-059-026**System/3**

Model 15
Jerry Roberts
(313) 642-8000

3742**3741****5496**

Jerry Sharon
(313) 642-8000

360/20**1130**

Jim Carleton
(313) 642-8000

CMI
CORPORATION

The IBM Specialists

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000

Member
Computer Dealers
Association

**DEC
HARDWARE**

PDP 11 PDP 8
Processors Peripherals
Memories

VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

WANT TO PURCHASE

IBM 370-138 On Line/Real time
Application Software - Order
Entry, Inv. Control, Bill of Ma-
terial Processor, Accts Receivable,
Sales Analysis, Accts Payable,
Payroll and General Ledger.
Send detail specifications, descrip-
tions, prices and other terms and
data.

CW Box 1367
797 Washington St.
Newton, MA 02160

SALE

or short or long-term
LEASE

IBM 3271s, 3272s, 3277s

write or call
METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg.
1111 W. Mockingbird Lane
Dallas, Texas 75247 TWX 910-861-4171
(214) 634-2750

**BUY - SELL - LEASE
-BROKERAGE-**

Buy, sell, lease, sub-lease, or be
your agent in placement of your
pre-owned IBM 360/370/System
3, or other units
COMPUTER INTERNAT'L LTD
BEACH COMPUTER CORP.
CWC's Leasing Division
COMPUTER WHOLESALE CORP.
(504) 581-7741

Suite 507/508 First National
Bank of Commerce Bldg
New Orleans, LA 70112
Member Computer Dealers Assoc.

For Sale
XEROX
DISK SYSTEM
MODEL 7275
Controller
W/86 MB Disks
Call
Telefile

(714) 557-6660
Ask for
Mrs. Weddle

NCR**Century 101**

32K 3000 LPM Printer
656 Drive with
50 Disk packs and
software for accounting
functions.

Leonard Kay
Data Corporation
of America
1980 Isaac Newton Sq.
Reston, Va. 22090
(703) 471-5905

Wanted To Buy

**3672-Memorex storage
control unit**
3673-Memorex disc controller
3670-Memorex disc module
3675-Memorex disc module

Contact:

Harry Blair 713-524-1401

FOR SALE

IBM SYSTEM 32
Model 834, including 13.7
megabyte disk, 24K, 64 char-
acter set, 115 lpm.

\$33,750

Available 2/78
COLUMBINE SYSTEMS, INC.
P.O. Box 740
Golden, CO 80401
(303) 279-4000
Call Collect

DEC DATASYSTEM 310

Immediate availability
Less than one month use

32KB Memory**2 RX01 VT 52 LA180****RK05J****(3.2MB)****disk Drive****PDM, Inc.**

34 Shade Street
Lexington, MA 02173
(617) 862-0820

digital**Factory Refurbished
Equipment**

All quality tested and warranted
by the people who made them.

- Complete systems
- Processors
- Peripherals
- Accessories
- Complete Documentation

Digital Equipment Corporation
Traditional Products
125 Northeastern Boulevard
Nashua, New Hampshire 03060

- ☐ Please send your complete product listing.
☐ Please call, I'm specifically interested in: _____

Name _____

Address _____

City _____

State _____

ZIP _____

Phone _____

CW128

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

IBM PROCESSORS & PERIPHERALS

PROCESSORS PERIPHERALS

SELLING:	370/165 Now	3330-1, 11
	370/155-II Now	3803-1, 2
	370/145HO Now	2314-A1
BUYING:	370/165	3344-B2
	370/168	3333-11
	370/155	3420-4, 6, 8
	370/145	
LEASING:	370/158 Avail. Feb. 1	3330-11
	370/145 Now 20 mos.	3340-B02
	370/155 Now 24 mos.	3420-5

The Logical Choice
COMDISCO

9701 W. Higgins Rd. Rosemont, Ill. 60018
(312) 698-3000

San Francisco 415 944-1111 Fort Worth 817 534-1774
Atlanta 404 250-5950 Minneapolis 612 654-8107 New York 201 568-9666

WANTED N.C.R. 200 or 201

Multi Programming,
Octoplex System
64-128K
657 Disk Drives

Contact:
COMPUDIAL CORP.
21 Olney Avenue
Cherry Hill, N.J. 08003
(609) 424-4700

BUY-SELL-SWAP

PDP 11'S & NOVA'S

Systems and Peripherals at very
attractive prices
New and Used

ICS

Computer Equipment Sales

408-735 7360

PAUL PEREZ

408 735 7361

BUY-SELL-TRADE IBM EQUIPMENT

IBM 370 Memory-Buy & Sell For Sale Now

370/135 Memory: IBM FE to GF (96K to 192K)
370/135 Memory: INTEL 96K to 320K
370/135 Memory: AMS 192K to 320K
370/135 Memory: AMS 240K to 384K
370/135 Memory: AMS 256K to 384K
370/135 Memory: INTEL - any 256K increment
370/135 Memory: AMS - any 512K increment
370/145 Memory: INTEL - any 256K increment
370/145 Memory: AMS - any 512K increment
370/158 Memory: INTEL 1 Megabyte - For lease

CALL DICK BAKER (305) 561-5207

dataware
incorporated

Intracoastal Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207

**MEMBER
CDA**

SALE/SHORT TERM LEASE

370/145 12

(2150, 4660, 6111,
6982, 7855, 8810)

Serial # 10920

Avail. 12/15/77

Additional 1/2 MB AMS
Memory

(2) 370/145-12

Serial # 10515, 11192

Avail. 2/1/78

COMMONWEALTH COMPUTER
ADVISERS, INC.
707 Main St.
Richmond, VA 23219
Contact Dick Nelson

(804)643-9123

PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS

Bob Russell
Jack Emery
Dave Hepburn
Paul Baillie

SYSTEMS MARKETING, INC.
1002 E. Thomas Road
Phoenix, Arizona 85012
(602) 264-5600 Telex: 667 339

DAI

CA

FOR SALE By User

Mohawk

9160 1250 LPM

Off-Line Printer
Contact Lon Kuehl

(714) 540-9380

Prudential Overall Supply -

1661 Alton Ave.,

P.O. Box 11210

Santa Ana, CA 92711

12 Month Lease on your

370/158-168

Term & Rate based
on acquisition cost

AVAIL. FOR LEASE 3158

JANUARY 20, 1978

Seasons Greeting From



COMPUTER CAPITAL CORP.

1351 Washington Boulevard
Stamford, Connecticut 06902
Tel 203 357 9663

DEC BROKER IN NEW

**&
USED DEC COMPUTER
SYSTEMS
& COMPONENTS**

C.D. SMITH

730 N. Post Oak Rd.
#301
Houston, TX 77024
(713) 686-9405

Sale or Lease

370/135 FEO

3330/3340 IFA

360/30 Model F

64K System

Disk Only

Lo Speed I/O

FOR LEASE

3033 8 Meg Syst.

Fall 78 Delivery

Call George Gilman

(212) 673-9300



383 Lafayette St.
New York, N.Y. 10003

MINICOMPUTERS & SYSTEMS

Don't waste company time or
money. Check with us before you
buy or sell.

New DEC Equipment

Immediate Delivery

RK 11-RK05 Disk Systems -

\$8500

PDP 11/04s and 11/34s - 20% off

list

DZ 11

DEC Station 78

New DG Equipment

Immediate Delivery

DG 10 Mbyte Disk Systems from

\$7500

DASHERS - 15% to 25% off list

Nov 3/12 or 3D - 20% off list

Immediate delivery for MOS!

Inventory Clearance

call us for free brochure

MINICOMPUTER

EXCHANGE

(408) 733-4400

TXW 910-339-9272

For Sale Or Lease System 3/15 Complete Systems

Any configuration from B 19 to D 24

30 to 90 days delivery depending

upon your requirements.

Also complete inventory tapes — disks.

Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700

TWX 910-861-4936



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WANTED TO BUY
IBM 370/155
 with or without DAT
 Contact: Harry Blair
 (713) 524-8249

You owe it to yourself to save money for your company on computer supplies. We stock ribbons, tapes, labels, diskettes, data modules, tax forms, binders, stock-paper, tab cards, and cassettes. Call or write C.A.M. Computer Supplies, Inc. 102-53 Jamaica Ave., Richmond Hill, N.Y. 11418 (212) 441-5677, (212) 520-8493.

370/125's
For Sale* Lease* Purchase
***Purchase Leaseback**

Specialists in 125 Systems
 3410's and 3411's Also Available
 **CORPORATE COMPUTERS, INC.**
 (203) 661-1500
 115 Mason St., Greenwich, CT 06830

efm computer
 leasing, inc.



3000 marcus avenue
 lake success, ny 11040
 (516) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65
 360/50 370/135

FOR SALE

Basic Four Model
 400 System
 Operator System Level 8J
 18K 8.4M Disk Capacity
 2 Model 7220 Video
 Display Terminals
 1 Serial Printer
PRICE - \$30,000
 Contact R.A. Pace
 A.H. Robins Co.
 1407 Cummings Drive
 Richmond, VA 23220
 (804) 257-2180

For Sale
IBM 3033
SEPT. 1978
PRINCIPALS ONLY

Reply To
 CW Box 1368
 797 Washington St.
 Newton, Mass. 02160

WILL BUY
IBM 3135

(Any Memory Size)
 With Features
 4655, 6981, 7855 & 7861;
 3046-1; and 3215-1

Contact
 Robert O. Frank
 MONETARY CONCEPTS INC.
 P.O. Box 116
 Orinda, CA 94563
 (415) 254-2638

dataserv

buy • sell • lease • trade

370
 115 and 125
 Steve Lacy
 800-328-2406

For Sale or Lease
 Any 115/125 configuration
 Sending 115/125
 Back to IBM

Call us! We'll show
 you how to make money
 using your rental credits.

370
 135 through 168
 Dave Miller
 616-637-8481

For Sale or Lease
 135 - 145 - 155
 CPUs — Peripherals —
 Memory

AVAIL. IN JAN.
370/138 MEMORY
 - I -

370
 Peripherals
 800-328-2406

For Sale or Lease
 3211/3811 3340/A2,B2
 3272/3277 3410/3411
 3330/3333 3420/3803

STOP! Before you send
 any of the above machines
 back to IBM call us. We'll
 show you how to make
 money.

360
 CPUs and Peripherals
 Neal Johnson
 800-328-2406

For Sale or Lease
 360/30 - 40 - 50 - 65s
 CPU — Peripherals —
 Memory

We'll Buy
 Any 360 CPU
 IBM Peripheral
 Non-IBM Periph/Memory

Sys/3
 CPUs and Peripherals
 800-328-2406

For Sale or Lease
 5406 - 5410 - 5412 - 5415
 CPUs — Peripherals —
 Memory

We'll Buy
 Your 5406/5410
 5415 — Rental credit
 machines
 Peripherals — Memory

Call Toll Free 800-328-2406
or 612-544-0335

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
 P.O. Box 9486, Minneapolis, MN 55440

Available for
 Short-Term Lease

1 Meg IBM memory
 for use as 3rd
 thru 6th Meg on
 370/158 or 168

Contact
 Randall Petrie
 (615) 645-6471

FOR SALE
SYS 3 MOD-10 16K
4 disc - 9.6MB
200 LPM Printer

Available 3/78

Call or Write
 Bill Goldman
 L. KARP & SONS
 1301 Estes Avenue
 Elk Grove Village, IL 60007
 (312) 593-5700
 (No Brokers)

Surplus DEC And
Data General
Hardware
 For Sale

PHIL THOMAS

(305) 272-8753

Thomas Business Systems, Inc.

BUY-SELL-LEASE

026- \$ 850 085- \$ 750
 029- 1850 514- 800
 082- 650 552- 750
 083- 1800 557- 2500
 Mohawk-6401-6403
 NCR-736

Shredders
 Bursters & Decollators
 Call Stan Polo
 DP
 SERVICE
 Inc.

5505 N. MENARD AVENUE
 CHICAGO, ILLINOIS 60630
 PHONE 312 / 774-2556

FOR SALE

IBM Sys 3

5415-021 Ser. # 40979
 3277-001 Ser. # 30840
 5421-001 Ser. # 12512
 1403-N1
 3340-A2
 3411 optional

Avail Feb. 15-78

* Will be furnished
 at closing of contract



DATA AUTOMATION COMPANY, INC.
 4888 CASH ROAD DALLAS, TEXAS 75247
 SAC 214 527-8870

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115
370/125

 **ECONOCOM**

ECONOCOM
 1255 LYNNFIELD ROAD
 P.O. BOX 17825
 MEMPHIS, TENNESSEE 38117
 901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION



INDEPENDENT

WE BUY - SELL -
INSTALL & REPAIR
 AT REASONABLE PRICES

HONEYWELL USED
SERIES 200 EQUIPMENT
 COMPUTER SYSTEMS
 PARTS — PERIPHERALS

Now in stock

2040-64K M7-32K M9
 120-1250 — TAPE DRIVES
 READERS, PRINTERS, PUNCHES
 3200-131K Avail. 6/78

CALL NOW

Wilson Grabill (513) 874-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
 Cincinnati, Ohio 45246

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
 AND PERIPHERALS

WE BUY • SELL • LEASE • TRADE

 **transdata**

P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.
026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.
029	\$1800	\$55/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.
046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.
056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.
059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.
077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.			

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202
 Chicago, Illinois 60611
 (312) 944-1401

115 Harbor Island Rd.
 Newport Beach, CA 92660
 (714) 875-2810

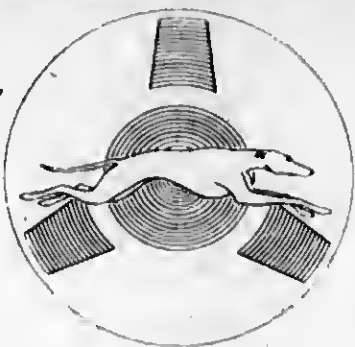
buy sell swap

buy sell swap

buy sell swap

software for sale

software for sale

**GO GREYHOUND**

When you plan to
Buy or Sell your
Computer Equipment

For complete information
call the Greyhound Repre-
sentative in your area.

FOR SALE

3135 DH - Avail. Now
7830 & 6 - 7330

WANT TO BUY

IBM - 1419, 3340-A2 & 3340-82
3135.H w/4655, 6981, 6982,
7855, 7861

U.S.

Home Office
New York
Chicago
Dallas
San Francisco

T.A. Takash
Dick Ventole
Pete Ahern
M.W. "Bill" Tucker
Henry Paulson

602-248-6037
914-949-1515
312-298-3910
214-233-1818
415-283-8980

INTERNATIONAL

Canada
U.K./Europe
Mexico
Austro-Asia
Eurasia

Don Maunder
Joe Gold
Andres Contreras
John Hallmark
Don Haworth

416-366-1513
022-61-27-54
905-543-6850
214-233-1818
214-233-1818

NON IBM

Dallas

John Hellmark

214-233-1818

**BURROUGHS EQUIPMENT**

FOR SELL OR LEASE
COMPUTERS

B700 Complete System available
April, 1978. B700 Systems and
Peripherals. B700 Systems.

PERIPHERALS

Tape Drives and Head-Per-Track
Disk.
1600 BPI Mag Tape Drives

TERMINALS

TC732/735 Teller Terminals TO
700's with Expanded Memory.
(303) 922-8331

2480 W. Alameda Ave.
Denver, CO 80223
Lawrence G. Lyon

370/135**IBM****Memory Sale**

from

H
H
H
GF
FE

to

HG
HF
DH
GF

Call Pam Hoban
for your quote

(313) 642-8000**CMI Corporation**

1500 N. Woodward Ave.
Birmingham, Mich. 48011

SOFTWARE

**WANTED
FOR PURCHASE/LEASE
ON LINE
UPDATE/RECOVERY
SOFTWARE**

An integrated online update/re-
covery system for TOTAL OBMS
files maintained through CICS/VS
(environment is OS/VS)

WRITE:

R.J. Zakowski
Manager of Software Systems
Bendix Corp.
South Bend Regional Data Center
P.O. Box 4001
South Bend, IN 46634 or call
(219) 237-2322

**TIME-SHARE
RDOS**

- Handles up to 8 users
- Runs on unmapped 32K Nova's
- Supports Fortran, Algol, Mac, Edit, Asm, etc.
- One terminal may control multiple jobs
- \$3,500 for single-CPU license

**POLYMORPHIC
COMPUTER SYSTEMS**

P.O. Box 3581
Boulder, Colorado 80307
(303) 443-5362



Where do I turn
for the best software
packages available?

To meet (or beat) deadlines,
to handle user requests,
to stay within budget, use

PC-70

The automated system that
helps you manage people and
projects effectively. PC-70 is
applicable to virtually any type
of project or project-oriented
group, including DP, engineer-
ing, R&D, legal, facilities
planning, maintenance, and
construction. Simple, powerful
and economical, PC-70 is
today's leading project/
resource management system,
with over 400 clients worldwide.

**Atlantic Software Inc.**

5th & Chestnut Sts.
Philadelphia, PA 19106 / (215) 922-7500
Europe: Tecsi Software, Paris / 225-86-83

BUY-SELL-TRADE IBM EQUIPMENT

**360/65 or 65 MP CORE
1.5 Megabytes For Sale**

Independent memory in single cabinet. Great savings
on floor space, power, air conditioning and mainte-
nance. 5th port available. Priced right. Intermem.

CALL DICK BAKER (305) 561-5207

dataware
incorporated

Interoceanic Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207

MEMBER
COA

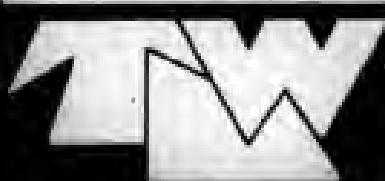
**FOR SALE OR LEASE
Immediately Available**

IBM 3330/001's**IBM 3330/011's****IBM 3333/011's****with features #8150****Contact: Harry Blair 713-524-8249**

**BEFORE YOU BUY, SELL, OR LEASE,
TAKE A 'SECOND' LOOK!**

FOR SALE

**3505-B1 and 3525 P3
3135-GF -- Fully Loaded
3155-J with Dat Box**

WANT TO BUY**370/145 IBM Mem. I2-J2****370/135 IBM Mem. GF-H****3-1403 N 1****1442 N 1****3420-5 Single Density****COMPUTER
INDUSTRIES
INC.**

3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO 312 298 5650
WASHINGTON 703 525 3074
LOS ANGELES 213 370 4844

**GRAPHIC RESOURCES
CORPORATION**

The Graphics Specialists
Plotters-Sale, Purchase, Leasing

Plotter Supplies-Manufacturer
Plotter Re-Conditioning

Services & Parts

Interactive Graphic Systems
Line Printers

All Manufacturer's Equipment
Available

GRAPHIC RESOURCES CORP.

Offices Located In:
Los Angeles, Houston
Denver, Washington, D.C.

CORPORATE OFFICE:**(213) 598-3318 (714) 898-3584**

5442 Research Drive

Huntington Beach, Calif. 92649

CALL OR WRITE FOR FREE

BROCHURES & SAMPLE

PLOTTER MATERIAL SWATCH

BUY SELL LEASE

**370, 380, 1401 & 1440
SYSTEMS & PERIPHERALS**

PURCHASE/LEASEBACK

**029, 129, 3741, 3742, 3540,
3803, 3420, 3340's**

**IBM UNIT RECORD
EQUIPMENT**

**026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557**

029-059-129

Call us for all your needs, we buy
rent and sell all types of IBM unit
record equipment. Over 12 years
of serving commercial and govern-
ment requirements. Contact ACS
for proposal.

ACS
Houston, TX 77081
214/666-2122
TWX 910 881 1526

EQUIPMENT CORP.**RPG TO COBOL**

Dataware's software translator
converts RPG and RPG II
programs to the industry standard
ANS COBOL (DOS or OS). The
translator achieves an extremely
high percentage of automatic con-
version (approaching 100%) of the
source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our
translators, write or call today.



Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

**PROVEN Packages
from Professionals**

- Financial
- ☐ General Ledger and Financial Reporting System
 - ☐ Accounts Payable
 - ☐ Accounts Receivable
- Manufacturing
- ☐ Material Requirements Planning
 - ☐ Master Production Scheduling
 - ☐ Capacity Planning
 - ☐ Shop Floor Control
- Comprehensive Report Generator
- ☐ FILETAB
- Small Business Systems
- ☐ System/3
 - ☐ General Ledger and Financial Reporting System
 - ☐ Accounts Receivable
 - ☐ Accounts Payable
- Burroughs B-1700/1800
- ☐ General Ledger and Financial Reporting System
 - ☐ Accounts Receivable

Get all the details. Today.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

Computer _____

Other small computer system application products available soon. Please specify computer and need.

**SOFTWARE
INTERNATIONAL**

Elm Square, Andover, Mass 01810 (617) 475-5040

Atlanta • New York • Washington, D.C. • Philadelphia • Chicago
San Diego • Toronto • Houston • Columbus, OH • San Francisco

CWC 1227

*Registered trademark of Software International

software for sale

software for sale

time & services

time & services

time & services

SAVE**RPG/RPG II TO COBOL TRANSLATOR**

This package accepts all types of RPG and produces ANS COBOL while approaching 100% error free conversion. The resulting COBOL program is modular in design and easy to read and maintain. Several client service options are available. Perpetual Lease, Conversion only, Clean Compile and full implementation including production JCL, test and installation. Over 100 satisfied customers.

For Prompt Reply Write or Call Us Today

DASD

Park Ridge, Illinois 60068, Suite 315
1480 Renaissance Dr., (312) 299-5005

TIME & SERVICES**Datacenter
370/158**

3 meg VS2
Specializing in
Remote Job Entry
and Batch
Excellent Technical Support
Very Attractive Rates
Contact: Stu Kerevsky
(212) 564-3030
Datamor
132 W. 31st St.
New York, N.Y. 10001

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI,
Data Craft, Data General, CDC,
DEC, EMM, Fabri-Tek, Honey-
well, GAI, HP, Interdata, Lock-
heed, Plessey, NCR, SMI, Univac,
Microdata, Varian, XDS.
Any Manufacturer's Memory

THREE DELTA CORP.

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

370/158 MVS 4 MEG

WYLBUR
IMS 1.1.4 DB/DC
7 Days/24 Hours
High/Low Speed Terminals
RJE and Batch
2: Xerox 1200 Printing
Systems
Full Key Entry Service

THOMAS NATIONAL

1775 Broadway, NYC
212-765-8500

TIME AVAILABLE**IBM
370/135
DOS/VS**

Up to 8 hours. 2nd shift
— some first shift avail-
able.

192K, 2-3420,
5-3330, 2-1403 N1

Commonwealth Avenue
Across from Armory

Contact:

Jo-Ann Fanti

(617) 738-6410

**REMOTE
JOB ENTRY****PHOENIX-HECHT**

- IBM 370/158-3
- Nationwide incoming Watts lines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS2, HASP, INTERCOMM, ROSCOPE
- Complete data security including off-site storage

For information
call Walter Czerniak,
at (312) 861-7100



PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

I.B.M. 360-40

All Shifts 128K, 4-2401
MOD-2, 9-2314, 1403-N1,
2540, 1401 Compatibility.
From \$35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036

Contact:

Al Palmo (212) 974-4966
Charles Leigey (212) 974-4967

COMPUTER TIME

370/135 360/40
370/145 360/65
STAND-ALONE, RJE,
OR BATCH

"ATTRACTIVE RATES"

ACS

APPLIED COMPUTER SYSTEMS

Dallas-Ft. Worth Metroplex
(817) 461-0120

**WE ARE
BROKERS OF
COMPUTER
TIME**

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

**Computer Time
Brokers &
Specialists**

- On-site or remote processing
- Serving the Tri-State Area

BROOKE COMPUTER CORP.
250 W. 57 ST., NEW YORK, NY 10019
212/586-0923

**COMPUTER
TIME**

RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 155II
360/30

- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

the choice of



**GENERAL HOST
CORPORATION**
Leading Conglomerate

**ACCOUNTING IV
GENERAL LEDGER**

Our software packages—General Ledger, Accounts Receivable, Accounts Payable, and Standard Cost—are the choice of leaders like General Host...
not by chance, but by design.
For details, call (201) 488-2100

Informatics Inc.

World's Largest in
Software Products
65 Route 4, River Edge, N.J. 07661

**MEDICAL/DENTAL
BILLING**

Complete Billing and Insurance Processing for doctors, groups and clinics.
• Complete Insurance Forms
• Profile, RVS, ICDA Files
• Bal. Forward, Ledger
• COBOL or RPG II
• 30+ users
• 360/370 or mini-computers
• On line, Real-Time or Batch Processing

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

ACCOUNTS PAYABLE SYSTEM

Many design features including:

- Auto. discount calculation
- Cost center reporting
- G/L interface tape
- Check reconciliation
- Written in COBOL
- Single data base
- Complete documentation
- 3 year warranty
- Batch mini or main frame
- Low purchase price or rent

Write or call for more information

LEGLER SYSTEMS COMPANY

23 Charles Hill Road
Orinda, CA 94563
(Est. 1972) (415) 254-1264

**ACCOUNTING SOFTWARE
FOR DEC RSTS/E
CTS-500 USERS**

From one of the pioneers in commercial data processing using RSTS. Successful installations in manufacturing, distribution, service bureau uses. Completely on-line, interactive systems. If you are installing or have installed a RSTS/E or CTS-500 system, contact us first for cost-effective solutions in: ACCOUNTS PAYABLE; GENERAL LEDGER; FINANCIAL REPORTING

The design specifications for these packages were developed by accountants for use by accountants. All packages provide excellent audit trail, extensive user prompting, fast data entry, full file-maintenance and inquiry capabilities, modular design and construction. These are consolidating packages and support multi-division company and multi-company corporate accounting functions. For more information, contact us at:

(219) 936-2183

p.o. Box 160

plymouth, in 46563

Div. of Young Deer Co.

Plycom services**TONE 3**

The only

TSO for VS1

Redesigned to eliminate
TCAM and the staggering
overhead of user swapping

ISP

(Intersystem Spool Processor)

System-to-System
Communication for VS1

(Write or phone for details)

TONE
Software Corp.

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

RPG II SYSTEMS

- A/R-OPEN ITEM OR B/F
- ACCOUNTS PAYABLE
- GENERAL LEDGER
- PAYROLL AND LABOR DIST.
- INVENTORY
- CREDIT UNION MAILING, ETC.

Extensive Documentation Provided

Bancroft Computer Systems

P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

**Microdata
Realty
Software
Wanted**

CW Box 1370
797 Washington Street
Newton, MA 02160

**WANTED
IBM
3800 Laser**

Feb. '78
Order Position

Contact:

Leo Hertzog
(215) 672-6900

**TSO
SERVICES
370/165-2**

**Systems Engineering
Computer Co.**

announces the availability of:
CHICAGO DATA CENTER
With Nationwide Network

Contact: Robert Chomko
(312) 298-0997

SEC**SYSTEMS ENGINEERING COMPUTER CO.**

2500 East Devon Ave.
Des Plaines, IL 60018

PRIME COMPUTER TIME FOR SALE

8-12 hrs/day block time, monthly billing, south west area, easy access.

IBM SYSTEM 3/150:

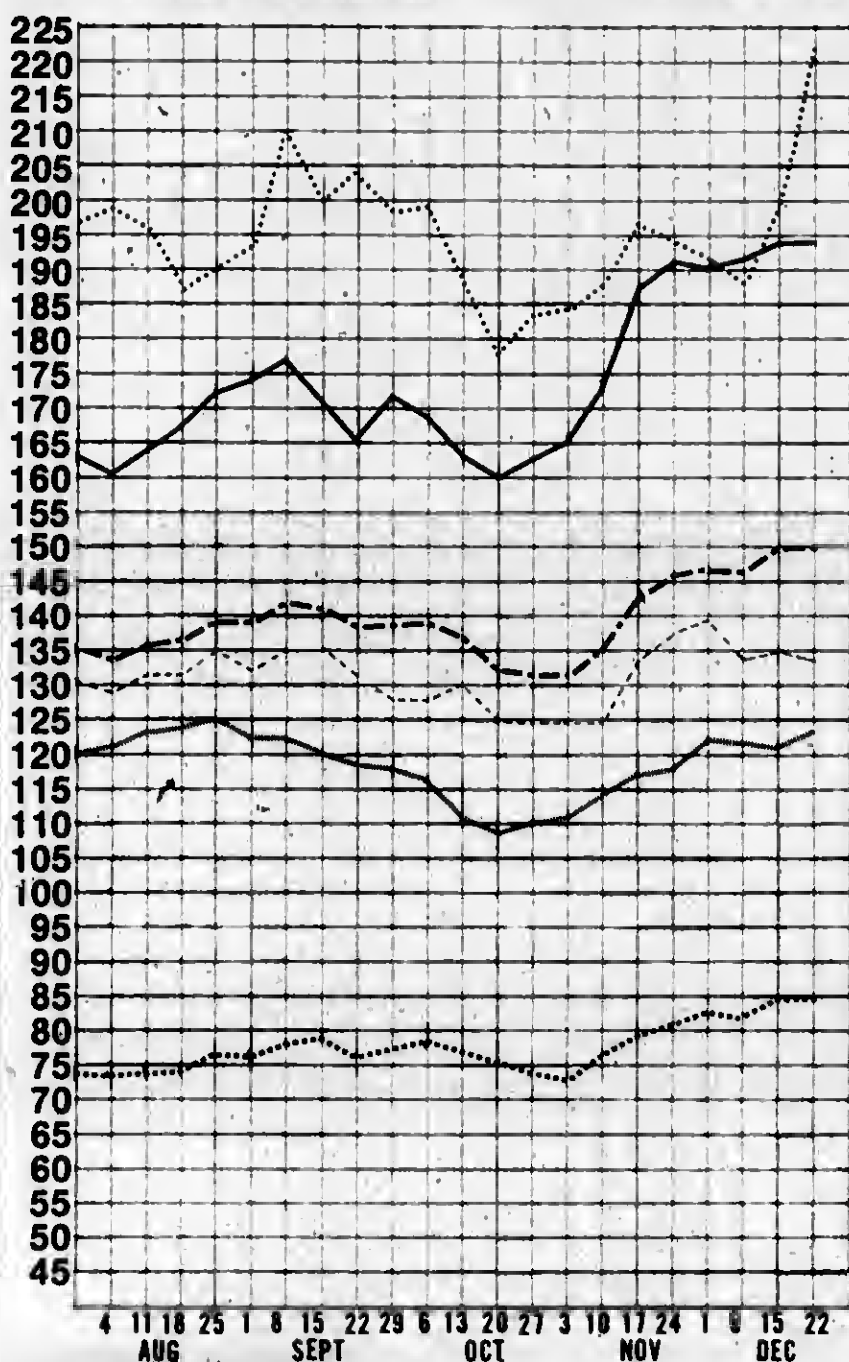
1100 LPM Printer, 120 megabyte 3340's, 3741 input (can add card reader),
2/80 KB tapes. Rate negotiable on block 8-12 hrs.

CONTACT: DICK GREISER

777 South Post Oak Rd., Suite 600
Houston, Texas 77056 (713) 627-2700/290

COMPUTERWORLD Computer Stocks Trading Indexes

— Computer Systems — Software & EDP Services
 - - - Peripherals & Subsystems - - - Leasing Companies
 — Supplies & Accessories — CW Composite Index



Earnings Reports

COMPUTER COMMUNICATIONS

	1977	1978
Shr Emd	\$.14	\$.13
Revenue	3,508,431	3,088,254
Tax Cred	200,000	180,000
Earnings	414,284	372,878

COMPUTER CONSOLES

	1977	1978
Shr Emd	\$.30	\$.30
Revenue	11,072,830	\$6,475,584
Spec Crd	91,500	
Earnings	844,872	10,328

a-No share earnings are shown as preferred dividend requirements exceeded net income.

COMPUTER INSTRUMENTS

	1977	1978
bRevenue	\$1,059,741	\$726,718
Disc Op Loss		305,794
Loss	127,878	464,030

a-Restated to reflect discontinued operations.
 b-From continuing operations.

DATA SYSTEMS ANALYSTS

	1977	1978
Shr Emd	\$.48	\$.25
Revenue	3,489,521	2,614,790
Earnings	318,059	196,812

DIGI-LOG SYSTEMS

	1977	1978
Shr Emd	\$.92	\$.51
Revenue	4,054,694	2,503,951
Earnings	834,100	344,032

GREYHOUND COMPUTER

	1977	1978
Revenue	\$11,860,000	\$11,560,000
Disc Op Loss		1,530,000
Earnings	1,236,000	(789,000)
9 Mo Rev	33,514,000	34,591,000
Disc Op Loss	2,856,000	1,777,000
Earnings	738,000	106,000

a-Earnings per share are not reported because all of the company's outstanding common stock is owned by Greyhound Corp.

Computerworld Sales Offices

Vice-President/Marketing
 Roy Einreihof
 Advertising Administrator
 Terry Williams
COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800
 Telex: USA-92-2529

Boston
 Robert Ziegel
 Northern Regional Manager
 Mike Burman
 Account Manager
COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800

New York
 Donald E. Fagan
 Eastern Regional Manager
 Frank Gallo
 Account Manager
COMPUTERWORLD
 2125 Center Avenue
 Fort Lee, N.J. 07024
 Phone: (201) 461-2575

San Francisco
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Donna Dezalan
 Account Coordinator
COMPUTERWORLD
 1212 Hearst Building
 San Francisco, Calif. 94103
 Phone: (415) 495-0990

Los Angeles
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Judy Milford
 Account Coordinator
COMPUTERWORLD
 1434 Westwood Boulevard
 Los Angeles, Calif. 90024
 Phone: (213) 475-8486

Japan
 Mr. Shigema Takahashi
 General Manager
DEMPA/COMPUTERWORLD
 1-11-15 Higashi Gotanda
 Shinagawa-ku, Tokyo 141
 Japan
 Phone: (03) 445-6101
 Telex: J2424461

United Kingdom
 Tony Vickers
 IDG PUBLISHING LTD.
 140-146 Camden Street
 London NW1 9PF
 England
 Phone: (01) 267-1201
 Telex: UK-264737

West Germany
 Hans-Jürgen Ballnath
COMPUTERWORLD GmbH
 8000 Munich 40
 Tristenstrasse 11
 West Germany
 Phone: (089) 36-40-36
 Telex: WGer-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 21, 1977

All statistics compiled,
 computed and formatted
 by
 TRADE QUOTES, INC.
 Cambridge, Mass. 02139

E X C H	PRICE					E X C H	PRICE					E X C H	PRICE				
	1977 RANGE (11)	CLOSE DEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE	1977 RANGE (11)		CLOSE DEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE	1977 RANGE (11)	CLOSE DEC 21 1977		WEEK NET CHNGE	WEEK PCT CHNGE			
COMPUTER SYSTEMS																	
A	AMTAL CORP	22-51	49 1/4	-1 1/8	-2.2	D	ADVANCEE COMP TECH	0-2	7 7/8	0	0.0	D	DATA ACCESS SYSTEMS	4-5	3 1/4	+1/4	+8.3
N	BURROUGHS CORP	55-51	69	-1/4	-0.3	D	ANACOMP INTL	7-10	8 7/8	-1/8	-1.3	D	DATA 100	6-11	10	-1/8	-1.2
D	COMPUTER AUTOMATION	18-30	25 3/4	-1 1/4	-4.6	A	APPLIED DATA RES.	5-10	8 5/8	-1/8	-1.4	A	DATA PRODUCTS CORP	9-19	16 5/8	-3/8	-2.2
N	CONTROL DATA CORP	20-27	26 5/8	-3/8	-1.3	N	AUTOMATIC DATA PROC	23-30	28 3/4	-3/4	-1.2	C	DATA TECHNOLOGY	3-4	4 1/4	0	0.0
C	CRAY RESEARCH INC	15-30	28 3/4	+1/4	+0.8	D	CCEMAN AMERICAN COS	2-2	1 3/4	+1/8	+7.6	D	DATUM INC	1-2	2	+1/8	+6.6
N	DATA GENERAL CORP	35-54	47 5/8	-1/4	-2.0	D	COMPL-SERV NETWORK	9-15	11 3/4	+1/2	+4.4	D	DECISION DATA COMPUT	2-3	1 3/4	-1/8	-6.6
N	DATACORP CORP	18-41	39 1/4	+1/8	+0.3	D	COMPU ELECTRON SYSTEMS	6-10	9 1/4	+1/4	+2.7	D	DELTA DATA SYSTEMS	1-1	1 1/2	+1/8	+33.3
N	DIGITAL EQUIPMENT	37-53	45 1/2	+5/8	+1.3	D	COMPUTER NETWORKS	1-1	1	0	0.0	A	OCCUPATIONAL INC	6-11	9 7/8	-1/4	-2.4
N	ELECTRONIC ASSOC.	2-3	2 3/8	-1/4	-9.5	D	COMPUTER SCIENCES	7-10	9 5/8	+1/3	+1.3	D	DATARAM CORP	2-24	22	-1	-4.3
A	ELECTRONIC ENGINEER	8-13	11 3/4	-1 1/8	-8.7	N	COMPUTER TASK GROUP	1-2	1 5/8	0	0.0	N	ELECTRONIC M C M	4-5	4 1/2	+1/4	+5.8
N	FOUR-PHASE SYSTEMS	13-21	20 1/4	-1/8	-0.6	C	COMPUTER USACE	1-3	1 1/2	0	0.0	D	FABRI-TEK	1-2	1	0	0.0
N	FCXCORP	41-54	47 7/8	-1/2	-1.0	D	COMSHARE	5-8	7 1/4	-1/4	-3.3	D	GENERAL COMPUTER SYS	0-2	1 5/8	0	0.0
N	GENERAL AUTOMATION	6-9	7 1/4	+3/4	+11.5	C	DATA DIMENSIONS INC	3-5	4 1/8	+3/8	+10.0	N	HAZELTINE CORP	8-12	10 3/8	-1/8	-1.1
C	GRI COMPUTER CORP	1-1	3/4	+1/4	+50.0	C	CATATAZ	1-2	1 1/2	0	0.0	N	HARRIS CORP	28-45	44 1/4	-1	-2.2
N	HEWLETT-PACKARD CO	69-87	72	+1/4	+0.3	N	ELECTRONIC DATA SYS.	14-20	15 1/2	+1/2	+3.3	A	INACORP CORP	10-19	18	0	0.0
N	MCNEILWELL INC	43-55	45 1/4	0	0.0	D	INSYTE CORP	2-3	1 1/8	0	0.0	D	INFACREX INC	4-7	6 1/4	-3/8	-5.6
N	IBM	245-286	266	-1/4	-0.0	C	IPS COMPUTER MARKET	1-2	2 1/4	0	0.0	D	INFORMATION INTL INC	9-14	5	0	0.0
C	MANAGEMENT ASSIST	5-10	9 1/4	-3/4	-7.5	D	KEANE ASSOCIATES	3-4	3 1/2	-3/4	-9.6	D	INTEL CORP	38-57	45	0	0.0
D	MICRDATA CORP	7-18	11	-1/4	-2.2	C	KEYDATA CORP	1-3	1 3/8	0	0.0	A	LUNDA ELECTRONICS	3-6	3 1/2	-1/8	-3.4
D	MODULAR COMPUTER SYS	5-9	8 5/8	-1/8	-1.4												
N	ACR	32-47	39	-1/2	-1.2	A	LOGICON	7-17	12 5/8	-1 1/8	-3.1	D	MSI DATA CORP	6-15	14 1/8	-1/8	-0.8
C	PRIME COMPUTER INC	12-23	22 1/4	-3/4	-3.2	A	MANAGEMENT DATA	1-2	1	-1/8	-11.1	D	MEMCOP	23-34	30	-1 7/8	-5.8
N	PERKIN-ELMER	17-22	19 3/4	-3/8	-1.8	A	NATIONAL CSS INC	10-16	15 1/2	+5/8	+4.2	N	MCHAMK DATA SCI	5-8	6 1/8	0	0.0
N	RAYTHEON CO	16-35	32 3/8	-1	-2.9	D	NATIONAL DATA CORP	4-7	7	+1/8	+1.8	D	PERIL CORP	2-5	5 3/4	0	0.0
N	SPERRY RAND	30-42	34 3/4	0	0.0	A	CN LINE SYSTEMS INC	16-22	19 3/8	-3/8	-1.8	A	PCTEC CORP	7-11	10 7/8	-1/8	-1.1
C	SYGGR INC	8-20	19 3/8	-5/8	-3.1	N	PLANING RESEARCH	3-6	4 5/8	+1/8	+2.1	D	PRECISION INST.	2-2	2	0	0.0
A	SYSTEMS ENG. LABS	5-11	10 7/8	-3/8	-3.3	D	PROCRAMPING & SYS	1-1	1 1/4	-1/8	-33.3	D	QUANTOR CORP	3-5	3	-1/4	-7.6
A	WANG LABS.	10-14	12 1/4	-1/2	-3.9	D	RAPIDATA INC	2-2	2 3/4	0	0.0	D	RECONITION EQUIP	6-10	7 3/8	+1/4	+3.5
						D	REYNOLDS & REYNOLDS	17-21	20 1/4	+1/4	+1.2	D	SCAN DATA	1-2	7/8	-1/8	-12.5
						D	SCIENTIFIC COMPUTERS	1-4	4	0	0.0	D	STORACE TECHNOLOGY	10-21	20 3/8	-3/8	-1.8
						D	TYPESHARE INC	14-23	21 5/8	-1 3/8	-5.9	D	T BAR INC	7-13	12 5/8	+1/8	+1.0
						A	URS SYSTEMS	4-5	4 3/8	-1/8	-2.7	A	TALLY CORP.	4-6	4 1/8	+1/8	+3.1
						N	WYLY CORP	1-2	3/4	-1/8	-11.1	A	TEC INC	7-10	7 1/4	-1/8	-1.6
												N	TEKTRONIK INC	29-40	36 5/8	-1 1/4	-3.3
												N	TELEX	2-3	3	0	0.0
												D	NITEX INC	1-1	3/4	-3/8	-33.3
SOFTWARE & EDP SERVICES																	
D	ADVANCED MEMORY SYS	7-9	8 1/4	-1/8	-1.5	N	ACCESSGRAPH-MULT	10-16	14 1/8	-1/4	-1.7	SUPPLIES & ACCESSORIES					
N	AMFEC CORP	8-11	9 7/8	+1/2	+5.3	D	AMFEC CORP	7-9	8 1/4	-1/8	-1.5	A	AMERICAN BUS PRODS	6-8	7 1/4	+1/2	+7.4
D	ANDERSON JACOBSON	3-5	4 3/4	0	0.0	D	ANACOMP INC	7-10	8 7/8	-1/8	-1.3	D	BALTIMORE BUS FORMS	1-4	1 7/8	+1/8	+7.1
N	APPLIED DIG DATA SYS	10-20	13 7/8	+1/2	+3.7	A	APPLIED DATA RES.	5-10	8 5/8	-1/8	-1.4	A	BARRY WRIGHT	10-17	15 7/8	+3/4	+4.9
G	BEEHIVE INT'L	5-12	4 7/8	-5/8	-11.3	N	AUTOMATIC DATA PROC	23-30	28 3/4	-3/4	-1.2	D	CYBERMATICS INC	1-1	7/8	0	0.0
A	BGLT, BERANEK & NEW	7-9	7 3/8	+3/8	+5.3	D	CCEMAN AMERICAN COS	2-2	1 3/4	+1/8	+7.6	D	DUPLER PRODUCTS INC	14-20	18 1/2	-1 1/4	-6.3
N	BUNKER-RAND	8-13	11 1/8	-1/8	-1.1	D	COMPL-SERV NETWORK	9-15	11 3/4	+1/2	+4.4	N	ENNIS BUS. FORMS	6-7	7	+5/8	+9.8
A	CALCOMP	3-5	2 7/8	0	0.0	D	COMPU ELECTRON SYSTEMS	6-10	9 1/4	+1/4	+2.7	C	GRAPHIC CENTRCLS	13-18	17	+1/2	+3.0
D	CAMBRIDGE MEMORIES	1-4	3 5/8	+1/4	+4.4	N	COMPUTER NETWORKS	1-1	1	0	0.0	N	3M COMPANY	45-56	45 7/8	-1/2	-1.0
N	CENTRONICS DATA COMP	19-20	19	-1/4	-1.2	C	COMPUTER TASK GROUP	1-2	1 5/8	0	0.0	D	MCOPE CORP LTC	24-37	27 1/4	+1/2	+1.8
C	CENITRONICS	1-1	7/8	0	0.0	D	COMSHARE	5-8	7 1/4	-1/4	-3.3	N	NASHUA CORP	16-28	19	-1/8	-0.6
D	COMPUTER COMMUN.	5-8	7 3/8	+3/8	+5.3	D	DATA DIMENSIONS INC	3-5	4 1/8	+3/8	+10.0	D	STANCARD RECISTER	18-25	22	+1/4	+1.1
D	COMPUTER CONSOLES	4-7	4 1/4	0	0.0	C	CATATAZ	1-2	1 1/2	0	0.0	D	TAB PRODUCTS CC	9-19	9	-3/4	-7.6
A	COMPUTER EQUIPMENT	2-4	3 1/2	+1/2	+16.0	N	ELECTRONIC DATA SYS.	14-20	15 1/2	+1/2	+3.3	A	UARC	18-22	20	-1/2	-2.4
D	COMPUTER TRANSCIVER	1-1	1 1/2	0	0.0	C	IPS COMPUTER MARKET	1-2	2 1/4	0	0.0	A	WABASH MAGNETICS	10-15	12	-1/4	-2.0
C	CENTEN	5-13	10 1/2	-3/8	-3.4							N	WALLACE BUS FORMS	17-21	20 1/8	0	0.0
A	CCNARC CORP	15-28	23 1/8	-5/8	-2.0												

EXCH: A=NEW YORK; A=AMERICAN; P=PHIL-RELT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-I-C PRICES ARE HIGH PRICES AS OF 3 P.M. OR LAST BID
-111 TO NEAREST COLIAN

EXCH: A-NEW YORK; A-AMERICAN; P-PHIL-PAUL-WASH
 L-NATIONAL; M-MIDWEST; D-DEVER-THE-COUNTY
 O-1-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
 (11) TO NEAREST COLON

I BOUGHT

ITRAC.



**And my transaction
processing worries
went away.**

I admit it. I was really worried about using a minicomputer for transaction processing. Until I saw how simple it is to put up an on-line system using Interdata business computers and ITRAC, Interdata's new transaction processing software.

Take programming. I was afraid my programmers would have to learn a new language. But with ITRAC they sat right down and went to work. Because ITRAC is totally COBOL compatible.

Screen formatting used to be a big headache. Now it's a snap. My designer keys in a screen in any format he chooses. And, in seconds, a completed screen comes back. Then he tests and modifies the screen on-line. No waiting or delays.

No problems with unsophisticated terminal users, either. Screen formats are easy to follow and all input data can be validated. So the user knows immediately when he makes an error.

But here's the best part: ITRAC software runs on Interdata's 32-bit processor. So you get the response time of a main-frame...for the price of a mini.

Interdata business computers and ITRAC. If you need transaction processing, they can help.

For more information, call Interdata today.

INTERDATA®
A DIVISION OF
PERKIN-ELMER DATA SYSTEMS
Oceanport, New Jersey 07757, USA (201)229-4040

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by Computerworld, Inc.

2

January 9, 1978

75¢ a copy; \$18/year

CW SAMPLE COPY
MICROFILM
UNIVERSITY MICROFILMS
SERIALS PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48103

NEWSPAPER



Boon or Bane?

Will electronic funds transfer be a boon or bane for consumers? Consumer activist Patrick S. Portway looks at some of the pros and cons of the developing systems beginning on Page 14.

Costs, Privacy Hazards Feared

OMB Asked to Delay TAS Funding

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Six senators have written to the Office of Management and Budget (OMB) protesting Internal Revenue Service (IRS) efforts to include a controversial computer system for tax administration in the 1979 budget request the President will soon send to Congress.

Fearing the Tax Administration System's (TAS) projected costs and its potential for "jeopardizing the con-

stitutional rights and the rights of privacy of American citizens," the senators asked OMB Director James P.T. McIntyre to defer funding for the system until its potential impacts receive further study.

They added their voices to the chorus of complaints about TAS begun by Representatives John E. Moss (D-Calif.), Dante B. Fascell (D-Fla.) and Charles Rose (D-N.C.). These congressmen sent their latest series of letters to the Secretary of the Treasury, the IRS commissioner and the House and Senate appropriations subcommittees on Oct. 31, expressing "serious misgivings" over the proposed system.

Waiting for Report

In particular, Senators James Abourezk (D-S.D.), Edmund S. Muskie (D-Maine), Charles H. Percy (R-Ill.), Abraham Ribicoff (D-Conn.), Birch Bayh (D-Ind.) and Charles M.C. Mathias Jr. (R-Md.) want the OMB to stall funding until Congress receives a General Accounting Office (GAO) report, expected in March, on the system.

"Although this report is just one analysis in the deliberative process, it is expected that it will comprehensively evaluate the merits of the proposed system as it relates to its technical components, as well as the privacy impact on individual citizens," the senators wrote.

They plan to ask the GAO to expand its examination of TAS and the congressional Office of Technology Assessment (OTA) to reinstitute its study of last February which first labeled the system a constitutional rights risk [CW, Feb. 21].

OMB held a meeting here last week

DP Budgets Grow 10% As Salaries Rise 11% Over '77 Expenditures

By Jeffry Beeler
CW Staff

DP budgets for large systems users will average about 10.6% more in 1978 than in 1977, according to a recent *Computerworld* survey of 27 major U.S. firms.

Much of the reported DP budget increases, which ranged from 4% to 32%, resulted from rising labor costs, the survey suggests.

Nineteen (70%) of the respondents cited salaries as the expense item that had risen most sharply during recent years. Maintenance ranked as the

second most inflationary budget category with five mentions, and supplies, which was named four times, ranked third. (Some companies said more than one expense item had risen fastest in cost.)

Among the respondents, DP salary increases this year will average about 11.2%, with 2% and 30% representing the low and high ends of the pay-raise scale, the survey found. Salary hikes appeared to be fairly uniform for all job categories including managers, systems analysts and programmers.

Partly because of the rising pay scale, respondents cited labor as the single largest expense item in their DP budgets. On the average, salaries accounted for nearly half (48.6%) of the participants' DP expenditures.

Mainframes and peripherals constituted the second largest budget share — 32.9% — among the relatively few respondents that could give a detailed breakdown of their DP spending.

Still Hiring

Despite these rising labor costs, about 70% of the companies replying to the survey said they planned to hire new DP personnel in 1978.

One firm intends to add only one or two employees to its DP staff, while

(Continued on Page 4)

IBM Moves for Mistrial, Cites Change in Definition

By Catherine Arnst
CW Staff

NEW YORK — IBM recently filed a motion for mistrial in the U.S. vs. IBM antitrust case on the grounds that, nine years after this action was started, the government is "dramatically changing its market definition claim virtually at the end of its direct case."

If Judge David N. Edelstein grants IBM's motion in full, the trial would be aborted and the government would have to retry the case from scratch.

But the judge also has several other choices.

He could merely suspend the trial and allow IBM to cross-examine government witnesses again on the new issues or prohibit the government from changing or expanding its market definition.

If he denies the motion, IBM could appeal the issue to the U.S. Court of Appeals through a writ of mandamus. However, IBM lead attorney Thomas

Barr refused to say how far he would take the issue.

The government has not yet filed its response.

The trial issues were limited by Edelstein in 1975 to those defined in gov-

(Continued on Page 2)

Memorex Soon

SAN FRANCISCO — The Memorex Corp. vs. IBM antitrust trial is slated to start Jan. 16 with the selection of a jury. Opening statements will begin Jan. 23.

The previously set date of Jan. 9 was cancelled in order to allow for more pretrial hearings.

Judge Samuel Conti held hearings Dec. 27-29 and again Jan. 4, when he denied IBM's motion for a summary judgment. There will also be a hearing Jan. 13.

NEWSPAPER

COPYRIGHT © 1979 BY THE
 NATIONAL ASSOCIATION OF
 PUBLISHERS
 1100 15TH ST. N.W.
 WASHINGTON, D.C. 20004

C

THE

Weekly News

2



B

Will electronic funds transfer
 activist Patrick S. Portway
 systems beginning on Pa

Costs, Privacy

OMB A

By Edith Holm

CW Staff

WASHINGTON, D.C. —
 senators have written to
 Management and Budget
 testing Internal Revenue
 efforts to include a contr
 puter system for tax adm
 the 1979 budget request
 will soon send to Congress

Fearing the Tax Admin
 System's (TAS) projected
 potential for "jeopardiz

NCR 'Clar

Upkeep Po

On Resold

By Don Leav

CW Staff

DAYTON, Ohio —
 started a furor last summer
 change in policy with re
 tenance service on its ec
 by others [CW, Sept. 5]
 parent than real, according
 up memo from E.F. S
 firm's vice-president
 marketing.

His recent statement wa
 clarify NCR's policy in
 "some misinterpretation"
 August memo, Shipman
 clarification — still not
 tributed — included a p
 ing for an inspection/cer
 cedure to be followed
 equipment sold by a
 ganization would quali
 tenance support from the

The new memo also said

(Continued on Pa



EDITORIAL

Editor: E. Drake Lundell Jr.
 Deputy Editor: Ronald A. Frank
 Managing Editor: Nancy French
 Associate Editor: Donald Leavitt
 Associate Editor: Esther Surden
 Associate Editor: Molly Upton
 Assistant Editor: Frank Vaughan
 Washington Bureau: Edith Holmes
 Staff Writers: Catherine Arnst, Jeffery Beeler, Timothy J. Scannell, Brad Schultz
 Chief Copy Editor: Cheryl M. Gelb
 Copy Editors: Barbara T. VanScoyoc, Susan Gerrard
 Photography Editor: Ann Dooley
 Editorial Assistant: Denise Petski
 Editorial Cartoonist: Jim Orton
 Bureaus:
 London: Roger Frampton
 Munich: Hans-Jurgen Ballnath
 Asia: Hidetsuna Sasaki
 Contributors:
 Education: J. Daniel Couger
 Legal: Roy N. Freed
 Taylor Reports: Alan Taylor
 Human Connection: Jack Stone

SALES

Vice President/Marketing: Roy Einreinhofer
 Advertising Administrator: Terry Williams
 Display Advertising: Mary Anne Furlong
 Classified Advertising: Frank Collins
 Recruitment Advertising: Kathy Steinberg
 Sales Promotion Director: Jack Edmonston
 Market Research: Kathryn V. Dinneen
 CIRCULATION
 Vice-President/Circulation: Margaret Phelan
 Circulation Manager: Barbara Jeannetti
 Customer Service Rep: Peggy Kelly
 Assistant: Maureen Burke
 PRODUCTION
 Manager: Lee Vidmer
 Supervisor: Henry Fling
 Assistant Manager: Peter Holm
 Typesetting Supervisor: Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristansstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc. Copyright 1978 by Computerworld, Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Walter Boyd.

75 cents a copy: U.S.—\$18 a year; Canada and PUAS—\$28 a year; Europe and Middle East—\$50 a year; all other foreign—\$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

COMPUTERWORLD, INC.

Board Chairman/Publisher: Patrick J. McGovern
 President: W. Walter Boyd
 VP-Marketing: Roy Einreinhofer
 VP-Finance: William P. Murphy
 VP-Circulation: Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

IBM Files for Antitrust Mistrial

(Continued from Page 1)

ernment papers, which alleged that IBM monopolized the "general-purpose digital computer system market." However, that definition of such a system bears no relation to the one given recently by Dr. Alan K. McAdams, the government's chief economic witness in this case, IBM charged.

"Earlier witnesses ... have testified in ways we deem to be inconsistent with the plaintiff's market definition. We take it, however, that since Dr. McAdams is not only a witness, but an active member of the trial staff, that he speaks for the government," IBM's memorandum in support of its motion stated.

McAdams' definition of the general-purpose computer system is "fundamentally different" from the government's definition in two ways, according to IBM: "The definition of the relevant market is made peculiarly time-dependent, with as many as five different definitions for five different time periods," and "in each time period there is asserted a unique defined or described market."

The government "has repeatedly and continually over the more than six years of discovery and 31 months of trial claimed a single, nontime-dependent systems market totally inconsistent with what its claim now appears to be," the firm said.

"Prejudice to defendant from this eleventh hour change is cast and irremediable. [IBM] has been misled and has been denied, in probably the longest trial in history, a reasonable opportunity to know the claims of the opposing party and to meet them," the defendant's memorandum said.

'Fish or Cut Bait'

Barr, commenting on the motion, said the government must either "fish or cut bait" — adopt McAdams' definition as part of its case or acknowledge that the witness is speaking independently of the government, he said.

As for a solution, Barr said IBM would be content with either a fresh cross-examination of the witnesses on

the new issues or a prohibition on the government's expansion or change of its market definition.

"I would never suggest that we should start from scratch ... we would throw out some and keep some," Barr said. "But this is a problem which I cannot cure" during the course of the trial because most of the government witnesses have already been called," he said.

The firm based its motion on a Supreme Court opinion written in 1938 (Morgan vs. U.S.), which defined the "fundamental requirements of fairness which are the essence of due process." One such requirement was that "a right to a hearing embraces ... a reasonable opportunity to know the claims of the opposing party and to meet them," the Supreme Court ruled.

"Throughout the almost nine-year history of this litigation, there was no notice of any kind of new, still-changing and unrefined definition" used by McAdams, IBM charged.

The definition laid out in the government's statement of triable issues reads "general-purpose electronic digital computer system means ... systems generally included in a manufacturer's commercial product line and comprises the hardware, software and services necessary to perform a broad range of commercial applications as the primary function of the system."

McAdams helped to draft that definition and other similarly worded trial papers — the pretrial brief, "The Economic Analysis of the Market for General-Purpose Electronic Digital Computer Systems" and the amended complaint. However, he described that definition as "incomplete" and said it "does not deal at all with the definition of a general-purpose computer system as I have used it for the period '72-'73," he testified. His newest definition was arrived at "sometime in the last year," McAdams said.

Market definition is the cornerstone of the government's case, because Section 2 of the Sherman Act, under which this action was brought, requires proof of the possession of

monopoly power in the relevant market. "The definition of a relevant market must follow a strictly applied test ... Congressional policy demands and most courts have recognized that a relevant market for antitrust purposes must be narrowly and precisely defined, reflecting the competitive realities of the marketplace," according to the government's "Memorandum on Market Definition for Antitrust Purposes."

Government attorney Lewis Bernstein took the position in court that McAdams' testimony "should be separated from any legal contentions that counsel for the parties may have with respect to market," but added his testimony is perfectly consistent with the government's allegations.

Under cross-examination, McAdams testified that the definition of a general-purpose system has changed over time and that definition "has different requirements as of different time periods ... The words 'general-purpose computer system' are unfortunate in one sense, and it is very clear that different people use those words with widely varying meanings ... Since the words as they are used generally in the computer industry mean so many different things to so many different people, it is unfortunate that those are the words that happen to be used."

This statement is at odds with the government's claim in the opening days of the trial that "the term 'general-purpose' used in describing a computer system manufactured and marketed primarily for the performance of a broad range of commercial or business data processing applications is a usage of this term which is well recognized in the industry."

McAdams defended his testimony by stating it was actually not the definition that had changed over time — "What has been changing and evolving is the computer system, and as the computer system changed, and evolved, I have been recognizing those characteristics of the computer system which qualify it under the single definition."

On the Inside This Week

NEWS

Europeans to Press for Privacy Rules in '78 ... 5
 DP-Planned Menus Seen \$3 Million/Day Sever ... 8
 Firm Economizes by Jobbing Out Most Coding ... 9
 UCLA's Bush Analyzer Retires to Smithsonian ... 10
 Matching Service Brings Househunters Homes ... 11
 Simulation Technique Creates Life-Like Photos ... 13
 In-Depth: EFT Systems? No Thanks, Not Yet ... 14-25

EDITORIAL

Editorial: A Coming Reality ... 26
 Human Connection: Deprivation Tied to Crime? ... 27
 Taylor Report: Output Completeness Flewed ... 27
 How to Project CPU Life? Try This Formula ... 30

SOFTWARE & SERVICES

Study Finds Users Sticking to OS/360 ... 31
 'Commercial' Fortran Supports HP Sites ... 32
 Update of 'UCC DBS' Handles 3344s, 3350s ... 36
 Service Analysis Shapes Form of Future System ... 37
 Cobol Not High-Level Enough for DBMS ... 38

COMMUNICATIONS

NAC Adds Network Design Software ... 43
 Printer Terminals Ease Handling of Passbooks ... 44
 Supermarket Terminals Perform S&L Tasks ... 45
 CA to Provide SNA/SDLC Support for Syte ... 47

SYSTEMS & PERIPHERALS

Motorole Offering Encryption Hardware ... 49
 Century-to-Criterion Move Ups Production 25% ... 53
 On-Line Units Handle 'Split' Hospital's Payroll ... 55

MINIWORLD

Support Problems Exist, Vendors Admit ... 81
 RDA Teams LSI-11, Disk ... 63
 Mini Eliminates File Duplication for University ... 65
 Unit Built for Wholesalers ... 66

MICROCOMPUTING

Kit Turns IBM Selectric Into Terminal ... 67
 I/O Subsystems Designed for TI Micro ... 67
 Self-Contained Beckemmon Set Uses 8048A ... 71

COMPUTER INDUSTRY

IBM Exit From India Not Surprising ... 73
 IBM Retains 100% of IBM Indonesia ... 73
 IBM Sparking Business for Add-On Makers ... 74
 Study Sees Israel Leading Middle East Industry ... 75
 OCR Vendor Protests SSA Benchmark Action ... 76
 Memorex Expends Floppies ... 78

MICROCOSM

Intel Starts LSI Subsystem Series ... 77
 Memorex Expends Floppy Line ... 78

ADR's ROSCOE®/RTS Brings Personal Computing to North Carolina State Highway Engineers

When the State Highway Department needed faster solutions to design and engineering problems, an interactive time-sharing system was their answer. Their first thought was TSO. But with their 370/158 already loaded with heavy CICS applications, TSO would have meant expensive system upgrading.

That's when they heard about ADR's ROSCOE Time-Sharing Option (RTS). It gives users full production time-sharing facilities for application programs in languages like Fortran, PL/1 and BAL.

"After using RTS for a month, it was clear that it would do the job we needed," said Engineering Programmer, Robert Wells. "With RTS, we could continue on VS1 and not have to go to MVS, as we would have with TSO. And machine overhead was about 70% less."

"Now we are executing over 45 programs under RTS covering every aspect of highway engineering. We are saving engineer's time and getting better studies."

"Under batch, there was usually a day's delay before all calculations were checked and the run made," added Staff Engineer, Bryce Clodfelter. "With RTS, we go from rough notes directly to terminal input. The run is completed in seconds. And if a mistake is made, we can correct it on-the-spot."

"We're doing a lot of work in four hours that would have taken a week before," emphasized Engineer Wayne Robey. "That's not just the calculations—that's the complete job."

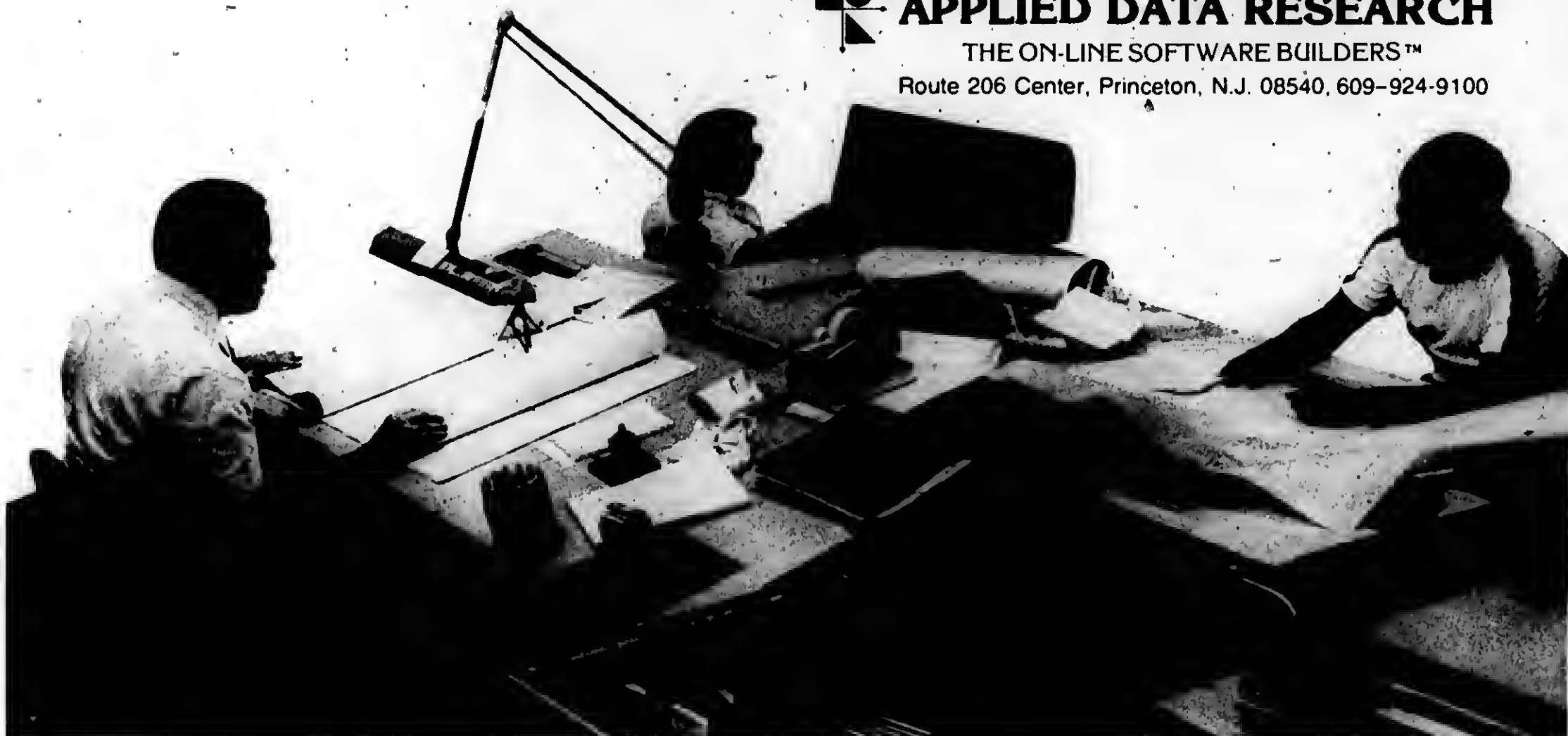
RTS, ROSCOE's new VS time-sharing facility, brings interactive personal computing to people who need to solve problems quickly, without the complexities of conventional data processing. It's a facility for solving business, statistical, engineering, and scientific problems—a simple way to share your computer with people who might otherwise need their own outside time-sharing service. In addition, ROSCOE's comprehensive preparation, testing, and maintenance facilities expedite the development of programs destined to run under RTS.



APPLIED DATA RESEARCH

THE ON-LINE SOFTWARE BUILDERS™

Route 206 Center, Princeton, N.J. 08540, 609-924-9100



Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.

ADR software products: in use at over 7000 installations worldwide. U.S. offices in Boston (617) 245-9540, Chicago (312) 694-2244, Cleveland (216) 826-0190, Houston (713) 526-3188, Los Angeles (213) 626-5527, New York (212) 986-4050, Princeton (609) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 261-2011. Foreign offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.



Salaries Show Biggest Gain in '78 DP Budgets

(Continued from Page 1)

two others plan to hire as many as 20 new staffers. The typical respondent, however, will add eight or nine individuals to its DP department — primarily systems analysts and programmers, with a sprinkling of data entry personnel and computer operators.

Most of these new staffers will assume their positions during the first quarter or first half of this year, the respondents said.

DP budgets for large systems users have risen steadily during the last five years, and the trend shows no sign of

abating in 1978, the survey found.

Twenty (74%) of the companies participating in the survey reported that their DP budgets had increased each year between 1972 and 1977. Only one company said the amount it spends for DP had fallen steadily during that period, while the remaining six firms said their budgets had fluctuated.

Pace Accelerating

What's more, for many of the respondents, the pace of budget increases appears to be accelerating. More than a third (37%) of the respondents said their budget hikes were

greater in 1977 than in previous years, and 23 (85%) of the companies predicted their 1978 DP expenditures would jump compared to last year's budgets.

Computerworld's annual budget survey was conducted this year by staff writers Jeffery Beeler, Ann Dooley, Tim Scannell and Brad Schultz.

Five (18.5%) of the firms, meanwhile, said their 1977 DP budgets will remain about the same as in the past five years, and three (11.1%) foresaw little difference between this and last year's expenditures. Only four (14.8%) of the participants reported that their 1977 DP budgets were less than in 1972-76, and only one company predicted a spending cut in 1978.

CW based the survey on interviews with top DP officials representing an assortment of industries including manufacturing, service, insurance, banking and transportation. Worldwide DP expenditures for the participating companies, which were predominantly IBM users, ranged from \$1.5 million to \$100 million per year, and annual gross revenues varied from \$240 million to \$7.5 billion.

The average yearly DP budget for the respondents was \$24.6 million; the average gross revenues, \$1.82 billion.

Hardware Trends

In other findings, the survey showed that most companies plan either to boost or maintain their budgets for medium- and large-scale computer hardware during the coming year. More than half (51.8%) of the respondents plan a 3% to 40% budget increase for this category, while another third of the companies intend to keep their 1978 expenditures at 1977 levels.

Slightly more than one-fourth of the survey population has definite plans to acquire new medium and large-scale computer hardware this year — primarily IBM 370s and 3031s — but most of the respondents (almost 63%) expressed uncertainty about their equipment acquisition plans. The remaining 12% of the companies said they have no plans to buy or rent new mainframes or mainframe peripherals during 1978.

Twenty-three of the responding firms also reported that they use minicomputers. Applications for these minis include process control, data entry, and collection, teleprocessing, general accounting functions, power management, word processing, scientific research and other jobs.

The largest share of the survey population (40.7%) pays for its minicomputer equipment from the DP budget, while exactly one-third of the companies require that minis be bought through the various user departments, the study found. Slightly more than 11% of the firms acquire minicomputer hardware both through the DP budget and user departments, and 14.8% declined for various reasons to explain how they obtain their minis.

Of the 14 companies that pay for minis at least partly from their DP budgets, exactly half predicted that the minicomputer portion of their DP budgets will rise this year — in most instances by at least 20%. Another four firms said they would spend about as much for minis in 1978 as they did last year, and the other three organizations either admitted they had not yet calculated their current minicomputer budgets or declined comment.

Data-Entry Budgets

Elsewhere in the survey, 16 (59.3%) of the respondents revealed that they include the cost of data entry solely in the DP budget, while only one company reported that user departments alone pay for that service. The remaining firms said they divided data-entry expenses between the DP budget and the user departments.

Eleven companies reported that they bill users for data entry, whereas 13 said they don't bill users.

Respondents gave diverse answers when asked about their 1978 data-entry budget plans. Seven (nearly 26%) of the companies predicted their data-entry expenditures would rise this year, while four forecast a decline, and 10 said their data entry spending would remain stable.

Most of the budget hikes for data entry proved modest (usually only about 2%-10%), while some of the spending cuts were more drastic, sometimes as much as 25%-50%, the survey found.

NCR Details Upkeep Policy

(Continued from Page 1)

tion would be done "expeditiously," taking no more than 90 days, unless a real problem were encountered. Meant as an assurance that the inspection would be completed within that time frame, that statement was interpreted by some — erroneously, according to NCR — to mean all NCR systems involved in third-party sales would be excluded from maintenance for 90 days.

However, equipment that "has been removed from maintenance for a period of more than three months" prior to its sale to a new owner "does not automatically qualify" for a maintenance contract, according to the "information for new users" printed on the back of NCR's new certification form.

That warning apparently became mixed in some users' thinking with the 90-day reinstallation period to create the impression that NCR was prohibiting maintenance support for the first 90 days of a new organization's ownership of used NCR gear, the firm indicated.

The August memo required all equipment sold by anyone other than NCR to be inspected by NCR prior to approval for maintenance services. At the time, users and dealers understood the existing policy required such inspections only if the equipment had

been out of service for more than 60 days.

There also seemed to be a change in who would pay for what as a result of the inspection. The pre-August policy limited charges billed to the new owner to such items as in-transit damage. The now clarified summertime statement said the cost of services needed to put the equipment into satisfactory condition would be borne by the prospective buyer.

Installation and certification costs will be on a time-and-materials basis, Shipman's recent memo said. Charges to the customer will be made to cover installation expense, such as cabling the unit, or system, physical and technical inspection and hardware diagnostic procedures, he specified.

Charges will also be made for software diagnostic procedures, replacement of defective modules, installation of any necessary modifications and "other work required to place the equipment in acceptable condition for reliable operation," he said, but added that "replacement parts and/or modules required will be charged to the customer."

But he added the company does not intend to support non-NCR equipment added by third parties to NCR systems. "Nor can we support unauthorized modifications made by third parties to NCR equipment."

erisa event reportable?

An employer who... of any of... reportable event... the plan administrator... must notify PBGC within 30 days.

If your benefit... reportable event... PBGC... 1000 Massachusetts Avenue, Natick, MA 01909... (617) 552-1111... PBGC... 1000 Massachusetts Avenue, Natick, MA 01909... (617) 552-1111...

Proposal Book Rocks Industry!

A California publishing firm has literally taken the computer industry by storm with a recently published "how-to" proposal book. The book, a 4 1/2 pound loose-leaf volume entitled *How to Create a Winning Proposal*, covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top West Coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in commercial, government and OEM proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

Using a step-by-step instructional technique, the authors provide a virtual roadmap to the entire proposal process... including section-by-section checklists to ensure the proposal team of covering all the important bases. Excellent guidelines are given on the contents, structure and methods of preparation for both solicited and unsolicited proposals. A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team, and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's, and IFB's are included.

Copies are available from Mercury Communications Corp., 730-CW Mission Street, Santa Cruz, CA 95060. \$65 (pre-paid) includes 3-5 day delivery inside USA. In Calif. add \$3.90. For outside USA, add \$10.00 (money order) includes air delivery. To order C.O.D. call 408/425-8444.

To Allay Privacy Concerns Europeans to Press for Data Flow Rules in '78

By G. Russell Pipe
Special to CW

AMSTERDAM, The Netherlands — The coming year will end the speculation about the impact of transborder data controls on U.S. interests abroad and confront data processors with some specific, costable dislocations with which to grapple.

Regulations covering the transmission of data across national boundaries entail much more than privacy legislation, although privacy concerns remain the centerpiece of national and international attention. The Swedish Data Act is to be expanded and toughened, Germany will implement its Data Protection Act and the French are expected to begin transitional phases of a data processing and freedom law.

Already these measures are being seen as possible vehicles for greater government regulation of DP that could involve influencing equipment and services deemed preferable for domestic users. Witness the French parliamentary debate [CW, Dec. 12] and the stringent technical and physical security demands contained in the German law.

Privacy, national dependency on computing, trends toward societal conformity and vulnerability, plus greater centralization of governmental powers, are issues which forthcoming national "data policies" may address. Next year should see Austria, Denmark and Norway adopting data protection laws with Belgium, Luxembourg and Spain not far behind.

National public data networks and the vast Euronet project will approach operational stages while the postal, telephone and telegraph (PTT) authorities' desired "volume-sensitive pricing" nears resolution.

Associations such as the Council of Europe and probably the Organization for Economic Cooperation and Development (OECD) and European Economic Community will be accelerating programs beyond the initial stages of international agreements ranging from personal data to general international DP practices.

U.S. Response

Evaluating the effectiveness of U.S. reaction to all of these developments may be more appropriate in terms of the commitment to action than in precise initiatives to date. The formidable U.S. contingent at the OECD Vienna Symposium last fall and the constructive overview presented by John Richardson, director of the Office of Telecommunications, demonstrated a strong government-industry will to go forward.

The institutional response by the Department of State, National Security Council, congressional committees and trade associations underscores the fact that the issues are being researched and positions formulated. If recent history is a guide, these moves are a preview to more potent developments.

The restlessness of the DP industry, however, has understandable merit. Undoubtedly the impact of dislocations will hit manufacturers, services and users in a haphazard way and U.S. government response may be difficult to marshal.

It remains to be seen whether American Embassies will have the available skills and manpower to deal with the problems on a country and case basis. Similarly, the implications of such "standards," as they are described in the jargon of nontariff and invisible barriers to trade, must be measured by multinationals on a five-to-10-year time frame for planning. Calculating the impacts on network building, for example, still seems to be a matter of guesswork.

An indirect problem may be Washington's lack of coordination or coherence in developing national information, computer and communications policies. Several European gov-

ernments recognize the need for rational policy and institutional solutions; seeing the U.S. in disarray doesn't help advance international cooperation in an "information age."

Analysis

Perhaps the new Assistant Secretary of Commerce for Telecommunications and Information can fill the breach, at least on the international scene.

A common complaint by DPers is the lack of sufficient hard information about what's going on and what it

means. This is attributable in part to developments which are moving from Europe to America, reversing the usual pattern of information flow on computer-communications technology.

Further, nearly all of the available reporters are European nationals, whether corporate managers or journalists, who just don't seem to see much urgency in the subject.

The OECD Vienna Symposium proved useful, although fewer facts were offered than some were anticipating. Reports emanating from the Council of Europe, through U.S. and other observers, may be constricted as negotiations leading to an interna-

(Continued on Page 6)

COMPUTER ASSOCIATES PROUDLY ANNOUNCES....

THE NEW CA-SORT FOR 1978

Significant enhancements make
CA-SORT, Release 5.0 for 1978
the most advanced sort software system
available in the world today!

More than 2300 CA-SORT users continue to report savings of up to 50% on Disk Work Space ... up to 50% savings on I/O activity ... up to 25% on CPU time ... and dramatically improved programmer efficiency.

Now CA-SORT Release 5.0 improves performance of the world's Number One sort software system.

● I/O accesses slashed further by an extension in the command chaining logic!

● Full support of 3350 disks is now available.

● Under DOS, support for multiple input devices (tape and disk) is provided.

● The sort has been more finely tuned for VS

through the use of monitor systems and string extension techniques.

INSTALLATION STILL TAKES JUST 10 MINUTES.. SAVINGS BEGIN WITH THE FIRST LONG SORT RUN! There are no lengthy "surveys" to be taken

MAIL THE COUPON OR CALL COLLECT TODAY! **(212) 355-3333**

YES! Please rush my CA-SORT Release 5.0 Information Kit along with details of the FREE 15-day trial.

Name

Title

Company

Address

City State Zip

Telephone No. ()

Computer Model System

CALL COLLECT (212) 355-3333 655 MADISON AVE. NEW YORK, NY 10021

COMPUTER ASSOCIATES

U.S. Offices: California, Connecticut, District of Columbia, Georgia, Illinois, New York, Ohio, Texas
Worldwide Offices: Argentina, Australia, Austria, Belgium, Brazil, Denmark, France, Germany, Holland, Italy, Japan, Switzerland, United Kingdom

Europeans to Press for Privacy Rules in '78

(Continued from Page 5)

tional convention grow more sensitive.

Most of the key actors in the field seem far more interested in communications channels with local interests than in foreign news coverage. Take, for example, the Swedish Data Inspection Board's recent decision, in a case where a Swedish bank has been sending manual files containing mostly economic information to Luxembourg for processing.

Until now, the board did not consider manual files leaving Sweden to be within its jurisdiction. Its responsibilities were activated when terminal access, magnetic tape or card media were involved. Now organizations which move paper files will need a license if they will be automatically processed abroad.

This new action has not been reported outside Sweden, to my knowledge, but it may have important international effects.

Conference Slated

An international conference on transnational data regulation, designed to find practical approaches to solving this array of problems, is scheduled for Brussels Feb. 7-9. It has already attracted considerable U.S. interest, with scheduled speakers including W.M. Combs, Tymnet; John Eger, formerly acting director of the Office of Telecommunications Policy (OTP); William Fishman of OTP; Phil Onstad of Control Data Corp.; Rein Turn, TRW; T. Utsumi, Global Information

French Concerned Over Access to Records

Special to CW

PARIS — The Committee for the Free Access to Information has been formed by two members of the French Polytechnical School.

Michel Raoust and Jean Claude Lepage are seeking an amendment to the "Data Processing and Liberty" legislation that, like provisions of the Freedom of Information Act in the U.S. and Swedish open record principles, gives public access to government records.

The committee favors including

manual files under the law and proposes that the commission established by the legislation be required to help citizens obtain access to records maintained by the government. The group is independent of all political and labor groups.

This expression of concern for freedom of information in France, while only recently appearing in an organized form, is likely to continue to gain more visibility and support when the new parliament sits next year, observers believe.

Services; Phil Walker, Telenet; and Charles Wilk, U.S. Office of Telecommunications.

Literally all of the principal Europeans and industry spokesmen are to be participating. Eger, now associated with the law firm of Lamb, Halleck and Keats in Washington, is coordinating information on the conference.

Getting a feeling for the issues is necessary before moving into fixed national positions or beginning negotiations with other countries. The strengthening of European counterparts by such trade groups as the Association of Data Processing Service Organizations, the Computer and

Business Equipment Manufacturers Association and the Information Industry Association is the type of effort which should be of considerable value. Giving greater attention to such related forums at Unesco and the 1978 Intergovernmental Conference on Strategy and Policies in Informatics in Madrid will give U.S. interests an opportunity to be heard as well as to sense the feelings of developing countries toward worldwide data communications.

Assessing the Issues

It is incorrect to lump all European countries into the same basket on all these issues. This is especially true for countries that are just beginning to consider major new DP projects or raising priorities on telecommunications services.

It should not be taken for granted that the UK with its tremendous banking and commercial data movements will be party to some of the proposals currently being considered. Also, the free trade-oriented governments of Holland and Belgium have yet to consider these matters.

This having been said, collective

policymaking on the continent is growing, and most of these issues have spilled over every national boundary. All countries are backing privacy legislation, and most want to develop stronger national computer-communications policies having important economic ramifications.

All except Spain have government-owned telecommunications authorities and many are building public data networks. Further, several are wary about too much dependence on computer technology for political and economic reasons.

Fears of Socialists

In the socialist regimes, the notion of sovereignty and national independence are alive and on the rise, and the concept of free flow of information is being challenged, the Helsinki doctrine notwithstanding.

The expressions of Canadian officials in the media and DP field are very close to those expressed in Europe. The developing countries are keenly aware of the impact of mass communications, but they have yet to frame a "new international information order" to include computer-communications. It is likely they soon will.

Unpleasant as some of these topics are to some, there is little chance of their being wished away or stalled by benign neglect. The coming year will surely evoke rhetoric, but those with vital commercial interests should be feeling the consequences of these developments as well.

Correction

In the editorial "Too Late Now" [CW, Dec. 26-Jan. 2], an error changed the meaning of a key sentence. The correct version should have read: "It is ironic that consumers were hard-pressed to identify with the non-competitive concepts of the earlier 'Consumer' Act, but are now directly affected by an industry proposal that makes no mention of them."



Don't let the compact size of our timeshare end direct access terminals fool you. They provide as sophisticated a data acquisition system as you will ever need... and at a price that is far below any other terminals available. For example:



THE CASSETTERM This battery operated timeshare or direct access terminal uses familiar ASCII code and features a mini-cassette memory system. An acoustic coupler allows for complete wireless mobility. An RS-232C connector is also provided for direct connection to most minicomputers. \$1995



THE MIGET The Miniature Interface General-purpose Economy Terminal is all that name implies. It provides direct access to minicomputers through a standard RS-232C connector, standard ASCII code and features a bright 32 character display. \$400



THE TIGER Micon's Television Interface General-purpose Economy Terminal makes any standard TV set into a timeshare terminal. 1024 characters of simultaneous display are switch selectable for 8 or 16 lines of 32 or 64 characters per line. Acoustic coupler provides for timeshare use and standard RS-232C connector gives direct access. \$500

For full information, call or write

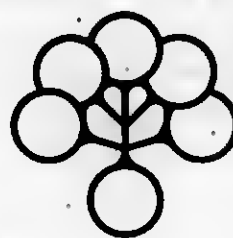


252 Oak Street
Oakland, California 94607
(415) 763-6033

Run ISAM Files on 3330-II and 3350's with DOS/VS Rel. 34

With The Value Computing Advanced Function ISAM 3330-II/3350 Native Mode Support

- ☒ No reassembly of Your Programs
- ☒ No Changes to Your JCL
- ☒ Completely Transparent to Operations



Value Computing Inc.
The Computer Operations Company

Please send me more information about ISAM Native Mode Support

NAME _____ COMPANY _____
TITLE _____ PHONE _____
ADDRESS _____ CITY _____ STATE _____
ZIP _____ CPU _____ OPERATING SYSTEM _____

Mail to: VALUE COMPUTING INC.
300 VCI Building, W. Marlon Pike
Cherry Hill, New Jersey 08002

Or call toll-free 800-257-8242

Concern Over TAS Privacy Grows

(Continued from Page 1)

Congress fund the system in fiscal year 1979, and OMB isn't sure when it will make that decision, Green said.

The senators sent their letter to OMB because "it has come to our attention that the OMB is prepared, in the immediate future, to make an affirmative decision regarding the funding and subsequent implementation of this system."

Costs — an estimated \$851 million — and constitutional rights dictate caution in approving and setting up the system, the senators said, noting that several congressional committees, including the Senate's Subcommittee on Administrative Practice and Procedure and its Committee on Governmental Affairs, the Joint Committee on Taxation and the Oversight Subcommittee of the House Ways and Means Committee, are interested in TAS.

"We especially feel the necessity to have specific facts spelled out regarding the constitutional issues so we can be assured all potential abuses in these areas have been clearly identified and specifically addressed in the TAS system or any alternatives," they stated in the letter to OMB.

Privacy at Issue

Chairman of the Senate Administrative Practice and Procedure Subcommittee, Abourezk was further dissatisfied with assurances given a member of his subcommittee staff by Patrick J. Ruttle, IRS assistant commissioner of data services, concerning TAS' potential privacy impacts.

Abourezk last week sent a letter to Kurtz asking several of the questions raised by OTA in its study of nearly a year ago.

The IRS attempted to answer OTA's contentions that TAS will give the agency the capability for increased information abuse by providing the "potential for surveillance, harassment or political manipulation of [tax] files" in a status report on the system's development issued last May.

For the IRS, the replacement of its 20-year-old centralized tax accounting and collection system is essential, and the agency considers privacy and security issues to be concerns running parallel to taxpayer service, Ruttle said in an interview last spring [CW, April 11].

He detailed the administrative and system safeguards the IRS plans to employ to protect taxpayer privacy, including such safety measures as pre-employment screening, supervisory reviews of unauthorized access at all levels of management, an extensive system of terminal profiles and strict limitations on the use of the terminals planned for TAS.

Members of Congress, however, want more details concerning the

Correction

Alan Hruska, an attorney with Cravath, Swaine & Moore recently assigned to the defense team of the U.S. vs. IBM antitrust trial, is not related to Roman Hruska, former senator from Nebraska [CW, Dec. 19]. David Boies is leaving the case to become chief counsel to the Senate Judiciary Committee's Antitrust and Monopoly Subcommittee.

safeguards the IRS will use under TAS.

Moss and Rose last year asked the House and Senate Appropriations Committees to refuse approval of the system in principle and to deny funding for procurement even in a minimal manner until the IRS has satisfied congressional misgivings about the potential abuses of taxpayer information contained in TS [CW, April 11].

Possible Abuses

The congressmen were particularly concerned about OTA projections that TAS could hook up with banks around the nation to check on the daily balances of businesses and individuals.

They also expressed their worry over the fact that by fiscal 1979, the Social

Security Administration (SSA) and IRS will be required by law to share income and tax data on all W-2 forms. This requirement could mean a direct link between the computers of the two federal agencies, pooling more data on individuals than any other federal agencies, Moss and Rose said.

For Dr. Ruth M. Davis, former director of the National Bureau of Standards Institute for Computer Sciences and Technology and a member of the OTA panel that reviewed TAS, the issue is the acceptable levels of risk the American public can tolerate in a system like TAS.

She encouraged the kind of dialogue between Congress and the IRS that compares and weights the risks and benefits associated with TAS.

Stag to Make Hearing Plans

BURLINGAME, Calif. — The California Board of Equalization has agreed to hold a public hearing April 5 on Tax Regulation No. 1502 on automatic data processing services and equipment, according to a spokesman for the Sales Tax Action Group (Stag), an organization that requested the hearing.

Stag will discuss plans for that hearing at an open meeting Jan. 11 at 6:30 p.m. at the Sheraton Inn here.

Stag is asking the Board of Equalization to review the regulation on the grounds that its application has been inconsistent and does not reflect current technology.

MVS. Make it do what it's designed to do.

If you're planning to go MVS, we can help ease the transition. If you're already using MVS, we can smooth a good many of the rough spots in managing overall system operation.

We are Capex Corporation. We make a program product for system management called PLAN IV:MVS. It offers solutions to DP problems not easily available anywhere else, from any other product.

PLAN IV:MVS provides the information you need to make your system perform at capacity. The information you need for management planning. For scheduling. For managing system services, controlling system resources. And it provides this information in a concise, readily usable form.

Information In Perspective

PLAN IV:MVS automatically monitors system operation. It spots bottlenecks and changes in operation before they can become serious prob-

lems. It puts information in perspective by means of its own historical data base automatically contrasting today with yesterday, this month with last.

It details the impact of changes. Makes management by exception feasible and workable. And, thanks to built-in trending, lets you see where you are now, and where you're heading.

PLAN IV:MVS provides the perspective you need to tune your system, quickly and efficiently. Workload balancing, IPS modification and other system tuning functions are brought quietly under control.

Proven Results

Many of the most sophisticated MVS users around the world rely on PLAN IV:MVS to make their systems perform the way they're supposed to perform. It is the only system management tool that supports system management decisions at all levels,

from evaluating turnaround time to channel loading, from TSO response time to target multi-programming. And because PLAN IV:MVS makes full use of built-in measurement facilities—SMF, RMF or RMF2, or MF/1—there's no costly overhead.

If you're using MVS, if you're thinking MVS, the next step is PLAN IV:MVS. It's the one way to make sure that your system gives you everything you're paying for.

To see how PLAN IV:MVS can help you, call or write us today.

Capex Corporation
2613 N. 3rd St., Phoenix, AZ 85004
Phone: 602-264-7241. TWX 910-951-1594
Offices nationwide: Atlanta, Boston, Chicago, Dallas, Los Angeles, New York, Phoenix.
In Europe, contact: GCS Products/London, Paris, Dusseldorf, Brussels, Rijswijk ZH



Capex Corporation (Info Dept BS)
2613 N. 3rd St., Phoenix, AZ 85004

- ☐ Please send me more information on PLAN IV:MVS
☐ Please contact me to arrange a demonstration

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

Model _____

System: ☐ MFT ☐ MVT ☐ VSJ
☐ SVS ☐ MVS

If Used by Federal Government

DP-Planned Menus Seen \$3 Million/Day Saver

By Tim Scannell
CW Staff

AMHERST, Mass. — The federal government could save more than \$3 million a day on the National School Lunch Program if a computer were used to plan and coordinate its menus, according to Joseph Balintfy, a professor here at the University of Massachusetts.

Using a Control Data Corp. Cyber computer programmed with such information as food preference, sequence of eating and budgetary and nutritional considerations, Balintfy claims to have found menus that are not only economical, but more readily accepted by students.

To do this for a particular school, the computer is first programmed with the results

of a food preference survey performed to determine what the students like to eat and how often, he said. These facts are collated into an "anticipated satisfaction group" based upon the frequency of what is served.

All the menu items offered by the school are then entered into the computer according to their nutritional benefits and

cost per serving. This usually amounts to 120 to 150 different selections, Balintfy said.

The resulting output is a menu based on preference that meets budgetary standards, satisfies nutritional requirements and offers the students the food they like, he said.

Balintfy's computerized theory was tested with 1,000 students in the Amherst and

Easthampton, Mass., school systems and resulted in less food being thrown away and a cost savings of 12.5 cents per student per day, he said.

Students actually preferred the computer-planned menus because they were served foods they liked to eat without sacrificing nutrition, he stated.

Balintfy believes using a computer is the only way to organize and catalog the variables of menu planning.

"We have a powerful tool in the hands of food experts. With this tool we can make predictions as to what direction managerial or nutritional assumptions should be explored," he said.

"It is humanly impossible to find the optimum mixture in menu planning," he continued. Using a computer is "the only way we can evaluate the nutritional and preference aspect of a combination of items over a longer period of time."

Opposed by Nutritionists

Although Balintfy has great faith in his system and its concepts, he finds his ideas are opposed by the majority of nutritionists he has approached.

"There is an interdisciplinary gap," he stated. "The educational background of food and nutritional experts is conspicuously void of any mathematical background."

"It is beyond the comprehension of an individual even with a Ph.D. in nutrition as to what can be done with mathematics," he added.

Balintfy believes his theories are rejected mainly because they will eventually result in a reduction of present nutritional budgets. "I haven't seen a food service director yet who wanted to cut his budget," he contended.

A teacher in the School of Business Administration, Balintfy has been doing research on mathematical models of the human diet for the past 15 years. "This is just the latest application — to the school system. I have been developing applications for other institutional food services such as hospitals and even the military," he said.

April 17 — 19, 1978 Chicago, Illinois

1978 DELTAK International

Data Processing Training Conference

DELTAK, the world's largest video publisher, announces its 3rd Annual International Users Conference, to be held at the Hyatt Regency in Chicago on April 17 — 19, 1978.



Hyatt Regency Chicago

This year's agenda features presentations of importance to Data Processing training organizations.

- DP Education and Training for the 1980's
- Industry Futures — Hardware, Software, People

- Programmer Productivity — Past, Present, Future
- The Jackson Structured Design Techniques
- Performance Goals and Appraisals

During the conference, a number of workshops (conducted by experienced DELTAK users) will deal with effective planning and management of in-house training activities.

- Designing a Learning Resource Center
- In-House Course Design and Presentation
- Establishing a Tutorial Program
- Record Keeping and Management Reporting

Additional workshops will address training areas that will become critical during 1978 and 1979:

- Data Base
- Structured COBOL
- Distributed Processing
- Mini/Micro Computers
- Structured Analysis
- Supervisory Training

Our speakers' forum consists of DELTAK users and a number of well-known and highly respected individuals who have made significant contributions to the Data Processing and Training industries:

- Leo J. Cohan, Performance Development Corporation
- Dr. J. Daniel Couger, University of Colorado/DPMA "Man of the Year"
- Dr. Herbert Grosch, President, ACM
- Capt. Grace Hopper, U.S. Navy
- Michael Jackson, Michael Jackson Systems Ltd.
- William Oncken, William Oncken Corporation
- John Toellner, J. Toellner and Associates
- Ed Yourdon, YOURDON, Inc.
- Plus DELTAK staff, selected DELTAK users and several other guest speakers.



Conference Logo

You are cordially invited to participate in this Conference. Write or call Ms. Sharon Trube, DELTAK, Inc., 9950 West Lawrence Avenue, Suite 50, Schiller Park, Illinois 60176; phone: 312-671-5300.



(402) 392-2606

VOLUME DATA ENTRY SERVICES ...

TAPE OR CARDS

"QUALITY AT A LOWER COST"

AMERICAN KEYIDATA

Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Keeps In-House Analysts

Firm Economizes by Jobbing Out Most Coding

By Brad Schultz
CW Staff

CHICAGO — A medium-sized manufacturing firm decided to job out the bulk of its software production rather than have in-house programmers because it could not get enough people with experience nor afford to train beginners.

This idea proved "excellent and productive" and would work for other firms with around \$150 million in annual sales in the same predicament, according to Eugene R. Tauber, DP manager of the Joslyn Manufacturing and Supply Co. here.

Joslyn's DP staff now consists of "technical professionals with a business orientation" whose prime function is to:

- Interpret user requirements.
- Develop detailed specifications of the project request.
- Coordinate the development.
- Manage the interface with the software house.
- Test the new system.
- Implement the new applications.
- Finalize documentation.

"The chore of the actual coding is gone, leaving the true creative design management function," Tauber said.

Joslyn now maintains a staff of analysts rather than programmers, Tauber noted, making the following distinction between these two professional types: "Really top programmers are principally technicians engrossed by necessity in the workings of the hardware and software," whereas "top analysts are application- or user-oriented, considering the computer only a tool for performing a given job faster than can be done by human power."

A firm's information systems department exists to provide information for administrative decision-making and financial reporting, in Tauber's opinion, and thus needs capable and suitably oriented analysts.

Economical Alternative

He found that by contracting out all coding jobs to top programmers, Joslyn could meet its need for analysis and programming at a much lower price and without having to pay high-priced technicians for "fixing small problems, waiting for the next assignment, drinking coffee and taking vacations," he said.

"And should the need to reduce or

expand output capacity arise, the change can be effected quickly without an employment agency fee," Tauber added.

In the past year, Joslyn manufactured and sold \$156 million in equipment for the utilities industry. In that period, the firm spent \$19,000 in jobbing out software support for a 23-installation data network under development, extensive modification of a general ledger system and updating an inventory control system.

That sum would have been exhausted merely in paying the salary of one experienced programmer, he pointed out.

Tauber said that firms undertaking this procedure should be guided by

some words of caution:

Always use a firm in close proximity to your shop — it saves travel time and general headaches waiting for response, he said.

Always use a fixed bid, he advised, but remember that changes in the original specifications will incur an additional charge.

Use a penalty clause for late delivery of code. Joslyn uses 10% of the fixed bid price per day. Some firms won't accept this, but Joslyn won't accept late delivery, he said.

Work with the outside software house to get the best understanding of what the job really is. If it doesn't understand what you want, you both will

be disappointed.

Start using this concept slowly. It will take a little time to find a few software houses that are reliable and whose prices are fair, he noted.

Resource Requirements

Be sure to have your technical people estimate resource requirements prior to contacting your "outsiders," and compare this time estimate with that of the outside bid, he said.

You may have to use more than one organization because of multiple machines with different languages. Joslyn has minicomputers and a mainframe, and sometimes it has used one

(Continued on Page 13)

How to train your COBOL programmers in structured programming for \$15 per student

When it comes to structured programming, the trainer's or manager's problem is twofold. First, he must decide which of the several methods of structured programming to teach. Second, he must decide how to teach the method. Up till now, neither decision has been easy, and it's little wonder that training in structured programming has been largely ineffective.

Now, I'm happy to announce a book by Paul Noll called *Structured Programming for the COBOL Programmer*. In my opinion, this book makes a major contribution to programmer productivity, because it does two things that haven't been done before. First, it presents a method for using structured programming that is complete, consistent, and practical. Second, it presents this method in a way that is educationally effective. In short, as you will see later, we guarantee that a programmer can learn to develop structured programs using the book alone. And that a programmer's productivity will increase as a result of this training.

Why Paul's Method Is Effective

It's not so much that Paul Noll has created a new method for using structured programming. It's more that he has refined and coordinated existing methods into a complete and workable system.

For instance, Paul uses IBM's HIPO for documenting his structured programs. Because IBM's implementation of HIPO is so cumbersome, however, he has developed his own HIPO subset... one that is easy to use.

Similarly, Paul has no objection to some of the existing methods for designing programs. It's just, he says, that they don't go far enough. They don't tell what type of modules belong at what level of the structure chart; they don't present a practical system for numbering the modules; and they don't relate the modules in the structure charts to the COBOL paragraphs. Furthermore, no one book or course presents a complete system for developing structured programs that includes design, documentation, coding, and testing.

In contrast, Paul's method is complete. He starts by telling you in detail how to design programs using structure charts. Next, he shows you how to create HIPO diagrams for each of the modules in the chart using his HIPO subset. Then, he shows you how to code the structured program using structured COBOL. Here, you will see how each paragraph

in the COBOL program relates to one module in the structure chart. Finally, Paul shows you how to use top-down coding and testing to improve testing efficiency.

4 Reasons Why this Book Is Effective

1. This book was written by an expert from industry, Paul Noll. He has been a software specialist for a large company in San Francisco, and he is currently responsible for the training of 250 programmers. As a result, his programming methods are superb, and his teaching methods are effective.

2. Paul never presents theory without showing its application. In contrast to other books and courses, this book is based around the development of four different kinds of business programs. Once you see how Paul's method is applied in these programs, you will forever see the value of structured programming.

3. This book is designed specifically for the COBOL programmer. As a result, you will see all of the structured coding techniques in COBOL (and only COBOL). You will also see how design and documentation are related to the programming language used.

4. This book contains dozens of illustrations taken from all phases of structured programming. You'll see structure charts and HIPO diagrams for each of the four programs developed in this book; you'll see structured COBOL, program stubs, test plans, walkthrough

agendas, and much more. In my experience, these illustrations, more than any other factor, determine whether an EDP course is effective... and they are the missing ingredient in other structured programming books and courses.

30-Day Trial and Unlimited Guarantee

Because there are many ineffective books and courses on structured programming, I don't expect you to take my word for any of this. That's why I make this unusual two-part offer.

First, take up to 30 days to review the book. If you return it within that time, forget the bill... no questions asked.

Second, if you discover after 30 days that your programmers can't learn structured programming from the books alone or that Paul's method doesn't make an important contribution to the programmer productivity in your shop, you can still return the books for a complete refund. In other words, I unconditionally guarantee the effectiveness of this book... no time limit.

So mail the coupon today. For each book ordered, I'll bill you \$15 plus postage (plus sales tax in California). Then you can see for yourself how a \$15 book can solve a trainer's problems.

Mike Murach & Associates, Inc.
4905 North West Avenue,
Suite 102
Fresno, California 93705
209-229-8111

Mike Murach & Associates, Inc., 4905 North West Avenue, Suite 102, Fresno, CA 93705

Gentlemen: Please send me _____ copies of *Structured Programming for the COBOL Programmer*. I will take up to 30 days to review them with no obligation. After that, if the books don't prove to be effective, I will return them for a full refund. I understand that I will be billed \$15 plus postage (plus sales tax in California) for each book ordered.

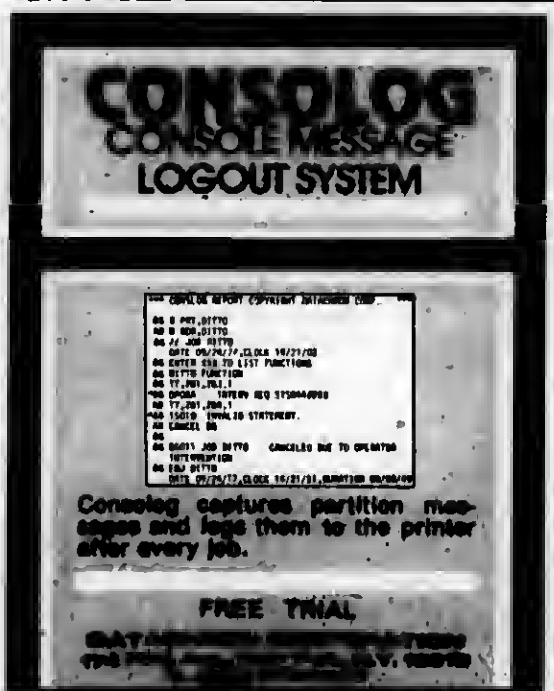
Name and Title _____

Company _____

Address _____

City, State, Zip _____

Individuals: Please send \$15.50 for each book ordered (plus 90 cents sales tax in California). In this case, our unlimited guarantee still applies. Return the book and you will receive a prompt refund.



UCLA's Bush Analyzer Retires to Smithsonian

WASHINGTON, D.C. — The most venerable computer at the University of California at Los Angeles (UCLA) has been saved from the scrap pile by a handful of devoted history buffs and is joining its fellow pioneers here at the Smithsonian Institution.

In the late '40s and early '50s, this Bush Differential Analyzer — now the last working model of its kind — introduced much of Southern California industry to automatic computing, instructed the first student generation in the new art and even starred in two Hollywood movies.

The differential analyzer, often described as "an oversized erector set," was named for and conceived by Prof. Vannevar Bush of MIT in 1931 as the first general-purpose computer.

In 1945, when the newly founded UCLA College of Engineering started shopping for a mechanical analog computer, General Electric offered to construct the differential analyzer for delivery two years hence at a cost of \$125,000.

On July 23, 1947, the new machine was ready to face its first numerical problems, but in contrast to today's split-second responses by million-dollar electronic machines, it

often took hours and days to run off a set of solutions.

Firms Initiated

Though slow, the differential analyzer was soon fully booked for teaching, research and cooperative contract work with industry.

Nearby Hollywood also discovered the oversized computer, measuring some 31 feet long by 9 feet wide. In the era before "Star Wars" and

"Close Encounters," the differential analyzer was the latest in way-out gadgetry, and it performed skillfully in such science fiction epics of the mid-'50s as "When Worlds Collide" and "Earth vs. the Flying Saucers."

However, the glamour was short-lived. With the rapid development of faster and more sophisticated computers, the differential analyzer fell into disuse. From 1960 on, the

UCLA engineering school used it mainly for display, although it clanked away occasionally for student and public demonstrations.

Earlier this year, the engineering school decided that the space occupied by the computer was needed for other purposes, and the machine was disassembled in June. Prof. Walter Karplus, chairman of the UCLA computer science department,

Linda Merims, former president of the campus computer club, and a few friends cast about for a way to save the old veteran and found a rescuer and buyer in Daniel McCracken, vice-president of the Association for Computing Machinery.

The machine was offered to the Smithsonian Institute, which agreed to add the differential analyzer to its collection of pioneer computers.

NSF Funds ACM Project

NEW YORK — The Association for Computing Machinery has received a grant of \$63,826 from the National Science Foundation to continue a project on courses in computer literacy and the impact of computers on society.

The project supported by the new grant will include refinement of an annotated bibliography and the information storage and retrieval system supporting it.

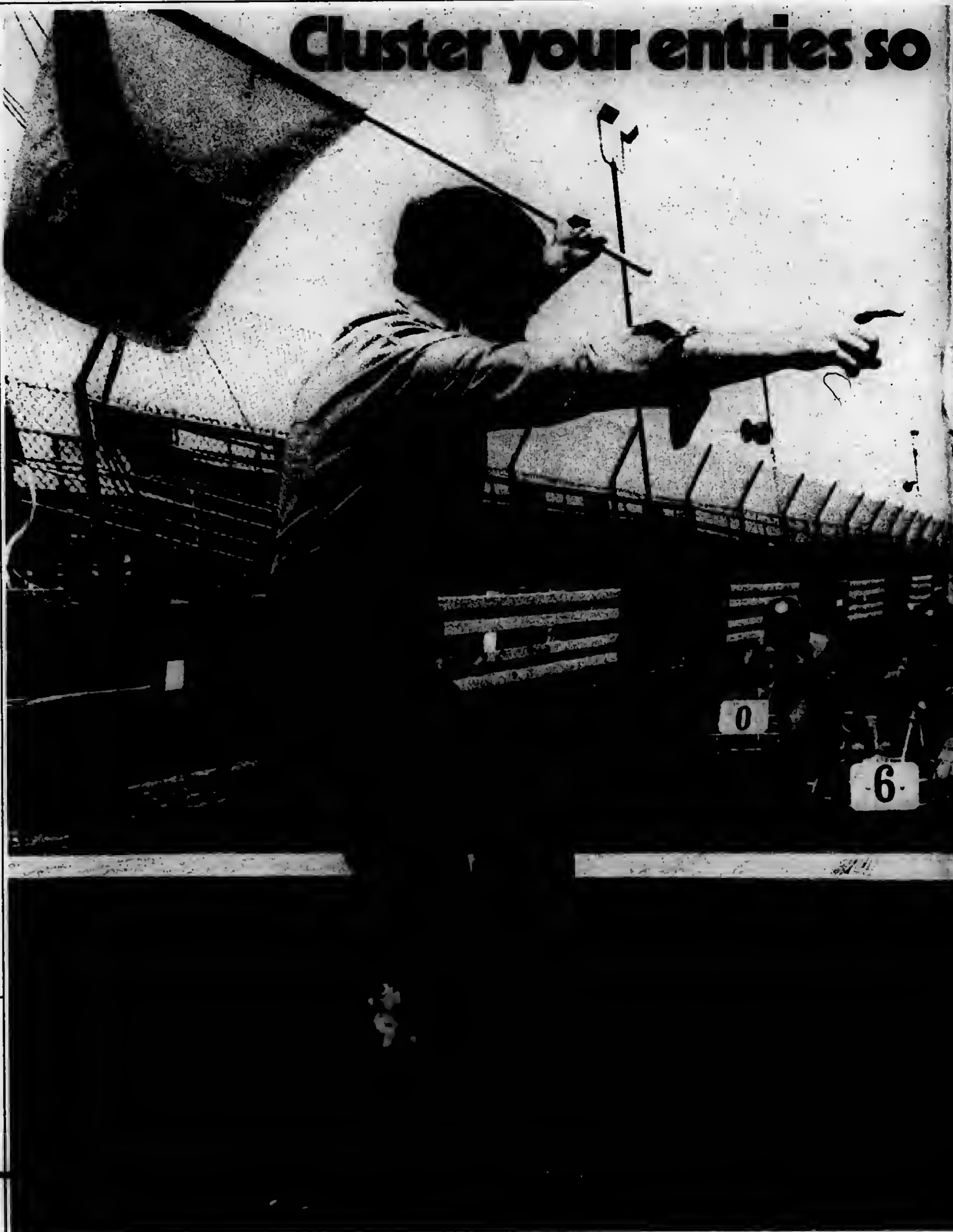
The ACM will also organize and conduct a workshop on computer impact involving individuals without computer training.

Principal investigators are Richard H. Austing of the University of Maryland and Gerald L. Engel of Old Dominion University.

FOR SALE Communication Terminals

- Teletypes - 28 32 33 35
- TWX - TELEX
- DECwriters LA36
- Acoustic Couplers & modems
- TI 700 series
- DATA COMMUNICATION

EQUIPMENT BROKERS, INC.
4915 Fernlee
Royal Oak, Mich. 48073
(313) 549-3400



T/S System Lists Houses for Sale Matching Service Brings Househunters Homes

By Tim Scannell
CW Staff

CONCORD, Mass. — A real estate brokerage firm here can access information on more than 4,000 homes in 41 communities and can reportedly match a home to a person's particular lifestyle with a terminal and a time-sharing service.

The Deignan Co., in con-

junction with Interactive Management Systems, Inc., offers customers instant feedback on their inquiries, according to Ted Deignan, originator of the service.

The system consists of two basic and complementary programs, Deignan said. The first is a "buying power system" which evaluates a person's financial picture in relation to

the community he has selected.

The second, the "match-maker system," compares that person's requirements with what is on file on a day-to-day basis.

Options Detailed

Upon enlisting with the company, a person is asked to fill out a form containing such

questions as the amount of cash on hand, securities, salary and approximate monthly expenses, Deignan said. This information is then entered into the remote computer via a Digital Equipment Corp. Decwriter terminal.

Within minutes the customer is given a printout suggesting the maximum advisable home purchasing price and covering

the available borrowing options. Financing flexibility is demonstrated by close to 54 mortgaging options at fixed and floating rates of interest ranging from 50% to 95% under conventional and Federal Housing Administration (FHA) financing plans to 100% financing through Veterans Administration loans, Deignan noted.

The customer is also presented with information on loan level, type of loan, advisable purchase price, required down payment, projected monthly payments of interest and principal, closing costs and annual real estate taxes and insurance, he said.

After establishing and inputting a purchase range, a list of possibilities stored on disk is printed from the computer's files and presented to the potential home owner, Deignan said.

'One-Stop Househunting'

If a home is not available that fits a person's needs or desires, his name is inserted into the file and will remain there until a suitable home is found. Deignan termed this "one-stop, we'll never forget you, househunting."

Deignan time-shares on a DEC PDP-11/70 minicomputer at Interactive Management via his terminal and a dial-up telephone line. The Interactive Management system operates in an on-line mode with 640K bytes of memory and is used by Deignan for approximately four hours a day.

The cost of the service varies with the amount of usage, but runs about \$800 per month, Deignan said.

By keying in a particular account number and password that can be changed periodically, it is possible to access all of the information within the file, he said.

Afips Relocates Washington Staff In Arlington, Va.

WASHINGTON, D.C. — The American Federation of Information Processing Societies, Inc. (Afips) has moved its Washington, D.C., office to larger quarters in nearby Virginia.

The address of Afips' new Capitol office is Suite 805, 1815 N. Lynn St., Arlington, Va. 22209. The telephone number is now (703) 243-3000.

The Washington office was established in 1975 to provide Afips constituent societies with a Washington-based information service and to make technical expertise available to government groups.

everybody wins. Mainly you.

You run a wholesale business. Two locations, 3000 customers and growing. But rather than hire more order clerks, you put a computer in your main office. Trouble is, feeding it orders keeps your clerks queued up, your direct line tied up, and your computer idling while your slowest operator taps out 30 words a minute.

We have a solution: A system that features our newest Dataspeed® 40 terminals clustered on a common controller in each of your two locations. Information is entered on a simple keyboard, with your own display forms to guide the operator, then held until all corrections are made and your computer is ready to receive it. Saves time. Avoids billing and shipping errors. Helps reduce inventory. Improves your cash flow.

Solving problems in data communications is an all-out commitment of the Bell System. If you haven't talked systems with your local Bell Account Representative lately, you're missing something.

The system is the solution.



SYNCHRO-SOUND ENTERPRISES, INC.

Everything you need in small computer systems!

LEAR SIEGLER ADM 3A TERMINAL



Assembled **\$849.00**
Kit **739.95**
Lower Case Option **69.00**

ADM 1 TERMINAL **\$1398.00**

ADM 2A TERMINAL **\$1895.00**

HAZELTINE MODULAR 1 INTELLIGENT TERMINAL

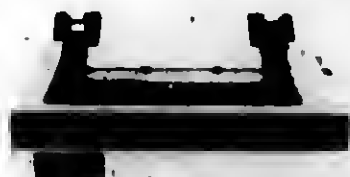
\$1659.00

1500 VIDEO TERMINAL

Kit also available

\$1149.00

CENTRONICS 703 SERIAL PRINTER **\$2395.00**



761 PRINTER

KSR with Keyboard

\$1695.00

700 PRINTER **\$1266.00**

OKIDATA MODEL 22 LINE PRINTER



Tractor Feed **\$2249.00** RS 232C Serial Interface **379.00**

MODEL 110 LINE PRINTER

Friction Feed

\$1149.00

LEAR SIEGLER 220 PRINTER **\$3845.00**



210 PRINTER **\$3345.00**

201 PRINTER **\$3045.00**

IMSAI 8080 MICROCOMPUTER



With 22 Slot **\$649.00**

Microcomputer based Business Systems available



SYNCHRO-SOUND ENTERPRISES
The Computer People
193 25 Jamaica Avenue,
Jamaica, New York 11423
212/668 7067 - TWX 710 582 5886
Hours 9-4 daily and Saturday
Visit our new showroom
Working units on display
Dept. CW

Calendar

Feb. 1-3, Washington, D.C. — Preserving Management Prerogatives in Privacy Legislation. Contact: The Institute for Science and Public Affairs, Continuing Education Division, P.O. Box 31, Benjamin Franklin Station, Washington, D.C. 20044.

Feb. 1-3, New York — Computer Performance Measurement: Tools and Techniques for Increased System Productivity. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 1-3, New York — Data Communications: An Introduction to Concepts and Systems. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 1-3, Washington — Word Processing: Guidelines for Planning, Design and Implementation. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 1-3, Chicago — Data Base Management Systems: General Concepts and Planning Guidelines. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 6-8, Washington, D.C. — Computer Performance Measurement: Tools and Techniques for Increased System Productivity. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 6-7, Chicago — Network-based System, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Feb. 6-7, San Francisco — "EDP Orientation for Administrative, Word Processing and Secretarial Personnel," sponsored by the American Institute of Industrial Engineers. Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Feb. 7, Hartford, Conn. — EDP Auditing, sponsored by Hartford SigBDP. Contact: Paul Fitterer, Systems Dept., 59 Field St., Torrington, Conn. 06790.

Feb. 7-9, Brussels, Belgium — International Conference on Transnational Data Regulation, sponsored by On-Line Conferences Ltd. Contact: Jan Freese, Online Conferences Ltd., Cleveland Road, Exbridge UB8 2DD, Middlesex, England.

Feb. 7-9, Mexico City — Automation/78, sponsored by Instrument Society of America. Contact: W.C. Rutledge, Mead Corp. R&D Dept., Chillicothe, Ohio 45601.

Feb. 8, San Francisco — Expo/3, sponsored by System/3 Users Group of Northern California. Contact: System/3 Users Group of Northern California, P.O. Box 329, Santa Clara, Calif. 95052.

Feb. 8-9, Chicago — Network System Design Workshop, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Feb. 8-10, San Francisco — Word Processing: Guidelines for Planning, Design and Implementation. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 8-10, Washington — Effective Computer Operations Management

Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 8-10, San Francisco — Word Processing Conference, sponsored by American Institute of Industrial Engineers. Contact: Dept. PR, P.O. Box 3727, Santa Monica, Calif. 90403.

Feb. 9, Baltimore, Md. — Data Processing Day, sponsored by Data Processing Management Association (DPMA). Contact: Bob Davis, Committee Chairman, DPMA, Baltimore Chapter, P.O. Box 22, Baltimore, Md. 21203.

Feb. 9-10, New York — Minicomputers and Microcomputers: Selection and Usage Guidelines. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 10, San Antonio, Texas — Structured Programming, sponsored by the Association for Educational Data Systems (AEDS). Contact: Ralph E. Lee, Director of Computer Center, University of Missouri-Rolla, Rolla, Mo. 65401.

Feb. 12-15, Houston — Telecommunications Workshop for Bankers, sponsored by the Operations and Automation Division of the American Bankers Association. Contact: Connie Williams, Operations and Automation Division, American Bankers Association, 1120 Connecticut Ave., N.W., Washington, D.C. 20036.

Feb. 12-17, Washington, D.C. — Annual Meeting of the American Association for the Advancement of Science. Contact: American Association for the Advancement of Science, Dept. R, 1515 Massachusetts Ave., N.W., Washington, D.C. 20005.

Feb. 13-15, Liege, Belgium — Symposium on Computer Network Protocols, sponsored by the International Federation for Information Processing (Ifip) TC.6 and Belgian Chapter (ACM). Contact: A. Danthine, Avenue des Tilleuls 49, B-4000 Liege, Belgium.

Feb. 13-17, Orlando, Fla. — Second International Learning Technology Congress and Exposition, sponsored by the Society for Applied Learning Technology. Contact: Dr. Carl R. Vest, Society for Applied Learning Technology, 41 Culpeper St., Warrenton, Va. 22186.

Feb. 14-15, Washington, D.C. — Data Communications Standards Conference, sponsored by Data Communications. Contact: McGraw-Hill Conference & Seminar Group, 1221 Avenue of the Americas, Room 3677, New York, N.Y. 10020.

Feb. 14-15, Orlando, Fla. — Symposium on Air Traffic Control Simulation, sponsored by the Society for Applied Learning Technology. Contact: Dr. Carl R. Vest, Society for Applied Learning Technology, 41 Culpeper St., Warrenton, Va. 22186.

Reflex. The Winchester disc drive that responds to you.



Reflex gives you high storage capacity and fast access at an extremely low cost.

It gives you trouble-free storage ranging from 12.5 to 63 megabytes unformatted in a moving head fixed media disc drive.

Reflex is so reliable and the air filtration system so advanced that preventive maintenance is not required. It's modular, so service is a snap. And it's compact, requiring only 7 inches of rack mounting space.

Reflex. Economical, efficient, reliable storage. Built and backed by Microdata.

Contact one of our local sales offices or the Director of Peripheral Sales, Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.

Microdata OEM Peripherals A significant difference.

SALES OFFICES:

Anaheim, CA: 714/533-8035 • Atlanta, GA: 404/252-9700 • Bellevue, WA: 206/455-0152
Dallas, TX: 214/387-3073 • San Francisco, CA: 415/573-7461 • Scarsdale, NY: 914/472-1141
Schiller Park, IL: 312/671-5212 • Tampa, FL: 813/872-1657 • Washington, DC: 703/620-3995

'Counterfeit Reality'

Simulation Technique Creates Life-Like Photos

By Catherine Arnst
CW Staff

LOS ANGELES — Computer technology has given this new twist to an old philosophical question: If a tree doesn't fall, but everyone hears it anyway, then does it exist?

That dilemma is raised by "counterfeit reality" — a computerized technique that creates photographs of realistic images that never existed.

Such photographs are the product of a two-year-old project at Information International, Inc. (III). The technique is used to make motion pictures, usually about a minute in length, and is especially useful for special effects and graphics, such as network television logos, according to John Whitney Jr., the project head. Both objects and environments can be created.

The technique could also signal the rebirth of the abstract film movement, which has been dormant since the activity of the 1960s, he said.

Whitney's interest in the computer as an artistic tool stems from his work with abstract films, which he made for about four years. Gradually, his attention shifted from the creative aspect to the mechanical.

Three-Step Technique

His work with the motion picture project is labeled "optic simulation"

("counterfeit reality" is his own coinage) and involves "looking at light in the modern world and figuring out how to simulate it," he said. Three steps are involved.

First, a drawing of the object, must be prepared and then it must be described in terms that can be stored in a computer memory. This information, a three-dimensional description of the object's topology, is stored on tape in III's own FR 80, a data entry system. The data is then transferred to a Graphics I system, also built by III, which is programmed to smooth the drawing and add shading.

The second step is the testing phase, when the motion picture sequence is recorded on black-and-white film or a vector-type picture on a terminal screen to confirm the visuals.

Finally, the film is made, using 35 mm Eastman Kodak color negatives.

At this point, only very short pieces of film, approximately a minute in length, can be made. It takes three minutes to make one frame of film, and there are 24 frames in a second.

The rather slow turnaround time is based on the running time of a general-purpose computer system, Whitney said. The Graphics I has 256K of memory, which is equivalent to that of a Digital Equipment Corp. System 10.

Previous Strides

The project based much of its programs on early work done on flight simulation and on research by Dr. Ivan Sutherland, of Evans and Sullivan, and University of Utah graduate students.

However, the state of the art has been advanced considerably by III in the last two years and even more advances

will be made in the next six months, Whitney said.

"There is a surprising richness we can bring to objects," he said. Although the efforts of the project are targeted toward theatrical works, Whitney does not expect a feature film will be made entirely by this method.

Not only would such an undertaking be too complex technically, it would probably not be artistically valid, he said. "Now films are made with a combination of techniques and talents and that is the way they should be made," he said.

The project members also see the computer only as a tool and not an end in itself. "We are consistently aware that no matter what the lure of technology the creative end must still be there. A lot of what we have to do involves creative energies but it couldn't be done without a computer," he said.

Handicapped Gain DP Jobs

CHICAGO — The Mainstreaming the Severely Disabled Project of the City Colleges of Chicago is placing a number of handicapped individuals in entry-level DP positions as junior programmers, programmer trainees, data entry clerks and keypunchers in the Chicago area.

Programmer trainee candidates and junior programmers have completed a nine-month introduction to DP along with basic Cobol — some with a time-sharing option. All have at least a high school diploma and some have junior college and four-year college degrees.

The curriculum studied by the students was developed in conjunction with a business and industry committee composed of DP trainers and specialists from major corporations in the area.

For additional information contact John Longstreet at the Chicago City-Wide College, Room 506, 209 N. Michigan Ave., Chicago, Ill. 60601.

Firm Cuts Costs For Coding Jobs

(Continued from Page 9)

house for each, he said.

Insist on a period of liability during which the house must resolve any detected "bugs." All the major code errors that may not show up with the first testing will usually emerge within 14 to 30 days, according to Tauber.

Document Applications

He added that the users should make sure applications are documented to existing standards and coded according to in-house standards.

All testing must be done on user equipment under current user software. Compatibility with different software releases may be a problem, he pointed out.

Bids must include a work schedule, specifying the number of hours the house will devote day-to-day to each program throughout the period of development. The user's analysts can tell if there is a gross error which may signal a misunderstanding.

Ask for, receive and verify all references of work performed for other clients, Tauber recommended.

Most important, he emphasized, specifications for outside contractors must be well thought out, detailed, extremely clear and concise to be used in the generation of a satisfactory product.

NOTICE TO BIDDERS

City of Philadelphia Water Department, Water Pollution Control Project, Southwest Water Pollution Control Plant, Additions and Modifications, Phase XI Process Computer Monitoring and Control System, Bid. No. 2814 - Division 34 - Equipment and Electrical Work No. 50-522-SW.

Sealed proposals for Additions and Modifications, Phase XI, under Work Number 50-522-SW of the Southwest Water Pollution Control Plant Improvements, invited by the Procurement Commissioner, will be received in Room 1385, Municipal Services Building, on April 4, 1978 at 2:30 PM Prevailing Time, at which time and place they will be publicly opened and read aloud.

The work for which Proposals are invited includes the designing, furnishing, and installation of the Process Computer Monitoring and Control System, and all related and appurtenant work.

The Contract Documents, including Instructions to Bidders, Proposal, Federal Requirements, Contract Requirements, Specifications and Plans, may be examined in Room 1360, Municipal Services Building, Philadelphia, Pennsylvania and at the office of Greeley and Hansen, Six Penn Center Plaza, Room 310, Philadelphia, Pennsylvania. Copies of these Contract Documents may be obtained from the City only upon the deposit of a check for \$250.00 for each set. The amount of the deposit for each set will be refunded if the documents are returned in good condition within 14 days after the opening of bids.

Each Proposal must be accompanied by a certified, bank treasurer's or cashier's check on a solvent bank or trust company, drawn to the order of the City of Philadelphia, in accordance with Clause 6, Security for Execution of Contract, of the Standard Contract Requirements. This sum is a guarantee that, if the Proposal is accepted, a contract will be entered into and its performance properly secured.

No bid will be accepted unless the standard "City of Philadelphia Questionnaire and Financial Statement for Qualifying Bidders" and the Supplemental Bidder Prequalification Documentation, with all questions fully answered, have been filed with the Water Commissioner in Room 1180, Municipal Services Building, at least sixty (60) days prior to the date of opening bids.

In regard to nondiscrimination in employment, Bidders on this work will be required to comply with the President's Executive Order 11246, as amended, and the Affirmative Action Programs/General Procedures. The requirements for Bidders and Contractors under this Executive Order and the Affirmative Action Programs/General Procedures are explained in the Contract Documents. No bid will be accepted unless it includes a complete "Affirmative Action Plan" (Philadelphia Plan) for equal employment opportunity, in accordance with the Appendix to the Proposal.

Grantees on Federally-Assisted Construction Contracts will be required to comply with the Federal Requirements and Contract Provisions for Work under the Federal Water Pollution Control Act Amendments of 1972, which are included in the Contract Documents.

Any Contract or Contracts awarded under this invitation for Bids are expected to be funded in part by a grant from the United States Environmental Protection Agency. Neither the United States nor any of its departments, agencies or employees is or will be a party to this invitation for Bids or any resulting contract.

The Procurement Commissioner reserves the right to reject any or all bids or to waive any informalities and to accept the bid which he deems most favorable to the interests of the City of Philadelphia, after all bids have been examined and canvassed.

OTTO R. WINTER
PROCUREMENT COMMISSIONER

DEC 10 & DEC 20 USERS:

SAVE UP TO 30% ON NEW PRINTERS

The latest 300-600-900-1500-2000 LPM Band, Belt and Train Printers from Control Data and Dataproducts: all installed — with controllers — by The Printer Sales Company!

Example: 1500 LPM Charaband

Belt Printer installed at a savings of \$17,400!

136 columns, your choice of interchangeable character sets. Compressed print feature for the 300 & 600 LPM printers (132 columns on 8½ x 11 paper).

THE ONLY PRINTERS INSTALLED ON DEC 20'S WITH COMPLETELY PLUG-COMPATIBLE, TRANSPARENT CONTROLLERS CONNECTED DIRECTLY TO THE UNIBUS AND OPERATING UNDER DMA CONTROL. AND...

- Fast Delivery
- National Sales, Service, Installation & Training

- Engineering Support & Special Feature Designs
- Factory Warranties

We also carry printers for PDP-11's and most other mini and maxi computers. Call us or write right now for a price and delivery quotation.

THE PRINTER SALES COMPANY

2684 Dawson Avenue
Long Beach, CA 90806
(Western Region): (213) 595-6337
(Eastern Region): (609) 795-2333

Please tell me how much I can save on a new printer for my Dec 10, Dec 20, or other computer:

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
MY COMPUTER/MODEL # _____ PHONE # _____

IN DEPTH
IN DEPTH
IN DEPTH
IN DEPTH

EFT Systems? No Thanks, Not Yet

By Patrick S. Portway

As new technology enters the consumer marketplace, it often finds a void in regulation and consumer protection laws that do not anticipate the product or service. While this period of nonregulation affords some opportunity for innovation and experimentation, it also creates market uncertainty and the risk that consumer reaction, when it sets in, could obsolete many of the installed systems.

This is the stage of development in which we now find electronic funds transfer (EFT).

Esther Peterson, President Carter's special assistant for consumer affairs, emphasized in a recent speech to industry, consumer and government leaders concerned with EFT [CW, Dec. 19] that "it's not too late for leaders in the financial community to listen to consumers and consumer advocates and benefit from involving consumers in the decision making, early in the process."

Peterson's own experience in the introduction of the Universal Product Code (UPC) in the food marketing industry provides an excellent analogy for what can be expected with EFT. She was consumer advisor to Giant Food Stores, a major grocery chain in the Washington, D.C., suburbs, when the firm introduced automated check-out systems based on UPC.

The consumer had for years received output from computers in the form of bills and monthly bank statements, but in UPC the computer and the consumer came face to face. The result was disastrous.

The UPC itself, now printed on nearly all prepackaged items sold in supermarkets, seemed harmless. The idea is that the code could be read automatically at the checkout station by the clerk, who would simply sweep the code block over a scanner that would identify the product, ring up the price, maintain the inventory status, order new stock as needed and print out a rather detailed list of the items included in the total price for a consumer's purchase.

Aside from the advantages to the store, the consumer would find his order checked out much quicker (although it was never clear whether the store would reduce the number of checkers to simply maintain an acceptable queuing pattern) and end up with a much more useful sales receipt.

With all these advantages, why wasn't UPC widely acclaimed by consumers? The fatal flaw in the system was the supermarket industry's attempt to reduce staff by eliminating the stamping of individual prices on



each item. Instead of individual item pricing, computer-generated shelf tags carried the price.

A consumer would check the shelf tag, but, once he picked up the item and walked away, the price was not available again until it flashed at blinding speed on a computer display or appeared on the detailed cash register slip provided as a receipt after he paid for his order.

In spite of input from consumer leaders throughout the country explaining this lack of individual price marking was unacceptable, the computer industry and supermarket industry moved ahead. Their research, prior to the installation of the system, had shown individual price

marking was not important to consumers.

Consumer groups didn't agree.

In each state they sought political redress through local legislatures, and in quick succession states passed laws requiring individual price marking of grocery items.

The Retail Clerks Union was fast to back the consumer initiative, and played a major role in lobbying for the legislation.

In all, 26 states either considered or passed legislation requiring individual price marking. Ironically, consumer research in test locations after installation confirmed individual price marking was indeed an issue once the consumer actually was deprived of the in-

formation.

The problems of UPC were not technical, but were "consumer acceptance" problems. As in any marketing situation, the final decision about the form of a service lies with the consumer who will use the service.

But no amount of market research could provide information on "organized" consumer reaction to UPC. Only careful consideration of input from consumer leaders who participated on UPC panels predicted what was to come.

Computerworld, in an editorial on UPC, recognized the error of its client industry. Once burned, you would expect that the computer industry would carefully examine any new initiatives

EFT systems ultimately may be a good idea, but consumer activist Patrick S. Portway believes they have a long way to go before consumers will feel comfortable substituting them for the services they now use.

IN DEPTH IN DEPTH IN DEPTH IN DEPTH



be a cause of real concern to the thoughtful managers who are anxious to improve the public standing of business.

The leaders in the automation of the banking industry and the leaders of the technical community may scoff at the following list of consumer concerns about EFT. Indeed, Dale Reistad, president of Payment Systems, Inc., recently quipped, "The only thing consumer leaders haven't done is link EFT to cancer."

This view notwithstanding, the commission predicted it is the consumers who will determine the final form of EFT. If the commission is right, it would be prudent for the industry to understand and address the concerns of the leaders who consumers trust.

A group of eight grass roots consumer groups under the leadership of the Virginia Citizen's Consumer Foundation (the nonprofit research arm of Virginia's statewide consumer council) has undertaken a study of consumer concerns in EFT — not to prevent the introduction of EFT, but simply to provide adequate protection of the consumer's interests and consumer education. While the technology evolves, it has not yet defined which of the concerns discussed below are real, which are shared by the public at large, which issues are "soft" and easily resolved through negotiations and which are critical to consumer acceptance and the very survival of EFT.

The foundation has formed an industry advisory panel and invited executives of the financial, retail and food marketing communities to participate. Simultaneously, I've accepted a position on the American National Standards Institute's Financial Committee to represent consumer interests in industry's efforts to develop EFT standards.

If consumers are concerned, industry should be even more concerned when, for example, Citibank of New York invests millions in EFT while a Texas public referendum outlaws the use of the technology for banks. Something has to be wrong.

The report of the Privacy Protection Study Commission which preceded the report of the National Commission on EFT recognized the serious concerns of consumers about any form of computerized records about their personal lives.

Of all the issues involved in the introduction of EFT, privacy is the most emotional and should be the least controversial. Financial institutions point with pride to their efforts to preserve

(Continued on Page 16)

into the consumer market. But computer manufacturers are experienced in an industrial market, not the consumer market, and EFT therefore has the seeds of a second fiasco.

The National Commission on Electronic Funds Transfer, in its final report, said "the future of EFT is inextricably tied to consumer acceptance. The technology must fulfill consumer needs and, if it does not, EFT is unlikely to grow beyond its early stages."

Yet the commission membership failed to include a single recognized consumer leader. Nor, in the view of consumer activists, were the major consumer concerns adequately addressed in the final report.

The leadership of the consumer

movement has rejected the commission's report as a document supporting the interests of the financial community and not, as claimed, the public interest.

The perceptions of EFT expressed by the leadership of the consumer movement will have a significant bearing on the final form of legislation regulating EFT. Although business leaders may feel consumer advocates speak for only a small, vocal part of their total market, this group will be testifying at congressional hearings, identifying concerns and preparing the arguments in favor of greater regulation of EFT.

To ignore their views is to ignore the influence groups like "Nader's Raiders," the Consumer Federation of

America and some 300 local consumer groups have had in public policymaking in the last decade.

A new weight has recently been given to the views of the consumer advocates as a result of a Louis Harris poll conducted on behalf of Sentry Insurance and released in 1977. Harris found 72% of the general public, "by and large, think favorably of the leaders and spokesmen of the consumer movement and feel that consumer leaders, overall, genuinely want to help consumers."

In comparison, the same study concluded that "the gulf between the perceptions and attitudes of senior business executives and those of the public is greater and more serious and must

Continued from Page 15)

the privacy of their customer records. They also point out that computerized systems are less vulnerable to disclosure than paper-based check systems because fewer people have access to the data.

What concerns consumers is:

- That EFT, when used in lieu of cash, creates records of transactions where no record existed in the past.
- That EFT makes retrieval of data

quicker and easier for both government agencies and for extensive in-depth market research. For example, if the data from UPC checkout systems were combined with EFT payment data, extensive market research information on buying habits could be utilized to create very valuable direct mailing lists.

The EFT commission ignored sensitivities when it voted to recommend that banks be permitted to sell mailing

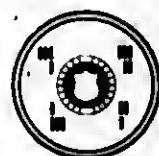
COMPUTER FACILITY DESIGN.

Because it's vitally important to design and secure your new computer center correctly, let's do it right!

We're a professional firm of management consultants and security engineers. We have helped over 300 major companies provide secure operating environments for their data processing installations.

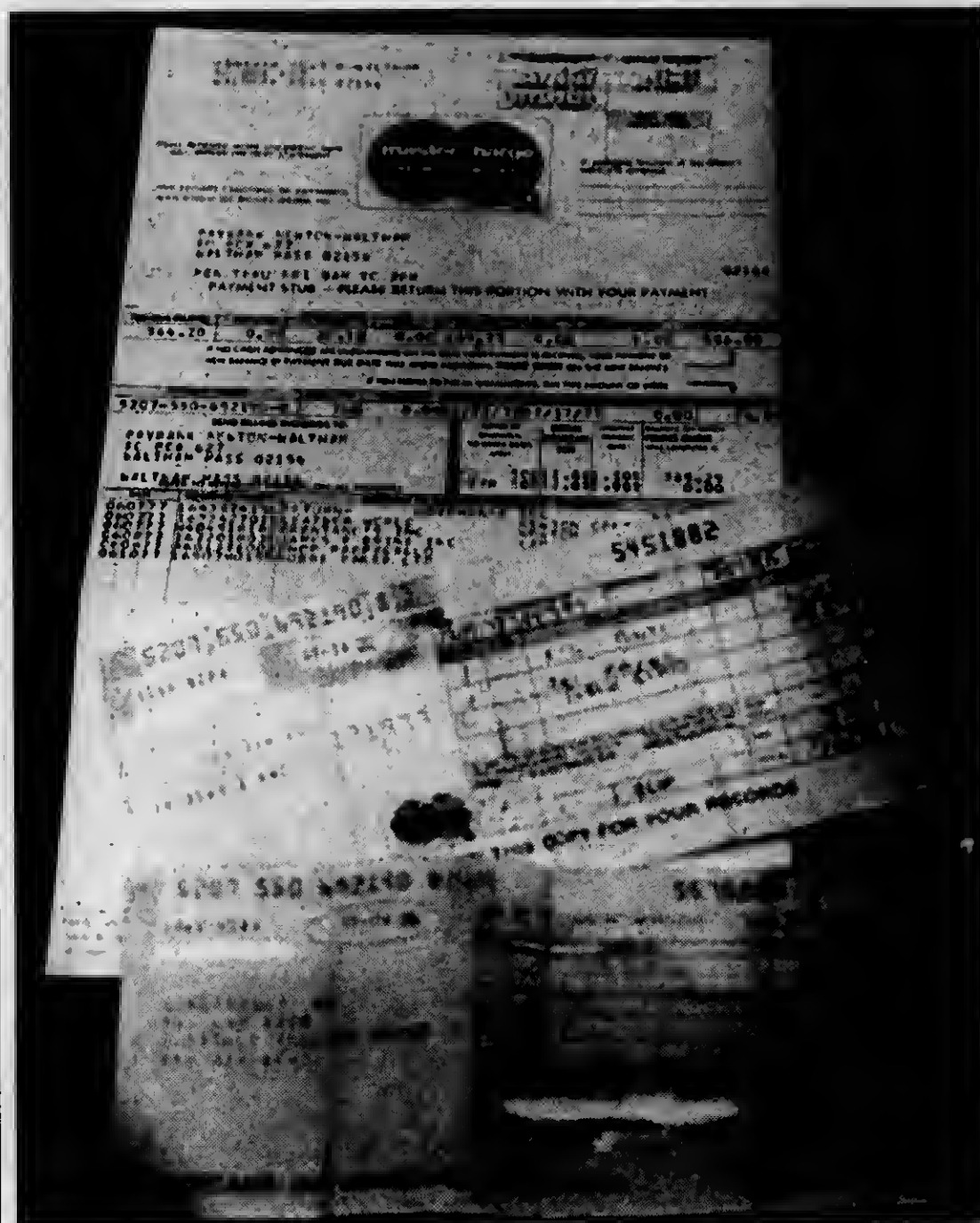
As specialists in computer facility design, we have spent over \$1 million in research benefitting the owner/architect in the development of plans and specifications for an overall security system. We provide general floor plans and construction details. We design environmental controls, fire protection and security systems, including perimeter security. And we develop final engineering drawings and system specifications suitable for inclusion in the contract/bid documents.

Avoid problems before you build them. Contact J. C. Matlock, Jr., Dept. C, 235 Northeast Loop 820, Hurst, Texas 76053, (817) 589-2244.



DATA PROCESSING SECURITY, INC.

Atlanta Chicago Dallas/Fort Worth Los Angeles New York Washington, D.C.



lists developed from EFT systems. It further ignored trends like the legislation proposed by Illinois' Rep. Frank Annunzio, the Debt Collection Practices Act of 1977, when it recommend-

ed that address information derived from EFT systems be provided to collection agencies.

Consumer groups are not in business to protect deadbeats, but they are concerned with release of personal EFT data to third parties for any reason.

Security Questions

The public statements of banking officials about the security of EFT systems must be a constant embarrassment to the technical community. Television programs like "60 Minutes," articles in the *New Yorker* and books like *Annals of Crime: Dead Souls in the Computer* by Thomas Whiteside have made it clear that a real vulnerability exists for sophisticated computer penetration of automated banking systems.

The public realizes that current systems are probably adequate to protect the small amounts involved at an automated teller machine, etc. but if the financial communities continue to be reluctant to accept liability (the next issue) in event of a catastrophic failure, this issue will become far more important in the future. The false confidence and casual attitude displayed to a wiser public does little to build consumer confidence.

The vulnerability of the banks' wire services, which currently transmit financial transactions without encryption, is well documented. Only last summer a \$2 million bogus transfer

(Continued on Page 21)

The DELTA 4050 Display Terminal with proven Burroughs, Honeywell & Univac emulation



Performance proven around the world



USE THE DELTA 4050 FOR EXISTING AND NEW APPLICATIONS

When you need an emulating terminal, consider the DELTA 4050—the terminal that offers true emulation for your existing software. Most so-called "emulating" terminals provide nothing more than communications capability. That limitation will work for some new applications, but what of current jobs? That's where the DELTA 4050 outshines them all: it gets right down to business without modifications. Think of the time you'll save, and the problems you'll avoid.

While you're at it, think about the operating features you'd like to have in your display terminal system. You'll find them in the DELTA 4050 which offers more features and advantages, is more economical and is easier to use than the computer manufacturers' or other companies' emulating terminals. Compare the DELTA 4050 with the others; we think you'll be quite pleased at what you see. Call us now for full details.



Over 800 installed



DELTA DATA SYSTEMS Corporation
Woodhaven Industrial Park
Cornwells Heights, PA 19020
Phone: (215) 639-9400
U.K. Subsidiary:
DELTA DATA SYSTEMS LTD.
Welwyn Garden 33833

STRUCTURED METHODS, INC.

127 EAST 59TH STREET · NEW YORK 10022 · 212 753-4450

☐ Please enter _____ registration(s) for: _____
_____ and bill me/bill my company.

☐ Please send me information about the following courses: _____

Name(s): _____

Title(s): _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Computerworld

FIRST CLASS
PERMIT NO. 2131
NEW YORK, N.Y.

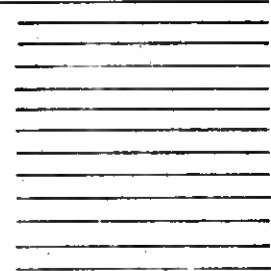
BUSINESS REPLY MAIL

No Postage Stamp Necessary if Mailed in the United States

POSTAGE WILL BE PAID BY

STRUCTURED METHODS, INC.

127 EAST 59TH STREET
NEW YORK, N.Y. 10022





The Structured Caravan...

SEMINAR SCHEDULE

COURSE	DAYS	FEE	JANUARY 1978	FEBRUARY 1978	MARCH 1978
Structured Caravan	1	\$50*	5 Wash. DC 9 Toronto 11 Chi. 13 S.F. 16 L.A. 18 Houston 20 Boston 23 N.Y.		
Introduction to Techniques and Tools of Structured Systems Development	1	175	30 Chi.	22 5.F.	15 Wash. DC 20 Toronto
Managing Systems Development: A Structured Approach	2	325	31-Feb. 1 Chi.	23-24 S.F.	16-17 Wash. DC 21-22 Toronto
Structured Analysis	2	325	30-31 S.F.	6-7 Chi. 27-28 Wash. DC	6-7 Boston 13-14 L.A. 27-28 Toronto
Structured Design	3	475		1-3 S.F. 8-10 Chi.	1-3 Wash. DC 8-10 Boston 15-17 L.A. 29-31 Toronto
Structured Analysis Design Workshop	5	625	30-Feb. 3 Wash. DC	6-10 Toronto 13-17 Boston 27-Mar. 3 L.A.	6-10 5.F. 13-17 Chi. 27-31 Houston
Structured Design Programming Workshop	5	625	30-Feb. 3 Chi.	6-10 Wash. DC 27-Mar. 3 S.F.	6-10 Toronto 27-31 L.A.
Software Reliability	5	625	30-Feb. 3 L.A.	13-17 Chi. 27-Mar. 3 Toronto	6-10 Wash. DC 13-17 S.F. 27-31 Boston
Structured Programming for COBOL Programmers	2	325		23-24 Wash. DC	20-21 5.F.
Infotech/Jackson Design Technology Workshop	10	1400	16-27 Chi. ** 30-Feb. 10 5.F. **	27-Mar. 10 Houston **	6-17 L.A. ** 13-24 Boston **
Data Base and the Organization	3	475	16-18 S.F.	13-15 Wash. DC	20-22 Houston
Data Base Package Analysis & Selection	3	475	9-11 Chi. 23-25 Wash. DC	13-15 Toronto	13-15 Houston 20-22 Boston
Data Base in a Distributed Processing Environment	2	325		27-28 Boston	6-7 Chi. 20-21 5.F.
Data Base Management Systems for Minis—A Comparative Analysis	3	475			1-3 Boston 8-10 Chi. 22-24 S.F.
Systems Design in a Data Base Environment	2	325		6-7 5.F. 27-28 Chi.	27-28 Wash. DC
Designing Effective Data Bases	3	475		8-10 5.F.	1-3 Chi. 29-31 Wash. DC
Transaction Oriented Processing	2	325		27-28 Toronto	6-7 Houston 27-28 Chi.
Transaction Processing Control Systems—A Comparative Analysis	3	475			1-3 Toronto 8-10 Houston 29-31 Chi.
Data Dictionary/Directory Systems—Management Overview	1	175		24 Boston	13-N.Y. 31 Wash. DC

*Entitles registrant to \$50 credit towards any Structured Methods, Inc. product or service

**Weekdays only

DISCOUNT POLICY

Groups of 3 or more—10%

Payment in advance of 21 days for courses beginning on or before Feb. 15, 1978—10%

Registration for consecutive courses listed below reduces fees to the following:

Introduction to Techniques and Managing Development: A Structured Approach	\$475
Structured Analysis and Structured Design	625
Data Base in Distributed Processing Environment and Data-Base Management for Minis	625
Systems Design in Data Base Environment and Designing Effective Data Bases	625
Transaction Oriented Processing and Transaction Processing Control Systems	625

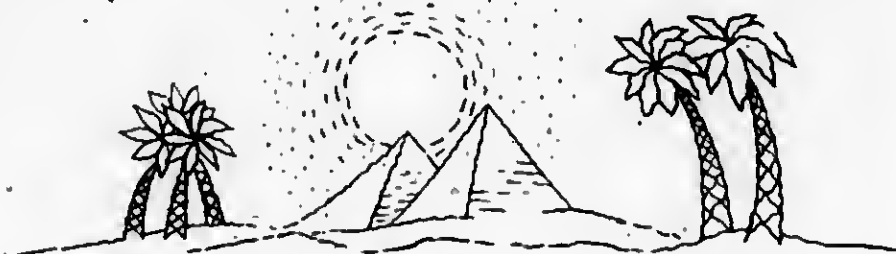
Fees include all materials, continental breakfast, coffee breaks and lunch

Structured Methods, Inc., 127 East 59th Street, New York, N.Y. 10022 212-753-4450

... coming soon to an oasis near you—the dates are in the schedule to the left. Meet the people from Structured Methods, the emerging leader in software development education. Bring along your questions—or just your curiosity—but make sure you attend!

The morning program of the Caravan will consist of three talks: **The Role of Structured Analysis in the System Development Life Cycle**—by Raymond Eisenstark of Structured Methods—**Developing Systems in a Data Base/Data Dictionary Environment**—by Hal Uhrbach of DBD Systems—**Structured Methodologies for Software Development**—by Andrew Pinkowitz of Structured Methods. The afternoon program will allow small groups of attendees to participate in each of three intense one-hour clinics. These clinics will deal with the topics presented in the morning session. The fee for the Caravan, including lunch and all materials is \$50... and we issue a \$50 credit towards any other Structured Methods product or service.

To register, or to receive more information you can call us collect at 212-753-4450, or you can fill out the coupon.



STRUCTURED METHODS, INC.

127 EAST 59TH STREET · NEW YORK 10022 212 753-4450

☐ Please enter _____ registration(s) for _____

(Course, City and Date)

☐ Please send me information about the following courses:

Name(s): _____

Title(s): _____

Company: _____

Address: _____

City: _____ State: _____

Zip: _____ Phone: _____

☐ Payment Enclosed ☐ Bill Me ☐ Bill My Company

Charge my: ☐ Visa/ ☐ Master Charge

BankAmericard

(Interbank No.—above your name)

Card No.: _____

Expiration Date: _____

Signature: _____



The first thing to know about buying computer systems is not what...but who.

And that's not as easy as it sounds.

Because significant companies you may not think of as being in the computer business are major developers of commercial computer systems. And ought to be on your list of suppliers.

We're talking here specifically about Texas Instruments and our DS990, an important new disk-based minicomputer system for standalone or branch office distributed data processing.

You already know enough about TI to anticipate that, once again, TI is offering more technology for less money than its competitors. But did you know that TI already has installed over 12,000 computers worldwide? It's a fact.

Furthermore, the DS990 is a disk system you can own for less than \$30,000* including installation and our powerful system software. All set up and ready for you to add your own application software while saving

DS990 Model 8 with 100 megabytes of disk storage and optional Model 810 Printer.

hundreds, maybe thousands of dollars over competitive systems.

But only if you know about it.

And now that you do know, pick up the phone and call TI. Ask your district manager for a demonstration. It won't cost you a thing. It may save plenty.



TEXAS INSTRUMENTS
INCORPORATED

Now, while you think of it, call your TI District Manager.

Boston, 617-890-7400 • New York, 201-574-9800 • Washington, 703-979-9650 • Chicago, 312-640-2900 • Dayton, 513-253-6128 • Detroit, 313-353-0630
Dallas, 214-689-4289 • Houston, 713-776-6511 • Orlando, 305-644-3535 • San Francisco, 408-732-1840 • Los Angeles, 213-973-2571 • Denver, 303-751-1780.

For literature write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001.

TEXAS INSTRUMENTS.

DS990 Model 4 with 10 megabytes of disk storage and optional Model 810 Printer.

*U.S. domestic prices.
Copyright © 1977, Texas Instruments Incorporated.

EFT SYSTEMS? NO THANKS . . . NOT YET

IN DEPTH

Continued from Page 16)

made over the Fedwire from the West Coast to the East Coast would have succeeded save for the intervention of one human being who became suspicious and refused to release the funds. Another example of the security problems of automated banking occurred at the Dime Savings Bank of New York several years ago — and in this case it was a clerk with no systems training who found a system flaw. The clerk, via his teller terminal, ripped off a large number of accounts for very small, unnoticed amounts, depositing them in an account of his own. The theft was discovered only by accident while he was on vacation.

The security question surrounding EFT should be openly discussed and the concerns of consumers addressed with cost effective levels of security tied to the value and frequency of funds transferred. Separate legislation addressing computer crime is one step forward, but the current standards for EFT security are inadequate.

Liability Concerns

The problems of security relate directly to the issue of liability for the unauthorized use of lost or stolen "debit cards." Federal Reserve regulations that limit consumer liability for lost or stolen credit cards also apply to debit cards which have a stated line of credit associated with them.

Pure debit cards have no stated limitation of liability and the EFT commission has recommended that the consumer have no liability at all unless he is negligent. Negligence might include such things as writing one's personal identification number (PIN) on a debit card or carrying the PIN in one's wallet.

Add to the impact of this the research done for the EFT commission in Syracuse, N.Y., that showed a large number of consumers do carry their PINs in their wallets and one begins to understand the dissenting opinion of Gordon Worley, executive vice-president of Montgomery Ward & Co., who represented retailers on the EFT commission.

Worley said, "The recommended rule of negligence permits a depository institution to escape its duty and to place the liability for loss upon the depositor."

"This recommendation would hold the consumer liable, upon showing that he was negligent, for all losses occurring from unauthorized use ... up to the total amount he has on deposit, plus \$50 for any credit service activated by the debit card."

Rather than transferring the first-level security responsibility to the consumer, the financial institution should fund development of more sophisticated security systems for use with EFT such as voice or fingerprint identification systems. The bank together with the Federal Deposit Insurance Corp. must bear the liability.

Other areas of liability include the question of who pays late payment penalty charges when a bill-paying ar-

range, misfires or overdraft charges when a direct deposit check is credited to the wrong account. The banks are not really sure who is liable for loss over shared wire services.

The consumer movement consensus is that applying the same limitation of liability to debit cards that now applies to credit cards — a maximum of \$50 without concern for negligence — would simplify matters. Consumers recognize that for marketing purposes most banks currently assume all liabil-

ity, but they are concerned that there is no written regulation and a resulting potential for catastrophic losses.

This issue of documenting proof of payment may become the pivotal one for the economic viability of EFT. If EFT systems are forced to provide "country club" billing with a paper audit trail of a slip of paper for every transaction, they may be very limited in their cost savings over the current checking system.

The Consumer Federation of

America has called for the Internal Revenue Service (IRS) to accept summary EFT lists as proof of payment where other documentation does not exist — a stand that actually amounts to a pro-EFT position. Consumers, the government (IRS) and the financial community must negotiate an adequate replacement for the cancelled check or EFT will be relegated to a minor role in consumer transactions.

The issue of reversibility — of stop-

(Continued on Page 23)

MODEM USERS:

**PUT
A
COMPUTER
IN PLACE
OF
YOUR
MODEMS,
THEN
WATCH
WHAT
HAPPENS.**

The MP-48 is the industry's first computer made into a modem.

What's so good about that. Plenty.

Other modems control circuit paths under rigid hardwired tolerances.

The MP-48 emulates them in a constantly adjusting mode that comes close to a line's actual theoretical performance. The result: nearly total elimination of ambient errors.

The MP-48's computer is program-controlled. That means its filters and

Tell me more about the MP-48.

☐ I have an immediate need for 4800 bps modems.

☐ I have a longer-term need, and would like to speak with a salesman.

☐ Please send me literature.

Name: _____

Title: _____

Company: _____

Street: _____

City: _____

State: _____

Zip: _____

Telephone: _____

digital equalizers "learn fast" in adapting to line conditions.

The result: a 35 millisecond train time for multi-drop networks.

The MP-48's computer is

powerful. It allows you to run four-wire full-duplex multi-drop, two-wire half-duplex multi-drop or point-to-point networks — with a two-wire dial-up capability — using the same modem. At 4800 bps. The results: more drops per line and more freedom to alter networks.

**THE
MP-48
LETS YOU
DO IT
RIGHT
NOW.**

paradyne

Paradyne Corporation, 8550 Ulmerton Road,
Largo, Fla. 33541 (813) 536-4771

Sales Offices: Atlanta (404) 588-0875 • Boston (617) 965-4850 • Chicago (312) 692-5950 • Cincinnati (513) 793-2853 • Cleveland (216) 656-2629 • Dallas (214) 661-0242 • Detroit (313) 559-5360 • Hartford (203) 563-8105 • Houston (713) 977-7102 • Los Angeles (213) 437-0613 • New York (201) 461-3700 • Philadelphia (609) 662-3049 • Pittsburgh (412) 343-9133 • San Francisco (415) 574-0902 • St. Louis (314) 739-2322 • Tallahassee, Fla. (904) 877-3896 • Washington, D.C. (703) 548-4453

The MP-48 is reliable. Ultra-reliable. Its computer's LSI chips are perfectly repeatable in manufacture and performance. Its all-digital circuitry permits operation on unconditioned 3002 lines and general switched networks. An MTBF of 20,000 hours is unmatched in the industry.



The MP-48's computer is adaptable. Its read-only memory can be field-altered to meet most geographic or international standards. It has alternate voice capability option, and two-call manual dial back-up option. The result: it becomes what you need right where you need it — on-site.

The MP-48's computer is inexpensive. The result: you can buy an MP-48 for under \$3,000, lease one for less than \$75, and get delivery in about 30 days.

The MP-48 from Paradyne. The next generation of modems has begun.

Tom Watson said "Think." So we did.

IBM is a very remarkable company.

It's the seventh largest industrial corporation in the world. More than half of its quarter of a million employees are university graduates.

IBM, whether one likes it or not, produces the world's finest computers.

The company was created in its present form by a Scottish ex-NCR cash register salesman. His name was Thomas Watson.

The result is Shadow II. Today it's brand leader in the very tough European market.

The result of six years' continuous development it has major advantages over its competitors.

For starters it takes just twenty minutes to install. As opposed to the days or weeks it takes to get some of its competitors operational.

It is a genuine rather than pseudo multi-tasking, multi-threading system. It has the most sophisticated Transaction Processing facility ever developed.

Shadow II was specifically designed to conserve programming resources. So, unlike other systems, the Shadow II programmer never has to establish addressability.

Because Shadow II provides so many more pre-written facilities the coding is far less complex than with other systems.

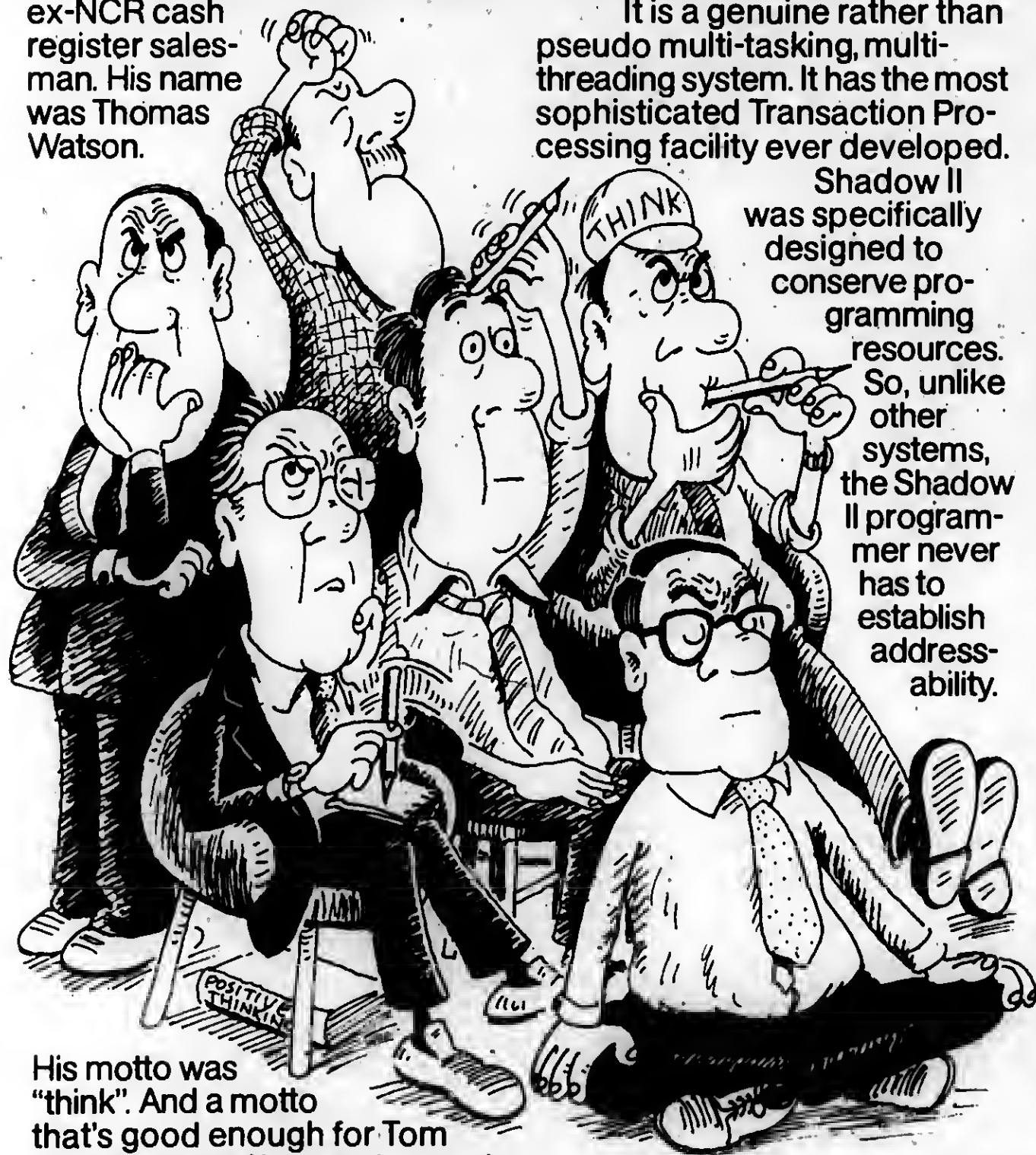
Shadow II can also save the IBM TP user between 25% and 75% of his main memory and CPU time requirements compared with any other system.

Terminal response times will always be faster with Shadow II - sometimes by a factor of three or four. There are many reasons for this, but one of the more important is that Shadow II provides users with unique high performance access methods to terminals and files rather than using antiquated IBM modules.

In brief, Shadow II is the fastest, most cost-effective and easiest to use TP package in the world.

So, to quote old Tom again, we hope we've given you cause to "think" - about your TP requirements.

Altergo Software Inc.,
Wellesley Office Park,
55 William Street, Wellesley,
Massachusetts 02181.
Telephone: (617) 237-6132



His motto was "think". And a motto that's good enough for Tom Watson should be good enough for anyone.

So when Altergo set out to create an entirely new TP monitor they did a lot of "thinking".

Shadow II provides high-level Cobol verbs and Assembler or PL/I macros for use with either of these languages.

Dear Altergo, you've given me food for thought. Send me the Shadow II information right away.

Name

Responsibilities

Organisation

Address

Zip Phone

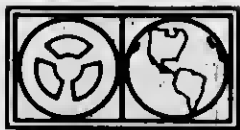
IBM computer Op system

Present TP package

My requirement is immediate ☐ within 6 months ☐
more than 6 months ☐

Shadow II
The World's most advanced TP Monitor

MMR



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

My current mailing label is attached
and I've filled in new information
on the other side.

Put old label or label information here

st - \$5() All Other Foreign - \$65

Expiration
Date. _____

Zip Code

Check here if you do not wish to receive promotional mail from Computerworld



- 11 President/Owner/Partner/General Manager

Detach here, fold, and place in post-paid envelope attached through binding.

ping payment — really comes from the inability of the banking industry to make up its mind just what EFT is. Is it a replacement for cash, as it has been described; is it simply another form of plastic, as it was described before Congress; or is it a replacement for the checking system, a position which has been used as justification for the massive EFT investment of the banking industry?

The public has been told the paper-based checking system cannot go on because the backroom operations would become so costly, as the volume of checks increases, that banks would have to begin to charge for checking services instead of operating at what they claim to be a loss. If EFT is to replace checking, which carries with it the stop payment privilege, that same privilege should be provided under any EFT system.

The infrequency with which the stop payment provision is used actually makes it a rather trivial element in the cost of current systems. Some small fraction of 1% of the checks processed each year are stopped.

It's also interesting to note that in Wisconsin, where reversibility of EFT transactions have been guaranteed by the State banking regulations for over a year and a half, not one single reversal has occurred.

The banking industry will use this data to show that reversibility is an unnecessary burden to the design of the EFT system. The view of consumer groups is that a stop payment order is often a last resort in a dispute between a consumer and a merchant.

Certainly, the more responsible retailers such as Montgomery Ward and Sears which have liberal refund policies are not the problem being addressed in the issue of reversibility. Rather, it is the small merchants, which account for the majority of disputes with consumers, and these merchants may very well participate in the future shared EFT systems.

The technical capability to reverse a transaction is inherent in most EFT systems. It is simply the reluctance of the financial community to accept this responsibility that creates or continues this as an issue.

Distributing the Benefits

As an advocate of the consumers' interests, the consumer movement has sought to negotiate the most favorable distribution of benefits resulting from EFT. Often, in the design of new automation, all benefits are designed to accrue to the industry involved, with little concern for sharing some of the savings with the consumer.

In the case of EFT, there may be no real savings to share at all. The installed systems have led to extreme costs and in many cases costly failures.

The aggressive marketing efforts of the financial community attempting to promote EFT through discounts and free services in their early stages raised the question of what will happen when the true cost of EFT must be borne by

the consumer. Since the banking community acknowledges EFT systems are not currently paying for themselves, and since there's such a large capital investment involved in expanding or establishing an EFT system, the consumer movement can only assume that other charges by banks are being used to subsidize the establishment of electronic funds transfer.

Loss of Control

The Virginia Banking Association concluded from a study of consumer reaction to EFT that consumers find the debit card too easy to use. As a result, they fear they might rapidly lose track of how much they spend in any given month.

Under the checking system, on the other hand, they have had a familiar recording method to enable them to keep track of their balances.

The Float Element

Most consumers' first reaction to point-of-sales systems is to question why they would use a debit card to pay instantaneously from their savings account instead of writing a check that might take two or three days to clear and thus provide them with an element of float.

In fact, most consumers who write checks seldom use float except right before a deposit of a payroll check. One of the advantages of savings & loan and credit union EFT systems is that the funds remain on deposit earning interest until the very second they are spent.

Since few checking accounts now provide any interest for funds on deposit, checking systems offer little float advantage except, as noted, 24 to 48 hours before a paycheck is deposited.

One proposal for providing the equivalent coverage for a consumer anticipating a major deposit is to provide a temporary line of credit at a minimal interest rate to cover what in checking account parlance would be an overdraft. While not substituting for the free credit available in float, it does provide the same service to the consumer.

The Greenwich Bank of New York has attempted to set some value on float and give the consumer something in return for the elimination of float. The Greenwich Bank will rebate to a consumer 2% against all purchases processed at point-of-sale terminals in its EFT system.

This rebate is acknowledged to be in excess of the true value of float, but it certainly represents a sharing of the advantage of EFT and the potential revenue from an EFT system with the consumer.

While some consumers may consider float a privilege, it is in fact a violation of the law in some states that prohibit the writing of a check against an account that has not yet received a deposit to cover that check. The banking industry will argue that float is really an accident of the existing system.

Float may work to the disadvantage

of consumers in a broader sense by creating a false impression of what the money supply truly is at any point in time. Elimination of float through a fully implemented EFT system could give the Federal Reserve a more accurate picture of the money supply at daily closing of banks and thus may actually result in lower interest rates over an extended analysis.

Other Concerns

One problem in understanding the impact of EFT is that there are a number of economic issues that the consumer's study of EFT cannot address. Some additional in-depth studies of the economic benefit or problems created by EFT should be undertaken.

Consumer organizations are concerned that the banking community has considerable discretion in establishing cost and convenience of various forms of payment. As a result, should EFT prove to be profitable to the financial community, steps might be taken that would eventually make it the principle or only means of convenient payment.

Although the banking community has clearly stated this is not its intention, consumers fear they will have lit-

tle control over the evolution of EFT. Consumer groups oppose any mandatory use of EFT even for payroll or federal payments.

And, while consumer groups are principally concerned with consumer education on EFT, the banking community has resorted to heavy promotional programs such as the free Big Mac program at the Virginia National Bank and terminals shaped like cookie jars to entice consumers into a system they clearly do not understand.

There is some concern that in the direct deposit of payroll checks some state and federal laws that protect part of a consumer's wages from garnishment will be lost. There is some question of what happens when these payroll checks are directly deposited in a bank where garnishment could occur.

Disadvantaged Consumers

Florence Rice of the Harlem Consumer Education Council has raised the question of what benefit EFT will have for the poor. EFT could bring some benefits to inner-city residents who fear robberies and therefore avoid carrying cash.

An EFT debit card and convenient
(Continued on Page 24)

Can off-the-rack software fit you like a glove?

A special report on *Applications Packages* in the January 30th *Computerworld*.

When the applications program you write yourself costs five times as much as a package you can buy off the shelf, "canned" software has a lot of appeal. Off the shelf software has become more attractive for vendors, too. Many small system manufacturers, for example, have found that applications software sales can add 15% or 25% to their hardware revenues. And more companies than ever before are entering the market with new software products for a wider range of applications — with ever greater modularity.

We'll be taking a close look at the subject in our January 30th special report, titled *Applications Packages*. Edited by Don Leavitt, this report will summarize the latest information available — including products, vendor strategy and market activity. In problem/solution format, the report will feature user experiences in the evaluation, selection, installation and use of applications packages, as well as topics like these:

- Converting programs and files from one hardware or operating system to another — examining the effort required.
- A statistical evaluation of commercial software — survey analysis.
- A review of vendor support for training and installation, and for installed packages affected by government regulations.
- Applications options offered to users through remote computing services.
- An overview of the industry — how vendors are expanding into new applications areas; adapting current lines to different CPU's; or consolidating product line to concentrate in selected areas of expertise.

If you're an MIS executive, DP Manager, Supervisor or Lead Programmer, our January 30th special report should be on your reading list. If you market programming products or services, you should put this report on your ad calendar. Ad closing date is January 13. Your *Computerworld* salesman can give you complete details. Or reserve your ad space today with a call to Terry Williams at (617) 965-5800.



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston	New York	San Francisco	Los Angeles
Bob Ziegert	Don Fagan	Bill Healey	Bill Healey
Mike Burman	Frank Gallo	Jim Richardson	Jim Richardson
(617) 965-5800	(201) 461-2575	(415) 495-0990	(213) 475-8486

IN DEPTH

Continued from Page 23)

automatic tellers enable inner-city residents to draw just enough cash for a particular transaction, and point-of-sale operation enables them to make purchases without intricate check verification processes.

Some precautions to prevent in-



timidation of an individual at an automatic teller machine also in a high crime area should be considered. For example, customers of the EFT system could be given an emergency code they could key in on the pad to show they were under duress.

The direct deposit of welfare and Social Security checks has obvious benefits for inner-city residents. Currently little thought has been given to encouraging use of or designing services for the disadvantaged consumer.

The financial community could gain a good deal of public relations value by considering services for senior citizens, the visually handicapped and the poor.

Existing Regulations

Several state and federal laws namely the Consumer Credit Act, the Uniform Commercial Code and the Bank Secrecy Act, are in need of modification to accommodate EFT.

Since purchases handled by EFT would go through banks, the banks, under the Bank Secrecy Act, may be required to maintain excessive amounts of personal data on transactions over \$100 for use by law enforcement authorities. This practice

is not required for cash or credit card transactions.

As for the Commercial Credit Act and the Uniform Commercial Code, these are currently under study by private attorneys who specialize in banking, and their recommendations on consumer protection are expected soon.

Complex computer systems often take months or years before all computer hardware and software bugs are corrected and the system is error-free.

In most states there are no standards for testing and certifying EFT services prior to their introduction to the public and handling of financial transactions. The Federal Deposit Insurance Corp. should certify the security of EFT systems.

Consumer Education

In his 1970 book *Future Shock*, Alvin Toffler discussed the rapid introduction of technology into society and the impact that could be anti-

cipated as this technology altered the environment in which people would be required to function. The implications of automation in the consumer marketplace is an early manifestation of some of this future shock.

Some consumers actually fear involvement with terminals — impersonal service by machines. As a result, the most significant requirement and the issue central to the introduction of EFT, UPC or, for that matter, any increased technology in the consumer

For Sycor's 10th birthday in distributed processing, a system that makes your wish come true!

Creating the first intelligent terminal ten years ago gave us the edge in distributed data processing today. We're celebrating that lead by introducing the Sycor 445—the ultimate distributed data processing system. It gives you power, versatility, security, proven software, communications capability and Sycor's traditional reliability and ease of use.

"A Gift" of Power

Jobs get done fast with the Sycor 445. The system presents up to 256K of memory, 70Mb of disk storage, eight video data stations and a combination of line and bidirectional matrix printers. The 445 meets all of your processing needs.

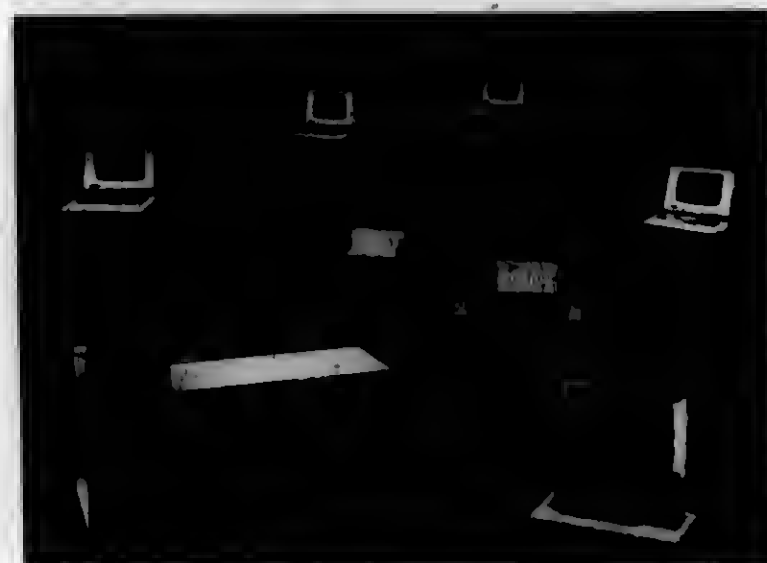
SYCORLINK—"One to Grow On"

Our exclusive SYCORLINK lets you connect several 445 systems and permits disk file and peripheral access of one system by another. Any operator can automatically access any file in your growing SYCORLINK network. So start with a basic 445 configuration and add processing capability with SYCORLINK as your business grows.

"A Package" of Proven, Reliable Software.

Start working right away with Sycor's proven software. The new 445 is ready with COBOL for both data entry and concurrent

processing. BASIC is available for business and financial applications. And TAL, Sycor's proven Terminal Application Language, makes data entry easy. A full range of file management capabilities and utility programs makes your 445 productive immediately.



Communications with Sycor Is "A Piece of Cake."

Our communications expertise gives you the edge in networking, no matter where you buy your mainframe. IBM, Burroughs, CDC and others. We talk to them, and we have for some time.

Of course, Sycor systems also talk to each other and your smaller offices can have remote

DATA ENTRY PROBLEM SOLVER

World's leading authorities present—Keys to successful Data Entry operations. New 275 page Manager's "How To" guide—"DATA ENTRY PROBLEM SOLVER"—Tells how to

- INCREASE KEYSTROKING RATES
- SELECT SUCCESSFUL OPERATORS
- DECREASE COSTS AND COMPLAINTS
- STOP CONTINUAL ABSENTEEISM
- REDUCE OPERATOR TURNOVER
- BUILD DEPARTMENT MORALE
- SUPERVISE WITHOUT PROBLEMS

FREE DETAILS

DATA ENTRY DIGEST
10522 Ridgeway Dr., Santa Ana,
Calif. 92705, (714) 838-2060

EFT SYSTEMS? NO THANKS . . . NOT YET

IN DEPTH

marketplace is extensive consumer education.

While the EFT commission places this burden on industry and the financial community, it is in fact a public need that must be shared also by government and the some 300 grass roots consumer groups that exist throughout the U.S.

For government's part, the educational system of the country must incorporate an increased sensitivity to the changing consumer marketplace.

How EFT operates is but one of the many issues in consumer education. It must begin in the elementary school system and continue through adult education, media and public consumer education programs.

Washington Office

The National Consumer Study of Electronic Funds Transfer opened its office in Washington, D.C. on Jan. 1 at 927 Fifteenth Street N.W. The study is headed by the Virginia

Citizens Consumer Foundation in cooperation with consumer groups in eight states working on a voluntary basis.

Over the next six months, data will be collected and a consensus of consumer opinion will be developed. The information collected during this study will serve as a basis for testimony before Congress on proposed regulations of EFT.

As a starting point, the Wisconsin EFT regulations are being used as a

model for state-level EFT regulations, but the study group will be recommending federal legislation.

Copies of the proceedings of the Nov. 14-15 EFT seminar at Dulles Airport are available through the national study office. A monthly newsletter, "Cabin," or "Consumer Affairs in Banking and Insurance" will follow the progress of the study and related EFT consumer issues. It is available through the same office.



data stations that share the power and resources of the 445. Best of all, the 445 provides IBM 3270 emulation so you can blend on-line communications with distributed batch operations.

Security for Peace of Mind and "Many Happy Returns"

Relax! The Sycor 445 gives you security in many ways. Every system includes a cartridge tape drive that can back up a disk file by recording up to 10Mb of data in a matter of minutes. Program controls let you lock out special keyboard functions and password-protect their use to authorized persons.

Sycor's Guardian feature protects against power failures. In the event of an outage, it saves memory by storing it on the disk. Then the data is automatically restored when power returns. You can also get an optional lock on each keyboard to lock out all activity on the data station.

Let Our Experience

"Make Your Wish Come True"

You can benefit from our experience. We didn't just jump into distributed processing. We started it a decade ago. We've designed our systems so your present employees can easily handle day-to-day operations. If they should need help, our experienced service people are ready. We've learned to make it easy for you.

"Join the Party." Call Sycor Toll-Free 800-521-2838.

Enjoy powerful hardware, proven software and peace of mind. A nice way to get ahead in distributed data processing. Find out how nice by calling Tony Fazio, VP, Sales. Or write: Sycor, Inc., 100 Phoenix Drive, Ann Arbor, Michigan 48104.

Better yet, contact a nearby sales office. We're in the Yellow Pages under "Data Processing Equipment."

Sycor puts computer power where the work is.

SYCOR



Patrick S. Portway is president of the Virginia Citizens Consumer Foundation, the nonprofit research and education arm of the 11-year old Virginia Citizens Consumer Council. The council is well-known as winner of a 1976 case in which the Supreme Court ruled advertising of prescription drugs was a First Amendment right, a decision that set a precedent for all professional advertising.

Portway is also director of the National Consumer Study of EFT and a consumer consultant to several federal agencies.

The author is employed in marketing planning by a firm that specializes in computer services. He holds a B.A. from the University of Cincinnati and an M.A. from the University of Maryland and currently is a guest lecturer at Virginia Polytechnic Institute and George Washington University.

JASPER
JOB ACCOUNTING
& BILLING
FOR DOS, DOS/VS, OS

NEW FEATURES

- WIZARD REPORT GENERATOR
- CICS BILLING
- RJE ACCOUNTING

100 Million Dollar Club

DATACHRON CORPORATION
174 Fifth Ave., New York, N.Y. 10010
(212) 675-0000

Editorial

A Coming Reality

Satellite Business Systems (SBS) is in the process of conducting business demonstrations at three large user sites. These demonstrations, described as strictly experimental in nature, are being held to show how business can operate with satellite-based telecommunications [CW, Dec. 26-Jan. 2].

While it is true that much of the equipment being used in Project Prelude is not yet commercially available, there is little doubt that integrated corporate telecommunications via satellite is coming.

There has been much talk recently about making telecommunications a separate corporate profit center. If this concept is to take hold, then integration of all telecommunications functions will be necessary.

As part of the SBS demonstrations, data is being transmitted at 1.544M bit/sec, and although the Harris Corp. modems were specially designed for satellite applications, the Hewlett-Packard Co. minicomputers are reportedly standard systems using standard software.

It would be a blessing for the DP/data communications user if the satellite systems of tomorrow turned out to be merely a mirror image of today's conventional terrestrial networks. It will probably not be quite that simple because of propagation delays and other unique attributes of satellite transmission, such as the broadcast mode capability.

But Project Prelude is showing management that satellites can ac-

commodate teleconferencing, facsimile and other telecommunications methods side-by-side on a single passive airborne facility.

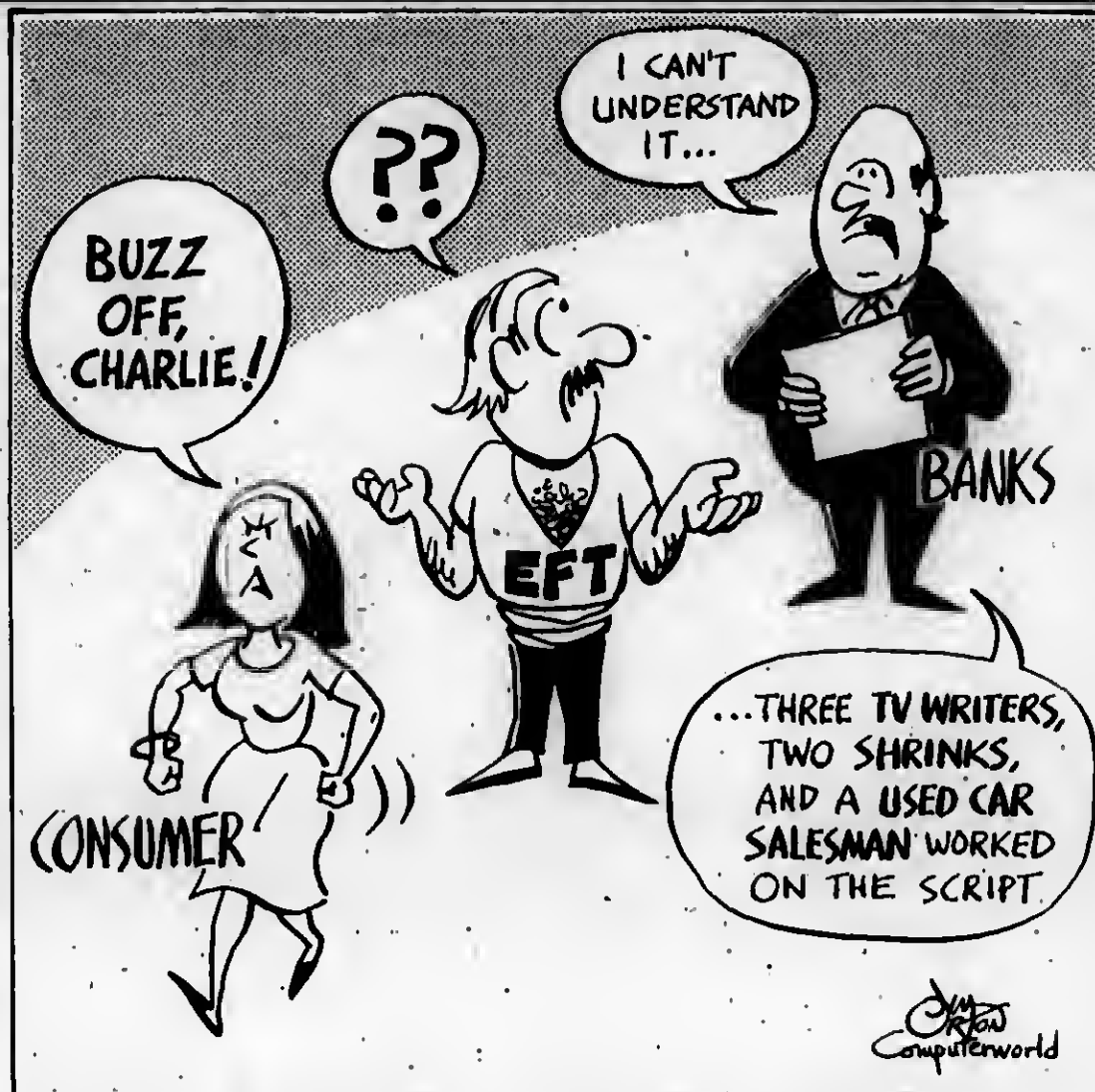
SBS hopes by 1981 to have its own "bird" instead of the experimental National Aeronautics and Space Administration satellite being used for the demonstrations. By the time SBS begins commercial service, rooftop antennas in the 12-to-14 GHz frequency range will have to be available for business users at a reasonable cost.

SBS is saying nothing about the cost of Project Prelude. Manufacturers, users and carriers have donated time and equipment to make these demonstrations a reality.

There are many questions arising from Project Prelude that remain unanswered. Can business adapt its operations to teleconferences instead of face-to-face meetings? What size user will have enough data communications volume to justify satellite facilities? How large (or small) will a user have to be to make satellites cost-effective?

The answers are emerging slowly while corporate management reorients its thinking to the methodologies suggested by satellite telecommunications. How DP and data communications will be handled in an integrated telecommunications environment, and who will be responsible for them, remains to be answered.

But satellites are coming quickly, and users should be aware of their challenging implications.



Letters to the Editor

Illogical Thinking by ACM, CW

The decision by the Association for Computing Machinery (ACM) to cut ties with the USSR [CW, Dec. 12] smacks of the same illogic which kept mainland China out of the United Nations for so long — "if you don't like 'em, don't talk to 'em."

I would expect this type of nonsensical, short-sighted thinking from the ACM, but hardly in a Computerworld editorial [Dec. 19].

H.R. Sides

Surfside Beach, S.C.

Tragedy or Comedy? Neither

Alan Gotthelf's response "Tragedy or Comedy?" [CW, Dec. 19] to the Nov. 28 article on Riverbend Farms leaves me a bit perplexed, for the implications he draws suggest some confusion. Please permit me a few words of clarification.

From the time Riverbend Farms installed its IBM System 32 to the present, the company has grown 10 times in size. Our growth was partly made possible by using the computer and our conversion to DP was not, as Gotthelf implies, an unplanned and naive adventure in which delusion was perpetrated by IBM.

The conversion process was carefully devised and designed in incremental stages. We phased in one business application with a computer size we thought to be appropriate and developed our data base in a methodical way while, at the same time, expanding the capabilities of the hardware to match our work load. Our order for the System 34 was a logical extension of this incremental plan.

I hasten to add that in his analysis, Gotthelf did focus upon a small inaccuracy. The printing speed of our System 32 is now 295 line/min, but since this upgrade took place after the article was written, the inac-

curacy is excusable.

Riverbend Farms' conversion is not the "comedy or tragedy" to which Gotthelf alludes, but rather, it is an ongoing process of development and experimentation.

Larry R. Harris
President

Riverbend Farms, Inc.
Sanger, Calif.

No More Put-Downs, Please

I am greatly aggravated and disturbed about an article that was recently put on the bulletin board in my company's lunchroom. It is entitled "Operators — We Hear You!" [CW, Dec. 5].

I agree with the article until the first sentence of the third paragraph. The sentence reads "... manager has called operators 'little more than glorified secretaries.'" What does that make a secretary? As a secretary, I resent that statement and feel it was a direct slur against me and my coworkers.

I am not saying that secretaries are better than operators, but we certainly aren't inferior. As it is, secretaries are put down enough in the business world. Secretaries and operators are less than appreciated verbally or salary-wise.

Leslie Rogers

Cupertino, Calif.

On Employee Responsibility

I greatly enjoyed Jack Stone's column in the Nov. 28 issue of Computerworld and his accurate description of the professional's responsibility to his employer.

It was all the more enjoyable when I read, at the bottom of the following article, Alan Taylor's waiver of his publisher's copyright on that article, encouraging his readers to "reprint and distribute" freely.

John F. Sheeran
Boston, Mass.

Data Past

Five Years Ago Jan. 10, 1973

SACRAMENTO, Calif. — A \$1,200 investment in plastic covers protected about \$15 million worth of computer equipment during a fire that ravaged the state headquarters of the California National Guard here. The plastic covers prevented water damage. The equipment was up and fully operational within four days after the effort to preserve the files.

WARWICK, R.I. — The city's DP director accused IBM of using "the resources available to the bureaucratic structure of a large corporation" in an attempt to dissuade a user from moving to another vendor. In a letter submitted after it became known the city was contemplating switching mainframes, IBM implied local DP personnel were not competent to de-

cide on hardware selection, DP director George Waterman said.

Eight Years Ago Jan. 14, 1970

MONTVALE, N.J. — Dr. Richard I. Tanaka, president of the American Federation of Information Processing Societies (Afiips), announced future Joint Computer Conferences would be held "to a maximum of 1,000 booths." Tanaka also announced an increase in conferences registration from \$30 to \$40, although fees for members of Afiips constituent societies would remain at \$20.

MAYNARD, Mass. — Digital Equipment Corp. introduced the 16-bit PDP-11, which featured a high-speed bidirectional data path called "a ~~unit that it said was immune to technological obsolescence~~."

Professional Deprivation Tied to DP Crime?

By Jack Stone
Special to CW

When John O'Mara, executive director of the Computer Security Institute (Northboro, Mass.) first phoned me in late 1975, I rather suspected what was on his mind.

"Jack," he said when we met a short while later, "we in the computer security business have an important problem we are simply not addressing."

"John, I really know what you're going to say," I replied. "It's on everybody's mind and nobody's doing anything about it. The issue is the 'disgruntled' employee — Is he a serious security risk and, if so, how do you detect and manage such a person?"

"Precisely!" John replied.

This conversation ultimately led to my lecture before the institute's Fourth Annual Computer Security Conference this past November, titled "How to Recognize and Control the Disgruntled Employee." The material for the talk was derived from my own research and study plus the experience of being a disgruntled employee for years before finding happiness in my own DP management consulting business. I thought it would be useful to devote this column to some of the thoughts I expressed at the conference.

To begin with, let me narrow the scope of the subject. I use the term

"disgruntlement" to mean discontentment associated with the business organization. There are, of course, abnormal employee behaviors related to medical, psychological and sociological problems, but these will be subjects of discussion on other occasions.

Consider a working environment where there is an atmosphere of strong disgruntlement involving a relatively large number of highly creative employees who are closely tied into informal work groups (does this description fit your DP department?). Unfortunately, there are few facts on which to base a scientific conclusion regarding a correlation between this type of situation and the potential risk to computer security. But common sense forces one to conclude that such an atmosphere just has to increase the opportunities for mischief, vandalism, embezzlement, mayhem or even more serious criminal actions.

I'm sure you know that criminal psychologists tend to relate conventional crime to socio-economic deprivation. I'm suggesting, by analog, that there may be a relationship between professional deprivation and the potential for "white-collar" crime in the DP department.

Although I sense glimmerings of increasing DP management awareness of personnel problems, the distressing truth of the matter is that

many DP centers simply ignore the risk of security violations from their own staffs. It would seem prudent for DP managers to reallocate some resources toward the correction of

The Human Connection

obvious deficiencies in the personnel area rather than dump it all into physical and data set security.

It has been suggested that in order to find future troublemakers, a manager should look for those employees who exhibit somewhat abnormal behaviors. But who's to say what is normal or abnormal behavior, particularly in our line of work? These two states are relative concepts, rather arbitrary points on the behavior continuum. Both are shaped by the same processes and principles involved with mental development.

Further, similar influences over the years result in abnormal habits and attitudes in some and not others. In addition, abnormal behavior in one person may change to normal (and vice versa for another) depending on the mental make-up of the individual, his perception of the environment and whether his mental state allows him to deter-

mine that positive reinforcement (the psychologist's jargon for "happiness") can be obtained by changing his behavior.

Is there a rational set of principles that can be used to assess, forecast and control employee behavior in a scientific kind of way? 'Fraid not. Human nature is too varied, if not unruly, to respond to formula treatments. Each person has a unique set of personality patterns. What the manager constructs as positive reinforcement for one, may be perceived quite the opposite for another.

Responses Vary

And behavioral responses change all over the map as a complex function of individual, group and societal relationships. (Astrologers go even further — they rely on intergalactic relations.) The situation is again complicated by many employees who are more adept at changing the behavior of the manager than the other way around.

And then managers have to face the particularly insidious case of the apparently loyal, normally behaving, hard-working, well-paid, pleasant-mannered DP employee who this very minute is, in fact, plotting an illegal act against the company.

Stone will continue this discussion in next week's column.

Output Has Flaws in Dating, Completeness

Last week's column must have struck many readers as being incomplete. It dealt with one of Saks Fifth Avenue's so-called H3 accounts, but never said whether Saks was really owed any money. Further, the column didn't present Gerald Clarke's opinions about the matter.

These omissions were intentional. The actual story of Clark's account over the years struck me as potentially prejudicing the consideration of the basic computer user problem — reckless and incorrect production of computer output.

Therefore, I dropped some of the facts from that article so readers could first react without knowing the background.

However, by the time you read this, the original questionnaires will be coming in, so here is a full explanation.

Clarke's Complaint

Along with the Federal Trade Commission (FTC) and the Massachusetts Attorney General's office, I received a copy of Clarke's complaint about Saks' \$57 statement, which was shown last week. The complaint was based upon what Clarke saw as being deliberate system design and mailing

practices. The bill, although dated Oct. 5, had not been mailed until Nov. 18. Clarke thought this was deliberate.

And Saks had managed to "lose" two previous credits to him amounting to \$77. Clarke believed this had been straightened out, but now that they were "lost" again, he came to believe it was deliberate. He particularly remembered there had been FTC proceedings earlier against Saks for "losing" credit balances in the system. They had ended a couple of years ago in a consent decree.

Saks' Response

The story from Saks' end, as given by Vice-President William Bloom, was very different. Bloom agreed that there had been two "credits" at one time, and the invoice had been mailed after the printed due date. But he said this showed that the computer system was working — not that it had failed.

According to Bloom, the only real outstanding credit, for some \$50, had occurred some years ago, before 1972. The FTC people had agreed that Saks need do nothing about that credit or any others like it. So Saks had done nothing about it, simply putting it into microfilm or some other archive form, and keeping the H3 flag on the account.

The other Clarke credit that Bloom did not agree should be in Clarke's account was a \$27.79 credit caught by the FTC consent decree. Bloom said a nontransferable, numbered credit memorandum had

been sent out by Saks around Sept. 8, 1975 and had not been returned by the post office.

Therefore, Bloom said, there was no credit due in the account for this, even though there was no history of its ever having been accepted by Clarke or used in any way.

The Saks system output was ambiguous. Clarke said he had no recollection of receiving the credit memorandum. A typewritten statement issued in January 1974 (well inside the FTC period) acknowledged

the debt of \$77.79, but within the year all that had vanished; in early 1975 the 'Previous Balance' was listed as zero. The \$27.79 was found in May 1975, but the \$50, as far as I can see, was just left lost from 1974 on.

As for the mailing, there was no "printing date" on the output, no statement that it was for research but not mailing purposes and, no statement of delayed mailing. Clarke only had the postmark to go

(Continued on Page 30)

Any Suggestions?

Saks thinks its system design is correct, but while it may not directly infringe any ICCP code at this time with regard to output dating or system completeness, these points should be addressed.

1. Is there any way in which Saks could now — or in the future — correctly date computer output, so that output recipients can know the production date instead of just the cycle cut-off date?

If there is a way, would it be important to use in this type of situation?

2. When a system produces a "balance" figure, is there any way in which the consumer can be told it is complete, or, if not, exactly what information has been ignored in its computation?

If there is a way of doing this, would it be important to use in this type of situation?

Please return the completed form to Alan Taylor, c/o Computerworld, 797 Washington St., Newton, Mass. 02180. Thank you.

Name _____ Professional Position _____

Street Address _____

City and State _____

Professional Society Memberships, Qualifications _____

City Learned Lesson In Hard-Sell Tactics

The article entitled "Favoritism Charges Shake City CPU Selection" [CW, Dec. 19] really came home to the City of Edmond. The city recently advertised for an in-house system to replace the computer service presently provided by the local university. The major point stressed in the specifications was the ability of the system to expand without major reprogramming efforts.

Nine major manufacturers replied. The list was subsequently narrowed to three: Burroughs Corp., Honeywell Information Systems and Univac.

IBM had proposed a System 32, later changed to a System 34. This proposal was rejected on two counts: (1) the need for a double conversion (once the current service to the IBM 32 and then to the IBM 34); and (2) the IBM 34, as proposed, lacked the growth capabilities the city needed.

The city staff really learned a lesson in "hard-sell tactics" the few days following the announcement of the three finalists still under consideration. The IBM representatives immediately moved up the city organization in an attempt to overturn the decision.

A letter was eventually sent to the Oklahoma City IBM office stating the city's official position on the selection process. A final attempt was still made to influence the city's decision in favor of IBM, and it took some strong verbal effort on my part to remove its representatives from my office.

Some months later we heard rumors to the effect that the local IBM office had placed an order to the production division for an IBM 34 using Edmond as the purchaser, based on our initial request for proposal.

This was the city's first experience with attempting to purchase computer equipment and we have since learned that our experiences were not unique and that such sales tactics are

not confined solely to IBM. I find it sad that the major U.S. corporations would sacrifice the needs of the country's citizens on the altar of a sales chart.

Bill Dashner
City Manager
Edmond, Okla.

Taken Out of Context

I have just read the article concerning the favoritism

by the Mayor's Advisory Committee for the City of Knoxville [CW, Dec. 19]. The article was entirely out of context and did not truly reflect the purpose and intent of the committee.

The meeting discussed in the article was only one of several held by the committee, and the thrust of our exploration was toward a "two-year window" for a possible merger of the city/-

county DP departments.

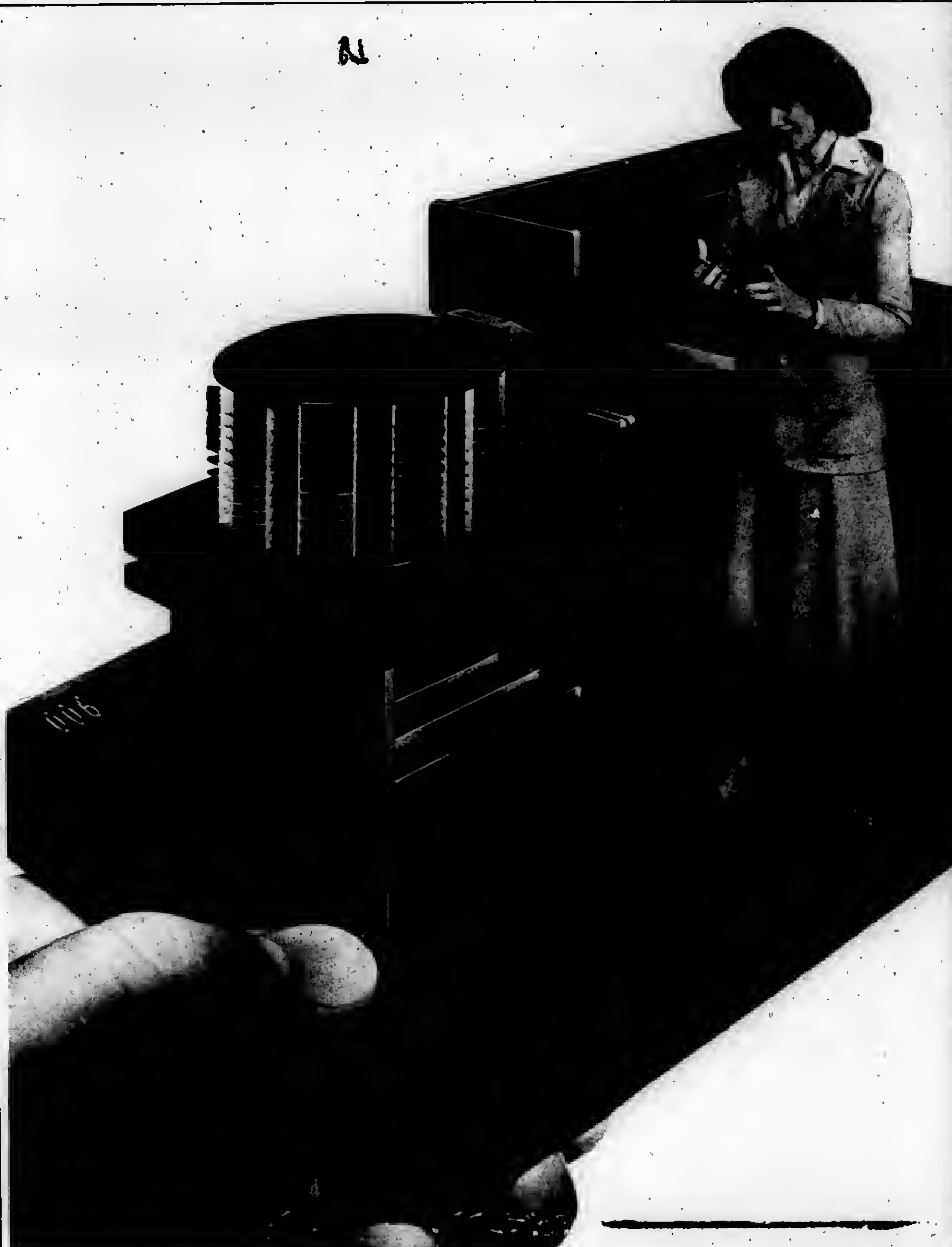
At no time was the committee acting in judgment upon James Ryan's selection of hardware. We did feel that the request for proposal was premature, inasmuch as there was an existing installment contract with Honeywell Information Systems for Knoxville's present 437.

Contrary to Ryan's feeling that the committee was try-

ing to block the Burroughs system, this was not the intent at all. We were asked by the city council and the mayor to review Ryan's procurement procedures. I think that his comment stating that there had been an attempt to resolve the contract dispute between HIS and the City of Knoxville is less than candid. HIS did make several overtures.

For your information, on Dec. 13, the mayor's advisory committee recommended, and it was approved. (Continued on Page 29)

Letters to the Editor



'Due to Computer Error You Have No Check This Payday, But Here Is Your Government Bond... You Won't Be Able to Cash It for Two Months, of Course.'

(Continued from Page 28) proved by city council, that the city remain with HIS in an upgraded mode and that contrary to these "alleged tapes," at no time was the committee pro-IBM.

T.J. Kennedy Jr.
President
Knoxville Computer Center
Knoxville, Tenn.

Why No Reaction?

As the national coordinator for the Data Processing Management Association's (DPMA) Industry and Government Relations

Sales Tax Subcommittee, I have been watching with interest (and in many cases disbelief) the reaction of the entire DP industry to the events that have taken place in 1976 and 1977.

We have witnessed several incredible events that would have sent shockwaves through any other profession but were accepted with little outward reaction (except for a few

laymen and lawyers close to the specific issue). Just think for a moment what has happened and its implications:

1. Robert Sherin has proved that there is legal recourse for laymen by which speedy remedy can be achieved without many of the time-consuming encumbrances of the normal judicial procedures. Yes, our legal system does work

for the benefit of the common man.

2. The "Mom and Pop DP shop" as well as the large institutional data centers have representation and the backing of 23,000 DP professionals through DPMA International in standing up and questioning sales tax assessments against them; one letter or phone call to their legislative network representative gives them ac-

cess to our subcommittee members.

3. Successful efforts have already been concluded in Florida, Alabama and New York in defeating current sales tax regulations and in some cases having new regulations or legislation implemented protecting DP interests. Several vendors are already sending notices to customers informing them that sales tax rebates are soon to be given to them amounting to thousands of dollars.

4. Other states have seen the events in other states and are already interpreting their regulations in terms favorable to the industry, thereby avoiding costly and time-consuming judicial proceedings.

5. Tennessee is a case unto itself; further activities and appeals will be forthcoming and it would not serve to comment on the issues at this time. DPMA is watching events closely and is providing support for Sherin's efforts.

But these are events of the past and present. What of the future? DPMA has already approved funding for 1978 activities of the sales tax subcommittee. We are already planning to continue our support in the Tennessee appeal, but we are also reviewing past events and decisions in Texas and Wisconsin, which we believe to be key states since they are representative of specific issues that must be addressed.

One of the major ingredients necessary to make 1978 an eventful year, and a year which will be remembered as the major turning point in the sales tax issue, will be involvement of all data processors.

It is our responsibility to ourselves and our employers to understand the issue and follow the events closely. You should know who your DPMA state legislative network representative is and how to inform him of any activity in your state's sales tax commission assessments.

Steve Vajda
Miami, Fla.

Letters to the Editor

Bruning is the Giant of Microfiche Duplication.

Nobody offers a broader line of fiche duplicators.

And thousands of microfiche users have come to depend on Bruning equipment to deliver high-quality duplicate fiche in volume.

Bruning units provide excellent resolution, using either diazo or vesicular process.

Our high-speed duplicators produce up to 1500 cut fiche per hour from cut or roll masters—and are available with automatic collators.

We also offer smaller, tabletop units for lower-volume requirements.

And we provide a full range of direct lease, lease-purchase, and rental plans.

When you deal with The Giant, you needn't settle for less.

Call your local Bruning Sales Office. Or write Bruning, 1834 Walden Office Square, Schaumburg, Illinois 60196.



BRUNING

DIVISION OF
ADDRESSOGRAPH MULTIGRAPH

SALE/LEASE
135
1419
3410-2
BERNIE GEST
(215)635-1700
COMPUTER
MARKETING INC.
7704 Seminole Ave.
Melrose Park, PA 19126

'Simple Mathematical Procedure' How to Project CPU Life? Try This Formula

By Fred Springer-Miller
Special to CW

"What is the projected life of this CPU?" is a question frequently asked by DP and corporate management. A simple mathematical procedure can help fix the number in spite of all the variables that surround it.

Reader Commentary

The starting point is a table of relative CPU power, such as that published in Computerworld after the IBM 3031 and 3032 announcement. Such a table must, of course, reflect the types and mix of processing done by a particular CPU (commercial, scientific, schoolboy Fortran, etc.). It may then be scaled to make the pertinent CPU its base.

The second vector in the equation is a range of percentages — expressed as factors — of projected annual increase in CPU utilization. For batch systems, this may depend simply upon new applications, real-time systems, time-sharing, etc., and may well have to be based upon prime-time rather than 24-hour utilization.

The illustrations shown here were prepared for an installation planning to upgrade its saturated IBM 3158-1 CPU to an attached processor (AP) version, then to a Model 3.

The first table shows the relative power of the current CPU as unity, because it is assumed to be exactly equal to the workload; its life, for whatever increase in CPU load, is of course 0.

From the 30% column for example, we see that at this growth rate a 3158-3AP should provide 2.4 years' additional service. The negative numbers project life into the past; at 30% growth, therefore, a 3145 should have died 3.2 years ago.

The second table shows the 3158-3AP scaled down to 1 in power and attempts to answer the question, "When it runs out of steam, what then?" We see a 3032 replacement would last only two years or so, a 3033 more than four — data that funds an analysis of what lease period for a 3032 (if any) should precede purchase of a 3033 for maximum economy over an extended time span.

Such an analysis can prove far more complicated for a manufacturing concern dependent upon short- and long-term bank loans, bonds and debentures for working capital than for an insurance company with a relatively assured cash flow and rate of return after taxes. In either case, however, for whatever sort of net present value calculation we contemplate, the base data is essential.

The computation is simple and consists of taking the logarithm of each relative power to the base of the increase factor. With APL, the entire table of life expectancies can be generated by a single instruc-

CPU	POWER	10%	15%	20%	25%	30%	35%	40%	45%
3138	0.28	-13.3	-9.1	-7.0	-5.7	-4.8	-4.2	-3.8	-3.4
3145	0.43	-8.9	-6.1	-4.7	-3.8	-3.2	-2.8	-2.5	-2.3
3148	0.53	-6.7	-4.6	-3.5	-2.9	-2.4	-2.1	-1.9	-1.7
3155	0.79	-2.5	-1.7	-1.3	-1.1	-0.9	-0.8	-0.7	-0.6
3158-1	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3158-3	1.12	1.2	0.8	0.6	0.5	0.4	0.4	0.3	0.3
3031	1.36	3.2	2.2	1.7	1.4	1.2	1.0	0.9	0.8
3158-1AP	1.65	5.3	3.6	2.8	2.2	1.9	1.7	1.5	1.4
3158-1MP	1.65	5.3	3.6	2.8	2.2	1.9	1.7	1.5	1.4
3158-3AP	1.85	6.5	4.4	3.4	2.8	2.4	2.1	1.8	1.7
3158-3MP	1.85	6.5	4.4	3.4	2.8	2.4	2.1	1.8	1.7
3165	2.22	8.4	5.7	4.4	3.6	3.0	2.7	2.4	2.2
3168-1	2.72	10.5	7.2	5.5	4.5	3.8	3.3	3.0	2.7
3168-3	3.09	11.8	8.1	6.2	5.1	4.3	3.8	3.4	3.0
3032	3.09	11.8	8.1	6.2	5.1	4.3	3.8	3.4	3.0
3033	5.56	18.0	12.3	9.4	7.7	6.5	5.7	5.1	4.6

These tables are intended as a guide to CPU life based upon estimates of annual increases in CPU load and as an adjunct to — but not as a substitute for — comprehensive system analysis. Table 1 (above) is based upon an IBM Model 3158-1 CPU configuration; Table 2 (below) is based upon the maximum expanded configuration of a Model 3158-3AP CPU.

CPU	POWER	10%	15%	20%	25%	30%	35%	40%	45%
3138	0.15	-19.8	-13.5	-10.3	-8.4	-7.2	-6.3	-5.6	-5.1
3145	0.23	-15.4	-10.5	-8.0	-6.6	-5.6	-4.9	-4.4	-3.9
3148	0.29	-13.2	-9.0	-6.9	-5.6	-4.8	-4.2	-3.7	-3.4
3155	0.43	-9.0	-6.1	-4.7	-3.8	-3.3	-2.9	-2.5	-2.3
3158-1	0.54	-6.5	-4.4	-3.4	-2.8	-2.3	-2.0	-1.8	-1.7
3158-3	0.61	-5.2	-3.6	-2.7	-2.2	-1.9	-1.7	-1.5	-1.3
3031	0.73	-3.2	-2.2	-1.7	-1.4	-1.2	-1.0	-0.9	-0.8
3158-1AP	0.89	-1.2	-0.8	-0.6	-0.5	-0.4	-0.4	-0.3	-0.3
3158-1MP	0.89	-1.2	-0.8	-0.6	-0.5	-0.4	-0.4	-0.3	-0.3
3158-3AP	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3158-3MP	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3165	1.20	1.9	1.3	1.0	0.8	0.7	0.6	0.5	0.5
3168-1	1.47	4.0	2.8	2.1	1.7	1.5	1.3	1.1	1.0
3168-3	1.67	5.4	3.7	2.8	2.3	2.0	1.7	1.5	1.4
3032	1.67	5.4	3.7	2.8	2.3	2.0	1.7	1.5	1.4
3033	3.01	11.5	7.9	6.0	4.9	4.2	3.7	3.3	3.0

tion. If A is a vector of relative CPU power such that one element in A has the value of 1 arbitrarily, then the instruction

1-B • • • A

displays the entire table rounded to one decimal place. It isn't that simple without APL.

An advantage of this sort of presentation is that it allows —

perhaps even forces — management to participate in the evaluation of CPU utilization growth, upon which the validity of the exercise depends.

A disadvantage is that explicit figures, no matter how hedged or qualified, provide the fasteners with which accountants and controllers (and others unaccustomed

to a world where nothing ever balances) can nail you to the wall.

Along this line, if anybody has a formula for predicting CPU resale values after X years, I should certainly like to hear about it.

Springer-Miller is an assistant for planning and research for AIG Data Center, Inc., a service company specializing in insurance.

Output Flawed in Dating, Completeness

(Continued from Page 27)

on and that cannot be regarded as proof.

The numbered nontransferable certificate had apparently never been tied into the system at all, although it was certainly part of Clarke's account history with Saks. Bloom said that to find out whether it had been cashed would take weeks, and I have no reason to disbelieve him.

All of this is very regrettable but reflects no systems problems, according to Saks. The store is putting the matter straight so far as Clarke is concerned.

Yet, I see some general systems problems here which our profession — including the Institute for the Certification of Computer Professionals (ICCP) — has simply not addressed:

1) Is there any way in which the

actual printing can be accurately dated? In the same way that cities and towns check on the accuracy of weighing machines in the supermarkets, at some time it may become necessary for data processors to actually date the printing, as opposed to the processing, of a run.

Technically, we just don't have the tools to do it yet. It would require special equipment (perhaps a national digital time service) and a special feature in languages such as Cobol "Actual Printing Time." Tests would have to be made to determine whether the output was being physically printed and not just spooled during a particular run.

Printing time could be indicated, but Saks cannot be faulted in 1978 for not going beyond normal technology. (It is, of course, possible to fault anyone who uses a system that requires more than stan-

dard technology, but that is another matter.)

2) Is there any way to see that reports are complete?

The idea of a nontransferable credit not being part of the statement — and not being recorded within relatively easy access — does not fit my conception of a complete system. The credit memo had plenty of cross-references on account number, etc. Yet it wasn't effectively entered into the system. Should it have been?

Well, those are the questions I can see coming to the profession as a result of the Saks affair. Again, I'd like to know your thoughts on these matters; then we can put the matter of the Saks H3 accounts to rest.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

Study Finds Users Sticking to OS/360

By Don Leavitt
CW Staff

WALTHAM, Mass. — Despite IBM's final downgrading of support for OS/360 from Class A to Class C last year, users aren't in the middle of a mass migration away from the operating system that developed over a period of 11 years.

Results of a study made late last year by the Services and Software Information (SASI) program of International Data Corp. (IDC) indicated that there were 530 sites with IBM 360s operating under "plain vanilla OS" at year-end 1976 and that the figure would grow to 575 sites by year-end 1978.

IDC also found 680 IBM 370 installations were running under OS/360 at year-end 1976. That figure will probably drop to 410 by the end of this year, according to SASI director Nancy Scull, who sees that change reflecting a changeover to the VS environment.

The 360 figures indicate users committed to OS/360 will remain so committed, she said, whereas the increase over the year-ago

figure represents DOS installations that are moving or have moved to OS/360.

The increase in OS users on 360 equipment runs directly counter to the change in size of the installed 360 base as seen by IDC. The research firm sees the base shrinking from a grand total of 2,120 360/40s, 50s and 65s at the end of 1976 to only 1,760 of the same CPUs by the end of this year.

The change from Class A to Class C support applies to OS/360 users operating under either multiprogramming with a fixed number of tasks (MFT) or multiprogramming with a variable number of tasks (MVT). The change took place for OS Release 21.0, 21.6 and 21.7 last May and for Release 21.8 at the end of November.

MFT and MVT were first delivered by IBM in 1966 and 1967. Used on the larger IBM 360s and the nonvirtual 370s, they were transformed into OS/VS1 and OS/VS2, respectively, when they were rewritten for virtual 370s.

The change came as no surprise to users. When IBM delivered Release 21.8 in 1974, it had warned users it was the end of the line for OS/360.

Under IBM terminology, Class A support includes centralized programming effort for both enhancements and error corrections and, if needed, free on-site personnel to solve a problem traceable to the IBM software. Class C status rules out all free support, but programming and systems engineering services are available on a fee basis.

If modifications are already

available for a problem just discovered by a user, the coding change will usually be provided without cost, even under Class C.

In addition, user groups such as Share and Guide have accumulated substantial libraries of OS changes that are available to their members at little or no cost.

The IDC study indicated a number of installations with both 360s and 370s have in fact already replaced IBM-supplied operating system software with offerings from outside firms, including, for example, Extended DOS from the Computer Software Co., DOS/MVT from Software Pursuits and DOS/RS from Dearborn Computing Leasing Co.

IDC is at 214 Third Ave., Waltham, Mass. 01254.

Version 2 Supports 32 Users

DEC Upgrades IAS for PDP-11s

MAYNARD, Mass. — Digital Equipment Corp. has enhanced its Interactive Application System (IAS) operating software for large PDP-11 configurations. IAS Version 2 is said to support more users with more peripherals and more software options than the initial release.

IAS is a general-purpose, multifunction operating system that enables simultaneous execution of real-time, batch and interactive programs on PDP-11/45s and 11/70s. The first version could handle 20 interactive users, DEC noted.

IAS Version 2 was designed to include support for the PDP-11/60 as well and to allow as many as 32 interactive users to function concurrently, according to a spokesman. The updated software also supports RPO5 and RPO6 disk storage subsystems, the RX01 floppy disk subsystem and the LA180 matrix line printer, he said.

The multilanguage operating system now offers facilities for users of RPG-II and Coral-66, a real-time language developed in the UK, as well as continuing support for Basic-11, Cobol, Fortran IV, Fortran IV Plus and a macro assembler, the spokesman

continued.

Data services reportedly available under IAS Version 2 include Sort-11; DBMS-11, — based on Cullinane's IDMS data base management system; Data-trieve-11, a conversational query language and report writing system; and the multikeyed Isam capability of Record Management Services, RMS-11.

The system provides multitasking and subtasking capabilities for time-sharing users and full support for execution of real-

time and time-sharing tasks in the same partition, DEC said. More communications flexibility, system utilities and compatibility with more laboratory and industrial real-time interfaces are also part of IAS Version 2, the spokesman added.

The enhanced software is available for distribution to current PDP-11 installations or for delivery with new 11/45s, 60s and 70s. The single-system license fee, with full support, is \$17,160.

Softool Checker Documents Errors in Fortran Programs

GOLETA, Calif. — The Ansi Fortran Checker from Softool Corp. analyzes Fortran programs for compliance with the 1966 American National Standards Institute (Ansi) definition of the language. Violations of the standard are concisely documented, according to a spokesman.

The package includes an "elaborate" diagnostic capability which is superior to that of most existing Fortran compilers, the spokesman claimed. This capability means the software is also

an error detector which documents existing as well as potential errors, he said.

The checker produces clear and self-documenting messages, in the spokesman's opinion, but a user manual is provided. The software is written in a subset of ANS Fortran so it can be used on virtually any CPU, he added.

A permanent license, including the first year of maintenance, costs \$8,000, Softool said from 340 S. Kellogg Ave., Goleta, Calif. 93017.

Meet Open To CPE Fans

NEW ORLEANS — Anyone interested in computer performance evaluation (CPE) is welcome at the next meeting of the Southwest Computer Measurement Group, scheduled for Jan. 19-20 at the downtown Holiday Inn here, according to program chairman Gary Goodwin.

Topics to be covered in the meeting, which will be held Thursday evening and all day Friday, will include IBM's Information Management System (IMS), IBM's 3850 mass storage system and MVS tuning. Goodwin said he would like to hear from anyone planning to attend so that seating and meals can be arranged. He is at Boole & Babbage, Inc., Suite 901, Stemmons Tower West, Dallas, Texas 75207.

You're in good company with the Johnson Job Accounting Report System used by more than 1,000 D.P. Managers.



SUPPORTS:
MVS-SVS-VS1-DOS/VS-POWER/VS-MVT-MFT-CICS/VS-IMS/VS-HASP

Tell us what areas you're interested in:

- | | | |
|---|---|--|
| ☐ Job Accounting | ☐ Budget Control | ☐ Resource Utilization |
| ☐ Cost Distribution | ☐ Thruput | ☐ Programmer Efficiency |
| ☐ Software Performance | ☐ Customer Billing | ☐ Job Scheduling |

Send for your FREE 30 page System Characteristics Manual

Name _____
Title _____
Company _____
Address _____ City _____
State _____ Zip _____ Phone (____) _____
Computer _____ Operating System _____

Johnson Systems, Inc.

8400 Westpark Drive
McLean, Virginia 22101
(703) 893-8700

Workshops Set

NEW YORK — "Jackson Design Method" Workshops providing lectures and time for application of structured programming tools and techniques will be sponsored by Structured Methods, Inc. (SMI) starting next week (Jan. 16) in Chicago and on Jan. 30 in San Francisco.

The two-week courses will be presented by David King and others from Infotech International, the U.S. affiliate of Infotech Information Ltd., which has conducted conferences in the UK featuring Michael Jackson himself, SMI said.

The individual registration fee for either workshop is \$1,400, SMI said from 133 E. 58th St., New York, N.Y. 10022.

'Commercial' Fortran Supports HP Sites

LONG BEACH, Calif. — A commercially oriented Fortran IV compiler, described as the first of several elements of a complete commercial software support system to be offered by Data Systems for Industry for the Hewlett-Packard 21MX and 1000 minicomputer line, is now available, according to a spokesman.

The compiler is said to include a highly optimized PRINT statement that eliminates the need for FORMAT statements and the report generation problem associated with the usual WRITE/FORMAT combinations.

Also provided in the compiler is an enhanced DATA STATEMENT definition providing variable-length character strings in A1, A2 and A3 ("crammed") formats.

Double integer arithmetic is fully in-

tegrated, which satisfies values in excess of two billion rather than the 32,767 maximum supported by single-integer processing.

The compiler requires a minimum user area of 10K words and generates relocatable code which runs under HP's DOS-M, DOS-II and RTE environments.

Relocatable code for the compiler and the run-time modules costs \$4,800 plus \$30/mo. Optionally, an additional \$10/mo provides maintenance and update support and reference manuals are available for \$25 apiece.

Data Systems for Industry is at 3450 E. Spring St., Long Beach, Calif. 90806.

DP Audit Tools Described

WELLESLEY, Mass. — Three certified public accountants have written a 512-page book, *Computer Control & Audit*, as an authoritative guide to the tools and techniques for control and audit of computer-based systems and their operation, according to the publisher, QED Information Sciences,

Inc.

The impact of DP on auditing has created a need to strengthen current knowledge of these tools and techniques within both the DP and the auditing community, a spokesman said, noting that authors William C. Mair, Donald R. Wood and Keagle W. Davis are all partners in Touche Ross & Co.

The system development process as well as the logic of the application programs themselves are covered in the book. So are the control and audit implications for advanced topics such as on-line systems, QED added.

Written under the auspices of the Institute of Internal Auditors, *Computer Control & Audit* costs \$29.50 (\$25.50 prepaid) plus \$1.50 for postage and handling and can be ordered from QED, P.O. Box 181, 141 Linden St., Wellesley, Mass. 02181.

'HOP2' Service Aids Hospitals

BURLINGTON, Vt. — An open-item billing and accounts receivable service for hospital outpatient departments, HOP2 from BDP, Inc. keeps accounts on file from admission to admission to improve financial control, according to a spokesman.

The service is batch-oriented, working with diskettes of patient transactions sent to the company's DP center here. It produces insurance claim forms, when appropriate, and statements to patients that show what is owed beyond any insurance claim.

BDP charges a start-up fee of \$1,000 plus travel to put HOP2 into a hospital, then production fees tied to number of transactions; accounts on file, statements and insurance claims generated.

BDP, Inc. is at 164 College St., Burlington, Vt. 05401.



T-BAR 4x12 Channel/Peripheral Switch Installation

For more efficient use of peripherals

T-BAR's 3915/3916 matrix switches for use with ITEL, AMDAHL and IBM 360/370 type computers permit load balancing by sharing printers, tape drives, discs and front ends between CPU's. Greater configuration flexibility is attained by using the larger T-BAR matrix sizes — up to 12 computer channels and 12 strings of up to 4 peripherals each — 12x12.

The 3915/16 computer switch speeds system restoration when mainframe trouble occurs. Pushing a button interchanges peripherals between a failed and back up system or reconfigures a computer room for multiple tasks on the same mainframe.

The switch can be controlled from a centralized operator's position up to 200 ft. away.

T-bar INCORPORATED

COMPUTER SWITCH DIVISION
141 Danbury Road, Wilton, CT 06897
Telephone: 203/762-8351, TWX: 710/479-3215.

MARKET YOUR OWN SOFTWARE PACKAGE

All new in-depth step-through guide covers 22 proven ways to reach your markets - why software houses fail into the "dead heap" - today's market hotbeds - the best software ads ever written - what it takes to measure up as a vendor - market research, how to test before you invest - Should you go with reps? - Shoe-string ventures, financing, patents, copyrights & much more. 171 pgs., 9 X 12 ring binder, \$28.00 (Check, BankAmericard, Mastercharge, or Company P.O.) to DATA-SEARCH INC., 730 Waukegan Rd., Dept. 108G, Deerfield, IL 60015. For faster service on credit card orders, phone (312) 945-2940. Illinois customers add 5% sales tax, invoiced orders add \$3.25 postage & special handling. 30 day refund if not satisfied.

INFORMATICS®



INFORMATIKA INFORMATIQUE

Wherever it's said, however it's spelled, Informatics® fulfills the promise of the computer...universally!

Informatics...throughout the world, the word is synonymous with the ultimate in modern data processing. In the United States and many other countries, it means the people, products and services of Informatics Inc. Many people know us for our software products, such as MARK IV®, or our information processing services. But we also provide a full range of professional services. Over 2,000 trained specialists available for information systems design, systems development, applications programming, management consulting, technical and managerial training, or full-scale facilities management. Informatics Inc., one of the world's leading independent sup-

pliers of software products and services. Drop us a line on your letterhead and we'll send you a colorful brochure that tells how we can help you fulfill the promise of *your* computer.

SOFTWARE PRODUCTS
PROFESSIONAL SERVICES
INFORMATION PROCESSING SERVICES

informatics inc



Corporate Offices/21031 Ventura Boulevard/Woodland Hills, California 91364/(213) 887-9040/Telex 69-8473

Member SIA  Software Industry Association ®U.S. registered service marks and trademarks of Informatics Inc.

INTERACTIVE USER REPORTS

"One powerful data base."

Software. "At Linkabit, we develop and produce advanced error control equipment, satellite communications modems, and data compression techniques for NASA, Department of Defense agencies and several commercial customers. For us, one of the key software features of the DECSYSTEM-20 is the optional DBMS software package which interfaces with both COBOL and FORTRAN. It lets us combine both scientific and commercial files

into one powerful data base. A data base

that's readily accessible, easily defined and maintained.

"The result is more accurate and timely reporting of job status, parts availability and manpower utilization."

Expandability. "Leasing is a dynamic business. So when Manufacturers Hanover Leasing went into the market for a computer system, we wanted one that could handle all our anticipated needs, as well as our present client load.

"That's why we went with the DECSYSTEM-20.

"We run heavy CPU calculations for financial models and the DECSYSTEM-20 offers us easy expandability — from its central processor and main memory all the way to the number of terminals. Furthermore, the DECSYSTEM-20 will continue to grow at the same rate we will — which means we'll never stretch the system beyond its capability or have a bigger system than we need.

"Finally, we really liked the fact that programs and



*James E. Dunn, Manager of Computer Services,
Linkabit Corporation, San Diego, California.*



*Lawrence M. Pinsky, Director of Information Services,
Manufacturers Hanover Leasing Corp., New York, New York.*

digital

LARGE COMPUTER GROUP

procedures developed now for the computer will still be completely workable in any expanded system. And, at the same time, our productivity will increase at moderate cost."

Productivity. "As the corporate headquarters for 120 reporting units involved in chemicals, natural resources and consumer services all over the world, we process a massive amount of information. And it's used by all kinds of analysts and decision makers.

"Switching to an interactive system is giving us the increased productivity we were looking for. We already see this in our programming and we expect to see this soon in our user community.

"With our programmers directly in touch with the interactive computer, we're able to put together information more quickly and in ways we couldn't before. And to us speed and flexibility are crucial.

"Since we put in the DECSYSTEM-2050 with five discs, 2 tape drives and 384K of core, we're getting more value for our dollar."



Robert E. Herlihy, Director of Computer Technology and Operations, W. R. Grace & Co., New York, New York.

digital DECSYSTEM 20



- ☐ Please send your Interactive User Reports information packet.
☐ Please have a sales representative contact me.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Telephone _____

Send to: Digital Equipment Corporation, MR1-1/M49,
200 Forest St., Marlborough, MA 01752.
Tel. 617-481-9511 ext. 6885.

B-1-9-8

DECSYSTEM-20

The interactive computer
for the big system jobs.

'Best/1' Runs Interactive Models

LINCOLN, Mass.— The heart of the Best/1 software tool for computer system capacity planning is a high-speed modeling facility that predicts system performance characteristics including throughput and response time, according to the vendor, BGS Systems, Inc.

Best/1 predictions take into account the hardware configuration, the system software and the application workload being processed. These are specified by a small set of parameters that state the speeds and capacities in terms that are easily available through accounting packages and hard-

ware/software monitors.

The level of detail provided by a Best/1 analysis can be adjusted to reflect potential changes in software or hardware or more accurate data as it becomes available, he said.

Release 4.0 of Best/1 is said to require much less CPU time than conventional computer performance simulators. This enables the system to operate effectively in interactive mode, allowing rapid analysis of various alternative configurations.

Best/1 runs on IBM 370s and costs \$15,000. BGS can be reached through P.O. Box 128, Lincoln, Mass. 01773.

Update of 'UCC DBS' Handles 3344s, 3350s

DALLAS — Version 4.3 of the UCC Data Base System (DBS) from University Computing Co. (UCC) is said to include support for IBM 3344 and 3350 disks and improvements in the performance and resource protection area.

The software enables IBM 360/370 users to store and retrieve data in random or sequential mode for disk files

and in sequential mode for tape files. It separates the definition of data from its use thus letting programmers work with the data without concern for its physical location.

Data and index buffer handling has been improved to provide a "substantial decrease" in I/O activity in both a batch- and an on-line environment, according to a spokeswoman.

Version 4.3 permits multiple occurrences of the same data element within a single records. The storage and retrieval of these data elements are controlled by user-defined keys embedded in the element; this permits greater flexibility in the data base design, the spokeswoman said.

The OS version of this release includes changes in enqueue processing that are said to provide more resource protection and to permit processing of identically named but physically distinct data bases.

The DOS version of this release includes a facility to override, at execution time, the installation-defined buffer parameters, she added.

UCC's Data Base System was designed for use under most IBM 360/370 environments, from DOS/360 through OS/MVS, the spokeswoman said.

UCC is at 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

Release Eases Installation Of 'Data-Text'

CULVER CITY, Calif. — Data-Text release 3.3, now supported by the Datatext Project, is said to simplify the installation of this statistical analysis system for social and behavioral science work on OS-based IBM 360/370s.

Featuring a natural language, Data-Text allows unlimited variables, free-form input and the processing of multi-punched data, according to a spokesman. Error messages are comprehensive, missing data values are handled and the correlation and factor analysis is not limited to available memory, he added.

The package includes procedures for basic statistics, frequency distributions, cross-tabulations, correlation analysis, t-tests and F-tests and multiple regressions, as well as others for cross-statistics, analysis of variance and covariance, he said.

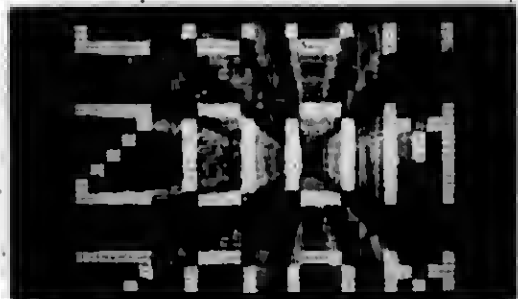
Release 3.3 is available under annual lease with a first-year cost of \$1,000, Datatext Project sources said from 5995 Sepulveda Blvd., Culver City, Calif. 90230.

Most graphics terminals are too dumb for words.

Even expensive models get tongue-tied when it comes to alpha-numerics. But now there's a bright new graphics terminal that has a lot to say for itself.

Alpha-graphics: the perfect combination.

It's the Hewlett-Packard 2648A alpha-graphics terminal. For just \$5500*, it will dazzle you with a



virtuoso display. You'll see zoom and pan, area shading, pattern definition, rubber band line, scientific plotting and graphics text composition. Having independent memories for graphics and alphanumeric, you can do auto-plots with or without words and figures on the screen.

And when you need a smart alphanumeric terminal for on or off-line work, stay right where you are.



How smart is smart?

Ever seen a graphics terminal scroll 200 lines of interactive dialogue? And store up to 220K bytes of data (words and pictures) on twin cartridges? And cut out repetitive routines by storing up to 80 characters on each of eight "soft keys"?

The HP 2648A can also edit with the best of them. Communicate with a computer at rates up to 9600

baud. And accept a plug-in forms drawing mode to generate just about any form your company uses.



Strong as well as intelligent.

Like all our terminals, the HP 2648A has a clean, tough, modular design. Open it up like a suitcase, and you'll see the neat row of plug-in PC boards.

That makes it easy to add options or take care of maintenance. Not that downtime is a problem. Our terminals have such a good track record that we've lowered our maintenance price three times in the past two years. When you do need service, more than 1000 Systems and Customer Engineers worldwide are ready to take care of you. So why settle for any dumb graphics terminal when ours can figure in your picture? See for yourself by calling the Hewlett-Packard office listed in the White Pages. Or send us the coupon and give our 2648A alpha-graphics terminal a screen test.



Yes, give me the good words (and pictures) on the HP 2648A terminal.

☐ I'd like a demonstration. ☐ Send me information.

Name _____ Title _____
Company _____
Address _____
City/State/Zip _____
Phone _____

Mail to: Ed Hayes, Marketing Manager,
Hewlett-Packard Data Terminals Division,
19400 Homestead Road, Dept. 314, Cupertino, CA 95014.

*U.S. domestic price

HEWLETT  PACKARD

42801HPT5

In-Depth Concern Needed

Service Analysis Shapes Form of Future System

By Stephen L. Robinson
Special to CW

In earlier columns I have been somewhat outspoken about the need to break the pattern of implementing old systems on new hardware. In this column, I shall discuss service analysis, which is a set of activities intended to ascertain what future systems should look like.

Data Base Corner

Since the advent of electromechanical accounting machine (EAM) equipment, data processing people have been reshaping business systems. Things that were done on an exception basis (e.g., computation of interest for savings accounts) in precomputer days became part of large maintenance runs.

After all, to update several cards in a deck, or to update several records on a tape, one had to "pass the whole file." It therefore made more sense to incorporate interest computation in a massive update of a savings file, an update in which every record was looked at even though only one-half of one percent of the records had transactions against them.

Such systems, of course, are "incompatible" with today's disk storage devices. The present peripherals are capable of efficient exception processing (especially for less than 10% of a file, certainly for less than 1% of a file). However, the systems being "upgraded" to disk are batch-oriented, full-file systems.

Representative Skills

A casual conversation with bank employees, executives and even some systems analysts would seem to indicate the present system design truly reflects the needs of the banking organization. However, an in-depth, probing discussion reveals there is really no need to update the interest of each account daily. An aggregate interest figure, based on total deposits, is more than adequate for all decision making.

How to discover interest really need not be computed daily? Clearly, it is an easy task. It requires:

- A basic understanding of the business process being studied (i.e., savings accounts).
- A business "imagination" coupled with at least an elementary understanding of what computers can do (in this case, compute interest "on the fly"

whenever a record is interrogated, for whatever reason).

- An interviewing skill (the ability to get people talking about what they do and what they need).

These are representative of the skills necessary to conduct a broad service analysis interview. Such skills are typically not found in individuals.

The Interview Team

An interview team of two people has proven ideal. When there are more than two, the interviewee (one, please, not a group) feels hopelessly outnumbered and persecuted.

The interviewers should previously have reviewed that portion of the information flow analysis (IFA) which pertains to the interviewee. In this way they are at least familiar with the documents the interviewee sees.

The interview should not turn into a "Do you get the agents' reports?" type of interview. Far from it.

The most effective ploy we have utilized is the "Dumb Dora" (or "Dumb Don" to avoid being called a male chauvinist pig) approach. For example, we ask questions like "How do you manage to schedule production for so many machines?" and "How do you anticipate demand at holiday time?"

Interspersed throughout this, of course are helpful suggestions (garnered from a study of the business area and developed by good systems analysis). "Would it be useful if you had a profile of last year's sales this time of year?" and "Would it be easier for you if the production and warehouse reports were somehow combined and summarized on one form?" are two examples.

No Leading Questions

This must be done carefully. The objective is not to lead the users by the nose nor to infer they are dummies if they don't use the information you are suggesting.

The recommendations are, ideally given the same "Dumb Dora" fashion as the earlier part of the interview — for example, "I'm not really into manufacturing, but it seems to me that it would be useful to know..."

One of several things will happen.

- You will be told why that information would not be useful.
- The user will agree with you.
- The user will think about it, thereby giving him the opportunity in a week

or so to write a memo indicating the need for a report with the information you suggested.

With regard to the last item, incidentally, all service analyses should terminate with the user being left with an official looking piece of paper called a "Wish list." Here the user is to enter any and all information he needs during the next couple of months, how he tried to obtain the information, whether the search was successful and,

if not, why not.

This list also serves to cement the relationship between the information group and the users.

In later columns, I will discuss more about service analyses, its pitfalls, ploys to use with recalcitrant users and interview scheduling.

© 1978 Stephen L. Robinson

Robinson is an independent consultant operating as S.L. Robinson & Associates in Morrisville, Pa.

Are Your DASD's Drowning ... in a Sea of Data?



DMS/OS the Wave of the Future in Data Management

DMS/OS has recently become the most widely accepted data management system available. For controlling the every day problems associated with DASD maintenance... it is the wave of the future.

Here's why DMS/OS is now the number one data management system: it addresses major user problems; reduces DASD and CPU operating costs; user proven in supporting all DASD devices and operating systems; supported by DASD experts; well documented; easy to load, use and maintain.

The BASIC SYSTEM includes:

1. Management Reports
2. Archival/Retrieval
3. Data Set Retention Control
4. Migration of Sequential GDG's from Disk to Tape
5. Automatic, Selective back-up/restore

6. PDS Management/Compression
7. Data Set History File
8. RACF Support
9. System Tasking
10. Self Diagnostics

SELECTABLE UNITS

1. VSAM Support
 2. TSO Command Processor
 3. DASD Space Billing
 4. Mass Storage Support* (Real to Virtual Migration)
 5. Volume configurator
- DMS/OS supports all IBM 360/370's under MFT, MYT, VS1, VS2, MVS and VM.

Let DMS/OS save your DASD's from drowning in a sea of data. DMS/OS is available for a free 30-day on-site evaluation. Call or write today for a free brochure, functional overview or for your on-site evaluation. DMS/OS... the wave of the future in data management.

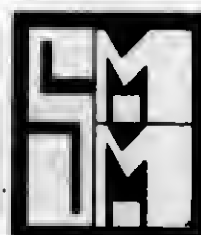
*MSS user group information available

the terminal connection

We can match your terminal needs with our off-the-shelf price and delivery. A wide selection of terminals like DEC LA-36 with all options in stock, LS-120, LA-180 and VT-52, Datacassettes, all new Teletype 43 KSR, TI-745, and acoustic couplers.

For your free quote, call us TOLL FREE:
800/323-2135

management response corporation



SOFTWARE MODULE MARKETING THE SUPERMARKET OF SOFTWARE

Crocker Bank Building/Penthouse 1007 7th Street Sacramento, CA 95814 (916) 441-7234 Telex 5MMSAC 377-314 IN EUROPE: California Module Marketing, Ltd. c/o Country Formations, Ltd. 27, Kelso Place, London W. 8

Cobol Not High-Level Enough for DBMS

By Ronald G. Parsons
Special to CW

With software costs rising to 80% of the total hardware/software expenditure, we are being forced to use languages optimized toward making better use of human resources as well as toward reducing hardware operating costs.

There are several obvious reasons why we need a very high-level language for use with data base management systems (DBMS). Looking at what a high-level data manipulation and definition language can do reveals increased productivity, especially when compared with the Codasyl Data Base Task Group data definition language

and its associated Cobol data manipulation language extension, a very powerful but low-level language.

The language specified by Codasyl is referred to as a low-level language for several reasons: statements in the data manipulation language cause a single record to be affected; the programmer is required to do the navigating or searching in the data base; and the procedures (branching, testing and looping) required of the language in which it is embedded are complex.

In contrast, a language is classified as high-level when the aim of the syntax is to describe what to do rather than how to do it and when one

statement can produce results which require several low-level language statements.

Two facets of increased productivity should be explored — the productivity of the hardware/software system and end-user and programmer productivity.

System Productivity

In a DBMS, the object of the productivity game is fewer I/O operations. Low-level systems place much of the burden of selection of a record on the application program.

This may be adequate for retrievals and updates using a single primary key. However, it is unlikely that a primary key policy number will be much help to an executive of a large insurance company who wants statistics on the policyholders with claims greater than a certain amount during a given period.

It may be that the data base administrator of the Codasyl system caused one or both of the retrieval criterion items to be indexed, or perhaps some auxiliary sets were defined to facilitate such a search. Even so, the program (notice that a program is necessary to solve the problem) must process a large amount of data just to find the subset of the data base fulfilling the requirements of our request. This is because the Codasyl syntax supports only "equal to" value selection.

The low-level systems "get next record" philosophy gives the system only a microview of the problem and thus does not permit the system to make a global analysis. It is unable to choose an optimum solution.

Furthermore, each record to be processed or modified must be passed back and forth between a Codasyl-type DBMS and the application program. The communication path between the DBMS and the application program (perhaps running in a separate region) is therefore very busy.

In contrast, a high-level language can be given instructions to process a group of records; make some change and never have to pass the record from the DBMS to the application program. Such a request might be phrased:

CHANGE RATING-CLASS
TO '0' WHERE CLAIM-AMOUNT
IS GREATER
THAN '\$300.00' AND
CLAIM-DATE IS BETWEEN
'01/01/77' AND
'06/30/77'

That type of syntax could be implemented for use with a host language such as Cobol or in a quasi-natural access language for end users. Interprogram communications traffic is reduced to the bare minimum — the problem request text (or call) from the

application program and the acknowledgement of success or failure from the DBMS at the completion of the command.

In a distributed environment, this communication path may be a telecommunication channel. Reduction of traffic in that case is probably essential.

We also have to assume that the implementation of the high-level language system will be very sophisticated. It is often said high-level languages produce less efficient code and require more memory than the code for the same problem written in a low-level language.

While this might be true for a highly optimized low-level problem solution, it is seldom true of the usual low-level solution. With data base management access languages, the high-level implementation, with its capability for global optimization, will require fewer total resources to be used in solving a problem. Such high-level systems will tend to be more efficient than the usual implementation on the best of low-level systems.

Personnel Productivity

A high-level system permits the end user or programmer to express *what* is to be done, not *how* it is to be done. In fact, the user of a high-level language may not even know (or care) how a question is being answered or in what manner the physical data structure is transformed into a logical view of the data.

This implies that the high-level language should use an item orientation in the syntax of the user language as opposed to an orientation toward records or even subsets of records.

Low-level systems such as Codasyl preserve the record orientation through the subschema concept. A subschema can contain data items from only a single record in the schema. Thus, it is important to the programmer to know whether birth date and address are in the same record.

The retrieval syntax and program logic are sensitive to this information. A significant amount of data independence is lost.

We must assume the implementors of a high-level data base management access language will provide general solutions to commonly recurring problems. We can expect the high-level system to process arbitrary Boolean expressions (AND, OR, NOT), to handle comparative operators such as "equal to" and "greater than" and to permit different logical views of the same physical data.

A Codasyl DBMS, for example, provides facilities for

direct access to a record or group of records on the basis of set membership or by specifying a value or group of values which must be contained in the record. Relational operators other than "equal to" are not supported, nor are arbitrary Boolean combinations or qualification conditions.

If the application requirements demand it, the Codasyl data base may have to be restructured to provide auxiliary sets which facilitate the search or else extensive programming will have to be performed.

Time pressures usually prevent application programmers working with low-level languages from developing these general methods on their systems. Even when they do, the distribution of these solutions is rather narrow.

With a high-level language, the services of a programmer are not needed for requests of a nature that a statement or two can generate the desired results.

Other Considerations

Besides system and programmer productivity, many other factors are affected by the level of access language. One such factor is transportability. Cobol programs are said to be transportable, but how often have you seen one of any complexity moved from one host to another without change?

It is tempting for hardware vendors to produce and supply software not easily transportable to other host computers — especially hosts of different vendors.

The conversion effort required when hardware from a new vendor is acquired is of such magnitude that vendors are changed only rarely. This certainly holds true in the area of DBMS, which utilizes or controls much of the resources of a computing center. And it is in this area that a high-level language is most productive and can be most transportable.

Software engineering considerations mandate that the solution to a problem should be easy to read, maintain and understand and be self-documenting.

The designers of the syntax of the language must tread carefully between the extremes of conciseness and verbosity.

In these software engineering considerations, the Codasyl data definition language falls short. Its verbosity alone is overwhelming. And it intermixes diverse attributes of an entity. A well designed high-level language must provide solutions for these situations.

Parsons is assistant to the executive vice-president of MBI Systems Corp., Austin, Texas.

LOCATE MINICOMPUTER SOFTWARE

—NOW TWO VOLUMES—

MINICOMPUTER SOFTWARE QUARTERLY

WITH

Over 500 detailed program descriptions
Indexed by: Application —
Hardware — Language

Subscription Includes:

Base Volume Set + 4 up-dates
\$85. US/Cen (+5% Tax in Mass.)
\$110. Foreign (prepaid only)

INTERNATIONAL MANAGEMENT SERVICES, INC.
215 Oak Street, Dept. C, Natick, Mass. 01760



ACQUISITION WANTED

Boston-based computer terminal lease/service Company would like to acquire Sales-oriented company with Fortune 1000 customer base. Our strong suits are administrative and financial expertise, plus excess cash flow from operations and lines of credit. Qualified organizations are invited to participate in our explosive growth — We double revenues every two years, and earn 10%+ profits. Contact PHILLIP K. CIOLFI, Pres.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300

Looking for software to sell?

We have a new (fieldtested) software package for all Cobol-users. It is in the \$3,000 area and tailored for mass selling on the international level.

We are now looking for local representatives in various countries on an exclusive right basis.

Interested?

Then send your or your organization's request together with

- Territory wished
- Size of organization
- Sizes of sales/technical force
- Track record of software selling and maintaining (system utility type)
- Other information concerning you or your organization.

To: CW Box 1371
797 Washington St.
Newton, MA 02180
U.S.A.

Word of mouth
becomes word of print.



If you're the kind of software user who can get along without a lot of support, you may be able to put Bell System software to work for your company.

You see, as one of the world's largest computer users, the Bell System has developed a lot of software for its own use. For data management, statistical analysis, practically anything done with a computer.

A limited amount of this software has been made available for licensing—because EDP Managers outside the Bell System wanted to put it to work for their companies. For example:

Operating System. The UNIX™ system is a multi-programmed, time-share operating system for the DEC PDP 11/40-45-70 minicomputers. It has features seldom found even in larger systems, including over 100 sub-systems and utilities. And it's written in a high-level language called "C" that makes it extremely easy to program and maintain.

Text Editing.

QED is a powerful text editor for creating and modifying text from a time-sharing terminal. Its command structure is easy to use even for non-programmers but

it also has the capacity to do elaborate jobs even for experts. GCOS-QED runs on the Honeywell 600/6000. TSO-QED on the IBM 360/370.

Computer Management. PAGES is an automated system which reduces user overhead on the IBM operating system in several specific areas: supervisor execution time; head movement and device-busy on the pageable Link Pack Area page-data-set device and load library device; channel busy time; and total elapsed run time.

Word of mouth has carried Bell System software throughout the United States and into 18 foreign countries through arrangements with over 300 users.

Users who were willing to take the software with no maintenance agreements, no technical support.

You see, our software comes "as is." Still, word of mouth is spreading.

And now we're putting word of mouth into print.

For a description of software available for licensing, complete the coupon and mail it to Bell System Software, 10 Pelham Parkway, Pelham Manor, N.Y. 10803. Or call 919-697-6530.

UNIX is a Trademark of Bell Laboratories.

To: Bell System Software, 10 Pelham Parkway,
Pelham Manor, N.Y. 10803

Please send me more information about:

- ☐ UNIX™ System (Operating system for DEC PDP 11/40-45-70)
- ☐ GCOS-QED (Text editor for Honeywell 600/6000)
- ☐ TSO-QED (Text editor for IBM 360/370)
- ☐ PAGES (Computer management for IBM operating systems)
- ☐ Other Bell System Software packages.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Telephone _____

Hardware _____

Computer World



8080-Based 'Famos' Gets File-Handling Facility

CANOCA PARK, Calif. — The Fast Multitasking Operating System (Famos) software for disk-based 8080 microprocessor systems has been enhanced with extended file-handling capabilities, according to its vendor, MVT Microcomputer Systems, Inc.

At the same time, a new version of MVT-Basic, a multiuser Basic compiler that serves as a primary component of Famos, has been released. I/O extensions make the language "ideal" for application programming, according to a spokesman.

The Famos update is said to support all file access methods, including Isam and random organizations. File record lockouts are provided to avoid concurrent updates by two or more users.

The system is now totally device-

independent, he claimed, adding that "any mix" of floppies and "hard" disks can be simultaneously supported. In effect, any random-access storage device can be included in the file structure, he said.

Variable block sizes, defined by the programmer, are supported while record blocking, included in MVT-Basic, is done by the system. A manipulation feature allows blocks to be inserted or

deleted anywhere in any file, the spokesman said.

The system permits creation of "virtually unlimited" file sizes, including support for files spanning more than one disk drive. The sector allocation scheme is augmented by a file system integrity maintenance feature, he added.

Backing for reentrant coding and a reentrant runtime system enable

Famos to support 20 to 30 terminals simultaneously. Execution speed has been enhanced through overlapping of interrupt and noninterrupt-driven processes, the company said.

Famos and the multiuser Basic compiler, including an S-100 bus-compatible vectored interrupt/interval timer board, costs \$2,050 and is available from the vendor at 21822 Sherman Way, Canoga Park, Calif. 91303.

Courses Set for Programmers, Managers

WASHINGTON, D.C. — Programmers and DP managers are the intended students of a pair of short courses scheduled this month by the Continuing Engineering Education Division of

George Washington University.

"Structured Programming and Software Engineering, Short Course 374," will run Jan. 16-20. It should provide experienced personnel with a

technical update in logical expression, analysis and invention in designing and building software based on sound architecture, according to a spokesman.

The course will cover discussion and application of structured programming and software engineering principles including stepwise refinement, program correctness and top-down system development. This \$495 course includes workshops and lectures, the spokesman noted.

"Short Course 236, Configuration Management of Software Programs," will meet Jan. 23-25 with several interrelated goals. It will review, for example, the relationship between hardware and software configuration management and will provide an insight into the technical and managerial aspects of a computer program contract, the spokesman said. This course costs \$395.

The director of the Continuing Engineering Division can be reached at George Washington University, Washington, D.C. 20052.

Account Work Runs on 3s, 32s

WARRENVILLE, Ill. — Despite its name, the Basic Accounts Payable (BAP) package was written in RPG-II for use especially with IBM System 3s and 32s, according to the vendor, Katwil International.

The package consists of 10 programs and various utilities to produce "everything" from edits through maintenance of the master vendor file, a spokesman added. It has provisions for manual and voided checks, dating and discounts, he said.

The package costs \$200 and can be ordered through P.O. Box 217, Dept. B, Warrenville, Ill. 60555.

Thousands of 1403's make IBM users look great. Now you can look as good.

You may be so accustomed to the printing you now get that you don't realize how bad it is. And, what it may be doing to your company's image. How does it compare with this:

- IT IS TIME TO TAKE A CLOSE LOOK AT THE PRINT QUALITY THE
- IBM 1403 WILL GIVE YOU. CLEAR, PRECISE, WITHOUT WAVY AND UNEVEN
- LINES. THAT IS THE KIND OF PRINTING THAT SHOULD BE REPRESENTING
- YOUR COMPANY.

Equally important is the 1403's extraordinarily high reliability, with downtime a rare occurrence. In addition, the 1403 is the fastest printer in its class.

The Grumman printer controller will interface the IBM 1403 to your present computer, whether it's IBM, DEC, Burroughs, Xerox, GA, CDC, HP or virtually any other, including minis. In today's market, the economics are favorable, too.

You can rent, lease or buy the Grumman printer controller. We can provide the maintenance. For complete information, get in touch with your Grumman Data Systems representative. Or contact Joe McDonough, Grumman Data Systems Corporation, Computer Products Division, 45 Crossways Park Drive, Woodbury, NY 11797, (516) 575-3034.



Grumman Printer Controller. The image maker.

Canada: Digital Interface Ltd. Tel: (416) 231-3321
 Nordic Countries: OY D. H. Wirkkala AB. Tel: 88 21 33
 Great Britain & Ireland: Data Design Techniques Ltd. Tel: 01-903 6977
 Spain: CERO. Tel: 416 87 60/ 416 61 88
 Switzerland & Austria: Intersystems AG. Tel: 061/35 09 25
 West Germany: PeriData GMBH. Tel: 06196/81952

SPEEDY

AUTOMATIC REBLOCKING

SPEEDY automatically reblocks both tape and disk files during normal DOS/VS processing. The end result is typically a 20-40% improvement in processing time and a 50-75% reduction in CPU overhead. Reblocking reduces the number of input/output operations and cuts down on supervisor overhead time. It also reduces disk arm movement which can be the most serious bottleneck in DOS/VS multiprogramming.

■ 30 DAY FREE TRIAL ■

QATACHRON CORPORATION
 174 Fifth Ave., New York, N.Y. 10010
 (212) 678-8333

Service Available on Telenet

NAC Adds Network Design Software

By Ronald A. Frank
CW Staff

GREAT NECK, N.Y. — An interactive network design service for users with limited design expertise has been introduced by Network Analysis Corp. (NAC).

Called the Modular Interactive Network Designer (Mind), the package allows users to access a specialized data base of network design parameters via the Telenet network.

Mind is written in Fortran and runs on a Digital Equipment Corp. Decsystem-20 under the Tops 20 operating system. It utilizes about 128K of storage at the CPU installed at Bolt, Beranek and Newman, according to Aaron Kershenbaum, director of network design services at NAC.

The Mind package consists of three modules: a network editor, a topological op-

verted into the V&H coordinates which are used in network design work.

The topological module will design a centralized multipoint line layout satisfying the user's requirements at the lowest cost, based on AT&T MPL interstate private line tariff, NAC said. The module can accept nets up to 1,000 nodes in a single design run and can be used to configure a new network or modify an existing one, the spokesman noted.

The topological module allows users to obtain "dollars-and-cents answers" on the economies of inserting multiplexing or concentration into a network, he said. Given data on the failure rates of hardware and line facilities, the module will compute the expected availability rate of a specific configuration.

This provides the user with information on making an optimal investment in redundant hardware and/or line facilities, according to NAC.

The multipoint line simulation system

module allows the user to obtain a throughput/response time analysis of a network configuration. It calculates the effect on network performance of such varying parameters as terminals per line, traffic load, message length, line speed, device characteristics and protocol, the spokesman said.

The design service can be accessed with asynchronous CRT or hard-copy Ascii terminals operating at 300- or 1,200 bit/sec on the Telenet network. As part of the service, NAC provides user training, documentation and up to four hours of free consulting time to assist the user.

The network design service includes two rate elements. The user pays a flat rate of \$5,000 for the first six months and \$4,000 for each successive six-month period. A second, usage-sensitive rate is assessed at 20% of the user's CPU usage charges.

NAC is at 130 Steamboat Road, Great Neck, N.Y. 11024.



CW Photo by R. Frank

Aaron Kershenbaum (left), developer of the Mind network design modules, discusses the system with Howard Frank, NAC president. Imlac PDS 4 graphics terminal was used to demonstrate the design tools.

timization module and a multipoint line simulation system. An executive program acts as a supervisor for the modules and guides the user through the design process, according to NAC.

The executive provides information to the user in ordinary English so the proper commands can be selected. As the user develops greater familiarity with the self-help command structure, productivity can be increased by bypassing these features, according to a spokesman.

The network editor is a data base system into which the user enters information describing the network. The edit module accepts location data in the form of telephone area codes and exchanges; this data is con-

ACS Becomes First U.S. User Of X.25 Over Public Packet Net

WILMINGTON, Mass. — Avco Computer Services (ACS), part of the Avco Systems Division here, reportedly has become the first user in the U.S. to utilize X.25 protocol over a public packet network.

Successful testing of this CCITT-approved protocol for connecting data communications equipment to packet networks was completed this fall in conjunction with Telenet, the first U.S. network to support X.25, and Cambridge Telecommunications, Inc. (CTX) of Bedford, Mass., developer of the DMEP X.25 software package for IBM systems.

The DMEP software at ACS operates in the IBM 3705 front end attached to a 370/158. It translates synchronous traffic from Telenet into asynchronous mode for entry into the IBM CPU. The DMEP package also makes the remote terminals in the Avco network appear to be operating in local mode to the 3705.

By having the terminals appear to be operating in local mode, Avco avoided making changes to its IBM Time Sharing Option (TSO) Tcam software. Terminals utilizing

the TSO network include IBM 2741s, teletypewriters, Ascii CRTs and Tektronix, Inc. graphics displays, all of which are operating at Avco client sites around the country.

ACS' first commercial DP clients were in the New England area, but the company soon found itself in the position of having to provide communications from as far away as Florida and the West Coast to serve the requirements of multilocation companies.

"It was clear we needed a nationwide network, and it is not very feasible for a company our size to build one," according to Gené Cort, manager of technical services. "We're not communications specialists."

Cort and ACS Director Richard Bibaud considered the value-added carriers to be their only real option. "We chose Telenet because of what this carrier is doing in synchronous communications with X.25," Cort explained. "A software interface means less equipment for us and makes it possible to run 3270-type applications in the future over the same network."

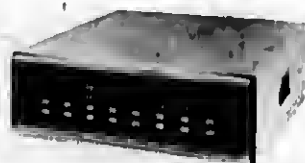
(Continued on Page 44)

CLIP AND RETURN FOR FAST RESPONSE

ComDATA

☐ Series 200 frequency division multiplexer

Data rates: Mixture of asynchronous channels up to 300 baud
Channels: Maximum of 18 channels
Diagnostics: Remote and local loopback, test, busy-out, indicators
Multi-drop: Drop one or more channels at a number of locations
Multiple access: Multi-drop channels have equal opportunity for processor channel
Line: Dial or dedicated
Options: Voice-plus-data, data regeneration



\$465 basic unit
\$325 channel end

codex

☐ Series 900 time division multiplexer



Data rates: Mixture of synchronous or asynchronous up to the high speed modem aggregate
Channels: Up to 64 channels
Diagnostics: Remote and local loopback, busy-out
Line conditioning: C2 conditioning recommended
Options: Auto speed detection, multi-drop

\$1283 base unit
\$152 async channel end

☐ Acoustic Couplers ☐ Modems ☐ Terminals ☐ Accessories

Check items of interest and return to us for additional information

ComDATA

8115 Monticello
Skokie, IL 60076
312/677-3900

New York
212/267-3696

member of
IOCMA
Los Angeles
213/624-0550

name _____
company _____
street _____
city _____ state _____ zip _____
telephone _____ ext. _____

multiplexers

Printer Terminals Ease Handling of Passbooks

By Christopher K. Watson

Special to CW

ROCKVILLE, Md. — County Federal Savings and Loan Association here, with assets of \$100 million, is unique among savings institutions of that size. County Federal employs minicomputers with its passbook savings application; the association also maintains a full-time DP staff of four.

County Federal attributes its successful employment of minicomputers in the savings

and loan business to the continuing reappraisal of its equipment capabilities. As a result, the association is currently replacing all of its printer terminals with newer, more effective units having the passbook insertion feature. The Carousel 350 printing terminals from the Terminals Division of Perkin-Elmer Data Systems have made a big difference.

Currently operating four savings branches, County Federal has two more

scheduled to open soon. Each branch now uses the Carousel 350 printing terminal for normal savings transactions — deposits, withdrawals, passbook updates and status of accounts. Each branch terminal communicates with the Data General Corp. Eclipse C/330 minicomputer at the main office over a 300 bit/sec dedicated communications line.

In addition to the 192K-byte CPU, there is an additional 96M-byte disk storage drive and a 9-track magnetic tape drive. Remote terminals include the Carousels and several DG 6012 CRTs, which are being replaced by Perkin-Elmer Model 1100 interactive CRTs.

Previous equipment included a DG Nova 830 and printer terminals that required extensive modifications.

Passbook Savings Only

County Federal uses the Carousel terminals only for the passbook savings application. The association does not offer statement savings at this time.

In the process of making a deposit or withdrawal, the terminal prints first on a carbonized journal roll through the deposit or withdrawal slips.

Then, in that same area, right over the top of the journal roll, the teller inserts the passbook into a front-form-feed device. This causes the passbook to be pulled into

position where the correct entry is made.

Automatic Positioning

In essence, the passbook positions itself automatically; it is no longer necessary to insert the passbook manually.

An advertisement brought the Carousel to County Federal's attention. Specifically, it was the front-forms-feed device that aroused initial interest, for at that time, association tellers were manually inserting the passbooks into the printer terminals.

In July 1977, County Federal brought one of the Carousels in on a trial basis. The print quality was immediately apparent. Both the existing terminal and the Carousel have plastic print wheels, but the existing terminal's wheel was subjected to more stresses and would break frequently.

The Carousel's cartridge slips in quickly, with no mess, unlike the old terminal.

No Modifications

The Carousels need no modifications by County Federal. The terminals being replaced had two costly modifications. First, key switches were installed for security purposes.

Then, because the old terminals were designed to work in a binary system, an interface had been designed and manufactured to interface those terminals with the DG

processor, an Ascii system. With the Carousel, daily passwords are used, and these terminals already understand Ascii.

The tellers at County Federal find the Carousel easier to operate. Now the computer and the Carousel do the forms positioning and the operator simply inserts the form into the front-form-feed.

Former Procedure

Previously, the operator had to open the carriage, insert the form, close the carriage, visually align the form and remove the form. This procedure was repeated for both the passbook and the deposit or withdrawal slip.

County Federal processed its work on a DG Nova 830. The association's growth, however, has been a little faster than anticipated. A DG Eclipse C/330 has now replaced the Nova 830. Yet, having chosen to go the route of the minicomputer, County Federal is not burdened with the problem of finding ways to pay off expensive DP equipment. Now there is no need for the DP department to perform services for other businesses and the staff of four is able to concentrate on its own applications.

Christopher K. Watson is assistant vice-president for information services at County Federal Savings and Loan Association, Rockville, Md.

ACS First in U.S. to Use X.25 on Public Packet Net

(Continued from Page 43)

The DMEP package was designed to run on an IBM 3704 and 3705 front end without any modification to existing host software. The ACS system is linked to a Telenet switching center in Boston over a 2,400 bit/sec private line.

Many simultaneous connections can be handled efficiently with this bandwidth, Cort said. It will not be necessary to increase the bandwidth to handle additional connections until a new IBM 3033 arrives this spring.

Initially ACS converted most of its low-speed users to Telenet. This move enabled the company to remove two Band 5 Wats and several FX lines at a savings of about \$1,800 a month.

In comparison, Telenet charges will be less than \$700 a month for computer access plus \$2 to \$5 an hour for terminal connection time, Cort said.

ACS uses Telenet's Network Virtual Terminal option, which translates all data into standard Ascii format and, in effect, makes all terminals look alike to the host computer. The option also relieves the host computer of certain editing and echoing functions that are performed at local network level.



'It Says: Money Is the Root of All Evil ...'

We know you've got everything

But ... what happens to your schedule when the unexpected job hits you?



BCS can take the overload off your back ... and help keep you right on schedule.

But ... what do you do while you wait for the equipment you need to bring your capacity up?



BCS has the hardware you're waiting for ... use it until yours is delivered, and up and running.

But ... what do you do when you can't find people with the critical skills you desperately need?



BCS has the experts in all areas ... they'll fill in until your search is ended.

26 Stores in Net Supermarket Terminals Perform S&L Tasks

ORLANDO, Fla. — A network of customer-operated terminals in 26 Kash 'N Karry supermarkets here is performing savings and loan transactions. Depositors of six different savings and loan associations in a three-county area surrounding Tampa and St. Petersburg can take advantage of the service at no cost.

Called Modern Money, the service extends savings and loan transactions to supermarket hours and locations by allowing depositors to cash checks and make deposits and withdrawals from their savings accounts.

The transactions are electronically transmitted against a customer control record or switching to the savings and loan data center for authorization.

The electronic funds transfer (EFT) techniques are implemented over 1,200 bit/sec asynchronous telephone lines and backed up with written copies of every transaction.

To minimize the use of supermarket personnel, the terminals are customer-operated and are located away from the customer service counter and cashier areas of the store.

System Security

Security is maintained by plastic Modern Money cards containing magnetically encoded information about the

depositor and secret identification codes that must be entered before the terminal will accept or verify a transaction.

All cash transactions are handled by the supermarket service counter employees after verification by the terminal.

The supermarket terminal transactions are identical to savings and loan transactions: withdrawals are immediately deducted from savings balances, deposits are credited subject to collection and checks are cashed against savings account balances until the checks clear.

On a daily basis, the savings and loan association receives a statement of each customer's account and a complete listing of all transactions. The supermarket merchant receives a complete reporting of every transaction (to use in balancing his cash accounting) and a weekly summary (to monitor store traffic patterns as they are affected by the terminals.).

A Data General Nova 3 minicomputer with 80K bytes of memory performs the file and communications processing for the network. The personal identification code, account status, Modern Money card expiration date, listing of the types and limits of allowable transactions and a running current seven-day total of allowable transactions are main-

tained on a 92M-byte disk.

File updating of this information is provided via an on-line CRT after telephone inputs are received from the savings and loan. Terminal transactions are processed by the Nova 3 on a time-sharing basis and electronically relayed over phone lines to the DP center that maintains the master files for each depositor.

Other computer peripherals used in the network include a DG Dasher printer, 1,600 bit/in tape subsystem, 300 line/min printer and DCU/50 data channel interface.

Software for the system was provided by Transaction Data Systems and the network design by Systems Technology, both Orlando-based companies.

After a second Nova 3 is installed for the network within a few months, communications processing and file processing will be separated between the two minicomputers, a spokesman noted, adding the network can then accommodate up to 500 terminals.

To the Modern Money cardholder, the service is said to facilitate shopping, check cashing and savings and loan transactions. The supermarket retailer reportedly enjoys increased store traffic, lower check cashing and credit card costs than with an in-store system and less employee time required for these activities.



A Modern Money terminal is shown operating in a Kash 'N Karry supermarket.

The savings and loans use the network to increase their service hours and locations at a cost that is shared by various financial institutions, since Modern Money is a statewide network, the spokesman noted.

The participating supermarkets are located in Pinellas, Hillsborough and Pasco counties surrounding Tampa and St. Petersburg. The six sponsoring savings and loan associations are Florida Federal Savings & Loan Association, Franklin Federal Savings & Loan Association and

Guaranty Federal Savings & Loan Association, all of St. Petersburg; Freedom Federal Savings & Loan Association of Tampa; First Federal Savings & Loan Association of Tarpon Springs; and First Federal Savings & Loan Association of Winter Haven.

Florida S&L Development Corp., an Orlando-based marketing and development firm, was formed to develop a cooperative EFT system for the savings and loan associations of Florida that could be shared with other financial institutions. The firm is owned by 82 Florida savings and loan associations.

Mobile Device Handles Storage, Communications

OAKLAND, Calif. — A mobile data storage and telecommunications device — the Cassetterm II — has been announced by Micom Industries. Described as a second generation of the Cassetterm, the latest model reportedly provides greater flexibility through microprocessor-based design.

Improved features include a minicassette memory system for serial storage and readout of up to 40,000 alphanumeric characters per cassette at 110 or 300 bit/sec rates, universal acoustic coupler that accepts most telephone handsets, a 32-char. display panel and full Ascii compatibility, the firm said.

Rechargeable battery operation and portability is important for many customer applications, it noted.

The Cassetterm II costs \$1,995. Options such as an RS-232C direct interface module and AC line power are available. Micom Industries is at 252 Oak St., Oakland, Calif. 94607.

under control

But... where can you find time to check all the applications systems to find the ones best for you?



BCS has most of them in operation... try us and see which ones work for you.

Most of the "Buts..." are the result of things going so well that you need more capacity, more people, more software now.

We know your problems, because we've been there... and solved them. We offer our experience and capabilities to help you when you need it the most. For example:

- MAINSTREAM®, our unique timesharing service. Only BCS offers you this choice:
- IBM 370/168's... remote batch and interactive... geared to large volume. MAINSTREAM-TSO.
- IBM 370/168's... interactive and overnight processing. MAINSTREAM-CTS.
- CDC CYBER 175's... interactive and remote batch for scientific and engineering applications. MAINSTREAM-EKS.

More than \$160 million in the latest hardware and peripheral equipment all linked by one of the world's largest privately owned telecommunications networks.

But, BCS offers you more than just time on MAINSTREAM. There's a range of products like PROJECT/2® to help you repeal Murphy's Law; SARA to diagnose your configuration... and EIS, the most comprehensive and innovative management planning tool around. Plus people — to give you critical skills now... and to train your staff for your future needs.

Now, while you have things under control, find out about the many ways BCS can help you when things get to be hard to handle. Maybe tomorrow?

The best reason to go outside.

BCS GOING COMPUTER SERVICES
177 Madison Ave., Morristown, NJ 07960 (201) 540-7700
O.K. BCS, maybe you are an extra resource I should know about.

Name _____
Title _____
Organization _____
Address _____
City/State/Zip _____
Phone _____

Who's leaking company secrets?

Perhaps no one — deliberately. But data vital to your company's management can "leak" in many ways. Some may be stolen. Some simply misplaced. Then there's inaccessible data. Unconsolidated data. DP centers which can't interact with each other. Yesterday's software and last year's hardware.



Take an unblinking look at the situation as a whole.

What now? Outside processing, perhaps, but what about security and reliability? A data base system? It'll take money, a lot of money, and help from people who know how.

As a manager, can you afford not to check us out?

We've already proven ourselves to others. With sensible upgrading of management systems. Innovative DP conversions. Workable consolidation plans. And a 99% up-time record at our Dallas Center. Send us your request for a proposal. Or ask for a Sun Seminar... a working session on subjects you choose. In your conference room. For the time you allot.

But your options are limited.

Computer problems are multi-dimensional and interrelated. You need a big single source, not a series of specialists. But in all the world, only a half-dozen companies have the depth, size and experience to accept the really big assignments. Now there's one more.

Sun Information Services.

Suddenly you've got another option.

For twenty years we developed and ran the computer services for America's 27th largest industrial — The Sun Company. Our capabilities, frankly, are the finest a large oil company could afford.

But to the marketplace, we're new. Which means we have extra incentive to prove we deserve your business. You'll find us more flexible. And far more inclined to develop new answers than apply old systems.



Send now to decide later.

We suggest only the next easy step. Clip the coupon. Then, you can exercise your options.

- ☐ A proposal may be in order.
- ☐ Tell me more about seminars.

Let us speak to your priorities:

- ☐ IBM or CDC Processing.
- ☐ Data Base.
- ☐ Project Management.
- ☐ Security.
- ☐ Reliability.
- ☐ The State-of-the-art.

680-K EAST SWEDSFORD ROAD, WAYNE, PA 19087 (215) 293-0660

Name _____

Title _____

Firm _____

Street _____

City _____

State _____

Zip _____

Sun

INFORMATION
SERVICES
COMPANY

Call us. The big new source.

Adding 3790 Emulation

CA to Provide SNA/SDLC Support for Syfa

IRVINE, Calif. — Computer Automation, Inc. will provide users of its Syfa network processing systems with Systems Network Architecture (SNA) compatibility, including the availability during 1978 of an IBM 3790 communications controller emulation package, using Synchronous Data Link Control (SDLC) line protocol.

The emulation package enables a Syfa network processing system to appear as a 3790 communications controller to an IBM mainframe while offering users local processing and mass storage capability in addition to batch and interactive communications, the company said.

In implementing SDLC, the firm is utilizing a programmable controller containing a microprocessor.

This approach reportedly allows the

WU Requests Rate Changes For TWX, Telex

UPPER SADDLE RIVER, N.J. — Western Union has filed with the Federal Communications Commission (FCC) for a revision of its Telex and TWX rates within the 48 contiguous states. Usage rates would decrease for long-haul traffic and increase for short-haul messages if the application is approved by the FCC.

If the majority of a user's calls are long-haul, there will be a decrease in the customer's billing. If short-haul calls predominate, a customer's bill will increase, a spokesman said.

For Telex subscribers, the present rate for the longest haul route will change from 60 cent/min to 52 1/2 cent/min, while the shortest haul route will change from 17 1/2 cent/min to 22 1/2 cent/min. This means that a 30-word message can be sent coast-to-coast for approximately 26 cents. The number of rate steps will be reduced from four to three, if the rate changes are approved.

Telex-to-Telex and TWX-to-TWX Infomaster store-and-forward service rates are being revised consistent with charges for the direct-dial service for both Telex and TWX service. Rates for Western Union Infomaster services other than Telex-to-Telex and TWX-to-TWX remain unchanged, the firm said.

For TWX customers, the longest haul interstate call dialed by a subscriber will be changed from 70 cent/min to 52 cent/min; a 100-word message sent coast-to-coast will cost 52 cents. The shortest haul interstate call up to 40 miles will be changed from 20 cent/min to 30 cent/min. The number of mileage zones will be reduced from 11 to five.

For remote access lines, beyond the city limits of the 623 TWX service cities, there will be a 75 cent per mile per month charge instead of the current 50 cent per mile per month charge.

Western Union also intends to file intrastate rates consistent with the interstate rates outlined above, a spokesman said.

offloading of SNA/SDLC overhead functions from the Syfa central processing unit to the microprocessor, which has its own 16K dedicated random-access memory (RAM), a spokesman said.

The microprocessor, which is loaded dynamically from the Syfa CPU, is said to provide the flexibility to adapt to future possible changes by IBM in network protocol details.

The 3790 communications capabilities are provided by the SDLC processor functioning in conjunction with an SNA-3790 software emulator executing in the Syfa CPU's main memory. This combined software/microprocessor approach allows the

system to emulate future IBM SNA products by writing additional software emulators to operate in conjunction with the SDLC processor, the firm said.

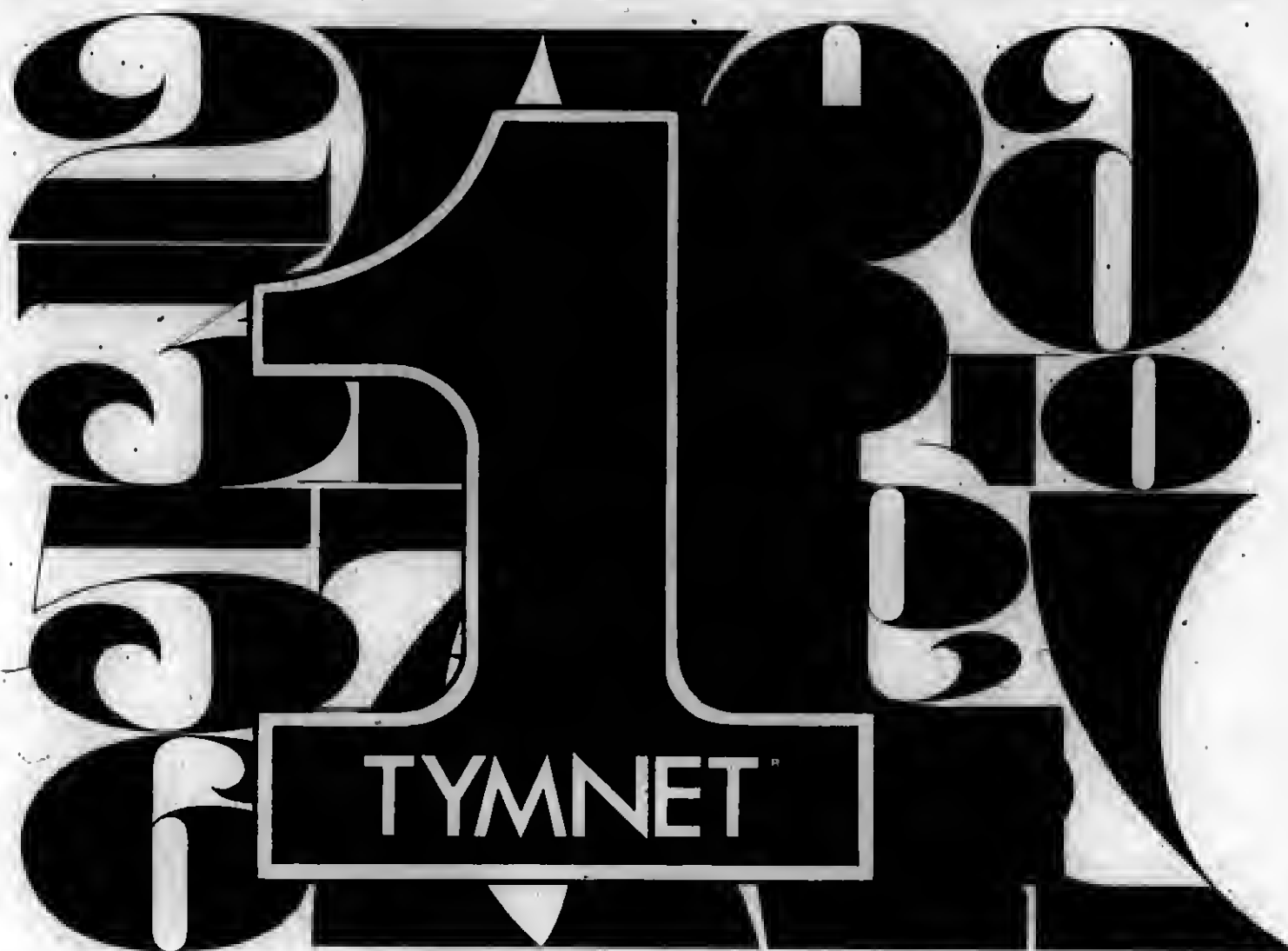
SNA communications will be initiated and/or received via any of the 24 terminals running applications on the system. These applications are written in the Syfa Business-Oriented Language (Sybol). Special read- and write-type commands in the Sybol language will be used to send information up or down the communication line. The Sybol application programs themselves can either be developed on the local Syfa systems or can be centrally developed for all distributed Syfa sys-

tems and then down-line loaded from the central step, according to CA.

Syfa's SNA-3790 communications capability will support all SNA commands with proper responses and handshaking, the company said.

The SDLC processor is priced at \$7,500. The SNA-3790 software emulator is also priced at \$7,500. The Syfa network processing system itself is priced from \$29,000 to over \$100,000 depending upon the particular configuration of peripheral and storage units.

First delivery is scheduled for the third quarter of 1978 from Computer Automation, Inc., 2189 Dupont Drive, Irvine, Calif. 92713.



No. 1 in packet network service for a lot of good reasons

Tymnet, Inc. is the established leader in packet network services. There are a lot of good reasons why. Our network service, TYMNET, has serviced more users with a greater variety of computers and terminals over a greater period of time, carrying a heavier volume of transmission, than any other packet service.

Consider these statistics about TYMNET, which in a typical day:

- utilizes over 265 intelligent, mini-computer nodes
- makes available over 2,500 access ports
- supports over 1,300 simultaneous terminal users
- services over 150 host computers
- carries approximately 300 million characters

TYMNET's success story is not accidental. It's based on long experience and sound planning, the use of advanced packet technology, plus an appreciation and understanding of the market for specialized data communications services, directed towards users whose network needs encompass time sharing, data base access, and message switching. These applications are distinguished by a large number of connections between

geographically dispersed, low-speed (1200 bps and below) terminals and a central computing facility. Typically such transmissions cannot be handled conveniently, reliably, or economically on standard communications facilities. But with Tymnet's existing, public packet network service users can take advantage of the operating efficiencies and economy of a national communications network designed specifically for these applications.

By incorporating the most advanced computer and communications technology in the network, Tymnet is able to offer its users a reduced operating cost plus a greatly improved communications facility.

- Users of TYMNET benefit from:
- highly sophisticated error detection and correction
 - alternate routing if a direct transmission facility should go down
 - full compatibility with all standard terminals and transmission codes
 - "turnkey" network management for the user
 - significant cost advantages

- the confidence and security that come from a packet network service with over 5 years of intensive operating experience

Domestically, TYMNET today provides access in over 130 cities — and the number of locations continues to grow. International operations can also be served by TYMNET, through interconnect agreements with the International Record Carriers which provide access in major world cities, from Rome to Hong Kong.

Experience — Capability — Comprehensive Coverage — Economics — in all these areas, TYMNET is unsurpassed as a packet network service. And why we can proudly claim the Number 1 title. For more information on TYMNET and how it can assist with your data communication needs, contact your regional Tymnet office or write or call Tymnet, Inc., 10261 Bubb Road, Cupertino, California 95014, (408) 446-7000.

TYMNET

Eastern Region (301) 770-5710

Central Region (713) 780-4455

Western Region (408) 446-7000

Cullinane Corporation Announces Free Seminars In Database and EDP Audit Software

IDMS, now the
only Database
System on the
Datapro honor roll
for the second
consecutive year.

Database Seminar

Presentations tailored to technical and management personnel on the Cullinane Data Management System (CDMS) including IDMS-DB/DC, INTEGRATED DATA DICTIONARY, ON-LINE QUERY and CULPRIT/EDP AUDITOR Report Generating Systems.

EDP-Audit Seminar

In-depth exploration of the capabilities and uses of EDP-AUDITOR, EDP-AUDITOR/3 and CARS 3, for IBM and non-IBM computers. Seminars include lectures, user presentations, examples of applications and discussion of auditing topics.

While these seminars are free of charge, they are conducted by individuals with extensive backgrounds in applied database and EDP audit technology to insure that the time spent at these sessions will prove of the utmost value for you and your staff.

John Cullinane

John J. Cullinane

Free Database Seminars

Cities	Dates
Miami, FL	Jan. 10
Jacksonville, FL	Jan. 12
Boston, MA	Jan. 17
Chicago, IL	Jan. 18
Indianapolis, IN	Jan. 24
Detroit, MI	Jan. 25
Montreal, QUE	Jan. 31
Raleigh, NC	Feb. 7
Philadelphia, PA	Feb. 7
Milwaukee, WI	Feb. 8
Greensboro, NC	Feb. 9
Louisville, KY	Feb. 21
Washington, DC	Feb. 21
Dayton, OH	Feb. 23
Grand Rapids, MI	Mar. 1
Memphis, TN	Mar. 7
New York, NY	Mar. 7
Birmingham, AL	Mar. 9
Minneapolis, MN	Mar. 15
Buffalo, NY	Mar. 21
Ottawa, ONT	Mar. 30

Free EDP-Audit Software Seminars

Cities	Dates
Miami, FL	Jan. 10
Boston, MA	Jan. 17
Chicago, IL	Jan. 18
Detroit, MI	Jan. 25
Montreal, QUE	Jan. 31
Philadelphia, PA	Feb. 7
San Francisco, CA	Feb. 7
Los Angeles, CA	Feb. 21
Washington, DC	Feb. 21
New York, NY	Mar. 7
Birmingham, AL	Mar. 9
Minneapolis, MN	Mar. 15

How to register

For further information and registration mail coupon or telephone (617) 237-6600

I plan to attend your _____ IDMS _____ EDP-Audit

seminar in _____ on _____
City Date

Name _____

Co. _____ Title _____

Address _____

City _____ State _____ Zip _____

Tel. () _____ My computer is: _____

Send confirmation to: _____



Cullinane Corporation

Wellesley Office Park, 20 William St., Wellesley, Mass. 02181 (617) 237-6600

Conforms to NBS Standard

Motorola Offering Encryption Hardware

By Brad Schultz
CW Staff

SCOTTSDALE, Ariz. — Motorola, Inc.'s Government Electronics Division has announced a line of encryption hardware conforming to the Data Encryption Standard (DES) approved by the National Bureau of Standards (NBS).

The announcement of Motorola's Infoguard products roughly parallels in time that of IBM's encryption line [CW, Dec. 12].

Data protection by encryption entails use of a key — a string of

bits — to encode data prior to storage or transmission and to decode data thus "scrambled" prior to accessing it. Scrambled data is therefore incomprehensible unless one has the key that scrambled it.

The Infoguard DES3100 Network Security Module (NSM) is described as suitable for "any application where sensitive data is exposed to clandestine monitoring and/or modification."

The NSM is suggested "for securing links between computer terminals, remote data job entry

terminals and central computer sites between computers, and between intrusion monitors and a

Motorola's Infoguard encryption line reportedly protects EFT applications, such as the "threat environment" shown on Page 59.

host processor," according to Motorola.

Another Infoguard intranet product is directed at electronic funds transfer (EFT) applica-

tions. The DES2400 Personal Identification Number Encryption Module (PEM) encrypts personal identification numbers (PIN) for remote financial transaction terminals.

The PEM accepts PIN data entered from a 10-digit keypad, enciphers it via the DES algorithm and outputs the enciphered text to a financial transaction terminal for transmission through a data network.

The PEM "can be customized to interface with user terminals... is compact and will greatly minimize fraud and counterfeit threats," Motorola claimed.

For Systems Development

Three Infoguard microprocessor-compatible Data Security Modules (DSMs) — designed to work with particular brands of hardware — are offered for use in systems development.

The MGD6800 works with Motorola M6800 microprocessor-based systems, and the MGD8080 works with Intel Corp.'s Micro Development System (MDS) and Single Board Computer (SBC) family, Motorola said.

The MGD6800 and -8080 set and load the key used in encrypting data or load a preset key for immediate use. Both are suitable for prototyping and engineering applications, a spokesman said.

The third Infoguard DSM

(Continued on Page 59)

Bank a Winner With \$57 Loss As It Brings COM Service In-House

Special to CW

ALLENTOWN, Pa. — Upper management usually frowns if a DP operation loses money, but when the First National Bank of Allentown lost \$57 one month on part of its operation, the loss proved the DP department had made some right decisions.

The bank had utilized the service of a computer, output microfilm (COM) service bureau for three years when management developed a timetable for converting to in-house operations. The bank was experiencing a 5% monthly growth in COM volume.

"We were planning for a mid-1978 equipment acquisition date," according to John Weinstock, the bank's vice-president of DP, "not only for monetary reasons, but also for convenience. We could have used several new microfiche applications requiring immediate turnaround that were found impractical with an off-site service bureau."

But last May the bank's COM timetable changed as its bureau announced its departure, along with a cessation of its services.

Weinstock studied the alternatives then open to the bank — either to use another service bureau or to bring COM operations in-house earlier than scheduled. He felt that if he could limit the bank's microfiche

volume and keep new applications to a minimum, he could cost-justify using the bureau for a maximum of six months. He anticipated, however, that two of those months would be required for a break-in period.

Weinstock instead proposed the immediate acquisition of in-house COM equipment to the bank's board of directors. He prepared a break-even analysis chart to compare COM service bureau costs with those of an in-house unit at incremental production volumes.

The chart showed the break-even point was 1,600 master microfiche and 6,400 duplicates per month. If the bank's growth

rate continued, its volume would reach that point in June, the same month the bureau would be discontinuing its service.

In addition, the bank would be acquiring Northampton National Bank that month, further increasing COM volume by 300 masters and 1,600 duplicates.

The proposal stated that because the bank's existing DP staff included both an operator and programmer, additional personnel would not be required.

The convenience of in-house microfiche management would give the bank the turnaround it needed for adding the cost-saving applications that had not

(Continued on Page 53)

Auerbach Gives Operations Tips

By Tim Scannell
CW Staff

PENNSAUKEN, N.J. — There are two ways to run computer operations — from memory or by the book.

Operating from memory is asking for trouble because it creates indispensable people; going by the book requires that procedures be correct and not too obscure or voluminous to follow, according to a publication released by Auerbach Publishers, Inc.

"Data Center Operations Management" is actually a series

of continually updated portfolios designed to acquaint the operations manager with solutions to problems involving planning, budgeting, personnel, efficiency and user/vendor interaction, Auerbach said.

Written in a "how-to" fashion, the publication attempts to help managers anticipate problems by presenting various examples that depict instances where these problems might occur, the publisher stated.

In one section, "How to Improve Internal Communications," the idea that management

is dealing with people is stressed with the emphasis on employee morale and satisfaction.

"Staff members who are not asked for their ideas and comments feel unimportant and their morale is lowered," according to the publication. When employees are not informed of changes or not asked to take part in group meetings, "there is an increase in inefficient job performance... and a feeling of competition and resultant isolation is fostered."

The pros and cons of memos

(Continued on Page 58)



with NATIONAL'S nationwide terminal services, mixed vendor products and continuous product maintenance.

We offer easy upgrades, easy terms, rapid delivery and installation (usually from stock)

So fight Terminal Inflation by dialing (800) 243-9006 NOW, (in Conn. 203-325-3831) before you turn this page and forget!

OFFICES LOCATED IN BOSTON-NEW YORK AND OTHER MAJOR CITIES

DEC (LA-36 LS-120 LA-180 VT52)	TEXAS INSTRUMENT (TI-745 TI-743)	LEAR SIEGLER (ADM 1-A/2-A/3-A/4)	DIABLO (HI Type I and HI Type II)
TECHTRAN (815-8410-8400-8420-8421)	National Computer (our very own) LA-36 ASR (NCC 1050 Reader Punch)	NCC (Modem-Couplers)	 NATIONAL COMPUTER COMMUNICATIONS COMPANY 28 Sixth Street Stamford, Connecticut 06905

SYSTEMS & PERIPHERALS

Tektronix 4020 Series

**When you make
your next investment
in terminals...**

**Get something
to show for it.**

The new Tektronix 4020 Series may be your first long-term terminal investment. It's a series of refresh terminals designed to fit your needs today... and your growth picture tomorrow.

For example: The 4025 terminal expands from smart alphanumerics...to forms ruling...all the way to graphics. You start with basics like expandable memory. Familiar typewriter keyboard with complete, easy editing. Scrolling. Easy-on-the-eyes green display with variable brightness.

Now or later, add forms ruling. You can construct separate on-screen workspace and monitor areas that scroll independently. You can recall complex forms with a single key.

Finally, you can add Tektronix graphics. The 4025's 34-line deep screen is the perfect proportion for graphics. Our PLOT 10 Easy Graphing software makes bar charts, pie charts and histograms easy to produce. Alphanumerics, graphics and forms can be positioned anywhere on-screen, in any combination.

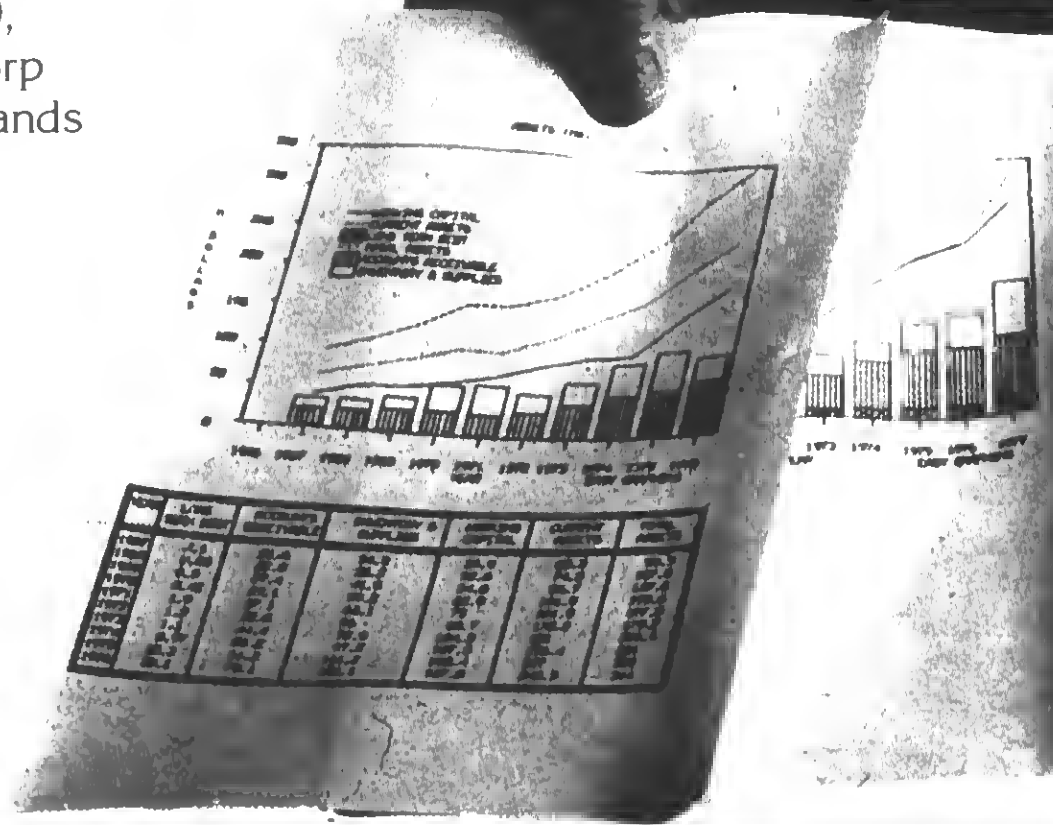
Our companion 4024 provides secondary growth... from alphanumerics to forms.

So you can closely plan and manage your terminal investment with optimum cost control.

Ask your local Tektronix Sales Engineer for a personal demonstration. We'll show you a priced-right, expandable approach to your input and display needs, with the promise of proven reliability and worldwide Tektronix support. The new 4020 Series. It's an investment you can grow with. Even when you're too busy for words.

Tektronix, Inc.
Information Display Group
P.O. Box 500
Beaverton, OR 97077
(503) 638-3411
Tektronix Datatek NV
P.O. Box 159,
Badhoevedorp
The Netherlands

OEM information available
Copyright © 1977, Tektronix
All rights reserved





Tektronix
COMMITTED TO EXCELLENCE



A COMMERCIAL WITH NO PROGRAM INTERRUPTIONS.

The Data General CS/40 Commercial Systems. They speed up program development using ANSI '74 COBOL and unique screen handling extensions. And these interactive small business systems can be enhanced without redesigning original programs. So CS/40 systems keep saving you time and money.

CS/40 systems, with multiple interactive terminals, put data processing power right in the hands of the people who need it. When they need it.

CS/40 systems won't interrupt your growth. Adding hardware such as larger discs or more terminals, or changing to other models, need not affect application design structure or programming.

CS/40 systems. The best way to minimize the application development investment. And the best commercial for a business system supplier's sales. For more information, call (617) 366-8911, Ext. 4735, or write.

 **Data General**
We make computers that make sense.

Data General Corporation, Westboro, MA 01581, (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61 rue de Courcelles, Paris, France, 766.51.78.
Data General Australia, (03) 82-1361. Data General Ltda., Sao Paulo, Brazil. © Data General Corporation, 1977.

Century-to-Criterion Move Ups Production 25%

By Tim Scannell
CW Staff

TAUNTON, Mass. — A manufacturer with 11 factories throughout the U.S. experienced a 25% increase in production after upgrading from an NCR Corp. Century 100 to that firm's Criterion system.

Robertson Factories, Inc., based here, produces such home products as curtains, draperies and bedspreads that are sold mainly through Sears, Roebuck and Co. stores. The Criterion system, in processing more than 1,000 orders per day, controls everything from the shipment of raw materials

from the mills to the delivery of finished goods, billing and accounts receivable, according to Ibrahim M. Abdallah, Robertson's vice-president of information systems.

When it is received, each order is assigned a number that becomes its file address within the system. The computer checks the inventory to see if the necessary raw materials are in stock.

If they are, the computer assigns the order to the factory nearest to the customer.

computer at Sears in Chicago, where the retailer accumulates orders. By dialing, I can automatically pull all their orders into our system."

The second network is used for communications between headquarters and the factories. Each plant dials the home office daily to receive orders, exchange administrative messages and transmit data on shipments for the day. All of this is done through a terminal at each factory that is equipped with a line printer which prints out the data from disk off-line.

The Criterion in Taunton deducts the raw materials from inventory, pulls the order information from the disk file and then invoices and debits customers in the accounts receivable file.

(Continued on Page 55)

User Wins With \$57 Loss

(Continued from Page 49)

been feasible with the service bureau.

The bank's board of directors gave the go-ahead for the acquisition, and Weinstock began studying several types of COM equipment. To save on processing time from his NCR computers, he decided to use a mini-computer-controlled recorder. The mini would also facilitate conversion of additional application to COM.

To keep labor time to a minimum, Weinstock looked for a maximum of automatic operational features in the mainframe. For microfiche duplication, the convenience and lower supplies costs of vesicular processing led him to switch from the diazo supplied by the service bureau.

With these basic requirements for a system, Weinstock compared suppliers. He chose a Mini-Autocom recorder and Autofiche duplicator from Datagraphix, Inc. They successfully filled his requirements and could easily be integrated into his DP environment, he said.

Two weeks later, the system was delivered. "To be quite frank about it," he said, "the changeover was better than I expected." The Autocom arrived on a Wednesday, three days before the service bureau discontinued operations. By 9 a.m. Monday, the first microfiche copies had been delivered to users throughout the banks.

Ten minutes later, Weinstock received a phone call from one of the bank's heaviest COM users. Her comment was: "John, they're beautiful!"

"This is the first time I have ever gone to a new system and had users actually compliment me on the product," he said. "I knew then that the system had passed the test ... and we have been live ever since."

The bank now produces daily abbreviated trial balances on microfiche for its 190,000 customers in 26 branches as a "real-enough-time" backup for its extensive on-line system. A history file created by the cross-indexed activity trial balance provides answers to customer account inquiries, saving enough research time to free two employees for other banking responsibilities.

The trust records and miniledgers, which previously consisted of up to 15 paper addendums to each account, are now updated each morning as a group on microfiche, saving hours filing and retrieval time for the bank's employees, Weinstock said.

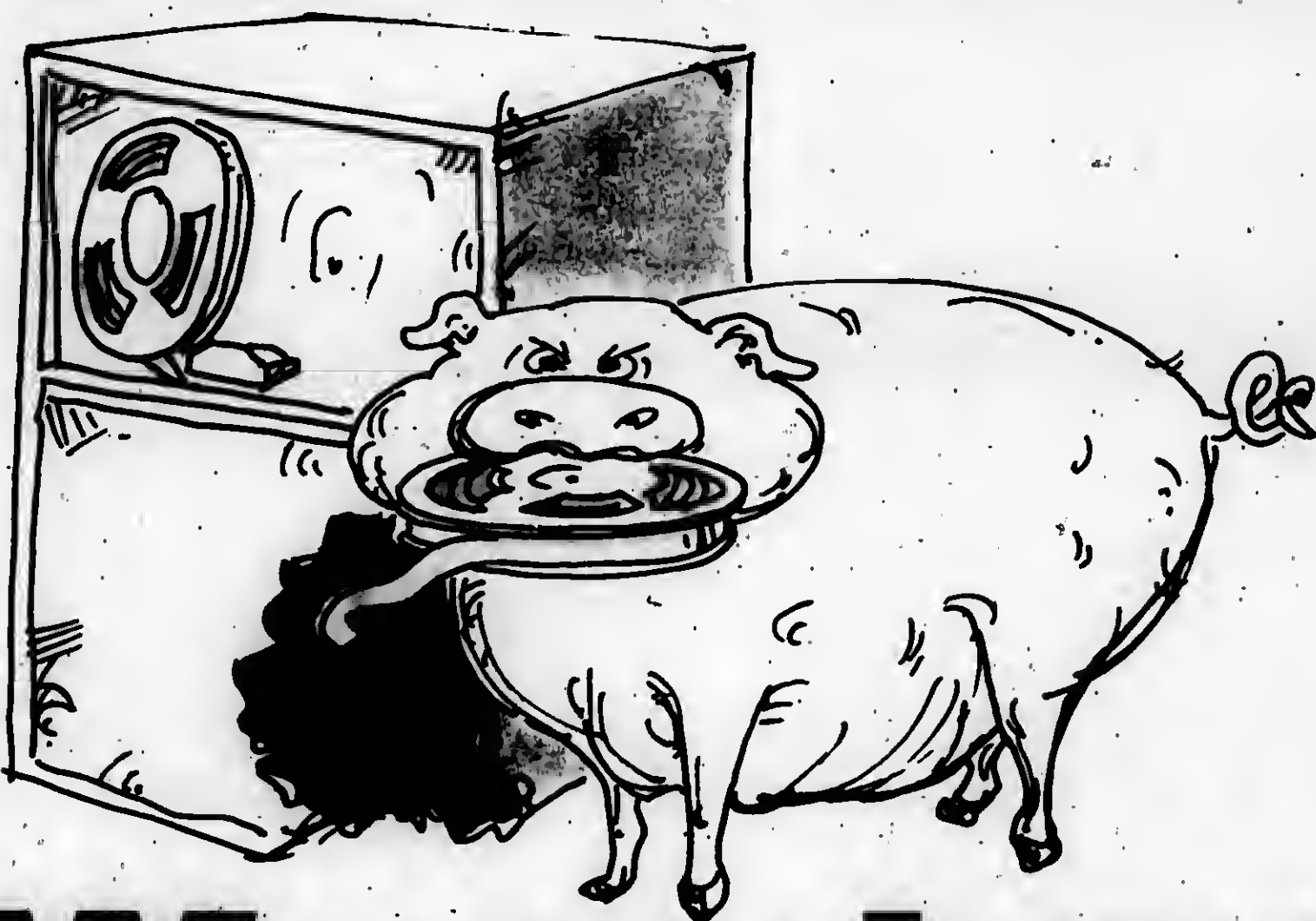
For its archival records, the bank stores original microfiche in an off-site warehouse after copies are made for immediate use. So much space has been saved by the use of microfiche for archival records that the purchase of an additional storage facility has been forestalled at least one year.

In the first month of operation, the actual costs of the in-house system were only \$57 over equivalent service

bureau charges, indicating the bank's conversion to in-house COM was made precisely at the break-even point. The bank's present volume of 2,000 master microfiche and 8,000 duplicates is saving the bank \$800 this month, with greater savings anticipated every month.

Two Networks

"We have two communications networks operating over the switched telephone network," Abdallah explained. "The first one is a stand-alone network which communicates with a



Wanna buy a hog?

Or the DBMS with No. 1 throughput on the market!

Their DBMS can eat you up alive. Waste your resources, CPUs, and slash the performance value of your million-dollar mainframe. A smart buying decision now can save millions in additional staff and hardware upgrades over the next few years. You should buy **DATAKOM/DBI**. We're easiest-to-use in design, implementation and maintenance of applications systems. Best on-line performance for inquiry and/or update transactions under **DATAKOM/DC** (our superior telecommunications monitor), CICS or

other monitors. ☐ Unequalled sequential processing capabilities. ☐ Minimum use of 360/370 hardware resources including CPU cycles, memory, I/O events and DASD space. ☐ Exceptionally readable and useable documentation. ☐ Continual, innovative, cost-effective enhancements. Call or write today. Let **DATAKOM** prove we're the most efficient, cost effective and easiest-to-use DBMS on the market... compared to any 'Big Bad Byte Eater' you can name!

I want you to prove **DATAKOM/DB** superiority on 360/370 systems.

Name _____ Title _____
Firm _____ Phone _____
Address _____
City _____ State _____ Zip _____

Member **STIA** Software Industry Association

DATAKOM DB and DC. Great by themselves... Even better together.

insyte datacom
corporation

214/526-4280
3707 Rawlins St. Dallas, TX 75219
Boston/Chicago/New York/Denver/San Francisco/Mexico City
Frankfurt, W. Germany Sydney, Australia

Memorex SuperReel™ A new approach to computer tape reels. The SuperReel is the new shape for tape drives here now, and for the new generations to come.

SuperReel gives you a uniquely-shaped I-Beam hub, making it 90% stronger than conventional reels, giving SuperReel the strength to withstand the higher tensions of both your current and future drives. SuperReel also has a specially-shaped tape wind surface, to prevent edge damage during rewinds. And all SuperReel components are ultrasonically welded—no glues or solvents—for improved strength, product uniformity, and lasting performance.

SuperReel is the only reel specifically designed to meet the demands of advanced drive technology. The one reel that surpasses all published specifications for high-performance drives. The one reel that performed reliably in stringent testing conditions at 15 ounces of tension and speeds up to 220 ips. The one reel with no flange expansion or contraction under stress conditions. The one reel balanced to prevent hub-to-drive fit problems.

Memorex SuperReel. A better reel, to give you better results. Better winding. Positive autoloading functioning. More accurate data transfer. Greater reliability. On the drives you're using now, and the new generations of drives to come.

Memorex SuperReel. The new shape that'll put your data processing in great shape.

Ask your Memorex representative to explain how SuperReel can dramatically reduce your data processing costs. Locations in principal cities worldwide. Or contact us at 1200 Memorex Drive, MS-0064, Santa Clara, CA 95052. Phone 408-987-1043.



MEMOREXCELLENCE

Units Seven Miles Apart

On-Line Units Handles 'Split' Hospital's Payroll

By Tim Scannell
CW Staff

PROVIDENCE, R.I. — St. Joseph Hospital, a 500-bed voluntary hospital separated into two units that are seven miles apart, has implemented a computerized payroll/personnel data system using a large-scale mainframe and a series of remote terminals.

The heart of the system is an IBM 370/138 system that is connected to a number of electronic time recorders placed strategically throughout the two units, Our Lady of Providence and Our Lady of Fatima, according to John W. Flynn, fiscal services director at St. Joseph's.

Each employee on the hospital staff is given an identification badge with a magnetic strip on the back containing a numerical code. All the information concerning that person is entered into the computer and a file is built that includes such things as his position in the organization, tax data and attendance records.

The information is then "leveled" as to its retrieval capability, protecting each employee's privacy while giving access to current personnel data by appropriate officials, Flynn said.

Key to Success

The key to the system's success, according to Flynn, is the direct connection of the time recorders to the CPU.

"We installed nine IBM electronic time recorders in the two hospital units. They are tied directly into the computer. When an employee 'badges in,' his time is encoded right into the system.

"There are no time cards and so no need to either keypunch those cards or to interpret individual payroll eligibility for shift differential, overtime, etc.," Flynn said.

At the end of each pay period, print-

Upgrade Boosts Production 25%

(Continued from Page 53)

Abdallah said.

The system is built around a Criterion 8550 CPU with 196K bytes of memory. It includes two NCR 634 tape drives that are switch-selectable for either phase-encoding or NRZ; four Model 658 disk drives with 100M-byte capacities; and an NCR 647 printer.

The system also contains a file on all contracts that are taken out with the mills, including their terms, Abdallah said. If a mill delivers an excessive number of "seconds," the computer compares the data with the contract terms and notes the deviations.

A file is also used in the inventory control program, which is used to determine the status of any style or color of material. As mill shipments are made, goods are added to inventory and deducted from the appropriate mill's contracted amount.

The possibilities of the present system are many, according to Abdallah. The information systems staff is experimenting with a forecasting program by accumulating histories of trends by style, color and the percentage of colors within each style.

outs are returned to the supervisory people for approval. Although the CPU has done all of the required calculations, supervisors check the employee's sheet for such things as sick days, holidays and vacation time, Flynn stated.

Alterations or corrections are then made on-line through a CRT terminal and the check is printed directly from the processed data.

The 1M-byte 370/138 configuration at the hospital operates in a DOS/VS environment. The system includes 10 Model 3330-1 disk drives with 100M-byte storage capacities; 32 Model 3410 80K-byte tape drives; a 3505 card reader, a 3525 card punch, a Model

1403-N1 printer with a speed of 1,100 line/min, 36 local terminals and 15 remote terminals, according to Norman Berube, acting DP director.

The benefits of the system are numerous, Flynn said. "In one department alone there are 24 different shifts and eight different ways an hourly employee can qualify for five separate rates of overtime pay under our policies," he noted. "The computer is programmed to recognize each employee's pay grade, so the tremendous amount of paperwork and potential for human error is totally removed."

Budget analyses, overtime reports and detailed employee paycheck and deduction statements are also prepared

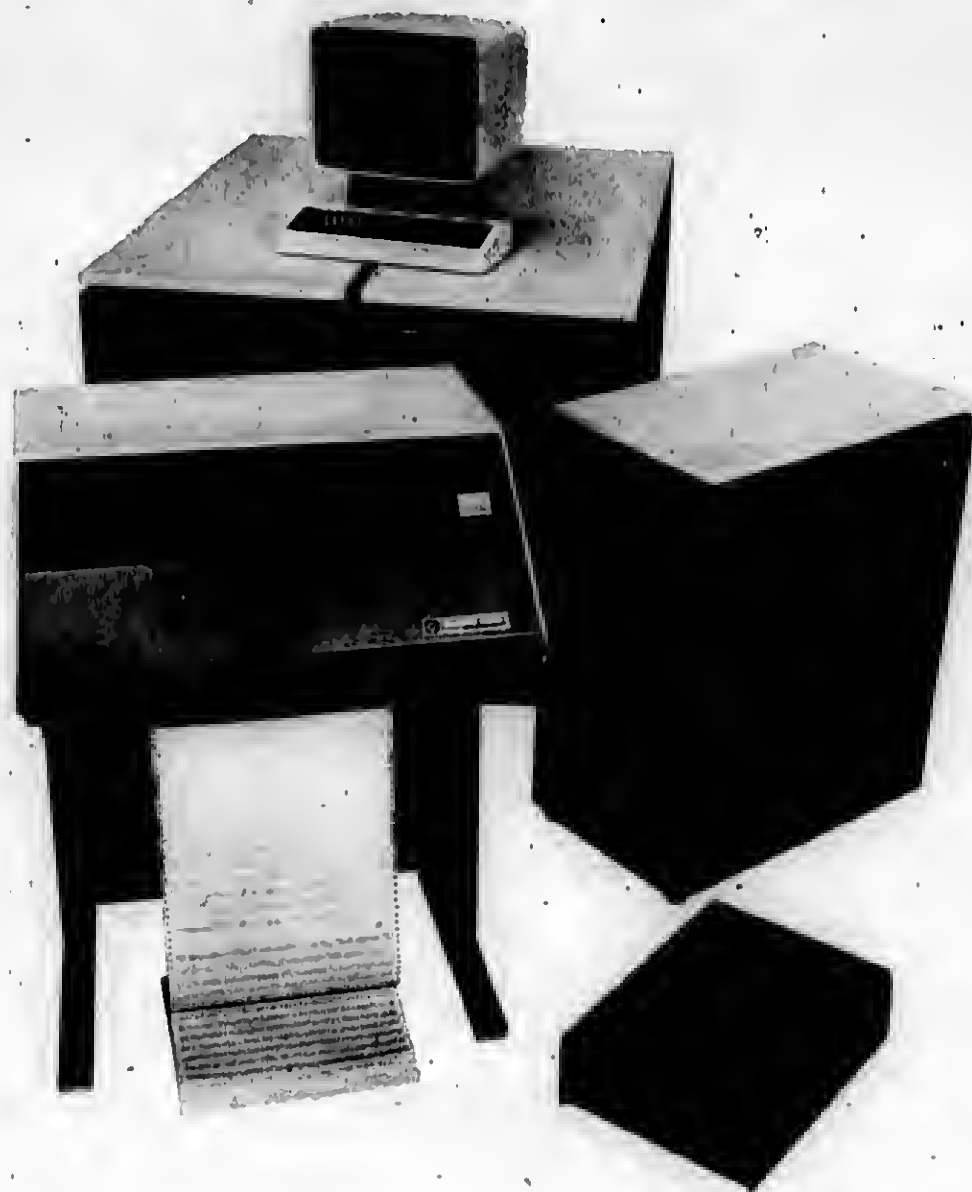
by the system, relieving the supervisors of these duties, he added.

"By dropping keypunching and various clerical functions, we have enabled the staff to engage in other work," Flynn noted. "We have also substantially upgraded the availability of a wide variety of direct and ancillary personnel data."

"For example, we are able to ask the computer to provide analysis of future retirees as of a particular date and their projected benefits. The answer is available in seconds, without the need to wade through a substantial number of individual files or group data," Flynn said.

(Continued on Page 59)

Computer Optics announces a new 3270 feature.



Immediate Delivery

Computer Optics can deliver a complete 3270 replacement installation — CRT displays, remote and local controllers, printers. And we can deliver tomorrow, the next day or as soon as you need it.

Computer Optics is totally dedicated to 3270 series replacement systems.

Minicluster systems that handle up to eight tubes or printers in a remote location. Maxiclusters, either local or remote, for up to 32 tubes or printers on one controller. All are plug-to-plug compatible with IBM equipment.

We've always saved you money over your IBM

3270 costs. And now, we can also save you time.

If you can't wait a year to expand your present display installations, or if you'd simply like to reduce your display costs, call Computer Optics immediately.

After all, time is money.



Computer Optics Inc.

Berkshire Industrial Park, Bethel, CT 06801

Toll free: 800/243-1314 In Connecticut call 1-744-6720 collect.



...it can help
...uncertainty when
...the company."

A Prime 400 computer at the National Fire Adjustment Company is helping businesses and homeowners through the chaos and doubt that often follow a fire or other disaster.

The Prime computer, using information gathered on the spot, can develop in a matter of hours a detailed loss estimate reflecting up to the minute local building costs. A claim can then be made on the basis of standardized, reliable data that both the policyholder and the insurer can understand and accept.

Thousands of large and small companies have found that Prime computers can equal the performance of large mainframe systems, several times more expensive, and in some cases can achieve results unmatched by any other computer, regardless of size or price.

Prime's family of interactive computer systems offers industry standard software including FORTRAN IV, BASIC, RPG II, COBOL, and a CODASYL-compliant Database Management System. They also have greater memory capacity than any other family of minicomputers: up to 8 million bytes of high-speed main memory, 2.4 billion bytes of disk storage, and 512 million bytes per-user of virtual memory. Prime computers are also true multi-user systems: one computer can handle up to 32 simultaneous users in such diverse activities as RJE communications, forms processing, on-line data entry, computational time sharing, and database management. And the PRIMOS Operating System allows any user to use any language at any time.

For more on how Prime can help, write Joseph A. D'Angelo, Director, Market Planning, Prime Computer, 40 Walnut Street, Wellesley Hills, MA 02181.

PRIME Computer

"Prime is helping



Fiche Accessory

SMYRNA, Ga. — Curtis 1000 has introduced a line of microfiche filing and mailing envelopes fabricated from acid-free paper that reportedly feature neutral gumming seams.

The envelopes will not chemically degrade the microfiche they hold, a spokesman claimed. Two styles are offered, one with an open top and the other with both an open top and open side.

Both styles have no front seam to snag microfiche as it is inserted, the spokesman said.

Prices of the envelopes range from .6 cent to 1 cent each in quantities of 1,000 with an additional cost for printing from Curtis 1000, 1000 Curtis Drive, Smyrna, Ga. 30080.

Tips for Operations Managers Published

(Continued from Page 49)

are also discussed in the section on internal communication. "The advantages of memos over verbal communication are less consumption of time, more precise expression and their availability for later reference," according to this section.

On the other hand, "feedback to the sender is usually nonexistent or delayed; a memo may not be clear or complete, and thus require additional communication... and a memo does not permit the sender to be sure of the receiver's response, understanding and feelings.

Successful Recruiting

"In the normal daily onslaught of problems, there is sometimes a tendency to forget that the basic ingre-

dient of every organization is people," the section on recruiting operations personnel contends.

"For some reason it seems the ideal person to fill any given opening is already satisfactorily employed somewhere else."

With this in mind, the manual resolves that "finding the right person for the position is really a function of finding the right group of people from which an individual can be selected."

A recommendation from a reliable employee is the preferred method of selecting a candidate for employment, according to the manual. Professional recruiters, advertising in trade and community newspapers and; occasionally, a radio or television spot are listed as dependable alternatives.

Direct contact with schools is,

however, recommended when an entry-level position is involved.

Screening and interviewing are also covered in the recruiting section, as well as what to expect from a new employee and what to do if that person does not live up to management expectations.

"It is possible the employee is simply mismatched to the job or the organization... If the employee cannot perform the job, consider the possibility of transfer to a more appropriate position.

"If no alternative exists, do not simply allow the employee to remain in the position with little or no advancement," the manual advises. "The definition of success in recruiting is placing the right person in the right job to attain the desired level of performance and satisfaction."

The section on establishing job flow procedures discusses why such procedures are necessary, what to expect from them, what tools are needed and how to put it all together. Job submittal forms, the need for error correction procedures and the problem of operator efficiency are among the topics outlined in this portfolio.

Also discussed is the programmer's involvement in the computer room and what steps an operator should take if a particular job's information is not clear.

"First ask the programmer to provide whatever is missing, even though you don't know exactly what that is. If the programmer provides no information, ask the programming manager to get it.

"If all else fails, either refuse to run the program until the information is provided or find out the programmer's home phone number and schedule the job for 4 a.m."

Maintenance procedures, including the proper care of magnetic recording devices, are also covered by the manual. So called shortcuts that save time by averting good maintenance procedures may cost more in the long run in lost computer time and data file reconstruction," the portfolio said.

The manual describes some events that have affected privacy in data processing such as the Fair Credit Reporting Act, the Privacy Act of 1974, international acts and future legislation and policy.

File security is also discussed from the standpoint that "good security is built on good procedures that are easy to follow and do not cause resistance from the people who must use them."

Touching briefly upon audits, the manual recommends they be used "to improve the operations function and... accomplish such things as validating the usefulness of present systems, identifying reports that might be eliminated, initiating a frank discussion of user complaints and reviewing the efficiency of operating and data procedures."

Finally, the manual examines the requirements and selection of a DP site including building specifications.

"Data Center Operations Management" is available at the subscription price of \$150 per year. In addition to the manual, subscribers to the series receive bimonthly supplements of four portfolios each that are revised on a continuing basis.

Auerbach is at 6560 N. Park Drive, Pennsauken, N.J. 08109.

MDS Series 21. Engineered for distributed processing with or without programming.



The cost of programming a distributed processing system can easily exceed the cost of the equipment. Series 21™ from Mohawk Data Sciences solves that problem by eliminating the need for programming in many of the applications most common today — those requiring from one to four operator stations for use in source data entry/verification, and remote batch communications.

Series 21 eliminates that programming requirement through its unique Formatted Data Entry Program (FDEP). FDEP consists of

pre-programmed software routines that allow formats currently used on keypunches, key-tapes or key-disk systems to be quickly and easily converted for use on Series 21.

Within hours after installation of Series 21, remote site personnel with no previous computing experience can become productive data entry operators. When your application requires more sophisticated editing capabilities, or file management, or local transaction processing, you can upgrade from FDEP to full

programmability under MOBOL™ (Mohawk's Business-Oriented Language) without replacing any hardware.

MDS is now conducting seminars on distributed data processing in major cities throughout the country. For an invitation to a seminar and a demonstration of Series 21, call our headquarters, 1599 Littleton Road, Parsippany, N.J. 07054, (201)540-9080, and ask for James J. Byrne, VP, U. S. Sales.

™Trademarks of Mohawk Data Sciences Corp.



Mohawk Data Sciences
1599 Littleton Road
Parsippany, New Jersey 07054
(201)540-9080

Please send further information on Series 21.

Have a salesperson call.

Send a schedule for the next free DDP seminar in my locale.

My application is

Name

Title

Company

Address

City

State

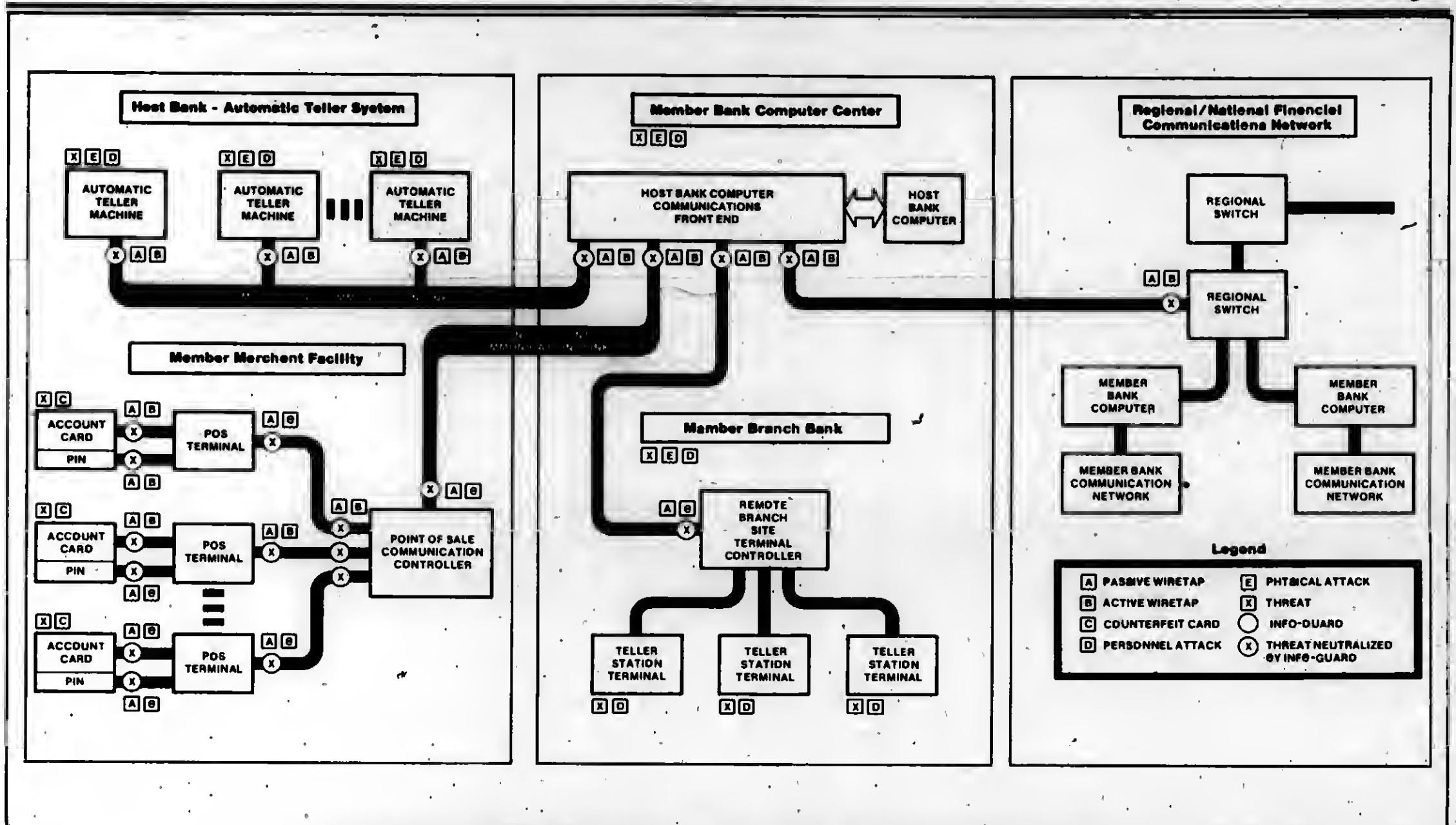
Zip Code

Phone

CW 190

MD

Mohawk Data Sciences



This Motorola illustration shows how Infoguard can protect an EFT threat environment.

Motorola Brings Out Encryption Hardware Line

(Continued from Page 49)

works with Digital Equipment Corp.'s PDP-11 minicomputers, fitting in one standard peripheral slot. The DES1100 board includes storage for encryption data, address-select logic, direct memory address (DMA) logic and three registers for control, status and data transfer.

Other Devices Forthcoming

The NSM, PEM and DSMs are available now, while another group of Infoguard products will be available in the second quarter of 1978, a Motorola

spokesman said.

The forthcoming group of products includes the factory-programmed DES4100, DES4200 and DES4300 devices. The DES4100 and -4200 are tabletop units differing from each other in method of key entry, whereas the -4300 is a rack-mounted device delivering one to 16 data channels, the spokesman said.

The DES3100 NSM is priced at \$3,000 per unit and the DES2400 PEM at \$250 per unit in quantities of 1,000, the spokesman said.

The MGD6800 and -8080 DSMs are priced at \$475 and \$495 respectively in quantities of one to four; the custom DSMs cost \$300 per unit — depending on the configuration for which they are designed, he said.

The DES1100 DSM costs \$1,995. The DES4100, -4200 and -4300 pro-

ducts will sell for \$2,500 to \$3,500 per unit, the spokesman continued, noting that the price will vary with options — in the case of the DES4300, according to the number of data channels selected.

Motorola is at 8201 E. McDowell Rd. Scottsdale, Arizona 85252.

Payroll Managed On-Line For Hospital in Two Places

(Continued from Page 55)

The hospital is also preparing for involvement in the federal pension reform act, according to Flynn. "St. Joseph's, as a church-operated facility, is exempt from the system at the time, but we are preparing for compliance

when required in the future," he said.

Although hospital officials are confident of the accuracy and reliability of the computerized system over the traditional keypunched time card methods, they also retain a manual "backup system" for emergency use.

Presenting the most dynamic business Opportunity since the Big Mac.™

A National ComputerLand Retail Franchise

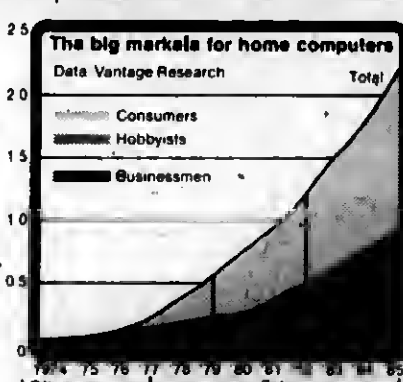
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Big Mac is a trademark of McDonald's Corp.

Mail to E. E. Feber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW
San Leandro, CA 94577 (415) 895-9363

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

CASSETTE TO MAG TAPE CONVERTER



Model 440B Microprocessor interfaces NCR 761 Cassette Handler to NCR 736 Data Encoder for Bi-directional or Unidirectional conversion.

- Automatically changes ASCII to EBCDIC or BCD during conversion.
- Provides computer compatibility for cassette generating terminals.
- High throughput rate
- Low cost.

COMMERCIAL DATA PROCESSING, INC.
2241 S. Grand Blvd., St. Louis, MO 63104
(314) 776-1130 (314) 652-1130



The reason Epoch 4 has made it so big in Switzerland is because it deserved to.

Quality. It's part of the universal language.

In a modern, high-technology country like Switzerland, a product that performs the way it's supposed to gets discovered fast.

And that's particularly true with computer tape such as Epoch 4.

Since its introduction several years ago, millions of reels of Epoch 4 have been sold. And billions of error-free passes have been made with it.

And the word has obviously

gotten around. Not just in Switzerland — but around the world.

Epoch 4 is known everywhere as the proven media for recording critical data. It's the patented one. The one that's working all over the world.



GRAHAM MAGNETICS *Proven around the world.*

Graham, Texas 76048



Talking to Mini Makers — Part 1

Support Problems Exist, Vendors Admit

By Esther Surden
CW Staff

Problems do exist with hardware maintenance and software support, a sampling of minicomputer vendors and small system makers admitted in recent interviews.

Most said they are working on ways to improve their services and make operations easier for their users.

Not all of the vendors were as blunt as Basic/Four Corp.'s director of marketing support, Chuck Muhle, who said, when asked what users should be able to expect from his system, "Users should expect a trouble-free operation."

Many, including Muhle, whose system was designed for first-time users, pointed out operations would be less troublesome if users took the time to get as much training as possible on their systems. As Muhle stated, "What is installed should not be asked to do what it was never intended to do."

Mike Snyder, manager of customer technical services at Computer Automation, Inc., concurred with Muhle. His firm deals with highly sophisticated users who have worked on many minicomputers.

"A problem is convincing the users to come to training classes. We can cut development time if we can get them to the training classes first, but many users feel they know enough about the systems" because they've worked on similar machines from other vendors. The two or three weeks spent on training would be well worth it, he said.

Users Misinterpret Guides

Since "most problems at the first level are misinterpretations of our users' guides," users have to read users' guides and documentation very carefully, according to Bill Swanson, director of software operations at Datapoint Corp.

The most common cause of trouble at user installations is an old story, according to Data General Corp.'s Steve Gaal, manager of systems engineering: "People don't have time to do it right, but they have time to do it over."

Users are reluctant to invest the money to send their people to training classes, he contended.

One way to avoid problems during the development stage is for the user to carefully examine how he is going to approach each problem in a "nonstressful environment" — without the system — before development actually begins, he said.

The vendors interviewed recognize the need to have reliable working conditions, especially when interactive systems are being used. Having realistic expectations is one

way to ensure success, Bill Krause believes. Krause is marketing manager for Hewlett-Packard Co.'s 3000 Series II system.

"I think it's unfair for a vendor to set a

In July, Computerworld asked readers to tell us what they thought about minicomputers by filling out and returning a survey form. The results of that survey, published in August and September issues, showed support and maintenance were areas of great concern to users.

Beginning this week, a series of articles will attempt to fill users in on what vendors say they are doing to alleviate some of the problems in those areas.

Based on interviews with a random sampling of minicomputer and small systems vendors, the series will cover various issues of concern to users.

user's expectations to expect a trouble-free operation," he said. But "we put the same emphasis on support as we do technological design."

First ARC User Expects System To Ease Managers' Headaches

By Esther Surden
CW Staff

NEW YORK — What are some of the problems confronting a management that supervises several discrete small systems running different applications within a company?

One of the major problems is getting time for development work, according to Fred Winograd, vice-president of Chase Manhattan Bank here; another is providing backup for critical applications and a third is finding economical upgrades.

The bank is one of the first users of Datapoint Corp.'s recently announced Attached Resource Computer (ARC) system, [CW, Dec. 5] which should, when fully implemented, provide a solution to these problems, Winograd said.

Chase also uses a lot of other small systems and minicomputer equipment, communications gear, terminals and mainframes from various vendors. The primary reason for Chase's choosing any small system is to provide a solution to a problem.

The ARC system is basically a method of linking several functionally dedicated processors along a common bus so they act together as a system with a common data base.

In order to assure a relatively trouble-free operation, a user should try to clarify what the vendor's responsibility will be in both hardware and software support and what his own responsibilities will be, Krause advised.

He suggested the user next evaluate the vendor's ability to meet its responsibilities by looking at its service force and commitment to that force, then make sure the services offered meet his needs.

Since there will probably always be bugs, Krause said, the user should make sure the vendor has a defined procedure for bug fixing and "test that procedure by talking to other users" to ensure it works.

The interactive environment is a critical environment, Microdata Corp.'s president Donald Fuller noted, because usually there are no alternatives to doing a job. If the minicomputer goes down, the whole operation goes down and the customer can't do business, he noted.

Although Fuller would not say this will never happen with his system, he did point to ways it could be avoided. "We use a four-

(Continued on Page 62)



CW Photo by E. Surden

Under Chase's raised floor, the Hub box helps link Datapoint systems.

A Datapoint user for about a year, the bank recently installed the ARC internal network. Presently only back-office data entry functions are being run on ARC for testing purposes and to make sure the system is secure, but the system is working well, Winograd reported.

The systems linked to ARC are scattered

(Continued on Page 62)

OUR MONTH-TO-MONTH LEASES HAVE ANSWERED THESE USER PROBLEMS!

**DECWRITER II • IMMEDIATE DELIVERY
CUSTOM-TAILORED TO YOUR NEED!!**

- ★ BRAND NEW TERMINALS
- ★ ALL DEC OPTIONS
- ★ SPECIAL DEC MAINTENANCE PLAN
- ★ 3 MONTH MINIMUM THEN MONTH-TO-MONTH ROLL OVER
- ★ SHORT EASY-TO-USE LEASE FORM

1. Peak demand need
2. Timesharing trial period
3. Terminal/Application test
4. Short-term government engineering job
5. Education (University grant)
6. Inability to commit money for long period
7. Inability to predict when job would end facing a 1 year roll over lease

AMERICAN TERMINAL LEASING

P.O. BOX 68, KENMORE STA., BOSTON, MA 02215

A DIVISION OF AMERICAN USED COMPUTER

617-261-1100

First User Sees ARC Providing Three Solutions

(Continued from Page 61)

on the fifth, seventh and eighth floors of Chase's Lower Manhattan building. Only five systems are presently hooked into ARC, but more will be soon, he said.

The system is expected to alleviate all of the problems Winograd mentioned. With ARC, it will be unnecessary to devote complete systems to development work.

When development work must be done, the programmer can sit down at an inexpensive processor that does not have any disk storage directly related to it and search the system to find where pieces of free storage are available. Using that information, the programmer can logically configure a system.

Demonstrating the system's capability, Winograd noted it doesn't matter to that programmer where the disks are physically located since there seems to be no degradation in response time.

Backup Solution

Solving the system backup problem is another function the ARC net is expected to do for Chase. The bank runs a number of critical applications that must be backed up.

Because of the ease of reconfiguring a system, processors can be swapped in and out with very little effort, Winograd said. If a file processor fails, the disks can be removed and hooked to another ARC processor; if an applications processor goes down, the user

can move to another applications processor operating in a less critical mode and continue processing.

Other methods require duplication of hardware, wasting the system's resources with idle machines waiting for breakdowns, he indicated.

Another area of concern to the bank is system upgrades. "As soon as you get any system in, there are 14 more that need to be done," Winograd commented. In most cases, an upgrade requires ordering new equipment that takes time to come in and software changes, which are costly.

Using ARC, the bank expects to save its software investment in Datapoint equipment while being able to upgrade in a modular manner. It will be able to swap in new processors with little

change to the system, Winograd said.

"It's much more economical to put in a minimum configuration and build in little pieces if it can be done without changing any code," he explained.

When Chase first became ARC's test



CW Photo by E. Surden

The RIM box fits on the back of the Datapoint system, interfacing the system with the ARC network.

site, Winograd recalled, very little new equipment was rolled in. The only equipment required were the Resource Interface Module (RIM) boxes, a Hub to connect the RIMs and coaxial cable. It looked as though the bank was getting cable TV, Winograd recalled.

The cable was run under the floor without disturbing normal operations, he said.

"The whole extension requires four new commands and no reprogramming," he noted. "Training came out of the regular Databus users manual."

In fact, the system was so new that no documentation was available for it, but it still went in smoothly, he added.

Vendors Admit Support Hard

(Continued from Page 61)

hour response time as an actual must" for hardware, he said, "and we make sure we have a service office within 50 miles of a machine."

"It's extremely bad for a customer to cajole a manufacturer into providing a machine if a service office is not close enough," he added.

Systems have room for improvement in reliability, he said, with self-diagnostics and error correction and logging techniques designed into the minis.

Users should be aware that those manufacturers surveyed all agreed they can't expect a bug-free system. "There's no way in the world you can put out a bug-free package," Microdata's Fuller cautioned. "Expect bugs."

Digital Equipment Corp.'s Henry Spencer, software services marketing manager, agreed. "It's impossible to get a piece of software completely bug-free," he said.

The crux of the matter, according to General Automation's John Appel, director of field service, is that software is not as easy as hardware to control. Software cannot be tested in the exact atmosphere in which the user is going to use it, he pointed out.

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.



Control Data
Datapro
Printronix
Codex
Lear Siegler
E M & M
The Morley Company
Vanier Graphics
Total Typography
Wang Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Inforex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Inform
Computer Decisions
Infosystems
T-Bar
Corporate Systems
Dynatech
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems

IBM
General Computer
Allantrac Research
Teleille Computer Products
General Electric
Qume
Moore Business Forms
DataMedia
Texas Instruments
Computerworld
NCI
Dellak
Kodak
BASF
Western Union
Anderson Jacobson
Computer Input Services
Paradyne
ComData
Genesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing

Intel Corporation
Peripheral Products
Applied Digital Data
Epic Data
Sykes Datatronics
Cummins Allison
American Microprocessor
International Data Corp
Programs, Inc.
Beehive International
Intertec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini-Computer Systems
Tandem Computer
PCC/Pertec
Computrend
Exiel
Menel
Sycor
Digitronics
TRAC Associates
Computer Services
Datamart
Courier Terminals
SBC
Shasta
Mostek
DIVA

Sperry Univac
Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathematica
Rianda Electronics
Computer Corp of America
AT&T
Cullinane
Hewlett Packard
Pansophic Systems
General DataComm Industries
Continental Peripherals
Computer Associates
Qantel
Diablo Systems
Marketechs
Racal-Milgo
Data Systems Specialists
Key Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
Datamation
Communication News
McCormack & Dodge
Data Rentals

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

For complete information on how the 1978 Computer Expo can work for you, use the coupon below or call Kim Wichert, toll free 800-225-4242. In Massachusetts, (617) 964-4550 (collect).



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
- ☐ Have Sales Representative call me
 - ☐ Send Reservation Agreement
 - ☐ Send Copy of 1977 Attendee Analysis

☐ I like to attend, please send more info.

☐ Southern California Computer Expo	Anaheim/LA	March 21-23
☐ Northwest Computer Expo	San Francisco	March 28-30
☐ Southwestern Computer Expo	Houston	April 11-13
☐ Southeastern Computer Expo	Atlanta	April 18-20
☐ Gateway Computer Expo	St. Louis	April 25-27
☐ Midwestern Computer Expo	Chicago	May 2-4
☐ Mid-Atlantic Computer Expo	New York	May 9-11
☐ Great Lakes Computer Expo	Detroit	May 23-25
☐ New England Computer Expo	Boston	May 30-June 1

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (_____) _____

RDA Teams LSI-11, Disk

BELTSVILLE, Md. — RDA, Inc. has teamed a Digital Equipment Corp. LSI-11 microprocessor with an integrally mounted dual microfloppy disk subsystem that features up to 205K bytes of storage, 64K bytes of random-access memory (RAM), four serial interfaces, two quad expansion slots and a power supply in a desk-top enclosure.

Said to be compatible with the DEC

RT-11 foreground/background operating system, the system reportedly supports a macro-assembler, Fortran IV, multiuser Basic, APL, Focal, Forth, Pascal, SAL 11 and Minbol.

An RD-11C with 8K bytes of RAM, dual microfloppies and a serial console interface costs \$4,595 from RDA at 5012 Herzel Place, Beltsville, Md. 20705.

Accountants Gain Turnkey

SANTA ANA, Calif. — General Information Systems, Inc. (GIS) has developed a hardware/software turnkey system for use by accountants and corporate financial officers.

The system, designed to generate reports, journals and ledgers for these users, allows individualized reports to be derived from any chart of accounts, the firm said.

Based on user needs, reports can be generated in dollars as well as non-monetary units such as gallons of gasoline or product units. Payroll recording and analysis can also be performed, a spokesman noted.

Communications with the system is through a special language dubbed "The Accounting Language," said to be easy for accountants to learn.

The system offers standard balance sheet; statement of changes in financial position; changes in working capital; working trial balance; detailed general journal; detailed general ledger; and a list of payroll check entry reports, the company noted.

A typical system based on the Digital Equipment Corp. Datasystem includes a PDP-11/03 CPU with 32K bytes of memory, one removable disk with 2.4M bytes and one 4.8M-byte fixed disk, a CRT, 180 char./sec printer, operating system, GIS Able software.

installation, 20 hours of training, a six-month software warranty and a 30-day hardware warranty. It costs \$33,995.

GIS is at 2024 N. Broadway, Santa Ana, Calif. 92706.

System Handles Laboratory Data

• **HARTFORD, Wis.** — General Robotics Corp. (GRC) has announced the LAB/X3 laboratory data acquisition system based on its 11/X3 system.

The 28K-word Digital Equipment Corp. LSI-11 microcomputer system has 16 channels of 12-bit analog-to-digital conversion, with a throughput of 35 kHz, and two channels of 12-bit digital-to-analog conversion.

A crystal-controlled programmable real-time clock is provided for control of sampling intervals, GRC said.

The system uses a dual-drive, double-density flexible disk subsystem. Total data storage reportedly exceeds 1.2 Mbytes and transfer rates are as high as 500,000 bit/sec.

Software provided includes the DEC RT-11 operating system, Ansi-standard Fortran IV, the Scientific Subroutine Package and Labdac, a set of Fortran-callable subroutines for data acquisition and control.

System options include a graphics terminal with software for full vector graphics capability, a 20M-byte cartridge disk subsystem, time-sharing software, APL, Basic, Multiuser Basic, CRTs and hard-copy terminals.

The standard configuration, which includes a one-year warranty, is priced at \$14,940 from the vendor at 57 N. Main St., Hartford, Wis. 53027.

Graphics Unit Built on Micro

SCOTTSDALE, Ariz. — Terak Corp. has introduced a stand-alone, table-top system featuring raster-scan graphics capability.

Based on the company's Model 8510, the 8510/A graphics computer system includes the Digital Equipment Corp. LSI-11 microcomputer, a single floppy disk drive and controller to handle up to four drives, 56K bytes of read/write MOS random-access memory, single asynchronous serial interface, video electronics, 12-in. CRT and keyboard.

Graphics are displayed in bit-map fashion using a 320-dot wide by 240-dot high matrix refreshed from any contiguous segment of main memory, the firm said. Text is dis-

played as 24 lines of 80 characters each from a randomly addressable page buffer.

Text and graphics are independently controlled, including three horizontal blanking zones in each mode of display. Text and graphics can be displayed simultaneously since dot matrices overlap yet are visually distinct, the firm claimed. The 8510/A is supported by a disk operating system. Languages available include Macro-Assembler, single and multiple user Basic, Fortran IV, APL and Pascal.

The hardware system costs \$7,850; software is priced separately, the company noted from Suite 100, 14425 N. Scottsdale Road, Scottsdale, Ariz. 85260.



flexible disks

The superb quality of Verbatim® removable magnetic storage media is now on a dealer's shelf, not far from you.

The reason Verbatim is now so accessible is that so many of you like the Verbatim idea: noticeably better quality and durability that show up in tough everyday use. The reason? We make almost everything ourselves, because we found that we could improve on the quality that we were getting from our suppliers.

Being demanding isn't always easy. But it's good for the people who buy and use Verbatim, and it's good for the scores of companies who specify Verbatim for the equipment they make. And we enjoy doing business that way.

Information Terminals Corp., 323 Sequel Way, Sunnyvale, CA 94086. (408) 245-4400. TWX: (910) 339-9381.

In the Far East:
ITC - Far East
404 Roppongi Skyheights
3-2-21 Roppongi, Minato-ku
Tokyo, Japan
Telephone: (03) 583-1981
Telex: J 47879

In Europe:
Information Terminals S.A.
Case Postale 296
1215 Geneva-15
Switzerland
Telephone: 41 (22) 34-90-55
Telex: 22647 ITGE CH

For your nearest sales office call toll free: (11) 800-821-3648 (in Missouri call 800-892-7655, Ext. 5151)

Ask for it by name.

Verbatim™

minidisks

data cartridge

mini disks

Dear Verbatim people:
Tell me where my nearest Verbatim dealer is.

My name is _____
Title _____
Department _____ Tel _____
Organization _____
Address _____
City _____ State _____ Zip _____

And while you're at it, send me literature on _____

Information Terminals Corp., 323 Sequel Way
Sunnyvale, CA 94086. (408) 245-4400

89-1-9-78

A multiple choice quiz on Keybatch.

A multifunction data entry system from Data 100.

(WARNING: there may be more than one right answer to each question)

1. Keybatch is:

- (a) a multifunction intelligent key-to-disk data entry system.
- (b) a brand new multifunction system from Data 100.
- (c) a multifunction system which supports high volume concurrent batch capabilities.

2. Keybatch is also:

- (a) a multifunction system offering stand-alone RPG for expanded user flexibility.
- (b) a multifunction system that can operate with on-line file inquiry capabilities (3271 compatible) via common keystations for both data entry and on-line file inquiry.
- (c) a system capable of handling mail sorting and other office tasks.

3. As a data entry system:

- (a) Keybatch has up to 20 megabyte disk storage capacity.
- (b) Keybatch is proven with approximately 900 units now in use.
- (c) Keybatch can be configured with 2 to 16 keystations.

4. For the end user:

- (a) Keybatch meets short range goals such as appreciable dollar savings.
- (b) Keybatch provides for long range system growth.
- (c) Keybatch offers both of the above.

5. For more information on Keybatch, you should:

- (a) search frantically through your EDP literature files.
- (b) write Data 100 at 6110 Blue Circle Drive, Minnetonka, MN 55343.
- (c) call your nearest Data 100 sales office or one of the numbers we've listed.



**Are you a multifunction expert?
Check these correct answers.**

All answers but four are correct.

1b: Keybatch isn't brand new, was introduced in 1974.

2c: Sorry, Keybatch can't do everything.

3b: There are actually 1500 Keybatch systems on the job worldwide.

5a: No need to search when we're so easy to write or phone. Do it now.

DATA 100
CORPORATION
multifunction data processing

LOS ANGELES 213/645-4300 • SAN FRANCISCO 415/546-6000 • CHICAGO 312/992-0850 • BOSTON 617/848-6100 • DETROIT 313/358-5065 •
MINNEAPOLIS 612/941-6500 • NEW YORK 212/867-6200 • PITTSBURGH 412/391-5425 • HOUSTON 713/777-4413 • WASHINGTON D.C. 703/790-5560 •
WOODBRIIDGE N.J. 201/634-7800 • ATLANTA 404/455-3895 • ST. LOUIS 314/878-4911 • TORONTO 416/494-0434 • MONTREAL 514/761-5894 •
LONDON ENGLAND (0442) 69161 • MELBOURNE AUSTRALIA 267-3544 • FRANKFURT GERMANY 72-04-71 • PARIS FRANCE 630-2144

Mini Eliminates File Duplication for University

Special to CW

OTTAWA, Kan. — Ottawa University here reported it eliminated redundant information in its records and hastened admissions and registration procedures when it installed a minicomputer.

With the system, it is now practical for the university to offer its students an extensive curriculum in computer languages. But the real benefits will become more apparent in the future as the system is expanded to handle more processing tasks, spokesmen for the university stated.

Ottawa University is a liberal arts school with a total enrollment of nearly 4,600 students, some of whom must register for courses five times a year.

The system was installed at the university's computer center in April 1976 and, according to Ottawa officials, has functioned 24 hours every day since then with almost no downtime except for preventive maintenance and system upgrade.

The system is based on a Data General Corp. Eclipse C/300 minicomputer with 192K bytes of main memory and an integral magnetic tape drive for backup purposes, 100M-byte disk drive and a spare disk drive.

It also includes several line printers, 10 CRT terminals, four hard-copy terminals and communications gear including modems and a DG asynchronous line multiplexer.

Supports Four Offices

Four of the CRTs are located in the administration department (that number will soon be expanded to six). Seven are available for student use in computer programming, mathematics, science and economics courses.

A dedicated telephone line connects the computer center to another terminal 55 miles away at the university's "College Without a Campus" in Kansas City.

The system was designed to address the information needs of the school's four primary offices: admissions, registrations, business and development, according to Dr. Justo Diaz, director of planning and analytical studies.

Since the installation of the minicomputer, Ottawa has automated the functions of and files maintained by the admission, registration and development offices.

Eventually the business office will also be connected to the computer center, Diaz indicated. All of the school's information will be maintained on a single data base, he added.

Unlike other universities which have two or a maximum of three registrations each year, Ottawa's 580 to 600 residential students as well as faculty and staff must undergo five registrations annually.

Before the system was installed to handle the registration procedure online through five terminals temporarily located at the registration site, the information on student identification, previous courses taken and grades and courses chosen by students for the present session were compiled manually and updated and maintained in up to seven different filing systems.

With the minicomputer system, the school eliminated some of those redundant filing systems along with an estimated 70 to 80 duplicates in the 4,000

records it kept, lead programmer Ron Dear recalled.

The system also has saved staff and students alike much time. All of the information on admissions and course registrations is now up to date, according to Dr. Spencer Martin, the former director of the university's computer center.

Before installing the minicomputer, the admissions cycle had been burdened with processing data on 5,000 to 6,000 students manually.

With the Otis software, the Ottawa staff saves time looking for and updating files and sending out the updated information to students and faculty because course registrations information is gathered at the registration site.

In addition, it has reduced errors —

how many the university does not know.

"Inaccuracies stuck out like a sore thumb when information was compared on the system's CRT terminals," Martin said.

Now detailed information such as student identification, addresses, past courses taken, credits earned, grades and present courseload — and, in the case of women who married after graduating, their married and maiden names — is maintained in one filing system.

Other Systems Considered

Ottawa examined different systems including a Digital Equipment Corp. PDP-11 and IBM System/3 before installing the one it now has. "We never

had a computer, so we had no preconceived notions about how it would fit into the Ottawa University scheme," Martin said.

"The IBM system really didn't meet our specs," Diaz added. The DG system was chosen because of its file management capability and the ability to process data in foreground and background, he said.

The system's ability to handle data in two distinct areas of memory ensures that administrative and educational operations are separately maintained.

"I've been in this business too long to take a chance with the security of administrative data," Martin explained. "If anybody can access and alter data, a student will be the first one to find out how."

Register now for DataComm 78!



Call 800-225-4242*

Don't miss the one Data Communications Industry Conference and Exposition held in the city where DataComm policy and regulation are established!

Profit from vital information, insight, ideas brought to you by nationally known data communications experts! Be there in person. Don't get DataComm secondhand!

Call 800-225-4242

Take part in panels and sessions that let you ask your questions, share experiences, express your needs.

Make DataComm your personal conference, choosing your options each day — ranging from tutorials for the beginner to advanced networking panels for the sophisticated user.

Call 800-225-4242

And register for one, two, or all three action-packed days, including:

19 Vendor/User Rap Sessions • 3 Special Management Sessions • 6 Network Tutorials and Panels • All Day Government Miniconference — and MORE!

FREE! The Exposition at DataComm 78 will feature exhibits from manufacturers all over the country. Discuss your needs and plans with key representatives in a quiet-paced, informative atmosphere.

Call 800-225-4242

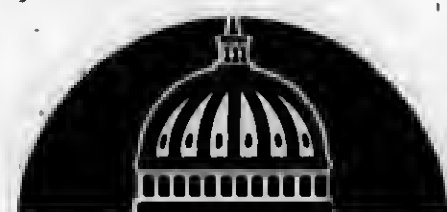
REGISTER NOW!

If this is the first news you've learned about DataComm 78, don't miss this chance to attend.

AFFORDABLE:

UNMISSABLE! Just \$115 for the whole DataComm Conference, or \$50 each for single days.

Don't delay! Master Charge, American Express, Visa/BankAmericard accepted. Call our toll-free number now to arrange your attendance at DataComm 78 — the ONE conference you don't want to read about later and be sorry you missed.



DataComm

78

CONFERENCE AND EXPOSITION

February 21-23, Washington, D.C.

*Inside Massachusetts, call collect: (617) 964-4550. Or write DataComm 78

Registration

The Conference Company

60 Austin Street, Newton, MA 02160

Unit Built for Wholesalers

EL SEGUNDO, Calif. — Compusource Corp. is offering a turnkey minicomputer for wholesale distributors.

Based on the Data General Corp. Nova or Eclipse, the system includes a multiple independent workstation capability and runs under DG's RDOS

operating system.

Up to 64 CRTs, 512K bytes of memory, 10M to 200M characters of disk storage and a selection of printers can be accommodated by the system, Compusource said.

Eight software packages are included with the turnkey system.

A system based on the DG Nova 3 with 64K bytes of main memory, a 10M-character disk, one CRT and a 300 line/min printer including all software costs \$42,000 or \$900/mo on a lease/purchase agreement. Compusource is at 2221 Rosecrans Ave., El Segundo, Calif. 90245.

DEC Adds PDP-8/T Line

MAYNARD, Mass. — A series of PDP-8 computer systems said to offer users up to 22% savings over standard prices has been announced by Digital Equipment Corp.

Called the PDP-8/T series, the systems incorporate standard peripheral and cabinet configurations and a choice of PDP-8/A central processors.

The PDP-8/T3 incorporates a PDP-8/A central processor with 16K words of core memory a four-slot Omnibus expansion capability.

The PDP-8/T5 central processor has 32K words of core and an

11-slot Omnibus expansion capability. The PDP-8/T7 features 64K words of MOS memory and an 11-slot expansion capability.

All three configurations include a 1.6 million (12-bit) word removable disk cartridge drive and a 3.2 million word nonremovable disk drive, a Decwriter II terminal printer and a VT52 CRT with the RTS/8 real-time operating system and the OS/8 operating system as software.

The PDP-8/T3, T5, T7 are priced at \$19,000, \$22,000 and \$24,500 respectively, from the firm in Maynard, Mass. 01754.

TSI

The Professional Seminar

Clearing House and

ETHNOTECH, INC.

Are proud to announce a one-day seminar by

GERALD M.

WEINBERG

DONALD C.

GAUSE

DANIEL P.

FREEDMAN

Measuring

And

Increasing

User

Satisfaction

This program demonstrates practical methods for actually measuring user satisfaction, and then provides practical techniques for raising the level of that satisfaction.

Plan now to bring your team of DP Managers, Systems Analysts, Designers, and Users to benefit from this breakthrough in User/DP interaction.

For a detailed course outline, simply call us, collect, at (212) 764-3070, or complete and mail the coupon below.

TSI

 Sales and Marketing, Inc.

19 West 44th Street, New York, N.Y. 10036

Gentlemen: Please send me the detailed course outline for MEASURING AND INCREASING USER SATISFACTION — New Techniques by Weinberg, Gause, and Freedman.

☐ Please place me on your mailing list.

Name _____

Title _____

Co. _____

Dept. _____

Address _____

City _____ State _____

Zip _____ Phone _____

Small System Streamlines Growing Firm

By Larry Mason

Special to Computerworld

EL MONTE, Calif. — Many firms are standardizing and streamlining their DP and management activities using small systems. A case in point is Cetec Corp., a miniconglomerate headquartered here that manufactures electronics including broadcast equipment, component supplies, marine and computer products and plastic extrusions.

Realizing rapid growth without the proper management controls can bring with it a number of problems such as a lack of communications among the divisions, repetition of certain tasks and overall inefficiency, the company was reorganized into 12 independent profit centers with a mutual data base so each division manager has all the knowledge he needs to handle his operation.

At the same time, this organization provides a common source of information for the entire company with data only entered once.

System Doubling Planned

In order to accomplish this, the firm has installed four Basic/Four Corp. small business computers; future plans call for the addition of four more systems. While there were a number of reasons for choosing this particular manufacturer, one of the primary advantages to the small systems is their interactive capability.

If a user has to rely on a service bureau or batch processing for data processing, chances are the information is out of date by the time he has access to it. With an interactive system, the output is as current as the last transaction. All management decisions are made on the latest statistics.

Another major reason for selecting these particular systems was to minimize software expenses by standardizing the programs and the programming language throughout the divisions.

Range of Systems

Before the present systems were installed, Cetec's information systems varied from automated to manual. For example, the Sparta Division used a Honeywell 57, while the Benmar Division used an IBM System 3.

Typical of the situation was Moltronics, a distributor of electric components to industrial accounts with four locations in California and Arizona. This division used a manual inventory control and purchasing system with a combination of hand-

posted records, cardex and bin cards.

Nine-part packing slip/invoice forms were typed on a Friden Flexowriter, then extended, journalized and posted to accounts receivable on an NCR 395 accounting system.

Moreover, there was no common system either operationally or for accounting purposes at the four locations, so the end result was four independent businesses.

Past, Present Systems

The initial small business system at Moltronics was a Basic/Four Model 350 with one CRT, one high-capacity disk drive and a medium-speed printer for hard-copy reports, packing slips, invoices and checks. Since that time Moltronics' sales volume has doubled and the system upgraded to a Model 500 with three high-capacity disk drives, three medium-speed printers,

five CRTs and a communications interface. User memory is 48K bytes with 12.6M bytes on-line storage.

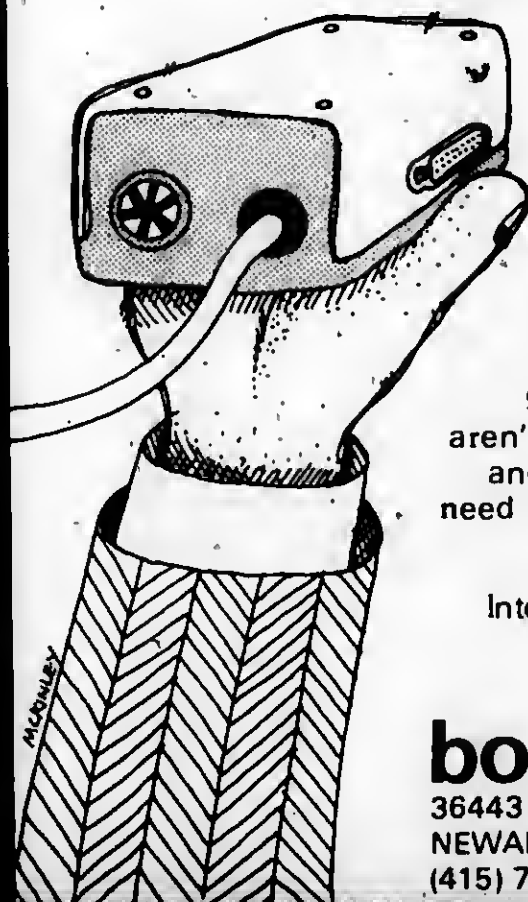
The current configuration has a CRT located in the Moltronics San Diego facility and one CRT and printer at both the Phoenix and Santa Clara locations, while the CPU, disk drives, printer and two CRTs are at the main plant in South Gate, Calif.

A line is reserved 24 hours a day for on-line, real-time inventory stock checks and order entry.

In addition to performing order entry and controlling inventory, the business functions currently handled by the systems include bill-of-material processing, material requirements planning, job costing, sales analysis, accounts payable and receivable and payroll.

Mason is corporate consultant to Cetec Corp.

THE \$99.00 MODEM*



You're suspicious aren't you? OK, we confess. Our M-1 asynchronous short haul modem won't do what a lot of other modems will do.

However, the M-1 will solve many of your local or in-house communication problems up to 10 miles or 9600 bps. And because you aren't paying for a lot of options and capabilities that you don't need in those situations, you'll be saving a bundle of money.

Interested? Write or call us now for a data sheet and complete price information.

bo-sherrel co.

36443 SHELLEY COURT
NEWARK, CA 94560
(415) 792-0354

*100 Quarterly

Kit Turns IBM Selectric Into Terminal

PLEASANT HILL, Calif. — Escon has introduced a kit which can reportedly convert an IBM Selectric typewriter into a hard-copy output terminal without the need to drill holes or make extensive modifications.

The terminal is compatible with most computer systems that utilize the S-100 bus interface, according to a spokesman.

The converter, Kit E-T, consists of a single Ascii-coded card utilizing parallel output, mechanical conversion parts, solenoids and an instruction manual.

A status byte indicating completion of

the operation is provided, with polarity and position determined by the user, the spokesman said.

An optional power supply provides 30 Vdc and includes a capacitor and driver power transistors to operate the solenoids, he added.

The converter is available for \$455 in kit form and \$695 assembled. The optional power supply is priced at \$60 in a kit and \$130 assembled from Escon, Suite 204, 171 Mayhew Way, Pleasant Hill, Calif. 94523.

I/O Subsystems Designed for TI Micro

NORWOOD, Mass. — A series of six analog I/O subsystems that are compatible with Texas Instruments, Inc.'s TM-990/100M 16-bit microcomputer has been introduced by Analog Devices, Inc.

The RTI-1242 provides up to four channels of 12-bit analog output and eight high-current digital outputs for driving peripheral devices, the firm stated.

The RTI-1243 is similar in design except that it offers eight channels of analog output.

Features of both units include a single 10V reference for all channels or for external use; an option for readback of the digital-to-analog conversion and driver data for software efficiency; an independent range and code selection allowing any of five output ranges and three input codes for each channel; and address selection via a solid wire DIP switch or jumper plug, according to a spokesman.

The RTI-1240-R has an instrumentation amplifier with a gain that is selectable by a resistor and that provides up to 32 single-ended on-board input channels, expandable to 256 channels using on-board logic, the spokesman said.

The RTI-1241-R has the same features but includes two 12-bit digital-to-analog converters.

The RTI-1240-S is similar to the 1240-R and 1241-R except that its amplifier gain is programmable through software, the spokesman noted. The RTI-

1241-S is also programmable and also features two 12-bit digital-to-analog converters, he said.

The RTI-1242 and 1243 cost \$395 and \$675, respectively.

Prices for the RTI-1240 and 1241 models begin at \$445. Analog Devices is at Rt. 1 Industrial Park, P.O. Box 280, Norwood, Mass. 02062.

Comes in Two Versions

Z-80, 8080 Get Floppy Controller

SAN JOSE, Calif. — Computer Hobbyist Products, Inc. has introduced a floppy disk controller board it said is compatible with S-100 bus Z-80 or 8080 microcomputer systems.

The FDC-108 is available in two models, one for minifloppy drives (5.25 in.) and one for standard drives (8 in.).

The board features an eight-drive capability, jumper-selectable addresses, IBM 3740 soft-sector format compatibility and an on-board crystal controlled clock, a spokesman said.

The unit has a 1K-byte programmable read-only memory (Prom) and a jumper-selectable wait state for 4MHz operation, he added.

Software routines include a boot to bring the system up without dependence on other hardware or software; a blank disk format program that allows salvage of "bombed" disks; and various programs for software customization, the firm said.

Assembled and tested, the controller board costs \$400. A Basic kit which includes a printed circuit board, large-scale integration controller chip, programmed

IBM 2708 Prom and documentation is available for \$225.

Computer Hobbyist Products can be reached at P.O. Box 18113, San Jose, Calif. 95158.

PCM-12 Gains Two Boards: CRT Link, PDP-8 Emulator

SAN RAMON, Calif. — Two interface boards for use with its PCM-12 microcomputer system have been announced by Pacific Cyber/Metrix, Inc.

The 12060 interfaces the PCM-12 to any teletypewriter or CRT terminal. The unit uses Digital Equipment Corp.'s device codes 03 and 04 and provides inputs and outputs for both the 20mA and RS-232 signaling levels.

Other features include user-selectable transmission rates from 110-to 9,600 bit/sec and programmable one-stop-bit or two-stop-bit operation, a spokesman said.

The 12310 is a TTL-level interface module that is said to execute for the PCM-12 an instruction set identical to that which DEC's DR8-EA module executes for the PDP-8/E.

It provides the 12-bit parallel I/O control capability necessary in data collection and control applications, the firm claimed. Two 26-conductor ribbon cables supply all external connections.

The 12060 costs \$97 as a kit and \$167 assembled. The 12310 is priced at \$138 in kit form and \$215 assembled. Pacific Cyber/Metrix is located at 3120 Crow Canyon Road, San Ramon, Calif. 94583.

Tired of being last on the routing list?

Subscribe yourself.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

MICROCOMPUTING

3270/3790 Users: Why wait for 3274s or 3276s? Raytheon's PTS/1200, the highly intelligent does much more. And you can get it

Waiting for the next new product advance can often make a lot of sense. Unless there is an immediately available alternative that has far more capabilities and can produce far greater cost savings and productivity benefits.

Raytheon's PTS/1200 system is such a product. It is a fully-programmable distributed processing system that uses an easy-to-use English-language compiler, has a main memory capacity of up to 128K bytes, handles up to 32 operator displays—plus dozens of additional downline displays in a multipoint network control mode—and can have a large peripheral equipment complement and local data base as well.

And the PTS/1200 operates in a fully compatible mode with IBM 3270 operator display devices. It not only emulates every 3270 function, but it performs total batch processing and spooling functions as well—simultaneously—and with no degradation in response times in either interactive or batch mode.

If you are waiting for the next 3270-type product to come on the market, wait no longer. For the PTS/1200 is far more powerful, cost efficient and adaptable—in a 3270 environment—than any product you can find today. And you can take delivery in just 30 days.

Look at what else the PTS/1200 can do for you:

- ✓ Operate in full 3270-compatible mode
- ✓ Control up to 32 operator displays
- ✓ Perform local batch processing concurrently with 3270 interactive processing
- ✓ Attach up to 24 peripheral devices
- ✓ Attach a large local data base
- ✓ Perform all 3270-type data entry tasks
- ✓ Perform all 3270-type inquiry/response tasks
- ✓ Operate as a HASP/JES workstation at the same time it is performing 3270 emulation
- ✓ Perform multiprogramming functions
- ✓ Control, in addition, a multipoint network of up to 24 terminals in 3270 mode.

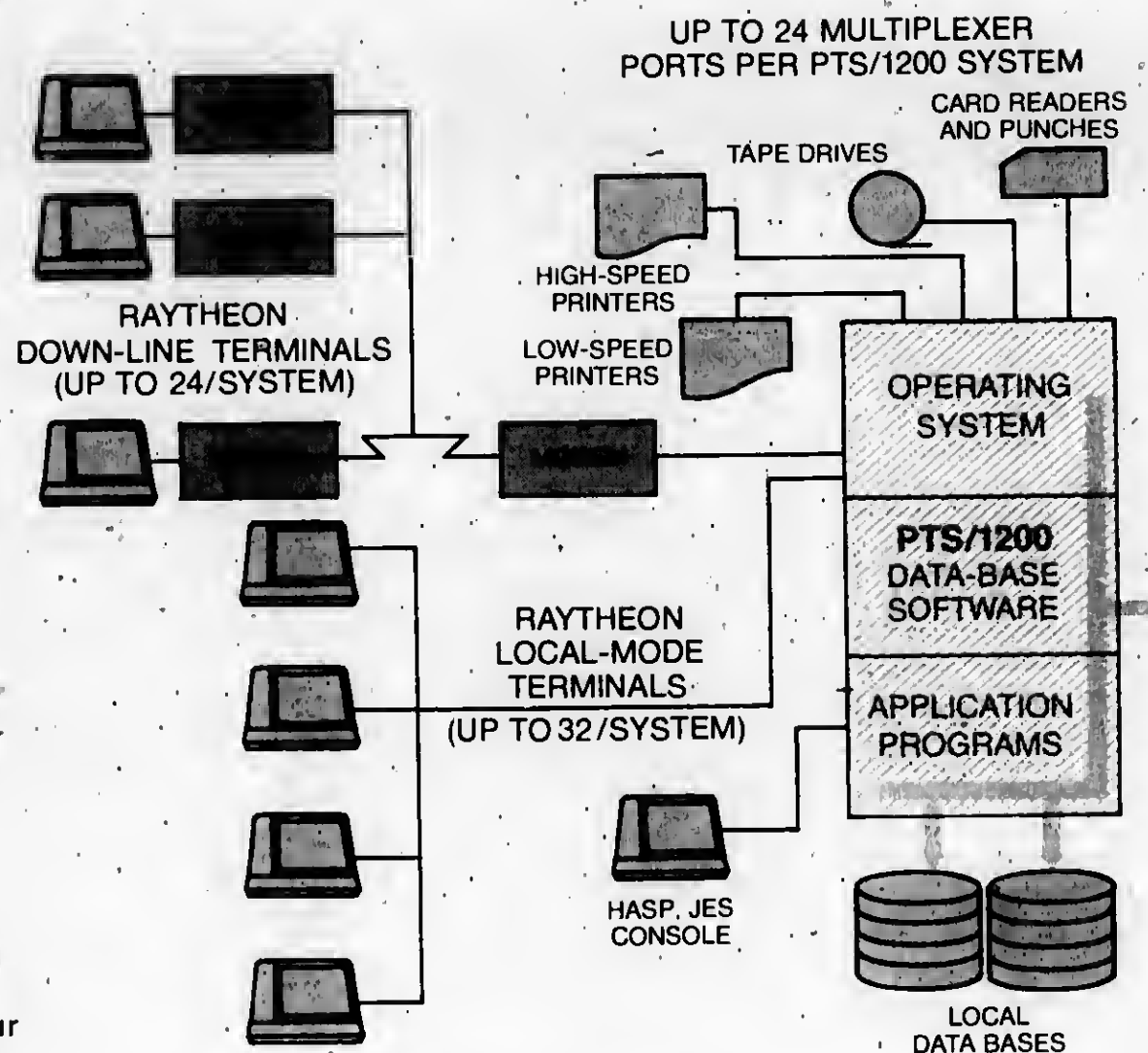
Consider these five benefits, and you'll look a lot harder at the PTS/1200.

No Change To Host Processor

The PTS/1200 installs immediately within your existing network with no change required in your host CPU, in the 370X front-end, in your existing applications software, or in your Emulation Program. It goes to work under 3270 bisynch protocol the day you install it.

Cut Mainframe Overhead

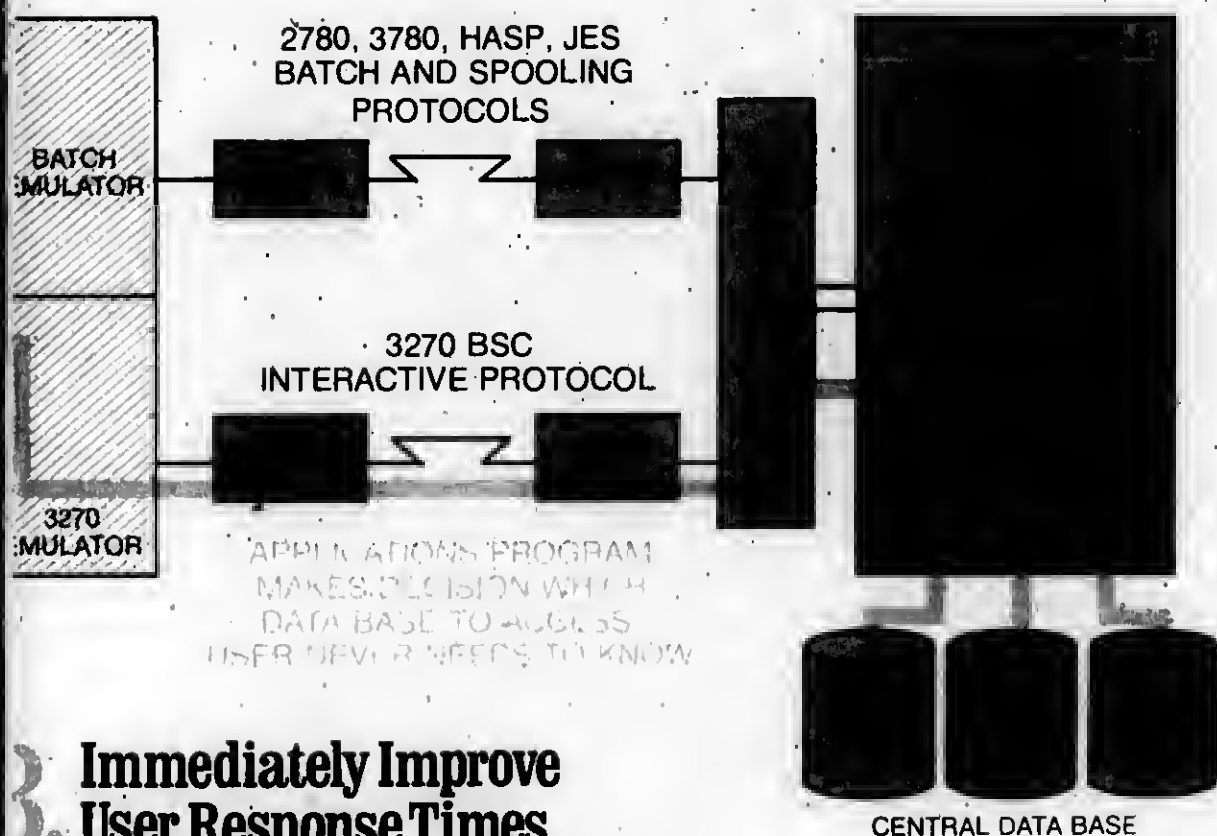
The enormous power of the PTS/1200 permits you to develop and store local formats and perform advanced data editing prior to transmission to the host CPU. This one feature alone can reduce your mainframe overhead by 30 per cent or more. The PTS/1200, in addition, runs its own multipoint network of up to 24 Raytheon terminals in 3270 mode—saving even more CPU time.



Intelligent terminal system, t in just 30 days.

4. Reduce Communications Line Loading

With the PTS/1200, you perform a high percentage of the data entry and inquiry functions of a 3270 locally. In many cases, that can eliminate up to 90 per cent of the wasted communications overheads involved in polling, ACKing and NACKing, and in retransmitting. Your system becomes much more efficient in its use of communications lines.



3. Immediately Improve User Response Times

The busy times that often degrade each operator's response time from the host CPU disappear when you install a PTS/1200. Instead of operator waits of 20 or even 30 seconds when the network is busy, with the PTS/1200 the response is instantaneous for every operator, with every transaction. Multiply the number of operator stations by the number of messages by the average degradation delay and you get some feel for the productivity advantages that the PTS/1200's local format and data base storage features offer you.

☐ Tell me more about the PTS/1200. I am currently planning to develop _____ 3270-type links, with about _____ terminals, using Model _____ mainframe equipment.

☐ I need immediate delivery of _____ 3270 emulation terminals. Tell me how fast I can get them. We'll talk about PTS/1200 features later.

Name: _____

Title: _____

Company: _____

Street: _____

City: _____

State: _____ ZIP: _____

☐ I'm also interested in:
 _____ PTS-100 intelligent terminals
 _____ Raytheon's packet network systems
 _____ Your New OEM/Dealer Support program

Why wait? Get PTS/1200 today to solve the capacity problems you have today. Order now, and Raytheon will ship you a basic PTS/1200 system — or just basic Raytheon terminals in 3270 mode — within 30 days. And when Raytheon delivers, you get more than just a product. You get the experience of having installed more than 50,000 2260/3270-type terminals worldwide. You get a field service organization that spans the globe. You get a commitment to customer support that is second-to-none. You get the sense of security that comes from dealing with one of the world's largest corporations. You get the back-up of an aggressive technological pioneer in data communications network development. And you get Raytheon's pricing leadership — which means savings of about 20 per cent or more over major competitive products. Raytheon: our job is to anticipate your network needs and fill them before anyone else can.

Intelligent Terminals, Minicomputers, and Distributed Processing Systems

RAYTHEON DATA SYSTEMS

1415 BOSTON-PROVIDENCE TURNPIKE • NORWOOD, MASSACHUSETTS 02062

Call Director, Field Marketing, at (800) 225-9874 (toll free)

Inside Massachusetts call (617) 762-6700 • TWX: 710 336-0646 • TELEX: 92-4408

ATLANTA (404) 321-3064 • BOSTON (617) 237-4190 • CHICAGO (312) 694-4420 • DALLAS (214) 661-9722 • DENVER (303) 371-0990 • DETROIT (313) 358-3990 • GREENSBORO (919) 294-5811 • HARTFORD (203) 243-2939 • HOUSTON (713) 771-5851 • LOS ANGELES (213) 770-4240 • MIAMI (305) 592-3884 • NEW YORK CITY (212) 661-2790 and (212) 895-2567 • PHILADELPHIA (609) 665-8466 • PITTSBURGH (412) 281-2117 • SAN FRANCISCO (415) 692-4640 • SEATTLE (206) 453-0650 • TULSA (918) 663-7852 • WASHINGTON, D.C. (703) 979-6100



DATA FORMAT — Rules and procedures describe the way data is held in a file or record, whether in character form, as binary numbers, etc.

DEBUG — 1. An instruction, program or action designed in microprocessor software to search for, correct and/or eliminate sources of errors in programming routines. There are many types of "bugs" or "glitches" that can be located by single-step testers, specifically designed programs or operational procedures. 2. To locate and correct any errors in a computer program. 3. To detect and correct malfunctions in the computer itself.

DEGAUSS — A procedure to demagnetize a magnetic tape. A degausser is a coil that is momentarily energized by an alternating current that disarranges the impulses on a magnetic tape when it is placed close to the coil.

DIAGNOSTIC — Refers to the detection, discovery and further isolation of a malfunction and/or mistake.

DIGITAL — Refers to the use of discrete integral numbers in a given base to represent all the quantities that occur in a problem or calculation. It is possible to express in digital form all information stored, transferred, processed or transmitted by a dual-state condition (i.e., on-off, true-false and open-closed).

DIGITIZE — A process which is used to convert an analog measurement of a specific physical variable into a number expressed in digits in a system of notation.

DIP (DUAL IN-LINE PACKAGE) — 1. The most popular IC packaging in the mid-1970s in the plastic, dual-in-line case, using plastic for economic reasons and the dual-in-line package (DIP) configuration for manufacturing efficiency. 2. Chips are enclosed in Dual in-Line Packages which take their names from the double, parallel rows of leads which connect them to the circuit board. DIPs are sometimes also called "bugs."

DISK OPERATING SYSTEM — Many such programs are data communications-oriented, disk-based operating systems. They feature both multiterminal and multitasking capabilities and allow full control of both hardware and software operations through the system console, or any batch input device.

DISK PACK — Refers to various removable direct access storage devices containing magnetic disks on which data is stored. Disk packs are mounted on a disk storage drive, such as the IBM 2311.

LEARNER'S LEXICON

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc., 207 Kenyon Road, Champagne, Ill. 61820.



COMPUTERWORLD
THE NEW WEEKLY SOURCE FOR THE MICROCOMPUTING COMMUNITY

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS.

California Microcomputer Company's (CMC) previous ads in Computerworld has resulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved business software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927 (918) 891-1420.

FOR SALE: IBM 5100 COMPUTER 64K, APL, 5103 Printer, Disk, Serial I/O. Software for multiple interfaces, academic and business applications, tapes. Please call Andrew Stadry (313) 851-8282.

MICRODATA REALITY CORE Memory. Manufactured and serviced by Microdata. Jack Hardman (201) 751-3000.

Teletype 33 ASR rebuilt \$750. 33KSR rebuilt \$395. 35 ASR used good \$750. Dura Mach IO \$225. IBM 745 \$550. Lou Carbaugh, P.O. Box 398, New Cumberland, PA 17070.

Microsoft ("Altair") BASIC for 8080/280/6502 and FORTRAN IV for 8080/280 now available to OEMs, end users. 8080/280 BASIC has random, sequential files; double precision; IF ... THEN ... ELSE and more. FORTRAN produces optimized relocatable code, meets ANSI68 except complex. CP/M and ISIS-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 San Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 282-1486.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02180.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02180.

I have read the rules, and would like to place my ad as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (____) _____

Self-Contained Backgammon Set Uses 8048A

HOUSTON — A self-contained microcomputer-controlled backgammon game has been introduced here by Texas Micro Games, Inc.

Utilizing an Intel Corp. 8048A microcomputer, timing circuits and various I/O functions, the unit is able to analyze current board positions and use game theories and probabilistic methods to interact with a player.

In traditional backgammon, a player's moves are determined by the roll of a set of dice. In this version, however, there are no dice; moves are dictated through the results of a simulated "dice" reading on a digital display. The display is activated by pushing one of six command keys used to control play, a spokesman said.

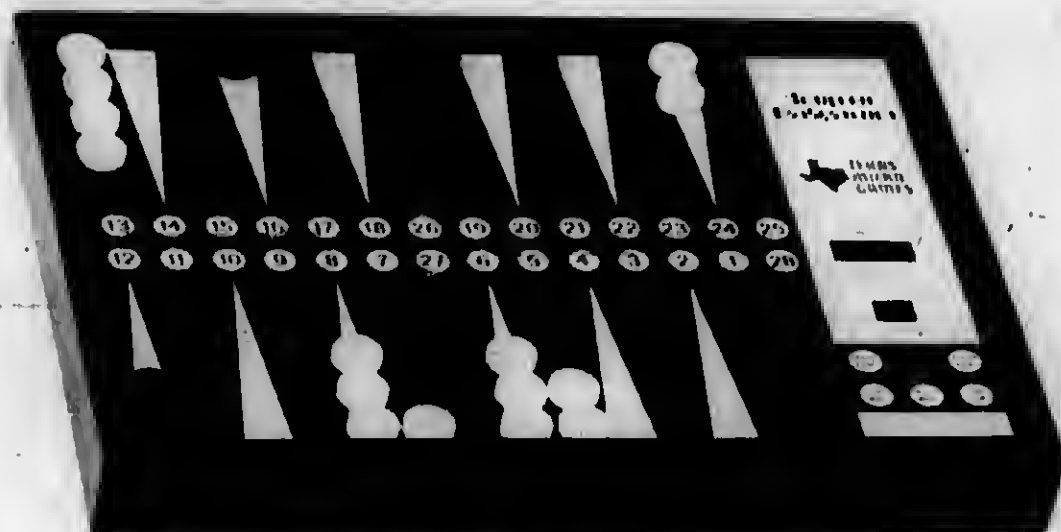
To begin the game and initiate board setup, a player touches the "start" button. The display will then show the

word "roll." The player presses this button to determine who will move first. Moves are completed by depressing the "from" point first and then the "to" point.

When a player's move is complete, the display will say "roll," which the player performs for the computer. A random selection of dice values is assured by the inclusion of a number generator, the firm claimed.

The game features a "display" function that allows the player to verify each point has the correct number of pieces on it and an "update" button lets the player create a given situation to study strategy or to correct an error in moving pieces, the company added.

The game comes encased in a wooden frame and sells for approximately \$200 from Texas Micro Games, Inc., 6230 Evergreen East, Houston, Texas 77081.



The game is operated with six command keys.

Hobby Havens

As a service to hobbyist readers, *Computerworld* periodically will list the micro clubs in different parts of the country. Clubs wishing to be included in this listing should send their name and address as well as the name and address or telephone number of a contact person to Frank Vaughan at *Computerworld*, 797 Washington St., Newton, Mass. 02160.

CALIFORNIA

South Pasadena SCCS. Contact: Greg Goldsmith, P.O. Box 987, S. Pasadena, Calif. 91030. Telephone (213) 682-3108.

Bay Area Microprocessor Users Group (Bamug). Contact: Tim O'Hare, 1211 Santa Clara Ave., Alameda, Calif. 94501. Telephone (415) 523-7396.

Calculator Lib. Contact: Gene Hegedus, P.O. Box 2151, Oxnard, Calif. 93034. Telephone (805) 486-7191.

Sonoma County Computer Club. Contact: Liza Loop, P.O. Box 945, Catati, Calif. 94928. Telephone (707) 795-0405.

CONNECTICUT

Southern New England Computer Society. Contact: Charles Floto, 267

Willow St., New Haven, Conn. 06511. Telephone (203) 562-4739.

DISTRICT OF COLUMBIA

Washington Amateur Computer Society. Contact: Robert J. Jones, 4201 Massachusetts Ave., Washington, D.C. 20016. Telephone (202) 537-1984.

HAWAII

Aloha Computer Club, Inc. Contact: George McOuat, P.O. Box 4470, Honolulu, Hawaii 96813. Telephone (808) 235-3585.

INDIANA

Purdue University Computer Hobbyist Club. Contact: Don Gille, Room 67, Electrical Engineering Building, Purdue University, W. Lafayette, Ind. 47907. Telephone (317) 463-2340.

IOWA

Quad City Computer Club. Contact: C.C. Fretwell, 2155 W. 30th St., Davenport, Iowa 52804. Telephone (314) 386-3723.

KANSAS

Computer Network of Kansas City. Contact: H.J. Schwartz, 7631 Broadmoor Lane, Overland Park, Kan. 66204. Telephone (913) 648-5410.

MINNESOTA

Advanced Technology Research Associates. Contact: Frank Stodolka, P.O. Box 456, Minneapolis, Minn. 55440. Telephone (612) 377-7387.

OKLAHOMA

Tulsa Computer Society. Contact: Mike Parr, P.O. Box 1133, Tulsa, Okla. 74101. Telephone (918) 581-3788.

TEXAS

The Computer Hobbyist Group of Northern Texas. Contact: The Secretary, P.O. Box 1344, Grand Prairie, Texas 75051. Telephone (817) 265-9054.

JSC Computer Hobbyist Club. Contact: Lonnie W. Jenkins, 1914 Wavecrest Lane, Houston, Texas 77062. Telephone (713) 488-4026.

Application System Bows

NATICK, Mass. — An application system that utilizes the Z-80 microprocessor and is compatible with Control Logic, Inc.'s MM1 modular support boards developed for the 8080A was announced by the firm.

The MM1-ZCPU, using a bus structured system called Poly-buss, allows the customer to utilize either a Z-80 or 8080A MPU board with the same memory and I/O boards, the firm stated.

4K Eprom Capacity

The Z-80 microprocessing unit (MPU) board has a capacity for 4K of erasable programmable read-only memory (Eprom) plus 1K of random-access memory (RAM) and operates at

a clock rate of 2 MHz.

Support boards are available for the MM1-ZCPU and include: 16K Eprom, 16K dynamic RAM, 4K nonvolatile RAM and 4K static RAM for memory supplementation. In addition, a wide range of I/O function boards are available, Control Logic said.

Software development for the system is supported by the Control Logic microcomputer development system (MDS), which has a complete floppy disk operating system with text editor, relocating assembler, linking loader and Fortran IV compiler, the firm said.

Price of the MM1-ZCPU board is \$350 with delivery in 30 days from Control Logic, Inc., 9 Tech Circle, Natick, Mass. 01760.

OEM America Meets at the Invitational Computer Conferences



In Orange County, Ft. Lauderdale, St. Louis and six other areas during 1978, OEM decision-makers meet the country's top computer and peripheral manufacturers at the Invitational Computer Conferences — the only seminar/displays designed specifically for the unique requirements of the quantity user.

In one day at each ICC, guests will receive a concentrated, up-close view of the newest equipment and technology shaping our industry.

Some of the companies participating in the 1978 Series are:

ADDs, Amcomp, Beehive International, Calcomp, Cambridge Memories, Centronics, Cipher Data Products, Computer Automation, Conrac, Control Data, DEC, Data 100, Dataproducts, Data Systems Design, Educational Data Systems, EECO, Florida Data, General Automation, Honeywell, ISS/Sperry Univac, Interdata, Kennedy, Lear Siegler, 3M, MDS Systems, MFE, Microdata, Mohawk Data Sciences, Micro Peripherals, Inc., Monolithic Systems, National Semiconductor, NEC Information Systems, Okidata, PerSci, PCC/Pertec, Pioneer Magnetics, Plessey Microsystems, Printronix, Remex, Rianda Electronics, Shugart, Tally, Tandberg Data, Tektronix, Teletype, Varian Graphics, Wangco, Xylogics.

The schedule for the current Series ending in April is:
January 19, 1978, Orange County, CA
February 2, 1978, Ft. Lauderdale, FLA
March 2, 1978, St. Louis, MO
April 4, 1978, Hasbrouck Heights, N.J.
April 6, 1978, Valley Forge, PA

The new 1978/79 ICC Series begins in September with Conferences scheduled for:
September 6, 1978, Newton, MA
October 3, 1978, N.J./PA area
October 5, 1978, Washington, D.C.
November 9, 1978, Palo Alto, CA

cc Invitational Computer Conferences

Invitations are available from participating companies or the ICC sponsor. For further information contact B.J. Johnson & Associates, 2503 Eastbluff Drive, #203, Newport Beach, Calif. 92660 (714) 644-6037

Wire-Wrap Tool For 26, 28 AGW

BRONX, N.Y. — A battery-powered tool for wire-wrapping 26 and 28 AWG wire onto standard dual in-line package (DIP) socket terminals was introduced by the O.K. Machine and Tool Corp.

The tool features a built-in bit and sleeve for producing a modified-style wrap with the 28 AWG and a regular wrap with 26 AWG wire, the firm said. The tool weighs 11 ounces, runs on alkaline or rechargeable "C" size batteries and features a standard device to prevent overwrapping.

The pistol-gripped unit sells for \$39.95 from the O.K. Machine and Tool Corp., 3455 Conner St., Bronx, N.Y. 10475.

SYSTEM 50. \$5250

The Video Processing Station that saves you a bundle.

Whoever thought \$5250 would buy a complete data system?

Well, think about this. \$5250 buys you an intelligent video terminal with a built-in microcomputer and a vast array of software. Such as an advanced diskette operating system (ADOS) with extensive file management, an Assembler,

Editor and Debug package. You also get extended ADDS* BASIC and ANSI standard ADDS* FORTRAN IV. So besides an affordable price, you get languages you can speak.

And there's much more. Like System 50's 32K memory, expandable to 48K. Plus a single IBM 3740 compatible diskette, with an optional second diskette.

All those features. And we aren't finished yet. Because with System 50, you'll have both a keyboard designed for operator convenience and a large 12" screen with 25 lines of 80 legible upper and lower case characters. All this is integrated into an elegant office-quality desk.

If you thought buying an advanced video processing station was out of the question, System 50 is the best answer around.

Quality, Reliability and Integrity. It all adds up to ADDS.

ADDS Applied Digital Data Systems Inc.
100 Marcus Blvd., Hauppauge,
New York 11787 516-231-5400

I want information on System 50.

Name _____

Firm _____ Title _____

Address _____

City _____ State _____

Phone _____

Government Felt 'Conned'

IBM Exit From India Not Surprising

By Joseph Hanlon
Special to CW

IBM's forced departure from India ended a long and unhappy relationship in which IBM was increasingly accused of exploiting this most advanced of Third World countries.

Ten years ago, when I was still on the staff of *Computerworld*, a report that IBM was still selling 1401s in India was treated almost as a joke. In a recent trip to India, however, I found that far from being a joke, it was a source of bitterness to the Indians which led to IBM's being forced out.

The first commercial computer in India was an IBM 1401 introduced in 1961, and throughout the 1960s IBM completely dominated Indian computing. But it did so by importing used 1400 series computers at scrap value, reconditioning them and selling or leasing them at new prices. A large 1401 configuration was said to cost as much as \$10,000/mo.

The massive profits on the 1401s were then used to pay for advertising, seminars and, according to some people, even bribes (although I saw no evidence of this) to further tighten IBM's grip on India computing. Resentment built as IBM oversold its computers on one hand but refused to import newer computers on the other.

'Height of Arrogance'

In what was seen by many as the height of arrogance, IBM proposed in 1970 to begin importing and reconditioning the then out-of-date 360 series. But the government said it would not be conned again and refused permission. It then increased pressure on IBM to sell half ownership to Indian nationals and to hand over servicing to the government service organizations set up in 1975.

IBM said no and pulled out instead. Considering the degree of bad will it had created, this was probably a wise decision.

IBM may have left, but its influence will remain. Of India's 350 computers, about 140 are IBM equipment. Most of these are 1400 series machines, but there is at least one 370/145 and a 370/155, the latter supplied as foreign aid from Germany.

The second largest group of computers — nearly 100 — are from a government company, the Electronics Corp. of India Ltd. (Ecil). These were designed and built in India, although they resemble Digital Equip-

ment Corp. machines. The TDC-2, first marketed in 1969, is similar to the DEC PDP-8, while the TDC-316, which has been sold since 1975, is similar to a PDP-11.

Although the Ecil computers reportedly

Analysis

work well, they are expensive — nearly three times more than their DEC counterparts.

The major new entry into Indian computing is the Soviet Union, with at least 10 of its Ryad computers now installed. Users object to the fact that Ryad does not have high-capacity disk systems or fast tape and card units, but their low cost and the Eastern Block willingness to take rupees is a major advantage.

With IBM squeezed out, has anything changed in Indian computing? Critics inside India say no. They charge that computing retains its traditional business and account-

ing orientation, displacing clerical staff when India's biggest problem is a lack of jobs.

On the other hand, there is little use of computers in areas such as planning, where they could be of great use. Although the Oil and Natural Gas Commission now has an IBM 370/145, the Planning Commission still tries to do its modeling on an IBM 1620.

Ecil is also criticized for rushing out a Western-style computer without asking if that was the most suitable thing for India. Might it not have been more intelligent, for example, to concentrate on process control?

But things may, in fact, be changing. The government is taking an increasingly strong role in computer developments. Computer purchases now must be approved by the government.

And India is now building up an indigenous software capability. One large firm, Computronics, now advertises for Indian staff in U.S. newspapers and has brought about 20 Indian software specialists back.

IBM Works Out Pact to Retain 100% Control of IBM Indonesia

MT. PLEASANT, N.Y. — IBM has tentatively worked out an agreement with the Indonesian government that will allow a portion of the firm's business there to remain 100% under IBM ownership.

The move comes after the firm decided to close out its manufacturing, marketing and service operations in India. That decision was made after IBM refused to knuckle under the Indian government's demand for 60% ownership of the marketing and maintenance portions of the firm [CW, Nov. 21]. India permits foreign ownership only by firms whose total manufacturing output is for export purposes.

The Indonesian plan calls for IBM to appoint a trading agent which will be 100% Indonesian-owned. IBM will also provide technical assistance.

This rearrangement of IBM's structure in Indonesia will apparently satisfy the Indonesian law No. 6, passed in 1968, that requires foreign firms to transfer control of their sales and distribution functions to Indonesian agents by the end of 1977.

It is unclear as yet exactly what the pur-

view of the future agent for IBM will be, according to a spokesman for IBM World Trade Americas/Far East Corp. here. The firm still has to work out a contractual agreement covering trading as defined by the law.

Employment opportunities will be offered to all IBM employees, the spokesman noted.

The current IBM presence in Indonesia, P.T. IBM Indonesia, is 100% owned by IBM and responsible for marketing and service. It will undergo a transition and emerge as a different entity, also owned 100% by IBM. Although the new entity will be smaller, it will have a substantial presence in Indonesia, the spokesman said.

IBM Indonesia was formed in 1937 and has experienced rapid growth recently, he said. Of IBM's 241 employees in Indonesia, nearly all are Indonesian and the firm offers a wide variety of products, he added.

While declining any specifics on a future agreement with a trading agent, the spokesman indicated there are many ways in which the IBM Indonesian operation can be divided.

While you wait for your new IBM 3031, 3032, 3033 Comdisco will lease you a used IBM 370 system.

Re- **THINK**

COMDISCO

THE LOGICAL CHOICE

IBM Sparking Business for Add-On Makers

By Richard J. Egan
Special to CW

Independent memory manufacturers have been enjoying an unexpected boom in add-on memory shipments for larger IBM 370 mainframes because of the convergence of two recent IBM policies that have stimulated — and frustrated — users looking for more capacity in their mainframes during a period when many are converting to MVS.

Coming on the heels of the Series 30 announcement was the delivery stretchout of 370/158 and 370/168 memory. The mere presence of these newer, larger resident memory models has whetted the appetites of capacity-bound users.

At the same time, IBM has also begun to stimulate purchase of broader memory

by users of the 370/158 and 168. In what we have come to call the IBM "suitcase policy," it appears as if IBM is currently embarked on a very active program of enabling 158 and 168 users to evaluate the need for expanded memory capacities.

IBM is doing this, our marketing intelligence suggests, by walking into a user shop with a suitcase containing up to 1M byte of memory cards. It offers to install the memory for a period of up to 30 days within the 158 or 168 CPU (which has built-in memory card cages).

After the 30-day period, the user can then judge for himself whether the need for memory is there. If it is, he can then order the additional storage.

The hitch is this: whether or

not the user orders the memory, IBM removes the suitcase memory from his machine at the end of the trial period — and the user is told he must wait up to 12 months to add more memory to his CPU.

As an independent memory supplier, those two IBM strategies combine to provide a very interesting kicker to what has been a consistent and satisfactory level of demand for semiconductor memory at the high end of the 370 line.

In view of the price differential that exists between IBM memory and independent memory, the expectation is that additional volume will be forthcoming from IBM 158 and 168 users to independents as IBM works down the delivery of its larger Series 30 processors and the extension memories needed for current large 370s.

Gap Reopened

When IBM moved two years ago from 1K to 2K static MOS chips, that technological move was given as the reason for a major price reduction in its add-on memory. What has been — under core memory and early semiconductor memory technologies — a margin of 40% or more price advantage for the independents quickly narrowed to 20% or 30% or more.

But time has once again reopened the gap in pricing between IBM and most independent memory prices. Take the 168 memory, for example. When IBM went to 2K chips, it dropped its price per 1M byte to \$110,000 — compared with what was then about \$90,000 from the independents.

Independents have moved to the IBM-compatible 4K MOS static chips, which open up a price advantage by an additional 10% or 12%.

Recent improvements in

packaging, the cost-effectiveness that comes from installing larger and larger modules and the need for less cabling, housings and other cost-related items because of better packing densities has enabled the independents to reprise again for an additional advantage. The result: a spread that approximates 45% again.

Cambridge Memories, Inc. several weeks ago, for example, announced a 9% reduction in 370/168 memory prices, bringing a typical 1M-byte memory module down to \$68,200.

The real economic advantage comes, however, when the user considers larger memory buys because of the packing densities and other manufacturing economies mentioned above. IBM memory is priced at about \$110,000 per 1M byte and is not improved by memory capacity or larger-quantity purchases.

Independent memory is housed outside the mainframe, with up to 8M bytes storable within a single housing. While 1M byte may cost \$68,200, 4M bytes might cost \$250,000 or \$62,500 per 1M byte.

In addition to this major and escalating price differential, large-scale IBM users are also becoming increasingly aware of several other factors that distinguish today's add-on memory suppliers from the equipment vendors of five or six years ago.

Built-In Safeguards

Some users' earliest experiences with add-on memories came in 1970 and 1971 when IBM first gave tacit and then written approval for installation of "foreign" memory on 360 mainframes. The initial risk was one of IBM nonsupport of processors with independent memory attached.

Over the years — memory being memory — the value-

added factors supplied by memory companies came in a variety of subtle ways, from memory expansion beyond IBM's rated limits to, most importantly, an entire hierarchy of memory system safeguards that gave nearly absolute assurance to the user that he could recover from, if not prevent, memory failures.

Features such as reconfiguration switches, off-line switches, the addition of memory exercisers, maintenance panels, auto power-on, auto IPL and IMPL, buffer management systems, DAT compatibility, "circuit-capture" techniques, single and multibit error recovery aids and built-in automatic memory port extenders are just a few of the technological enhancements that memory suppliers have added to their products in addition to the improved memory chips themselves.

The goal of these enhancements is user peace of mind. Memories are not likely to encounter the failure rates of electromechanical subsystems, for example. They are virtually all electronic and usually extremely well-tested before shipment, and they are supported with expert field engineering.

In almost every case, the cumulative effect of these features is to provide far more memory capacity than is available from IBM, and with uptime rates that typically exceed 99.85%.

Thus, while IBM is promoting more memory capacity and, at the same time, denying its immediate availability, the independent manufacturers are once again at the point of offering their maximum advantages in terms of price and performance, but with the added bonus of delivery and installation in as few as 30 days.

Egan is executive vice-president at Cambridge Memories, Inc.



**TEXAS INSTRUMENTS
TERMINALS**
**IMMEDIATE
DELIVERY**



T.I. 733 A.S.R.

AVAILABLE FROM STOCK

T.I. PORTABLES	DECWRITERS
T.I. ASR & KSR	DIABLO PRINTERS
ADDS CRTS	FLOPPY DISKS
DATA GEN.	TECHTRAN DIGITAL
TELEPRINTERS	RECORDERS

**Westwood
Associates, Inc.**

DATA COMMUNICATIONS EQUIPMENT

1442 Broad St., Bloomfield, N.J. 07003 / (201) 338-0200
N.Y.C. (212) 964-3018 Phila. Area (609) 829-7280

Contracts

International Communications Corp. has signed an agreement with Toshiba of Japan to supply modems under an OEM contract.

Qume Corp. has received a \$5.6-million order for its high-speed daisy-wheel character printers from the Information Product Division of A.B. Dick.

Sycor, Inc. has signed a purchase agreement with Datamation Associates for 50 Sycor 350 intelligent terminals valued at more than \$800,000 for use in custom service operations.

Digi-Log Systems, Inc. has received a \$1,800,000 order from Western Union Data Services for additional microcomputers-based intelligent terminals to be used by subscribers of the firm's stored mailgram service.

Docutel Corp. has been selected to supply bank equipment to Western Bank Corporation (WBC), a Los Angeles holding company.

Honeywell has been awarded an 8-year contract valued at \$13.9 million by the Internal Revenue Service. The contract covers hardware, mainte-

nance, systems support and supplies.

Rolm Corp. has received a \$16.5 million contract for its AN/UYK-19 computer from Raytheon for the U.S. Navy.

Honeywell has received a renewal of its OEM agreement with Industrial Nucleonics Corp. of Columbia, Ohio for Level 6 minicomputer systems.

The Pertec Division of Pertec Computer Corp. has signed a 2-year contract valued at \$500,000 with the Paradyne Corp. of Florida for Pertec's T8000 tape drives for use in the PIX computer system.

Sites Grew by 11% in '76

Study Sees Israel Leading Middle East Industry

By Bohdan O. Szuprowicz
Special to CW

While the Sadat-Begin dialogue is focusing world attention on the Middle East again, it seems like an opportune moment to look at the computer industry in that part of the world.

On the assumption that stable peace would eventually come to that troubled region, an interesting vision of the growth of computerization of the area was presented in the early 1970s by a study of the "Middle East in the Year 2000," published by the Association for Peace of Tel Aviv, Israel.

The study was widely publicized in the Middle East in 1971, but it received at best only a mixed reception in Arab countries. Some resentment was generated by the fact that it was unilaterally developed by Israel and that it singled out Israel as the leading scientific and high technology country in the area.

The study proposed that Israel should continue to stress development of electronics, computers and medical industries and become a leading supplier of such products and services in the area as a whole.

Other Countries' Role

Egypt would concentrate on engineering, steel and motor vehicle production, Syria would specialize in food processing and textile industries, Iraq and the Gulf States would continue in petroleum extraction and petrochemical production and Lebanon would play its traditional role as provider of banking, trading, shipping and communications services to the region.

The choice of Israel as a major electronics, computer and

high technology products supplier in that part of the world is logical. Israel is not well endowed with natural resources and is facing a heavy import bill every year.

Technical Resources

It is best suited to play a role of a designer and manufacturer of high technology equipment such as computers, instruments or even aircraft and communications satellites, which call for a small amount of raw materials but require a high input of skilled labor and technical management.

At the end of 1976 there were 529 computers operating in Israel's civilian sector, according to the "Electronic Computers Survey 1977" published by the State of Israel Prime Ministers Office Central Bureau of Statistics. At least another 30 to 50 installations are believed to exist in the military and defense establishment.

There are today and there have been from the outset more computers in Israel than in any other country in the Middle East, including Iran, which is industrializing rapidly.

According to the "Middle East in the Year 2000" study, as many as 5,000 computers are envisaged in Israel by the end of the century. It is expected to remain the leading computer-using nation, far ahead of the 3,000 computers projected in Egypt and the 500 installations which Lebanon is expected to have at that time.

Recent Growth Rate

Israeli computer installations increased in 1976 by 11% over the previous year, although minicomputer installations showed a slightly faster growth of 12%. Of the total 529 machines in operation,

357, or just over two-thirds, are minicomputers.

It is also estimated that about a third of all the computers installed in Israel are produced domestically by the Elbit and Elcint minicomputer manufacturers.

Design and construction of electronic computers is not

present the most advanced computer manufacturing country in the Middle East, with basic all-round capabilities in design and production of CPUs as well as peripherals, which can be expanded to accommodate larger markets.

More important perhaps is

semination and introduction of information processing in the Middle East.

Future Budget Plan

If and when peace is firmly established in the Middle East, the vast sums that now fund military budgets are expected to be switched to support economic development and education.

The futuristic study already envisages a system of at least 35 general and desert universities operating large computer centers from Ankara to Aden and Teheran to Khar-toum. These are expected to be linked through data communications systems to work on common solutions to all interrelated problems of the region.

International News

new to Israel; in fact, it began as long ago as the early 1950s. The first Israeli-designed computer, known as the Weizac, went into operation at the Weizmann Institute of Science in Rehovot in 1954.

Since then the Golem A and the Golem B scientific computers, comparable to Control Data Corp. 6600 machines, have been designed by the institute for internal use.

Joint Venture

In 1967 Elbit Computer Ltd. was formed as a joint venture of the Israeli government and the Elron Electronic Industries Ltd. It has since become the largest computer equipment manufacturer in Israel and is estimated to supply at least 20% of all the computers in the country.

The basic product was originally the Elbit 100 minicomputer, but in 1970 CDC became associated with the Israeli manufacturer and Elbit designed and built the CDC System 17 minicomputers in 1973 for domestic as well as export markets. Up to 50% of Elbit products have been exported in certain years.

Elta Electronics is a unit of Israel Aircraft Industries Ltd. and has been manufacturing Eltaterm 8504 LSI microprocessor-based computer terminals, which have also been designed with the domestic as well as export markets in mind.

Several other manufacturing operations in Israel produce a number of peripherals primarily designed for domestic consumption. These include 6.4M-bit minidisk memories, paper tape readers, high speed readers, data input devices, verifiers and data communications equipment such as modems.

Several Israeli manufacturing firms are also engaged in production of electronic components such as integrated circuits, transistors and other elements.

Matter of Necessity

Israeli computer and electronic manufacturing industries were developed out of necessity in order to save foreign currency and limit imports. As a result, Israel is at

the fact that such an industry requires a certain nucleus of trained software developers and designers which are critical to the establishment of a viable computer industry. From that point of view, Israel is particularly well qualified to take the lead in further dis-



IS YOUR IBM OS
ENVIRONMENT STATIC?
IF NOT,
you need PROC/ANALYSIS
WHY?

PROC/ANALYSIS uses your most informative and least used library to analyze your current environment (OS supplies the input, not you!) providing crossreference information on PROGRAMS, JOB STEPS, DATA SETS, and REPORT FORMS. PROC/ANALYSIS helps you determine the impact of changes to your production application systems BEFORE you make them. PROC/ANALYSIS is a management tool providing timely and accurate summarized and crossreferenced production environment status information to both applications and operations. PROC/ANALYSIS is available from CHICAGO DATA SYSTEMS, INC. for \$2500. PROC/ANALYSIS has many more uses; can we demonstrate them for you?

INTERESTED? CALL (312) 751-5474 FOR INSTANT ACTION OR, SEND THE COUPON FOR A FREE TRIAL.

MAIL TO: John A. Ambler, President, Chicago Data Systems, Inc.
P.O. Box 7644, Chicago, Illinois 60680

☐ Rush Me More Information
☐ Send Proc/Analysis for 30-Day Free Trial

Name _____
Title _____ Phone _____
Company _____
Address _____
City _____ State _____ Zip _____

or telephone (312) 751-5474

SUPER MINI REPLACEMENT FOR SYSTEM/3

models 10/12/15 and 370/115-125

HEWLETT-PACKARD 3000

comes complete with COBOL, RPG and DATA BASE for as little as \$1600/mo

multi-user, interactive, application packages also available

acct's payable
payroll

acct's receivable
general ledger

word processing

Call Peter Melvin today at:

617-266-4933

CMC Associates 755 Boylston St., Boston, MA 02116

Claims Agency Bias in Bid

OCR Vendor Protests SSA Benchmark Action

By Edith Holmes

CW Staff

WASHINGTON, D.C. — A small California-based firm has locked horns with the Social Security Administration (SSA) once again.

Information International, Inc. recently charged the SSA with behaving unfairly in an early December benchmark test of the company's microfilm optical character reader (OCR) equipment.

The SSA has offered to let the firm demonstrate its wares again this week, and Information International has agreed. However, the company also lodged a formal protest against the agency's actions with the General Accounting Office.

The firm believes this to be the third time the SSA has shown a preference for paper document OCR machinery in its bid to obtain OCR equipment to read all employer-submitted W-2, W-2P, (pension) and W-3 (summary) earnings statements beginning in 1979.

In an effort to reduce the paper work required of and by the federal government, Congress passed a law eliminating the need for almost five million employers to file quarterly 941 reports with the SSA. Public law 94-202 instead requires the SSA to share earnings information with the Internal Revenue Service.

Needing additional OCR

equipment to satisfy this law, the SSA put out a request for proposal (RFP) for multifont scanning devices in July. Information International protested that the RFP did not permit bids from manufacturers of microfilm OCR equipment and, with the help of members of Congress and the Department of Health, Education and Welfare, persuaded the SSA to amend its RFP in August to include microfilm OCRs and to require a benchmark performance test [CW, Sept. 12].

Conversion Penalty

After a revision of the RFP, the SSA informed Information International it would have to assess any microfilm

reader manufacturer a \$2.5 million penalty in the bid evaluation to cover the estimated extra expense of converting the W-2 paper forms to microfilm. However, the agency is already microfilming most documents for storage purposes, according to Information International's president, Alfred L. Fenaughty.

Fenaughty pointed to statements by the SSA Office of Advanced Planning that microfilming will be continued by the agency well into the 1980s and beyond.

The SSA's estimated costs for microfilming the paper wage forms are too high in any event, Fenaughty added. Kodak as a commercial film processor was prepared to bid \$50,000 for this task.

The SSA initially told Information International the high cost of microfilming at the agency was attributable to its employment of "handicapped workers." Challenged by the firm on the truth of this contention, the agency adjusted its microfilm penalty to a fraction of the original \$2.5 million.

As they approached their benchmark test date of Dec. 5, Information International executives were also told by SSA's Technical Evaluation Committee that the agency planned to evaluate the OCR equipment after screening out 30% of the most illegible and hard-to-scan W-2 forms. Yet nowhere in the amended RFP is there mention of the equipment being allowed to read only 70% of all the wage statements, Fenaughty said.

The RFP plainly states that equipment must be able to scan 100% of all W-2 forms with a low reject rate, Information International's president noted.

In the course of the bench-

mark test, the SSA told the company that instead of forms prepared directly on typewriters and computer-based line printers, the only materials the SSA would make available for the test were offset-printed facsimiles of the original forms and microfilm made from those facsimiles, an Information International spokesman said. The SSA had filmed 400 original forms and offset-printed these documents for the benchmark test.

Offset print does not correspond in any way to the anticipated SSA requirement for reading "real world" wage documents prepared by a variety of typewriters and computer printers, the vendor spokesman stated.

Information International told SSA that it was not prepared to run with microfilm made from the offset-printed data and that the material was not representative of the W-2 documents the SSA would actually receive. The firm offered to read images made from the original W-2 forms using conventional microfilming techniques.

Information International also offered to read microfilm made from repeated filming of 400 original test pages, the spokesman noted.

Because neither of these alternatives were acceptable to the SSA committee, its members left the firm. They returned later in the week, however.

Information International used two scanners to demonstrate its readiness, achieving in excess of 80 pages per second or more than 204 forms per second, the spokesman claimed. Only 10 characters out of the total 130,572 characters were unread by the equipment, he added.

REMOTE BATCH PROCESSING
ON IBM'S FASTEST CPU
.360/195

TIME FOR SALE

GUARANTEED
TURNAROUND
only
50¢ a second

OS/MVT, HASP/RJE, 2 Meg, 3330's and 2314's — United Airlines operates a **Cost Efficient** service featuring **High Speed Processing** and **Quick Turnaround**. Through **Auto Answer WATS** or leased lines (at speeds of 2000 to 9600 BAUD) you gain access to one of the most complete data centers in the United States.

Dial our number and execute your own programs or utilize a wide range of software — ICES, MARKIV, OSIRIS, BMD, PANVALET, GPSS, HEC1, HEC2, SWMM, all standard compilers and more.

If you are using an outside computer service, United can offer you a substantial savings and an unbeatable service.

COMPARE — call or write today to request a benchmark or additional information.



UNITED AIRLINES

Computer and Communications Services Division
Denver Technological Center
5350 South Valentia Way
Englewood, Colorado 80110
Call Collect (303) 779-2000 — Ask for Jon Burley

Introducing the \$3890



Meet Lear Siegler's Dumb Connection™ Peripheral Package.

At first glance, it might seem a lot to pay for a cable. But when you consider that it comes connected to the Dumb Terminal™ on one end, and to the Ballistic™ Printer on the other, it becomes a pretty smart buy.

From a single source, you get the world famous video terminal, the Dumb Terminal, and hardcopy from Lear Siegler's new Ballistic Printer.

The Dumb Terminal is, of course, that same reliable terminal, with loads of standard features, that specializes in dependable performance with a minimum of frills.

Our new Ballistic Printer is designed for heavy duty applications. Thanks to its unique head design, it'll give you output

National Semi Unveils Static 64K ROM Chip

SANTA CLARA, Calif. — National Semiconductor Corp.'s NMOS 64K read-only memory (ROM), the MM5235, has a typical access time of 450 nsec, the firm said.

The 28-pin device is a static 8K by 8 chip which requires a single +5V power supply.

National plans to bring out a faster 64K ROM, the MM52164, in February. That will have a maximum access time of 450 nsec and will be configured with the standard 2316E pin out of 24 pins, a spokesman said.

The MM5235 is being promoted for the home computer market, he indicated.

The MM5235 is fabricated with a metal gate technique. Available in sample quantities, the price of the commercial version is \$32 each in lots of 250. In large volumes, the price is expected to be about .025 cent/bit, the firm added.

National is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Micro Aids Developer

WOODLAND HILLS, Calif. — Comptronics, Inc. announced a single-board microcomputer designed for systems development and evaluation and featuring 2K 8-bit words of random-access memory (RAM).

The Model 1080 F-8 Development Board includes an F-8 CPU, the 2K RAM, sockets for an additional 4K of 2708 memory, a Fairbug program storage unit, a 3853 static memory interface, 32

bits of I/O arranged in four 8-bit ports and two I/O expansion sockets.

The board also features a buffered address and data bus to an S-100 memory expansion connector, 1K of 2708 custom user monitoring and 2.0 MHz crystal and interface circuitry.

The Model 1080 costs \$249 as a kit or \$299 assembled.

Comptronics is at 19824 Ventura Blvd., Woodland Hills, Calif. 91364.

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call and per-call field service at rates much less than the competition.

NEED FAST TURNAROUND? CALL OR WRITE:

COMPUTER SYSTEMS SUPPORT CORPORATION
9112 Gaither Road
Gaithersburg, Maryland 20760

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

Intel Starts LSI Subsystem Series

SANTA CLARA, Calif. — Intel Corp.'s Microcomputer Components Division has started a series of single-chip LSI subsystems with logic functions dedicated to specific classes of peripherals.

Two devices for operating microprocessor-based manual-input and display-output peripherals were announced as starting the series and IBM-compatible controllers — for floppy disks and communication links will be added next, the firm said.

The Intel 8275 Programmable CRT Controller and 8279 Programmable Keyboard/Display Interface are the first peripheral circuits covering "human interface" needs of such CPUs as the 8080A, 8085 micro and 8048 single-chip, the firm claimed.

The 8275 and 8279 chips contain more logic than a microprocessor and intelligence, thereby minimizing the amount of software needed to run peripherals, Intel said.

8K Prom Introduced

SAN DIEGO — Electronic Solutions, Inc. announced an 8K-byte programmable read-only memory (Prom) board compatible with Intel Corp.'s SBC 80/10 and National Semiconductor Corp.'s BLC 80/10 single-board computers.

Either base address of the Prom-8's two 4K segments can be independently set via jumpers — with base addresses falling on segment boundaries, and the board contains sockets for eight 2708 E-Proms.

The Prom-8 board is available for \$186 from Electronic Solutions, Inc. at 7969 Engineer Road, San Diego, Calif. 92111.

For example, the 8279's keyboard portion can be initialized and maintained with two or three bytes of program instructions, the firm noted.

the CPU.

Format and control features of the 8275 are fully programmable and the chip does not require memory refresh.

Microcosm

The 8275 chip is the first comprehensive CRT controller with LSI construction, Intel said. It handles main memory refresh and data transfer, some graphics generation, cursor control, light-pen detection, scan control and read-only memory (ROM) character generation, according to the firm.

Display formats and control functions are governed by program commands received through the system bus.

The 8279 keyboard/display interface operates a 64-key keyboard and up to 32 numeric or 16 alphanumeric character readouts, Intel said.

In quantities of 100 or more, the 8275 Programmable CRT Controller is available for \$62.50 per unit and the 8279 Programmable Keyboard/Display Interface for \$14.10 per unit.

Intel Corp. is at 3065 Bowers Ave., Santa Clara, Calif. 95051.

IEBCOMPR IS DEAD

If you've always wanted IEBCOMPR to

- Underline Unequal Bytes
- Print Hex and/or Character
- Compare Specific Records or Fields
- Predefine Error Record Quantities
- Compensate for Missing Records
- Print Portions of a Record
- Process VSAM Files

Then call us for a free 15 day trial of ACCUCHEK.

ARKAY COMPUTER INC.
24 Manor House Road
Newton Centre, MA 02159
(617) 964-1894

Dumb Connection.™

almost as long as you want to give it input.
At 180 cps.

The Dumb Connection. Another reasonable, cost-effective product from Lear Siegler. For those who always wanted a Dumb Terminal, but needed hardcopy, too.

Now you can have the best of both worlds. And the connection to go with them. In one package.

**Dumb Connection.
Smart Buy.**



LEAR SIEGLER, INC.
ELECTRONIC INSTRUMENTATION DIVISION
DATA PRODUCTS



Lear Siegler, Inc./E.I.D., Data Products,
714 N. Brookhurst St., Anaheim, CA 92803; (800) 854-3805. In California (714) 774-1010.

CRT Features Window Ability

PHILADELPHIA — Human Designed Systems, Inc. has a low-cost microprocessor-based CRT called Concept 100 that reportedly offers such features as forms control, text editing, upper/lower case, accents, up to 19 user programmable function keys, line drawing graphics, multiple pages of display memory, multiple character sets and shared printing.

It also offers "windowing" — a feature that permits the application programmer to divide the display memory into any number of separately controllable rectangular areas. These areas can be treated as if they are separate terminal displays, the company said.

The CRT is described by the



Concept 100

manufacturer as easy to use with a tilt/swivel nonglare screen.

The Concept 100 will be available at \$1,260 per unit in quantities of 50 in February from the company at 3700 Market St., Philadelphia, Pa. 19103.

Memorex Expands Floppies

SANTA CLARA, Calif. — Memorex Corp. has expanded its OEM line of disk drive products with a dual-headed flexible disk drive said to provide enhanced performance and reliability as well as a series of fail-safe features.

The Memorex 552 incorporates two ceramic read/write heads that allow use of both sides of a dual-sided flexible disk, according to a spokesman.

The 552 offers a recording capacity of 492K bytes in IBM 4964 format or up to 1.6M bytes of unformatted data with access time of 3 msec per track, he said.

Data transfer rate is 250 kbyte/sec in single-density recording mode, Memorex noted.

The 552 can reportedly be operated in double-density mode, without modification or additional electronics.

Data transfer rate in this mode is 500 kbyte/sec, the spokesman claimed.

Four 552 units can be mounted ver-

OEM Products

tically or two can be mounted horizontally in a standard 19-in. rack.

A door-controlled latch/eject mechanism makes cartridge insertion and removal a "pop-in/pop-out" operation, the company said. In addition, a lock stop feature also makes it impossible for the user to close the door on a cartridge that is not fully inserted or removed, providing protection for media disk.

The disks are available now in OEM quantity prices of \$585 each from Memorex, San Tomas at Central Expressway, Santa Clara, Calif. 95052.

ATTN: 3270 Users

Here's a *tailor-made* 3270 system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. **Systems Programmers**, in particular, find the following features very valuable.

Both Local and Remote 3270 are available, of course,

PLUS

Local Job Entry. Line printers up to 1200 LPM with 1403 addresses and card readers with 2501 addresses can be placed next to any BRAEGEN CRT. These "hot" printers and readers are located in the users' areas up to 7,500 feet outside the computer room. Most popular uses are for programmer listings and accounting work. Users get the benefits of increased productivity because turn-around time is reduced to minutes.

PLUS

Address Switching. Any BRAEGEN CRT terminal provides as many addresses

as required for Console, TSO, Applications, etc. Any CRT can have both Local and Remote addresses. This feature can reduce the number of CRT's required and will eliminate NCP, VTAM type software overhead requirements.

PLUS

Multiple Controller Interfaces. The BRAEGEN controller allows multiple channel and remote interfaces. Any CRT can access multiple local IBM CPU's or remote CPU's. Just 2-3 seconds to switch a CRT between CPU's or addresses.

PLUS

Fast Cursor, Programmable Keyboard, 7500' Coax, Multiple Drops per Coax, Wide range of speeds in 3286/3288 compatible printers; from 45 cps to 1200 LPM, Offline Data Entry, and our Offline TSO Editor.

PLUS

Features others have promised for 1978-1979 are **AVAILABLE NOW** . . . Local Copy, 128 character set CRT, Typamatic keys, Home key, etc.

PLUS

Low Prices — 1, 2, 3 year leases available.



Customers throughout the U.S. are benefiting from these features now. For more information please contact Bob Beaver, The BRAEGEN Corporation, 20740 Valley Green Drive, Cupertino, California 95014. (408) 255-4200.



BRAEGEN

Intel Offering PDP-11 Memory

SUNNYVALE, Calif. — Intel Memory Systems has announced an add-on memory it said is hardware- and software-compatible with the Digital Equipment Corp. PDP-11/04 and 11/34 minicomputers.

The In-5034 uses high-speed 8K/16K MOS random-access memory devices to provide 32K, 48K or 64K by 18-bit memory capacity on a card that fits a single PDP-11 hex height card slot.

Reliability features include parity checking and generation and control status register without the need for a DEC parity controller module, Intel said.

The price of a 32K by 18-bit In-5034 memory system is \$2,625. The 32K version is available now; the 48K and 64K versions will be available in the second quarter.

Intel Memory Systems is at 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.

Fabri-Tek Adds Bulk Core Unit

MINNEAPOLIS — The Fabri-Tek, Inc. Model BCM 760 bulk core memory was designed to replace drum and disk memory devices, main memory and main memory extensions as well as memory buffers on medium- to large-scale computer systems.

Maximum capacity of a single BCM 760 module is 128K words of 20 bits, with 18- and 16-bit word configurations also available.

Maximum addressable memory in any given system is 32 modules, Fabri-Tek said, adding cycle time is 1.5 microsec full cycle with a 500 nsec data access time.

Fabri-Tek will also offer a 64K-word version known as the BCM 750.

A single 128K, 18-bit module costs \$5,787, with enclosure and power supply an added \$2,965. OEM discounts are available.

Deliveries will begin in the first quarter from the firm at 5901 S. County Road 18, Minneapolis, Minn. 55436.

Tektronix Graphics Display Backs Store-Refresh Mode

BEAVERTON, Ore. — Tektronix, Inc.'s GMA102A 19-in. storage-refresh graphics display for the OEM can store up to 1,575 in. of refreshed vector in the combined store-refresh mode, the firm said.

The unit can be used in the creation of dynamic or interactive displays, Tektronix said.

A basic operational version costs

\$6,175.

The GMA102A offers both a directed-beam refresh display, which features dynamic movement and selective erase, as well as direct view storage tube (DVST), which features low-cost, high-resolution graphics, the firm stated.

Parts of images may be stored in display phosphor while interactive pic-



Tektronix GMA102A

ture elements can be displayed in refresh, the firm added.

Options can increase the storage to more than 8,000 characters and the display to 400 refreshed characters.

There are three modes of operation: store, non-store and store-refresh.

More information is available from mailing station 60-631, Tektronix, Inc., P.O. Box 500, Beaverton, Ore. 97077.

DEC Brings Out Micro for OEMs

MAYNARD, Mass. — Digital Equipment Corp. now has a PDP-11/03-L microcomputer for OEMs that want to configure more powerful systems without adding an expander box.

It features a 9-by-4 slot backplane with six slots for OEM expansion, 32K bytes of MOS memory and space for up to 32K bytes of UV-Prom or read-only memory (ROM) on a single printed circuit board.

A typical CPU, backplane, 32K bytes of MOS memory, bootstrap module with self-test features, 115V-230V AC input box and power supply in a 5-1/4 in. rack-mountable enclosure costs \$3,995. Deliveries are 90 days ARO.

DEC's OEM group is in Maynard, Mass. 01754.

Punched-Tape Reader Bows

IRVINE, Calif. — A punched-tape reader capable of sensing up to 200 char./sec in asynchronous operation and up to 300 char./sec in asynchronous handshake mode is available from

reader panel.

The RRK 8000 punched-tape reader is contained within a single, cast-aluminum frame and can be panel-mounted in a 4-in. square cutout. The number of moving parts has been reduced by elimination of belts and sprockets, and input power is 24V at 100mA.

The Remex RRK 8000 is presented as a system component with minimum operator interaction that can be directed by the host system to drive tape from left to right or right to left.

The unit is available for \$240 in quantities of 500 or more, from Remex Division, Ex-Cell-O Corp., 1733 Alton St., P.O. Box C-19533, Irvine, Calif. 92713.

OEM Products

the Remex Division of Ex-Cell-O Corp.

The reader can handle 5- and 8-level tapes with standard formats, or 6- and 8-level typesetter tapes. Track format is selected by a single switch on the

Keyboard/Display Offered

GRANDVIEW, Mo. — Computerwise, Inc. is offering a rack-mountable keyboard/display unit for use in computer-controlled machines, automatic testers and similar applications.

The unit can be attached to any computer or microprocessor using an asynchronous RS-232 or 20mA current loop I/O port, the firm said. Switch-selectable modes include 110-9,600 bit/sec, full- or half-duplex, even/odd/no parity, 5 to 8 data bits and one or two stop bits. The unit

mounts in a standard 19-in. wide rack and is 10-1/2 in. high.

A gas discharge display provides a single line of up to 32 alphanumeric characters.

Keyboard options available include a 24-key format, a 53-key full alphanumeric model or a custom configuration.

The standard unit is available in 30 days for \$750 in single quantity with discounts available.

Computerwise, Inc. is at 4006 E. 137th Terrace, Grandview, Mo. 64030.

Telex Adds 6250 Tape Unit

TULSA, Okla. — Telex Computer Products, Inc.'s 6,250 bit/in. tape transport, Model 6250, is available in standard 19-in. rack-mount configuration and meets the requirements of 1/3-in. interrecord gaps in read and write operations, the firm said.

The 6250 is designed to fit PE and GCR data formats while the lower performance Model 6240 operates with NRZI and PE data formats. Models are available in 45-, 75-, 100- and 125-in./sec configurations, the firm indicated.

Data transfer is up to 781K bit/sec and the rewind speed is 500 in./sec.

Eight Transports

The 6850 formatter controller can handle up to eight transports and can intermix any combination of up to four speeds and three tape densities, Telex said.

The design of the drive includes a servo control system that uses infrared sensors and a 'Supr-Lite' capstan weighing 1.9 grams.

An optional dual speed and dual access allow two formatters to access the same tape drive while the drive may

operate at two different speeds and densities to present a reasonably constant throughput to the CPU, Telex indicated.

In quantities of 100, the drive prices range from \$6,995 for the Model 6240 to \$7,495 for the Model 6250. The basic controller formatter starts at \$6,495 in lots of 100.

Telex Computer Products, Inc. is at 6422 E. 41st St., Tulsa, Okla. 74135.

Control Added To Self-Scan II

PLAINFIELD, N.J. — Burroughs Corp.'s Electronic Components Division has added microprocessor control to its Self-Scan II line of gas plasma displays.

In lots of 100, the displays cost \$225 for the 40-character panel; \$500 for 240 characters; and \$750 for 480 characters.

Burroughs Electronic Components Division may be contacted through P.O. Box 1226, Plainfield, N.J. 07061.

CONTROL YOUR INTERDATA TAPE SYSTEM

WITH PERFORMANCE NEVER BEFORE AVAILABLE

Western Peripherals, NUMBER ONE in tape controllers, does it for Interdata users, with the TC-140.

- Fully embedded — Single board, dual density tape controller for PE and NRZ formats
- Mix & Match: 7 TRK, 9 TRK NRZ, PE and PE/NRZ all on one controller
- Mix any two speeds in the range of 12.5 to 125 ips
- Operating System compatible
- Enhanced Command Set
- Extended Status Register
- Selector Channel or Multiplexer Bus operation
- Western Peripherals Worldwide Service

WRITE FOR COMPLETE INFORMATION

 **western peripherals** T.M.

(714) 991-8700 • TWX: 910-591-1687 • Cable WESPER
1100 Claudina Place, Anaheim, CA 92805

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION ANNOUNCEMENTS

SOFTWARE RESEARCH AND DEVELOPMENT

SDC/INTEGRATED SERVICES INC. HAS EMPLOYMENT OPPORTUNITIES FOR QUALIFIED AND EXPERIENCED SYSTEM DESIGNERS - SYSTEM ANALYSTS SYSTEM PROGRAMMERS

THE COMPANY SDC/ISI has been the industry leader in Systems Software Development for over 20 years. We are undergoing rapid expansion due to our demonstrated technical excellence.

THE ACTIVITY SDC/ISI has initiated a large Research and Development project to design an advanced standard architecture for the U.S. Navy's computer based Real-Time Command and Control Systems. Our R&D effort will utilize top down design techniques, structured analysis and structured programming. Additionally, we will define and design new automated techniques for producing operating systems software.

THE LOCATION You will live and work in fabulous Virginia Beach, Virginia. Low cost of living by the sea plus our mild year round climate.

THE FUTURE Your opportunity is now! SDC/ISI offers top compensation and benefits including paid relocation. Our Software Professionals also enjoy our technically challenging but casual work environment. For consideration or information contact T.W. Salmon, Personnel Administrator, (804) 461-6662.

SDC/Integrated Services, Inc.
13 Koger Executive Center, Norfolk, Virginia 23502

A Subsidiary of

SYSTEM DEVELOPMENT CORPORATION



FIELD ENGINEERS IBM 360/70 SYSTEM/3 MINI SYSTEMS

SORBUS INC., a leader in EDP equipment maintenance, has immediate openings nationwide for highly skilled Field Engineering professionals.

Our expanding service network offers an opportunity to specialize or diversify. Background should include 3-5 years experience in maintenance and repair of IBM 360/70 - System/3 or comparable Mini Systems and peripherals.

These positions provide excellent opportunities for personal recognition and professional growth through advanced training and career development programs, along with attractive compensation, incentives, and benefits.

If you are interested in working for a progressive company, and want a bright future, please write or call toll free:



SORBUS INC.
an M/AI company

Les Broedway
Personnel Administrator
SORBUS INC.
150 Allendale Road
King of Prussia, PA 19406
(800)-523-5632

An Affirmative Action Employer

D.P. PROFESSIONALS

We represent a number of firms throughout the United States seeking qualified D.P. Professionals. Firms include manufacturing, banking, insurance and consulting firms. If you are an experienced programmer, systems analyst or project leader seeking professional and financial advancement, we invite you to submit your resume, including salary history, to:

**EXECUTIVE RECRUITERS
INTERNATIONAL**
4101 Medical Parkway
Suite 204
Austin, Texas 78756
(512) 454-5247

SYSTEMS ANALYST To \$23,000 FEE PAID

International non-textile mfg. firm has a fascinating future in a small shop 370 environment. If you have 2-4 yrs exp. in Systems Design.

Call or send resume to
Data Processing Dept.

**PERSONNEL
PLACEMENT**

537-D Huffman Mill Rd.
Burlington, N.C. 27215
(813) 344-5581

Programmer

Scientific Programmer Be Our Technical Expert

OXY needs someone to provide technical expertise in chemical engineering applications, applied mathematics and statistics, plus to code and debug programs.

You will confer with our DP personnel and engineers to determine the problems and type data to be processed, as well as defining application problems, designing DP procedures and block diagrams. Your degree in computer science, chemical engineering, chemistry, math or statistics plus three years of experience in a scientific environment using FORTRAN, JCL and assembly will qualify you for this position.

For confidential consideration,
send a resume to:



Occidental Research Corporation
A Subsidiary of Occidental Petroleum Corporation

P.O. Box 310, Dept. W-4, La Verne, CA 91750
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

DATA BASE CONSULTANT

Professional career opportunity with a high technology consulting firm based in St. Louis. Responsibilities will include technical assistance in applications data base designed tuning, client training, etc. In addition to exciting challenges and a variety of responsibilities, you can expect an attractive compensation and benefits package.

Interested candidates may submit resume and salary history in confidence to:

CW Box 1369
797 Washington St.
Newton, Mass. 02160

PERSON NEEDED AS OF 9-1-78

To teach Computer Science courses at all levels of undergraduate work and give leadership to a newly instituted concentration in Computer Science, Ph.D. in Computer Science is strongly preferred, but individuals with exceptional qualifications without the degree will also be considered. Practical experience is also preferred. Salary and rank negotiable. Send inquiries to: Dr. Arthur Hill, Chairperson, Mathematics Department, Albright College, 13th and Exeter Sts., Reading, PA. 19603. Albright College is an equal opportunity employer.

Computer Science

Anticipated Faculty Vacancy. Teaching business-related Computer Science courses primarily for majors in Business Administration. Date of vacancy: June or Sept. 1978. Experience and/or graduate training in Business Information Systems is required. Preference earned doctorate. Initial screening of applications, Feb. 1; final application deadline, March 15. Send letter of application, resume, letters of reference, and transcripts to Martha A. Farver, Associate Director of Personnel, Alpha Hall, Elizabethtown College, Elizabethtown, PA 17022. For additional information call Miss Farver. An affirmative action/equal opportunity employer.

PROGRAMMER

Las Vegas, Nevada

Two to five years experience in both COBOL and FORTRAN. COB 6000 or CYBER experience preferable. Bioenvironmental background required. BS degree in mathematics or related sciences field, statistical knowledge helpful. Responsibilities include design and implementation of Retrieval System for Personnel Radiation History and development of Bioenvironmental Studies Data System.

Excellent Fringe Benefits
Must be a U.S. Citizen
Interview and Relocation Expenses
Equal Opportunity Employer - M/F
Send resumes to: L.W. Bennett
Reynolds Electrical
& Engineering Co., Inc.
P.O. Box 14400
Las Vegas, NV 89114

New! 1978 Computer Salary Survey

Call for your FREE copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

This comprehensive free report also gives you expert advice on a variety of important career topics such as:

- When you should consider a job change.
- What you need to do to break into management.
- How to make sure you're getting the proper exposure.
- Why timing is so crucial in your long range career development.
- How you can avoid stagnation.

And much more. The 1978 Computer Salary Survey has been compiled by

Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But, call now, it could be one of the most important career decisions you've ever made.

source edp

1978
Computer
Salary
Survey

For your FREE
1978 Computer
Salary Survey call
the Source Edp
office nearest you.

East:

Boston 617/482-7613
Hartford 203/522-6590
New York City 212/736-7445
Philadelphia 215/665-1717
Stamford, CT 203/329-8411
Union, NJ 201/687-8700
Washington, D.C. 703/790-5810
Wellesley, MA 617/237-3120

Midwest:

Chicago 312/782-0857
Cleveland 216/771-2070
Detroit 313/963-0510
Kansas City 816/474-3393
Minneapolis 612/544-3600
Northfield, IL 312/446-8395
Oak Brook, IL 312/986-0422
Rolling Meadows, IL 312/392-0244
Southfield, MI 313/352-6520
St. Louis 314/862-3800
St. Paul 612/771-0544

South/Southwest:

Atlanta 404/325-8370
Dallas 214/387-1600
Denver 303/773-3700
Fort Worth 817/338-9300
Houston 713/626-8705
New Orleans 504/561-6000

West Coast:

Encino, CA 213/995-8866
Irvine, CA 714/833-1730
Los Angeles 213/386-5500
Oakland 415/444-5955
Palo Alto 415/328-7155
San Francisco 415/434-2410
Seattle 206/454-6400
Torrance, CA 213/540-7500

Canada:

Toronto 416/364-2919

If unable to call, write:

Source Edp
Department C-1
721 Enterprise Drive
Oak Brook, Illinois 60521

When writing, please be sure to use home address and indicate position title.

NEW HAMPSHIRE BECKONS

The PEERLESS Insurance Company, in beautiful Keene, New Hampshire, needs PROGRAMMERS and PROGRAMMER ANALYSTS with varying degrees of experience. CICS experience is a plus!

PROGRAMMER ANALYSTS. Three years experience. Systems Design and insurance background a plus!

PROGRAMMER: Six months experience in COBOL or BAL is a minimum. Insurance application is a plus!

SYSTEMS ANALYST. Five years experience in insurance property and casualty or financial applications.

Keene is one of New Hampshire's nicest communities. New Hampshire has NO state sales or income taxes. If you want to work and live in a rural setting that's close to metropolitan areas, send full resume in complete confidence to:

Michael S. Cabot, Personnel Director

PEERLESS INSURANCE COMPANY



62 Maple Avenue
Keene, New Hampshire 03431
An Equal Opportunity Employer M/F

PROGRAMMING

The University of Delaware is seeking candidates for openings in the following areas of administrative data processing.

Senior Programmer Analyst(s) — responsible for the design, programming, and implementation of university administrative computer applications with some experience with Burroughs equipment. Minimum qualifications require equivalent of a bachelor's degree with 3 to 4 years' effective experience.

Programmer Analyst(s) — responsible for the design, coding and testing of university administrative programs including systems testing, user training, and preparation of final documentation with some experience with Burroughs equipment. Minimum qualifications require equivalent of a bachelor's degree with 1 to 2 years' effective experience.

These positions represent an opportunity to work within a centralized university computing center utilizing advanced teleprocessing and data base techniques on a large scale Burroughs B7700 system.

Submit resume including salary requirements by January 31, 1978 to:

Daniel J. Heimerich
Assistant Director
Administrative Systems
Computing Center
University of Delaware
Newark, DE 19711
An Equal Opportunity/
Affirmative Action Employer

Systems Programmer MVS

UOP Inc., a leader in the energy and environment fields, is searching for a Systems Programmer with MVS background to join the present staff. We installed MVS on an IBM/MP-158 in June 1975 and since have migrated to an IBM/168-3. The Data center provides services for 40 RJE stations and 32 TSO terminals. This is an exciting opportunity to work with the latest software (TCAM/TSO, TMS OB/DC and JES2). We offer an attractive salary and a full benefit package. Send resume including salary requirements to Barbara Gardner, Employee Relations, UOP Inc., Ten UOP Plaza, Des Plaines, Illinois 60016. We are an Equal Opportunity Employer M/F.

uop Inc.

position announcements

position announcements

position announcements

position announcements

position announcements

BOEING

Software Specialists

The Boeing Company, in Seattle, Washington, is seeking computer professionals for a variety of important assignments on a wide range of systems including:

- Energy Management/Control Systems
- Military Command/Control Systems
- Military & Space Avionics Systems
- Surface Transportation Systems

Challenging opportunities exist in the following areas:

OPERATIONAL SOFTWARE DEVELOPMENT

- Design and develop software for simulators, operational systems, automatic test equipment and other special-purpose or realtime applications.

SOFTWARE/COMPUTING SYSTEM DESIGN AND ANALYSIS

- Analyze system hardware, software and operator requirements to support establishment of a system architecture.
- Perform systems analyses and trade studies to support design concepts, new business acquisition and proposal activities.

SOFTWARE AND COMPUTER SYSTEM TEST AND EVALUATION

- Design and develop hardware and software test concepts and environments to support operational software and computer systems test.
- Conduct software tests.

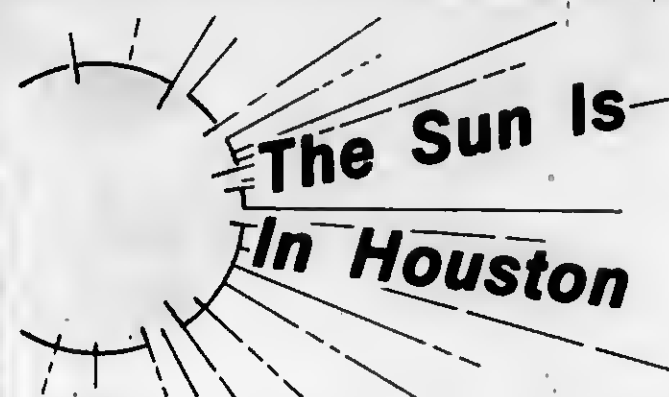
Candidates for these opportunities must have a BS degree or higher in Engineering or Computer Science and be a U.S. citizen.

Attractive salary, fringe benefits and moving allowances will be offered qualified candidates. And living is a pleasure in the unspoiled Northwest with its many recreational and sports activities and relaxed life-styles.

Look into these opportunities.

Send your résumé to The Boeing Company, P.O. Box 3707-LLA, Seattle, WA 98124.

An equal opportunity employer.

BOEING
Getting people together

The Sun Is
In Houston

Programmer Analyst

The Systems Division and Development Section of TRW Mission Manufacturing Company is in need of an innovative individual with three years programming experience in an IBM environment utilizing CICS and a Data Base concept. Our in-house computer is an IBM 370 138 DOS/VS system with programming in ANS COBOL.

We offer:

- Relocation Expenses
- Fully Paid Health and Dental Insurance
- Fully Paid Life and Pension Plan
- Educational Assistance Program
- Residential Location in Northwest Houston
- Promotional Opportunities Through Job Posting
- Part of a Fortune 100 Corporation
- Stock Savings Plan
- Credit Union
- Cafeteria in Plant
- Free Parking
- Air Conditioned Shop
- Hours 8:00-4:30

Send resume and salary history to Larry Garcia, TRW Mission Manufacturing Company, P.O. Box 40402, Houston, Texas 77040.

TRW MISSION
Equal Opportunity Employer M/F

Programmers

National Semiconductor, Large Systems Division, located in San Diego, is expanding its already successful product line of 158 and 148 size IBM plug compatible CPU's. To meet the challenge of new architectures and systems, we are in search of the following self motivated expertise:

Sr. Scientific Programmers

Requires BSEE Computer Science or equivalent and three years assembly language experience. 370/OS experience is desirable. Will design and implement console software systems, diagnostics, and develop microprograms.

Design

Automation Programmers

Requires BSEE Computer Science and three years designing software for wire wrap machines. PL/1 and other high level language experience is helpful. Will develop new wire wrap systems and integrate existing wire wrap software with in-house DA systems.

These positions and others of a similar nature are immediately available. To find out more regarding National's large systems team in San Diego, call COLLECT, or send your resume in confidence to: Jack Moyer, EXSYSCO, Personnel Manager, 10788 Roselle Street, San Diego, California 92121. (714) 453-1040. We are an equal opportunity employer m/f/h.

EXSYSCO

DATA PROCESSING PROFESSIONALS

Partial Listing

DP Sales
Programmer/Analyst SYS 7, Series 1
NCR Programmer-Neat 3
RPG II-Programmer
DP Mgr-SYS 3
Programmer-Assembly Language
Univac-COBOL
Systems Manager-Financial Exp
Programmer/Analyst-COBOL
Programmer/Analyst-Burroughs
Project Leader-COBOL, DL-1
Maintenance Programmer
Systems Procedure Analyst SYS3/370

To 24K
To 24K
To 14K
To 16K
To 22K
To 16K
To 16K
To 20K
To 17K
To 18K
To 19K
To 16K
To 20K

FEE PAID POSITIONS BLANKETING the MIDWEST

For Confidential Interview Call or Send Resume to Data Processing Division, 1401 Trader's Bank Bldg., 12th & Grand, Kansas City, Missouri 64106. (816) 471-4206.

PROFESSIONAL
CAREER
DEVELOPMENT, INC.



Earn

thousands of Dollars

Salesperson or Distributor. Experienced in selling Computer Ribbons, Computer Tapes and Office Machine Ribbons. Salary and commission. Call Greg: (516) 931-3120.

EDP AUDITOR

Opportunity to grow with subsidiary of one of the largest commercial banks in U.S. Accounting degree, able to program in COBOL and instruct programmers. All public OK. \$24,000 FEE PAID.

ROBERT HALF
PERSONNEL AGENCIES
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

position announcements

position announcements

position announcements

position announcements

position announcements

**DATA PROCESSING
LAB COORDINATOR/
INSTRUCTOR**

This position is subject to approval by the state legislature, the board of regents, and the university's administration. Favorable action is expected in early 1978.

Coordinate/manage college of business' data processing lab facility. Also, teach approximately 6 semester hours in introductory OP/IS courses or related subjects. Responsible for assuring that all lab equipment, systems software, and application software are operating properly and are available for student use. Schedule, supervise and coordinate work of part-time lab assistants in staffing lab facility during the 60-65 hours per week that it is operational. Position will be nine or ten month appointment.

Prefer minimum of master's degree earned in bus. ad., MIS or closely related field. Should be able to program in Fortran, Cobol, and Basic. Must be able to carry out duties and responsibilities with a minimum amount of direction and must enjoy working with, and being of service to, college students. \$12,000-\$16,000 dependent upon background and experience. Start August 1978. Contact Frank H. Besnette, Dean, College of Business Administration, Northern Arizona University, Box 15066, Flagstaff, Arizona 86011.

The Pros and Cons of working and living overseas



We know the answer...
and usually the Pros win!

We can guarantee... IMMEDIATE ACTION For Overseas Adventure.

Our client is currently scheduling expense paid interviews in Houston for qualified applicants during January.

If you are degreed and have expertise in each of the following:

- Programmers/Systems Analysts/Project Leaders
- Business/Commercial Applications
- COBOL and/or PL-1
- 370/OS.

call us collect (station-to-station) at (713) 621-9811, and we will appraise your chances.

***If you can't make this schedule or are considering an overseas position in the future, write for our free booklet.

Scientific Placement, Inc.

EMPLOYMENT SERVICE 2700 SOUTH
POST OAK ROAD Dept. 44
HOUSTON TEX 77056 713 621-9811

Data Processing

SYSTEMS ANALYST

We need an experienced systems analyst with a strong background in programming who can handle extensive systems design and program specification development responsibilities.

We have an IBM system 370-138 operating under OOS/VS and offer a competitive salary with excellent fringe benefits.

For appointment call:
DAN TELFORD
(312) 648-7810

**WESTERN RAILROAD
ASSOCIATION**
222 S. Riverside Plaza
Chicago, IL 60606

equal opportunity employer m/f

Field Service Engineers



Ambitious Field Goals?

PRIME has Some Points to make.

- At PRIME you'll encounter a sophisticated line of minicomputer technology.
- At PRIME you'll receive in-depth training.
- At PRIME you'll enjoy close interface with the home office.
- At PRIME you'll be part of industry-pacing growth.

PRIME offers Field Service Engineers the opportunity to do outstanding work independent of constant supervision, yet closely coordinated with developments in the company. You'll be working with an organization that tripled sales over the last two years, providing a growth-oriented environment in which you can advance at your own swift pace.

1-5 years experience and a technical school degree or equivalent are required. Also necessary are the ability and initiative to detect and solve problems as the primary post-sale liaison between PRIME and the user.

With openings in major cities across the country, we're looking for individuals to help meet our objective of becoming the most effective services network in the industry. If your goals involve advancement in a challenging career, come to PRIME.

EASTERN

Syracuse, NY
Wayne, PA
Hartford, CT
Boston, MA
Washington, DC
Orlando, FL
Atlanta, GA
Roanoke, VA
New York City, NY
Mountainside, NJ
Buffalo, NY

CENTRAL

Houston, TX
Detroit, MI
Pittsburgh, PA
Cincinnati, OH
Louisville, KY
St. Louis, MO
Chicago, IL
Dallas, TX
Moline, IL

WESTERN

Los Angeles, CA
San Francisco, CA
Portland, OR
Seattle, WA
Denver, CO
Phoenix, AZ

Please send resumes to Jay Lyons.

PRIME Computer, Inc.
40 Walnut Street
Wellesley, MA 02181

PRIME

PRIME COMPUTER, INC.

TECHNICAL SUPPORT SPECIALISTS

Rapidly growing company needs to add several well qualified, technically oriented self motivating individuals to Corporate Data Center staff. Applicants must be experienced in at least one of the following areas. Experience in multiple areas is a definite plus.

Telecommunications
Hardware Evaluation
OS/VS2 (SVS), HASP, MVS
ICS/DL1, IMS, TSO, RJE
Performance Evaluation

Send resume including salary history in confidence to:
Personnel Manager

AMCA International Corporation
5775 Summer Trees Drive, Memphis, TN 38134

DIRECTOR OF DATA PROCESSING

Major health care company. Over 100 in data processing area. Requires a director with superior management skills, one who has a track record of achievements and prior health care or insurance experience. IBM 370/OS/VS shop with high volume of transactions. Eastern Seaboard (Not NYC). \$37,000 FEE PAID

**ROBERT HALF
PERSONNEL AGENCIES**
522 Fifth Ave.
New York, N.Y. 10036
(212) 221-6500

RETAIL SYSTEMS EXECUTIVE \$35-\$40,000

Leading billion dollar Corporation with multi-division operations, seeks exceptional retail Information Systems Executive. Successful candidate will report to Group Vice President and be responsible for development of computer-based merchandise information system. Systems will serve hard and soft lines and include small POS systems. Candidate will interface with Division Presidents and have outstanding corporate visibility. Prefer MBA with at least three intensive years of information systems experience in general merchandise. Consulting experience would be an excellent background for this position. You may reply in confidence. Please send details of career and current compensation to CW Box 1375, 797 Washington St., Newton, MA 02160.

position announcements

SYSTEMS PROGRAMMER

\$1589-\$1933 per month

Knowledge computer programming languages; fourth generation computers, peripheral hardware, operating systems, large scale on-line CICS teleprocessing networks; skill analyzing hardware software requirements - capabilities; comorending and assimilating highly complex technical data; tracing systems to locate malfunctions. Apply no later than Friday, January 27, 1978:

City of Anaheim
241 S. Anaheim Blvd.
Anaheim, CA 92805
17141 533-5375

EDP OPPORTUNITIES

SYSTEMS ANAL. 370/148

OOS/VIS CICS \$28M

MGT SCI-ROI

Financial systems \$25-32M

MANUAL PROCESSES

corp policy \$15,500

FINCL SYSTEMS ANAL.

Fortran/Basic POP

11/35 \$27-35M

OR ANAL-Investment banking

Fincl modelling \$30M

FINCL SYST ANAL

RAMIS/FOCUS, MBA \$33-39M

OOS to OS conversion

In CICS \$20M

LEARN IMS-2.3 yrs

OS Cobol or BAL \$19-21M

SOFTWARE DEVELOPMENT

CICS/VIS AOR LIB \$26M

FORTUNE CO-OS COBOL

In data base \$24M

Bill Borrelli (212) 349-3610

William Harris Assoc.

150 Broadway

New York, N.Y. 10038

Agency

HOUSTON

Jobs! Jobs! Jobs!

Lots of sunbelt opportunities for Programmers, Programmer Analysts, Analysts, DBA's, Systems Programmers, etc. Experience ranges from 1+ years and salary from \$14,000 to \$26,000. Send your resume to Jim Fleming, Robert Half Personnel Agencies, 4801 Woodway, Suite 231W, Houston, Texas 77056.

ROBERT HALF
PERSONNEL AGENCIES

position announcements

SOFTWARE PRODUCT MANAGEMENT**EXPAND with us!**

Interdate, one of the country's fastest growing minicomputer systems manufacturers, seeks medium and senior level software generalists to join its hard-hitting computer systems marketing team. Openings are at our Home Office in the Jersey shore area, conveniently located just 55 miles south of New York City. Positions require good written and oral communications skills and broad experience in software development, programming, technical support, or sales activities in one or more of these areas:

- High level Languages
- OS and Utilities
- Data Base and Transaction Processing
- Generalized Application Packages

As a member of the product management team, you will interface with our development group performing product planning and with the sales organization merchandising our products.

Beyond an excellent starting salary and company benefits, we can promise you substantial growth potential that will more than keep pace with your growing capabilities. For prompt consideration, CALL COLLECT, (201) 229-7007, or send resume and salary history in confidence to:

Veda Drummond.

INTERDATA®

A DIVISION OF

THE PERKIN-ELMER CORPORATION

2 Crescent Place, Oceanport, New Jersey 07757

An Equal Opportunity Employer M/F

look
into your
future

position announcements

SOFTWARE PROFESSIONALS

NATIONWIDE POSITIONS

15K-35K

SYSTEMS ENGINEERS

SYSTEMS ANALYSTS

SALE SUPPORT

REAL TIME

COMMUNICATIONS

BUSINESS

SCIENTIFIC

CALL ROGER WILKERSON

MATT**SARNER****ASSOCIATES**

10050 N. Wolfe Road

Suite 250

Cupertino, Calif. 95014

(408) 996-2112

AGENCY

ALL FEES EMPLOYER PAID

COMPUTER USER**SERVICES****COORDINATOR**

University computer center seeking experienced college instructor to head Computer User Services area. District academic consulting effort, conduct non-credit mini-seminars of computer resources including IBM 370/138 and time sharing computers, prepare user documentation and special purpose software. Minimum of BS degree in computer technology or related field required. Send resume, salary history and requirements to:

Walter Miner
Direct Data

Systems and Services

PURDUE UNIVERSITY

CALUMET CAMPUS

2233-171st Street

Hammond, Indiana 46323

Equal Opportunity Employer M/F

Systems Analyst

Mapping, Mini and

Large Computer Applications

A Northwest electric utility is in need of a Systems Analyst to assist in digitizing our service area maps.

Specific qualifications are: degree in a technical field, command of FORTRAN, COBOL, and an assembly language. Experience with minicomputers and large commercial data processing systems such as 370/158, experience in writing and reviewing hardware/software specifications and in working with vendors. A knowledge of data base structures, interactive graphics, plotting, the State plane coordinate system and common projections used in mapping.

The successful candidate will have from six to ten years of solid data processing experience and will be a heavy individual performer.

If you have most of the above qualifications, contact Roxie J. O'Brien, Senior Employment Coordinator, Portland General Electric Company, 121 S.W. Salmon, Portland, OR 97204.

an equal opportunity employer m/f

PGE

Portland General Electric
121 S.W. Salmon
Portland, OR 97204

Computer Engineer

To join the faculty of Electrical Engineering Department at the University of Southwestern Louisiana. Experience in computer hardware design and its application to engineering problems. Ph.D. in Electrical Engineering or Computer Engineering desired with demonstrated research ability. Accomplishments should include publication and participation in professional organizations. He or she will teach and conduct research. Salary is open to negotiate. The University of Southwestern Louisiana is an Equal Opportunity Affirmative Action Employer and is in compliance with Title IX and Section 504 of the Rehabilitation Act. Mail resume by March 15, 1978 to: William A. Klos, USL, P.O. Box 43990, Lafayette, LA 70504.

SENIOR PROGRAMMER ANALYST

PORTLAND, OREGON

Educational organization seeks individual with proficiency in BASIC and SPL (or comparable MACRO language) and familiarity with HP3000 equipment. Minimum requirements: 5 years experience as programmer or systems analyst; experience with educational applications; formal training in systems design or analysis. Starting salary range: \$7.46-\$8.23 per hour, 40 hours per week. Initial application materials: letter of application and resume. Closing date: 1/22/78. Apply to MCIED Personnel, P.O. Box 16657, Portland, OR, 97216.

An Equal Opportunity Employer

Assistant or Associate Professor

To begin Sept., 1978. Should hold a Ph.D. and teach well with knowledge of several programming languages. Teaching load about 12 hours (quarter). Send vitae by March 15, 1978 to Or. James J. Johnson.

Dept. of Mathematics
and Computer Science
University of Tennessee at Martin
Martin, Tenn. 38238

An Equal Opportunity/
Affirmative Action Employer

SYSTEMS ANALYST/DESIGNER

GO WITH THE BEST...

SYSTEMS & COMPUTER TECHNOLOGY

AT THE UNIVERSITY OF ALASKA

What you've been looking for is an opportunity to advance quickly and take charge of system development effort. What we have to offer is just that. We're SCT, a recognized expert in providing EDP systems and computer center management to colleges and universities, local governments, and healthcare institutions throughout the USA. Growth potential is excellent.

Right now the University of Alaska Computer Network (UACN) needs your total systems expertise for the following broad based responsibilities:

- Defining information requirements for administrative university functions;
- Designing new systems and enhancements to satisfy these requirements;
- Providing training/assistance to administrative systems users;
- Serving as a local point for the entire systems development process;

This key position requires a degree, preferably in business administration; a minimum of 2 years analysis/design experience including file structures; at least 1 year of programming; a financial systems background; and superior oral and written communication skills. Experience in planning and executing system development projects for large scale computer systems and for administrative applications in higher education is desirable.

Our excellent compensation package includes:

- Cost-of-living adjustment
- Medical and dental plan
- Three weeks vacation after one year
- Company paid relocation.

CALL COLLECT

Manager of Administrative Systems

(907) 479-7665

Monday thru Friday, 12 noon-9pm (C.S.T.)

or send resume today to:

SYSTEMS & COMPUTER TECHNOLOGY CORP.

P.O. Box 95101

Fairbanks, Alaska 99701

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

ANALYST/PROGRAMMER

Technical development of Health Care Applications. Ideal candidate's experience should include some of the following:

- Several years mini-computer experience
- Distributed network experience helpful
- Experience in Assembler, FORTRAN/COBOL

For consideration, please submit a resume including references and salary history to:

Employment Manager
Methodist Hospitals of Dallas
P.O. Box 5888
Dallas, Texas 75222
Equal Opportunity Employer

**SENIOR
SYSTEMS
ANALYST**

Administrative Data Processing. Minimum 2 years systems analyst experience in systems design and implementation using PL/I or COBOL. CICS experience is desired. Familiarity with AOP systems supporting a major university is desirable. Salary range \$15,310-21,430. Please apply by January 20, 1978 Personnel Office, 110 Forest Blvd., Michigan State University, East Lansing, MI 48824. An Equal Opportunity Employer.

PROGRAMMER/ANALYST

Mainline computer services organization offers professional opportunity to qualified candidates — wide variety of applications and hardware — State of the Art Software — Professional environment with planned professional growth — competitive salary and benefits plan — need COBOL or Assembler experience — IMS, CICS and PL/I helpful — positions available in Baltimore, Buffalo, Chicago, Pittsburgh, Rochester and Syracuse locations — call (716) 325-4220 or rush resume to:

Computer Task Group, Inc.
183 Main Street East
Rochester, N.Y. 14504
Equal Opportunity Employer M/F

SEATTLE

Clean air, mild climate! DP needs for a healthy economy. Programmers 1+ yr to \$15,000. Prog/analysts 3 yr to \$18,000. Jr Consult (MBA) to \$24,000. DP Planning Mgr (bkng) to \$30,000. Call or send resume to: COMPUTER PERSONNEL, 1 Lk Bellevue Dr., Bellevue, WA 98005 (206) 453-0444.

PROGRAMMER/ANALYSTS

Establish Your Own Milestones For '78

Computer Sciences Corporation, with over 8,500 computer professionals, knows how to develop and reward computer expertise. We are still expanding into interesting and challenging projects, and would very much like to help you meet your goals this coming year...

CSC's System Sciences Division is meeting new project demands and creating new positions in support of contracts with the Federal Aviation Administration and National Aeronautics and Space Administration. One of our newest projects is the development of an air traffic control system in Jacksonville, Florida. In addition, we have several NASA projects in the Washington D.C. area, requiring scientific or technical programming backgrounds. We invite you to investigate your future with our division.

Air Traffic Control Systems: Space Sciences:

We are seeking experience in IBM 360/OS, Assembly (BAL) and/or high level language (preferably JOVIAL) to work in any one of the following areas in Jacksonville, Florida.

- Software test and validation including development of tools to test and validate real-time software systems
- Simulation/modeling of air traffic patterns. Knowledge of JOVIAL a plus
- Design and implementation of data base management systems
- OS/360 System generation and maintenance
- Diagnostic design, development of enhancement and hardware orientation
- Software Quality Assurance

Current positions available in support of our Goddard Real-Time System, Space Tracking Data Network and On/Off Site Projects for the NASA Goddard Space Flight Center in Greenbelt, Maryland, a suburban Washington, D.C. location. These positions require a degree in Computer Science, Math, Physics, Astronomy, Meteorology or Engineering with experience using FORTRAN and/or Assembly languages on large-scale or mini-computers. These skills will be applied in the following concentrations:

- Telemetry application with multi-computer configuration
- Integration and testing of realtime display software
- Data base management
- Real-time scientific applications
- Network management
- Computer-to-computer communications
- System requirements definition

- Analysis and application of climatological data
- Simulation/modeling of real-time systems
- 360/370 OS systems programming

We offer you a professional environment and opportunity to grow within the above spheres. We have an excellent benefits package and competitive salaries. For further information, please send resume or call:

Staffing Department
Toll Free: 800-638-0842 OR Call
Collect: (301) 589-1545

**COMPUTER
SCIENCES
CORPORATION**

System Sciences Division
8728 Colesville Road
Silver Spring, Maryland 20910

Major Offices And Facilities Throughout The World
Equal Opportunity Employer M/F



Iowa beef is a cut above the usual bull.

In our short 17 year life, we've made it... all the way to the top. With corporate foresight and ambitious, yet realistic goals, we're a billion dollar giant, a Fortune 125 leader and #1 in our field. We have advancement positions now available for data processing professionals who want to grow with us and develop their expertise in a state-of-the-art environment.

SYSTEMS ANALYSTS

As part of our systems development group you'll play a major role in the on-going development of new business systems. To qualify you should be degreed with 3-5 years experience that emphasizes the design of on-line data base systems. Manufacturing systems background is a plus.

PROGRAMMER ANALYST

Requires a minimum of two years experience in COBOL programming and one year experience in systems design that emphasizes team leadership responsibility for the development of a major computer system.

We offer an outstanding compensation and benefit program that includes annual cash bonus and stock options. Interested candidates should CALL COLLECT or send resume in confidence to: Walt MacLag, (402) 494-2061, IOWA BEEF PROCESSORS, INC., P.O. Box 3350, Sioux City, Iowa 51101. An Equal Opportunity Employer M/F.

ibp IOWA BEEF PROCESSORS, INC.

**OPERATIONAL
SUPERVISOR
DATA PROCESSING**

Salary Range & Requirements: \$1483-1806 per month. Requires 2 yrs. of supervisory exp. in developing and implementing systems involving feasibility, system designs, programming and computer operations; also requires ability to train and supervise the work of subordinate employees. Apply: Yolo County Personnel Dept., Courthouse, Room 102, Woodland, CA 95695. PH: 666-8386. Final filing date: 1/13/78 - 5 pm. An Equal Opportunity-Affirmative Action Employer.

HOUSTON

Combined unemployment 4 1/2%. Date Processing - Almost 0%. Average temperature - Approx. 68.9 degrees. Start the new year right by sending your resume to Jim Fleming, Robert Half Personnel Agency, 4801 Woodway, Suite 231W, Houston, Texas 77056.

ROBERT HALF PERSONNEL AGENCIES

CINCINNATI

370 Prog Anal. Heavy demand OS & OOS to 24K
EOP Audit-career opportunity upward. 370 background to 23K
Teleprocessors. comten 3670 to 23K

Fee & Relocation Paid
Call Bill Rialhmiller (513) 961-5575 or
ava/wkands (513) 561-8935
Angus/Baldwin Assoc., Inc.
2337 Victory Parkway
Cincinnati, Ohio 45206
Nationwide Coverage
80 affiliate offices

SYSTEM PROGRAMMERS

PENN STATE'S SYSTEM/370 Model 168, providing research and instructional services to our large academic community, is scheduled to be upgraded to a 3033 Processor in August 1978. This computer is the hub of a network supporting 40 remote batch installations plus conversational RJE, time-sharing, and graphics terminals. High performance (over 18,000 jobs in a peak day) has been achieved by modifications and development of systems programs with emphasis on manageability and system throughput.

SYSTEM PROGRAMMERS are needed to participate in our conversion from MVT/HASP to MVS/JES2, to help us establish an effective measurement and evaluation program, to install and support enhanced interactive services, and to develop other sub-systems.

APPLICANTS must have a degree in Computer Science or related field and must have demonstrated fluency in S/370 assembler language and a sound knowledge of operating system organization and principles. Also desirable are experience with HASP or JES2 internals, experience with interactive systems, and advanced degree. Salary and responsibilities will be commensurate with education and experience. Send resume, including education, professional experience, and salary history, to Dr. Donald T. Laird, Director, Computation Center, 229 Computer Bldg., University Park, PA 16802.

THE PENNSYLVANIA STATE UNIVERSITY
An Affirmative Action/Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER-ORIENTED ENGINEERS AND SYSTEMS ANALYSTS.

Aramco, the world's largest oil producing company, is seeking people interested in applying computers to efficient operation and scheduling of the world's largest crude oil pipeline network and marine terminal, and one of the world's largest refineries. Positions are in Aramco's Oil Supply Planning and Scheduling Department located in Dhahran, Saudi Arabia.

Existing computers are (A) dedicated twin CHI-2130's running under time-sharing and supporting multiple CRT terminals used for our production and terminal delivery planning system and interactive program development, and (B) IBM System 7 acquiring tank gauges from remote locations for use in central planning office. A large scale oil and gas remote data acquisition system is currently under study.

The requirements.

Applicants must have a bachelor's degree, know FORTRAN, and like to do a job from start to finish including problem definition, systems analysis, programming and user

training. Experience with 1130-type computers and/or petroleum industry experience would be useful.

Why work for Aramco?

Besides the challenge and career opportunities of your job, working for Aramco overseas offers several excellent advantages. You'll receive a good salary and savings plan, plus a generous tax-protected expatriate premium.

And you can travel the world if you wish, because on the average of every 12½ months you receive 40 fully paid vacation days, as well as round trip vacation travel fare to the U.S. Add to this on average of 12 paid holidays each year. In addition, medical care for you and your family is furnished at no charge by the company while you are in Saudi Arabia.

Interested?

If so, and you're qualified, please write for an application. We'll be back in touch with you as soon as possible.

ARAMCO

SERVICES COMPANY

WRITE SECTION OMT, DEPT. CW0109A,
1100 MILAM BUILDING, HOUSTON, TEXAS 77002

SYSTEMS PROGRAMMER

Rapidly expanding computer mfr. seeks systems software programmers. Must have hands-on exp. on large IBM OS, VM/VS, internals, sysgens, & strong personal interface skills. Openings in various desirable U.S. cities. \$21-\$28,000 (Fee Paid).

**ROBERT HALF
PERSONNEL AGENCIES**

140 Federal St.
Boston, Mass. 02210.
(617) 423-6440

CASE WESTERN RESERVE UNIVERSITY CASE INSTITUTE OF TECHNOLOGY

Director Andrew R. Jennings
Computing Center

Nominations and applications are sought for the position of Director of the Andrew R. Jennings Computing Center. Duties will include assuring adequate computing services for faculty, staff and students by supervising the center; administering the operations of CWRUNET, the distributive computing network presently being developed; and acquiring needed computer equipment. Experience in academic computing is required. Administrative experience in operating a computing facility is desirable. The position may carry a faculty appointment in the appropriate academic department. The salary will be commensurate with qualifications and experience.

Inquiries and applications should be addressed to:

Prof. Glenn M. Frye, Jr.
Chairman

Search Advisory Committee

Rockett Building
Case Western Reserve University
Cleveland, Ohio 44106
Application deadline is February 1, 1978.

Case Western Reserve University is an equal opportunity/affirmative action employer.

INTERNATIONAL MARKETING MANAGER

Computer Peripheral Equipment

The Americas and Asia Group of Memorex, located in Santa Clara, California has an opening for an experienced computer marketing professional. Memorex's rapid growth in Latin America and Far East markets has created the opportunity for an individual to provide leadership in the marketing of current products and the introduction of new products in existing sales and service locations and new geographic markets.

This position requires 5 years experience in large scale computer system sales, with 2 years experience in sales management. Successful experience in product sales or product planning of memory or communications system is also mandatory.

Engineering degree and MBA are desired. Fluency in Spanish or Japanese is a definite advantage. 8-10 weeks per year of travel is required.

This is an excellent opportunity for a talented EDP marketing professional who seeks to broaden his career horizon in a highly rewarding, results-oriented company. Compensation and benefits are competitive and the opportunity for personal growth is outstanding.

Please send a resume, including compensation history to Memorex Corporation, Attn: K. Rosheim, Manager of Professional Employment, San Tomas at Central Expressway, Santa Clara, CA 95052. An Equal Opportunity Employer M/F.

MEMOREX

SYSTEMS PROGRAMMER

The University of Idaho announces an opening for a OP Software Specialist II, to participate in the enhancement of software and hardware services at our S370/145, OS/VS1 academic and administrative computer facility. The position, with starting salary of \$14,796, includes excellent fringe benefits, an enjoyable college atmosphere, and easy access to Northern Idaho outdoor recreation. If you are interested, and you have a bachelor's degree in a computer-related field and a year of full-time paid systems programming experience on an IBM System/360 or System/370, send your resume by January 31, 1978 to Jeff Billin, Computer Services, University of Idaho, Moscow, ID. 83843. An AA/EO employer and educational institution.

ATLANTA PROG/ANALYST

We have an immediate need for seasoned prog/analysts who are proficient with: COBOL, RPG, IMS, CICS & TOTAL. Degree preferred but experience is most important. \$16,000-\$24,000 (Fee Pd.)

**ROBERT HALF
PERSONNEL AGENCIES**

3379 Peachtree Rd. N.E.
Atlanta, GA 30326
(404) 266-2153

SOFTWARE SALES

We're looking for highly motivated systems software salesmen with experience selling to the IBM DOS and OS/VS marketplace. If you want to increase your income potential with a broad and diversified product line, call Bert Parsloe at (203) 792-5100. Universal Software, Inc. Brookfield Office Park, Brookfield, CT 06804.

PROGRAMMERS AND ANALYSTS

If you are a programmer, programmer analyst or systems analyst and would like the most individualized job search offered in the data processing field today, either on a local or national level, send your resume in confidence to either location:

CINCINNATI

SEARCHED, INDEXED,
SERIALIZED, FILED
JAN 11 1978
FBI - CINCINNATI

DALLAS

SEARCHED, INDEXED,
SERIALIZED, FILED
JAN 11 1978
FBI - DALLAS

SYSTEMS SOFTWARE PROGRAMMER

Hennepin County (Minneapolis and surrounding suburbs) provides a broad range of governmental services to the one million residents of this area. Our Data Base Group has an immediate opportunity in state-of-the-art IBM 370/168 IMS/VS on line systems development for the individual with at least 1 year of programming experience and a working knowledge of Data Base, IMS, MFS or data dictionary are highly beneficial. Responsibilities will include providing technical support to development and operations staff in their use of IMS/VS 1.4. In addition to competitive income and comprehensive benefits, we offer you all the social, cultural, educational and recreational benefits of living in the Twin Cities area, one of America's most livable communities.

FOR IMMEDIATE ATTENTION, PLEASE RESPOND IN CONFIDENCE TO:

Ruth Cina
Hennepin County
Personnel Department
A-3 Government Center
Minneapolis, Minn. 55487

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER ANALYST

Come Grow With Us In Sunny California

We are the newly created Western Division of an established consulting firm. We provide the business communities of Los Angeles and Orange County, Phoenix and Tucson with the data processing expertise they require.

We are seeking new individuals with a professional attitude who have the experience and the ability to grow in the consulting environment.

This outstanding professional opportunity offers:

- Stimulating work environment
- A policy of internal promotions
- Professional and technical education
- Above average salaries
- A fully paid benefits plan

Currently we have openings for individuals who have a thorough knowledge of the following:

COBOL, IMS, (on line/batch processing), TSO, SPF, structured programming, structured design, OS/VS/MVS, PL1 and ALC applications, DOS/VS, CICS/VS.

Please call, or send your resume to:

CIBER, Inc.
Consultants In Business/
Engineering/Research
WESTERN DIVISION, INC.

3858 Carson, Suite 201
Torrance, California 90503

(213) 540-3210

(602) 248-0813

(313) 642-2900

CIBER



We Are An Equal Opportunity Employer M/F

San Diego opportunity in SOFTWARE SYSTEMS DEVELOPMENT

Want to combine the ideal career opportunity with your favorite lifestyle? NCR Systems Engineering/Torrey Pines needs your help now in developing advanced, high-technology, EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, La Jolla and downtown San Diego. You can live in the setting of your choice — beach, valley, mountain, country, small-town or urban — and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too — from mild coast to dry desert. San Diego is a place of extraordinary choices — and right now the choice is yours.

COMPUTER PROGRAMMERS

The Systems Engineering/Torrey Pines Division has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- Telecommunications Software
- File Processing
- Network Development
- Large Mainframe, Mini and Micro Processor
- Operating Systems
- COBOL Applications
- Assembly Language

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems: both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.

NCR

Thom Harris, Employment Specialist
SYSTEMS ENGINEERING/TORREY PINES
4046 Sorrento Valley Blvd., San Diego, CA. 92121
An Equal Opportunity Employer



Yale University

Two Challenging Positions Available

SR. SOFTWARE SYSTEMS PROGRAMMER

Will be responsible for the design, development, implementation, modification and evaluation of software systems and packages such as operating systems, language, compilers and utility programs necessary to meet the needs of a broad and diverse user and staff population. Several years experience as systems programmer. Must have thorough knowledge of assembly language and PL/I.

ADMINISTRATIVE APPLICATIONS PROGRAMMER

Will assume programming and user support function for a large computerized accounting and administrative reporting system. Also make system extensions as required and make indicated modification to improve efficiency and ease of use. Advise administrative personnel on current use of system. Must have several years experience in data processing applications, thorough knowledge of PL/I and experience with OS/VS JCL, statistical packages and a large administrative applications system.

Liberal fringe benefit program including contributory comprehensive group practice health insurance plan for employee and dependents, life insurance, 12 holidays, 1 month's vacation, employer paid pension plan, university facilities and programs.

Send resume and salary desired to: Mr. Richard Osgood, Manager Operating Systems & Programming.

Yale Computer Center

175 Whitney Ave. New Haven, Conn. 06511

Yale University is an Affirmative Action Employer. All interested persons are encouraged to apply.

PROGRAMMER ANALYST

LONG ISLAND AREA

If you're a highly skilled innovative professional who is looking to join a dynamic management team... this position offers top dollar. You'll have to be a top programmer analyst with a strong background in IBM 370, OS/VS with a proficiency in assembler and higher level languages. TP experience is a plus.

We are a NYSE listed, people oriented company recognized as a leader in the O.P. services field, who can offer the right individual high visibility and full involvement with our management team.

Remuneration will include an excellent starting salary commensurate with experience and ability, and other attractive company paid benefits.

If you'd like to discuss a great opportunity where you can exercise your talents in management and both systems and application programming, please submit resume in confidence, including salary history and requirements to:

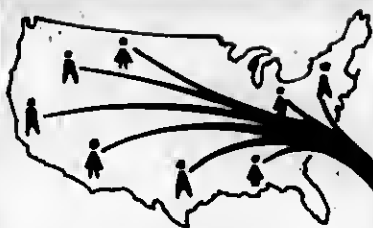
CW Box 1374

797 Washington Street

Newton, MA 02160

an equal opportunity employer m/f

COMPU SEARCH



**specializes
in careers
for you...**

See us in your city

Since 1968, CompuSearch has sought out exceptional individuals with data processing related skills for large and small companies throughout the United States. We also have been very successful in locating challenging new positions for thousands of people who have requested our assistance. If you are a talented achiever interested in learning about situations that will best meet your goals, contact our office nearest you in complete confidence. We keep a close watch for the best available opportunities locally and nationally.

Appleton, WISC	(414) 731-5221
Arlington, VA	(703) 841-1700
Boston, MASS	(617) 262-5050
Braintree, MASS	(617) 848-1666
Cincinnati, OH	(513) 651-5500
Cleveland, OH	(216) 623-1037
Dearborn, MICH	(313) 336-6650
Indianapolis, IND	(317) 257-4261
Jacksonville, FL	(904) 356-8513
Los Angeles, CA	(213) 930-1313
Louisville, KY	(602) 456-4330
Madison, WISC	(414) 273-4430
Omaha, NEB	(402) 397-8115
Pittsburgh, PA	(412) 343-7410
Rochester, NY	(716) 325-1660
Rockford, ILL	(815) 968-1552
San Francisco, CA	(415) 362-0911
Southfield, MICH	(313) 569-2828
Stamford, CONN	(203) 324-2232
Troy, MICH	(313) 585-4200
Tulsa, OKLA	(918) 622-6632

COMPU SEARCH
Division of
Management Recruiters

Systems Analyst

Excellent opportunity in New Mexico's high country for a self-starting creative individual.

This highly visible position will be responsible for designing and implementing a modern, on-line, interactive, financial management system.

For further information on how you can make full use of your ability and experience, Call Collect or submit your resume to: Administrative Services Department.

Los Alamos County

P.O. Box 30

Los Alamos, N.M. 87544

(505) 662-4122, Ext. 45

an equal opportunity employer m/f

The University of Texas

Medical Branch at Galveston has an immediate opening for an experienced Systems Programmer. Join a progressive data processing staff of 70 persons working for the largest, oldest and most prestigious medical school in Texas. UTMB is involved in some of the most advanced research being done in the medical field today. This 1100-bed health care facility provides a constant challenge for the development of new systems. The innovative data processing department offers each employee the opportunity to develop through internal and vendor education programs. On-line, real time, health care support applications provide the backbone of the development environment. Working with a group of four, the person selected will share responsibility for development, testing and maintenance of systems software. This is a dynamic growth environment currently moving from OS/MVT HASP to MVS/JES 2 on a four meg, 370/158. A large teleprocessing network is managed by CICS using DL/I as the OBMS. Qualifications should include a good working knowledge of ALC and 3 years experience with similar systems and equipment. The position provides excellent benefits and a salary commensurate with experience. 50 miles south of Houston, Galveston Island sits just off the Texas coast in the Gulf of Mexico. The town's unique combination of historical (late 1800's) architecture and coastal beach advantages provide a delightful living environment for the employees of the large medical school/hospital complex. Leave your cold weather worries behind and join us in one of the highest growth areas in the U.S.

Send your professional resume to:
Service Computation Center
c/o Mr. Bernard Curran, Personnel Office
P.O. Box 146

University of Texas Medical Branch

Galveston, Texas 77550

For more information concerning specific duties, call (713) 765-3800. We are an equal opportunity m/f/h employer.

position announcements

position announcements

position announcements

position announcements

position announcements



Marketing opportunities at Tektronix are created by growth.

People advance, new units are formed, existing units expand. Events that create opportunities for you, the marketing professional. We need marketing professionals for laboratory and portable oscilloscopes, benchtop test systems, microprocessor development aids, logic analyzers and an extensive line of data and intelligent terminals, graphic systems, plotters and related products.

Your background in design or applications of these products, communications skills and desire to work in marketing is necessary. Experience with microprocessors and ASSEMBLY or high level programming is a plus factor, or for some positions, is a necessity. Formal education might include a BSEE or BSCS plus marketing courses.

Product Managers

Responsibilities will include developing marketing and sales and service support for products in the assigned group. Substantial interaction with engineering, sales, finance, manufacturing and corporate management is necessary.

Necessary experience includes marketing experience in related product areas. Formal education includes a BSEE or BSCS plus an MBA.

Program Supervisors

Persons in these positions implement and monitor marketing and sales programs for their assigned products. In conjunction with product managers, specialists and engineering, they also participate in developing new products proposals, market definition and sales training programs.

Background might include previous marketing experience or hardware/software/applications engineering with marketing courses. Formal education may also include a BSEE or BSCS, plus marketing courses or an MBA.

Product Specialists

These individuals work directly with our customers and sales engineering providing technical support and applications assistance as well as participating in product planning and market development.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

CALL Art Andersen at 800-547-1164 (Toll free) or collect 503-644-0161, extension 7043 or send a complete resume and salary history to Art Andersen, TEKTRONIX, INC., P.O. Box 500, C56, Beaverton, Oregon 97077.

An Equal Opportunity Employer M/F/H

Tektronix
COMMITTED TO EXCELLENCE

FEDERAL EXPRESS

America's Airline for Packages

An expansion of our Information Systems Department has created the need for additional personnel. For experienced, imaginative professional who enjoys the challenge of a rapid-growth environment, we offer the following opportunities:

SYSTEM SOFTWARE PROGRAMMER/ANALYSTS

Individual must have experience B6700 or B7700 systems and be thoroughly familiar with support software. Proficiency in COBOL and ALGOL languages required, DMSII and/or GEMCOS helpful. Heavy on-line transaction processing experience a plus.

We offer excellent compensation, benefits package, and advancement opportunity.

To apply send confidential resume including salary history to:

Kay Coop, Sr. Personnel Representative

FEDERAL EXPRESS CORP.

AMF Box 30167
Memphis, TN 38130
(901) 369-3245

Equal Opportunity Employer M/F

DATA PROCESSING PROJECT MANAGER

Do you have five or more years in successively more responsible programming and systems analysis positions?

Do you have experience with data base applications, communications and ALC programming in an OS environment?

If you can answer yes to the above questions, then one of Washington's leading financial institutions may be looking for you. We currently have an opening for an officer to lead a group of programmers and analysts and assume all technical and administrative responsibility for our data base management on-line system.

Salary \$21,000-\$24,000 per year. Send confidential resume outlining qualifications and experiences to:

The National Bank of Washington

Personnel Department
4340 Connecticut Ave., N.W., Washington, D.C. 20008
An Equal Opportunity Employer

CONSIDERING A CHANGE?

The time is right - EDP opportunities at all-time high!

FEE PAID NATIONWIDE COVERAGE CONFIDENTIAL

Companies pay our fee, interviewing & relocation expenses. Client firms are engaged in all industries - Manufacturing, Banking, Retailing, Insurance, CP Services, etc.

Immediate needs include:

Prog/Anal (1-5 yrs)	\$15-22K	Soft. Prog (1-5 yrs)	\$18-24K
Sys Anal (+5 yrs)	\$20-25K	Soft. Prog (+5 yrs)	\$24-30K
Sr. Anal/Prog Mgrs	\$22-27K	EDP Auditors	\$18-22K
Material Anal (MRP)	\$20-28K	Scien. Prog/Anal	\$18-23K
Mgrs IBM S/3, RPG-11	\$16-22K	(mini's, PDP's, etc.)	

For more information, send your resume in confidence to:



Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

NEW OPPORTUNITIES IN DATA PROCESSING SYSTEMS ANALYST

3-5 years experience
SR. PROGRAMMER

3-4 years experience
PROGRAMMER
0-2 years experience

REQUIREMENTS

Degree
Manufacturing/Marketing
Background
COBOL Language
IBM 370 OS/JCL

Zimmer USA, a recognized leader in the manufacture of quality health care products, offers rewarding career development opportunities for data processing professionals seeking new challenges and an innovative environment.

We offer a salary commensurate with experience plus an attractive benefit package. Send letter or resume to: J. Steger, Director of Staffing or call (219) 267-6131 ext. 235.

ZIMMER-USA



Division of Bristol Myers
Warsaw, Indiana 46580
An Equal Opportunity Employer M/F

SKI COLORADO!

SR. SYSTEMS ENGINEER
Chemical process design, reaction kinetics, prefer both process and systems experience, BS/MS Chem. Eng.

PROG./ANALYSTS
Business and Scientific applications on Burroughs 6700, Honeywell 6000, and CDC CYBER hardware.

SYSTEMS PROGRAMMER
OS/VS Internals, TSO, RTAM, SOFTWARE SPECIALISTS
POP RSTS, VARIAN VORTEX or INTERDATA OS/32 MT Internals.

Reply in confidence to: Mr. Pieper, NELSON, COULSON & ASSOC., INC., Consulting Engineers, 333 W. Hampden Ave., Englewood, CO 80110. EOE.

FLORIDA

The holidays are over - Companies are interviewing! We need prog/anal, analysts, sys prgs, scientific-you name it - we have it. All ranges 100% Co pays fee and interview exp. Salaries range from \$10,000 to \$22,000. Mail your resume to Stan Allen TODAY! Don't get left in the cold!

ROBERT HALF PERSONNEL AGENCIES

1311 N. Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

Programmer Analyst Pharmaceutical

Ethical pharmaceutical firm, relocating to the central Ohio area, has an excellent career opportunity for a programmer analyst. The position will be responsible for structuring a clinical data base, writing new programs to support clinical data processing and providing assistance to medical personnel to define data processing needs.

This is an outstanding opportunity for a person with a science education and experience with pharmaceutical research/clinical data processing. Paid relocation.

Send resume including salary history to:

CW Box 1739
797 Washington St., Newton, MA 02160
An equal opportunity employer M/F

ANALYST/PROGRAMMER

Immediate opening. Design, implementation and maintenance of systems in administrative and library areas. Minimum requirements are a bachelors degree; experience in analysis and design; and a working knowledge of database management (OBMS), COBOL and FORTRAN IV. Ability to interact at a high level with administrative staffs, translate requirements to system specifications, and lead a programming team is essential. Bucknell's Freas-Rooke Computer Center operates a Honeywell (Xerox) Sigma-7 CP-V system. Comprehensive batch and time-sharing services support academics and administration. Excellent fringe benefits. Send detailed resume and references to:

Dr. Ben Douglas Gay, Director
Office of Computer Activities
Freas-Rooke Computer Center, Bucknell University
Lewisburg, PA 17837
An Equal Opportunity/Affirmative Action Employer

For all future orders, please use the serial number below.

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

a new subscription

new address

new title

new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



**797 Washington Street
Newton MA 02160**

position announcements

position announcements

position announcements

position announcements

position announcements

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

- **SYSTEMS ANALYSTS**
- **PROJECT LEADER**
- **SENIOR PROGRAMMERS**

Candidates should have a college degree or equivalent, and a minimum of 4 years' experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and knowledge of JCL for OS/MVT is desirable.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If interested and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C
EG&G Idaho, Inc.
Box 1625, Idaho Falls, Idaho 83401
U.S. Citizenship Required
We are an equal opportunity employer M/F/H



DIRECTOR OF SYSTEMS & DEVELOPMENT

Our client is a leader in its industry, highly dependent on the computer (370/145) to maintain its growth and profitability. The systems to be developed are utilized by major manufacturers in a unique manner and are characterized by large data bases.

The successful candidate must have significant systems development experience with the demonstrated capability to manage a multi-project situation optimizing the talents of 25 professionals.

If you have 10 years experience and the business acumen to provide the dynamic leadership in this critically important role, send us your resume and present earnings in total confidence to:

CW Box 1381
797 Washington St.
Newton, MA 02160

(Individuals will not be presented to client without prior interview with consultants and the candidates written approval)
An Equal Opportunity Employer

ELECTRICAL ENGINEERS/ PROGRAMMER ANALYSTS

We offer an outstanding opportunity for interested electrical engineers or scientific programmer analysts to join our expanding division of Control Data Corporation. Our open positions offer challenges in the analysis, design and development of special purpose computers and systems. Work experience in such areas as technology assessment, system design and hardware/control systems is applicable. Control Data offers excellent salary, fringe benefits, and unlimited opportunities for advancement. Submit resume including salary requirements in confidence to:

Ms. S.M. Bergman
CONTROL DATA CORPORATION
Digital Image Systems Division
P.O. Box 1249
Minneapolis, Minnesota 55440



An Affirmative Action Employer M/F

Positions Available Nationwide
Call Toll Free

800-426-0342

Assured Confidentiality
and Employer Retained.

SALES REPS 25-30K
4 years experience in DP field
(including time sharing and/or remote batch processing).

SYS. PROGRAMMER ... 20-24K
Experience with OS systems, dumps and CICS/VS. Client moving to MVS & TSO.

SYSTEMS ANALYST ... 20-30K
BS in Computer Sci., Physics or Eng. Minimum 3 years experience in design of processing algorithms.

SOFTWARE SUPERVISOR ... 26-30K
Software development experience on large scale systems. B.S. in Math, Physics or Eng.

PROGRAMMERS 17-20K
Experience in financial/insurance/mfg. areas desirable. Openings on both Coasts and in the Midwest.

**PARKER PAGE
ASSOCIATES**

P.O. Box 12308
Seattle, WA 98111
Offices in Wash. D.C.
Chicago, Atlanta, Portland, Or

CONSULTANTS

Northeast based Software Consulting client has opening in most major cities in U.S.A. Individ's. with COBOL bkgd. and willingness to travel qualify for starting salaries to \$20,000 +. (Fee Paid) Contact Stan Ourbas for geographic preferences.

**ROBERT HALF
PERSONNEL AGENCIES**
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

Programmers Software Specialists

Experience desired in:
*MINI/MICROCOMPUTERS
*Assembly language
*Real Time systems

Solid State COMMUNICATIONS SWITCH Manufacturer offers a technical SOFTWARE challenge. Utilizing minicomputers (POP-11) disk and tape drives, this product line allows switching versatility for large & small customers around the World - this versatility provided by sophisticated and advanced systems software philosophies. We are the undisputed Technical & Sales Leader - Internationally!

Should an advanced, intricate, multifaceted series of software challenges spur your interest - and match your experience, please drop us a note with your qualifications. We, in turn, will send you our product literature, annual report and excellent Employee Benefits package. We are located in beautiful, historical suburban Maryland. Please contact S. Spire, Division Representative, P.O. Box 1052, Mt. View, CA 94040.

PROGRAMMER

Excellent career opportunity in the corporate headquarters of a progressive industry leader in Southern California. Qualified candidates should have a minimum of 2 years experience in an IBM environment. Languages preferred are COBOL and RPG II. A manufacturing background is desirable but not necessary. Must be heavily experienced with accounting application ie: payroll, accounts payable, general ledger, etc.

Here's a challenge to show your worth and growth with the needs of the company. Salary in high teens. Submit resume with salary history in complete confidence to:

CW Box 1377
797 Washington St.
Newton, MA 02160
Equal Opportunity Employer

Computer Graphics

Gould Instruments - a world wide leader in Electrostatic Printer/Plotters - is expanding its software development staff. Challenging opportunities exist for software professionals interested in the development of graphics systems.

MINI/MICRO SYSTEMS PROGRAMMERS

Preferred background should include familiarity with Assembly Language programming and operating systems internals. Experience with minicomputers such as POP-11, NOVA/Eclipse or HP 21 MX is required. Experience with microprocessors is highly desirable. Position requires a degree in a computer related field and/or significant relevant experience.

GRAPHICS SOFTWARE SPECIALISTS

Applicants should have in-depth familiarity with computer generated graphics and graphics applications. Assembly language and Fortran experience on large scale IBM, CDC, or UNIVAC computers is highly desirable. Position requires a degree in a computer related field and/or significant relevant experience.

Excellent salary and benefits including profit sharing and 100% tuition refund. Please call Robert Masterson at (216) 361-3315 (collect) or write Gould Inc., Instruments Division, 3631 Perkins Ave., Cleveland, Ohio 44114. An equal opportunity employer.



CSC PROGRAMMERS ANALYSTS SW ENGINEERS SYSTEMS ENGINEERS START THE NEW YEAR RIGHT

RESOLVE to open new career opportunities for yourself.

RESOLVE to join a company with an unbroken record of growth and technical leadership.

IF you are a computer professional with hardware or software experience in any of these areas:

- UYK-7, UYK-20, CP 642 CP 901
- SONARS BQQ-5, BQQ-6
- NTDS or CV-TSC
- Inertial Navigation
- Torpedo Fire Control
- Weapons Systems Analysts
- PERT/Project Planning
- Logistics Systems Analysts
- Radar & Analog Comm.
- CDC-6600 KRONOS OS programming

RESOLVE to investigate the outstanding opportunities awaiting you at CSC's operations in NEWPORT, RI, MOORESTOWN (southern NJ), BRYN ATHYN, PA, or HUNTSVILLE, AL.

ACT by calling collect or sending us your resume in time for one of our

Career Weekends

Newport, RI	January 21
Virginia Beach, VA	January 21
Huntsville, AL	January 21
Moorestown, NJ	January 28

CONTACT Derek B. Cross, (609) 234-1100 or (215) 331-8300.

**COMPUTER SCIENCES
CORPORATION**
Defense Systems Division

P.O. Box N. Moorestown, N.J. 08057

Major Offices And Facilities Throughout the World
An equal opportunity employer m/f/h

position announcements

position announcements

position announcements

position announcements

position announcements

SYCOR**DISTRIBUTED PROCESSING
JOIN THE GROWTH INDUSTRY**

Sycor, Inc., a dynamic, fast growing manufacturer of distributed processing systems and intelligent computer terminals is seeking a

**PRODUCT
SPECIALIST**

The successful candidate must have a minimum of 2 years experience successfully selling terminals, peripherals or small systems and general knowledge of DP applications, including communications.

This function includes the conceiving and creation of collateral materials to assist the salesmen in the presentation of Sycor product lines.

Good writing skill essential.

We offer a very competitive salary, fully-paid benefits and strong advancement potential.

Send resume and salary history to:

Linda E. Swahle
Salaried Employment Specialist



SYCOR, INC.
100 Phoenix Drive
Ann Arbor, Michigan 48104

An Equal Opportunity Employer M/F
"Sycor Puts Computer
Power Where the Work Is"

SYCOR**SYSTEMS
DESIGNERS**

Conn. Corp. has approved 1978 budget. Multiple openings for COBOL exp'd. indiv's. with med. or large Hardware. Excellent long term pro. growth opp'ty's. Salaries up to \$23,000 (Fee Paid). Contact Stan Durbas for details.

**ROBERT HALF
PERSONNEL AGENCIES**

111 Pearl St.
Hartford, Conn.
(203) 278-7170

DOS SOFTWARE

To \$25,000

Suburban NYC manufacturer seeks BAL/DOS expert. Responsible for Sysgens, Software support. Learn CICS, VSAM on 370/135 DOS/VS.

Call/send resume to
Steve Schraub/Norm Merrill

ROSS personnel agency
20 Rte 110, Melville,
LI, NY 11746
(516) 549-5656

**ILLINOIS STATE
UNIVERSITY**

Faculty positions for Aug. 1978 in Applied Computer Science. B.S. offered, M.S. under development. Areas: systems development/design, data base, on-line systems, minicomputers, information retrieval, systems programming, operating systems. Qual: PhD in appropriate area, industry experience desirable, ability to interact with other departments. Tenure track, rank/salary open. Contact: M.J. Powers, Dir. of ACS, Illinois State Univ., Normal, IL 61761. Equal opportunity/affirmative action employer.

**ITEL
CORPORATION**

Data Services Group,
is looking for a...

**Regional Supervisor-
Data Communications**

- with Field Engineering experience,
- with a talent for troubleshooting and solid experience in working with low-speed modems and multiplexors,
- who can handle the responsibilities of an administrator and grow with a growing company,
- to coordinate and supervise daily coverage of communications in a multi-vendor environment,
- to earn a salary commensurate with experience.

If you're the Communications Supervisor we're looking for, send your resume in strict confidence to:

**ITEL
CORPORATION**

Data Services Group
Personnel Administrator
3 Corporate Park Drive
White Plains, New York 10604

Itel Corporation is an equal opportunity/affirmative action employer—M/F/H.

**Data Processing
Professionals**

Here's how we can help the job you're looking for find you.

If your looking to explore career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS and SOFTWARE SPECIALISTS for companies nationwide, at no cost to the applicant.

Here's how our service works. After we receive your resume, we (1) can make it instantaneously available, via computer, to our network of CYBERSEARCH placement offices in major cities across the country. (2) Trained placement consultants at each office can then refer your resume to companies seeking EDP professionals with your qualifications. So instead of one office and one consultant, you can have all the offices of CYBERSEARCH searching the data processing job market for you. To protect your identity, your name and present employer's name are not included in the computer file.

When interest is expressed, your personal CYBERSEARCH consultant will contact you and arrange an interview. This service is available without cost to you now, or upon hire. All fees are paid by the employer.

To put your resume into circulation fast, call or write the EDP Dept. at the CYBERSEARCH office nearest you.

CONTROL DATA CYBERSEARCH INC.
a subsidiary of
CONTROL DATA CORPORATION

CHICAGO, IL 214 North Michigan 60601 312-454-8490	LOS ANGELES, CA 8616 La Tijera Boulevard 90045 213-642-2462
DALLAS, TX 8585 Stemmons Freeway 75247 214-688-5810	MINNEAPOLIS, MN 6800 France Ave. South 55435 612-830-6650
HOUSTON, TX 2000 West Loop South 77027 713-265-5006	PHILADELPHIA, PA Two Balacynwy Plaza 19004 215-667-2400
IRVINE, CA 17744 Sky Park Boulevard 92714 714-754-7701	SAN JOSE, CA 2025 Gateway Place 95110 408-866-3186

MAINE**D.P. MANAGER**

Opportunity to run the computer dept. of a fine Maine firm that wants to move into new applications. System 3. To \$20,000.

SYSTEMS ANALYSTS

Several openings for COBOL people with experience in developing, programming and installing new applications. Relocation plus \$16,000-\$22,000 salary.

Fee paid. Reply in confidence to:

**ROGERS
AND SEYMOUR**
PERSONNEL CONSULTANTS

94 Auburn St. - Portland, Me. 04103

SEATTLE....**Career enrichment**

opportunities are available in banking, insurance, manufacturing, service bureaus, and newspapers. Positions include programmer, analyst/programmer, systems analyst, and systems mgr. Burroughs, DEC, WANG, IBM large and small scale shops in need of personnel.

To discuss your opportunities write or call:
Keith North, CPA, CDP

**ROBERT HALF
PERSONNEL AGENCIES**

RAINIER BANK TOWER
Seattle, WA 98101
(206) 624-9000

FIELD SERVICE

370/360, H-200,
SYSTEMS XDS, Univac, CDC
All Large & Medium
CPU's
MINI's PDP, NOVA, G.A.,
HP, etc. All Mini
Systems

I/O STC, TELEX, CDC,
ITEL, CALCOMP,
etc. All Peripheral Ex-
perience

MTR

MTR ASSOCIATES
1107 Mennheim Road \$12-30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

CSC**DIGITAL SYSTEMS
ENGINEERS****DIGITAL
TECHNICIANS**

H 316

**DEC PDP-11 Univac M642B
Stored Program Decommutators**

Dynamic and challenging career growth opportunities are available for technical personnel with a strong digital background.

CSC has immediate openings for Digital Systems Engineers and Technicians to participate in a wide range of activities ranging from hardware installation, modifications, and diagnostic testing to analysis and resolution of software/hardware related anomalies. These technical support services are required on mini and medium size mainframes, disc and drum storage units, CRT terminals, magnetic tape units, data transmission units, stored program decommutators, timing systems and other peripheral devices.

Qualified applicants will possess a BSEE or will have attended an accredited technical/military school (as applicable to the position) and will have 3-6 years related experience.

CSC offers competitive salaries and a comprehensive benefits package.

These positions are in support of our Space Tracking Data Network Project with the NASA Goddard Space Flight Center.

Please send resume or call:

Philip T. Foster
Toll Free: 800-638-0842 DR
Call Collect: (301) 589-1545

**COMPUTER
SCIENCES
CORPORATION**
System Sciences Division
8782 Colesville Road
Silver Spring, MD 20910
Minor Offices and Facilities throughout the World
Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

VM/370 SYSTEMS PROGRAMMER

Due to the expansion of our user community, RCA Corporation has an immediate opening for a Systems Programmer in the Cherry Hill Computer Center utilizing dual IBM 370/168's, operating under VM and SVS, HASP.

Responsibilities include design and implementation of enhancements to the system, installation of major packages, maintenance and troubleshooting. Successful candidate must have 2 years experience with VM internals, especially CP. Additional experience with SVS or MVS internals will be given special consideration.

SYSTEMS PROGRAMMER

We also have a requirement for a Teleprocessing Systems Programmer with 2 years of CICS experience. Knowledge of COBOL, ALC and VSAM is desired. IMS or IDMS will be a definite plus. Major duties include the development, installation and maintenance of CICS software in an IBM environment.

RCA offers an excellent benefits program. Relocation assistance is available.

Both positions offer excellent growth potential plus the opportunity to work in a progressive software organization.

Interested applicants should forward resume and salary requirement, in confidence, to: Judson G. Dunlap, RCA Service Company, Cherry Hill Personnel, Bldg. 201-2, Camden, N.J. 08101.

We are an equal opportunity employer F/M.



Data Processing Manager III

SALARY to \$36,784

The Data Processing Department of the County of Los Angeles is seeking two highly experienced managers to be in charge of major areas of its Systems and Programming Branch. Each position, reporting directly to the Deputy Director, will be responsible for the supervision of three to five systems development and program production support divisions involving the management of large-scale development projects using data base and data communication techniques in an IBM 370/158 and Univac 1100/42 environment including over 1,000 terminals. Responsibilities include supervision, through subordinates, of between 200-300 technical programming personnel in application areas such as financial systems, welfare, elections, personnel and payroll, and health care. Within the health care area are included such specialized programs as Hospital Admissions, Billing and Pharmacy Control for the County's seven hospitals.

The minimum requirements for these positions are two years managerial experience, within the last three years, in managing a large systems and programming segment of an Electronic Data Processing installation at the level of a Los Angeles County Data Processing Manager II who manages a large organization of data processing personnel providing either systems development or computer operations and programming maintenance services. The systems involved must have been in large-scale data processing organizations using a complex mix of third-generation main frame and peripheral equipment supporting a complex operating system with a variety of real time and data base software. The desired individuals should have a proven record of managing technical groups in the analysis, design and implementation of new systems using DBM software (such as DMS 1100 and IMS) and teleprocessing software (such as CICS, IMS, TIPS/CMS).

These opportunities offer career stability in a dynamic and growing professional environment along with our excellent range of employee benefits. Persons with this background should send their resumes and salary history to:



Thomas C. Marvin, Personnel Officer
Los Angeles County
Data Processing Department
9150 East Imperial Highway
Downey, California 90242

Equal opportunity employer m/f

DATA PROCESSING PROFESSIONALS

Jr.-Sr. Positions Available: Systems & Applications Programmers, Systems Analysts, Design/Systems Engineers, Business/Scientific Applications, IBM, UNIVAC, CDC, Honeywell, HP, Mini & Micro; national & international. Salary \$16-42K. Send resume & salary req. in confidence to:

PROFESSIONAL SEARCH PERSONNEL

MIS-EDP Dept.
4900 Leesburg Pike, Suite 311
Alexandria, VA 22302
(703) 671-0010

No Contracts. No Fees to You

Programmer/Analyst

We require a person with NCR Century Computer experience, a minimum of 3 years in a manufacturing environment and a college degree to develop logic flow charts in program language code for the solution of business problems. You will be expected to revise and improve the system as needed, under the direction of the Manager of Information Systems. Butler is an employee-oriented machinery manufacturer offering a competitive starting salary and an outstanding benefit package. Please forward your resume, including salary requirements to: Frank Cullen, Butler Automatic, Inc., 480 Neponset St., Canton, MA 02021.

Butler Automatic



an equal opportunity employer

DIRECTOR OF COMPUTING AFFAIRS

N.Y.C. Based Medical Center
Responsible for User (academic and research) services, Administrative Programming and Production Services. Computing facility is remote 370/168 and running modified CMS. Many interactive users of APL. Communications via packet network. Desired qualifications include advanced degree in Engineering, Computer Science or Mathematics and management of programming in a university or medical setting. Excellent benefits plus immediately vested pension plan.
Please send resume and salary history to:
CW Box 1376
797 Washington St.
Newton, MA 02460
equal opportunity employer m/f



WHY EDP SEARCH?

Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond. We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

PROGRAMMER

ITT Life Insurance Corp., subsidiary of International Telephone and Telegraph, seeks an experienced professional programmer to assist in the development of major insurance systems. Desired qualifications for this position include a thorough knowledge of ALC programming, OS/VS1 and CICS.

ITT Life Insurance is a rapidly growing company located in a pleasant rural community in northcentral Wisconsin.

If you are highly motivated and want to be recognized and compensated for your performance, please forward resume and salary history.

Personnel Administrator
ITT LIFE INSURANCE CORP.
Box E
Thorpe, WI 54771
Equal Opportunity Employer

MEDICAL ANALYSIS SYSTEMS MARKETING MANAGER

Salary to mid \$30's

One of the country's leading manufacturers has an exciting opportunity for a dynamic, experienced marketing manager of computers or digitally-based systems. This highly visible position requires exceptional planning and leadership skills and a thorough knowledge of markets for capital instrumentation used in the clinical laboratory, and research aspects of pathology, radiology and related medical areas.

The ideal candidate will be a successful professional, experienced in managing other professionals, who also has keen business acumen, excellent communications skills, and potential for growth to top-level management positions.

If you meet these qualifications and are interested in joining a top-notch organization, send your resume immediately or call:

Lou Cots

C.J. VINCENT ASSOCIATES, INC.

2000 Century Plaza, Columbia, MD 21044
(301) 997-8590

Fee paid agency specializing in high technology sales/marketing personnel

Storage Technology Corporation

The world's largest manufacturer of high density tape data storage products, a major manufacturer of disk subsystems and supplier of memory products, have the following openings:

SENIOR BUSINESS ANALYST

Challenging opportunity to design and install major computer based business systems. In-depth experience at Senior Analyst or project leader level in developing on-line telecommunications and data base systems is a must. Requires a minimum of 8 years experience in Systems Development with at least 5 years in one or more of the following applications: Manufacturing MRP Systems, Field Inventory Systems, and Financial Systems. Distributed processing experience helpful. Send resumes to Dept. LH.

DATA COMMUNICATIONS ANALYST

Outstanding opportunity for a qualified individual with a proven track record to participate in the planning, development and implementation of corporate-wide data communication systems. This individual must have substantial experience in data communication applications with particular emphasis in systems planning. A minimum of 5 years experience in complex telecommunications applications is required. Must have good hardware and software knowledge plus the ability to communicate plans and recommendations effectively. Send resumes to Dept. LH.

PROGRAMMER/ANALYST

Participate in design and installation of major computer based business systems in areas of Manufacturing of MRP Systems, Field Inventory Systems and Financial Systems. Experience in on-line telecommunications systems, mini-computers and data based systems desired. Requires at least 3 years applications programming experience, with high proficiency in COBOL. Send resumes to Dept. LH.

We offer an excellent salary and benefits program, including health and dental insurance, stock purchase and retirement plan. Please send resumes in complete confidence to: Mr. Jack Glatleider.

STORAGE TECHNOLOGY CORPORATION

2270 South 88th Street,
Louisville, Colorado 80027

We are an equal opportunity employer M/F



position announcements

position announcements

position announcements

position announcements

position announcements

It's 1978 and opportunity's knocking.

At Microform, we're still building an organization. It's a place where you can still make decisions — take positive steps in building your career. It's opportunity knocking for you in 1978.

Answer the challenge. Consider these outstanding opportunities.

Systems Sales

Aggressive systems salespersons with experience in selling real-time data base communications systems are needed for these key positions in the eastern, southwest and midwest regions. We need sales pros with direct experience in the following industries: federal government agencies, telephone and financial institutions.

Programmer Analyst

Help develop real-time applications for the telephone industry using PDP 11 or multi-terminal systems. Experience in real-time minicomputer assembler language preferred.

Microprocessor Programmer

Work in engineering software design division on multimicroprocessors data communications equipment. Ideal candidate has data communications experience. Intel 8080 microprocessor background desirable.

Microform provides the challenge of being involved with an industry leader, AND an excellent benefits package, including a unique preventive health care plan, dental insurance, profit sharing, educational aid and much more.

For immediate consideration, please send your resume to our Employment Office, Microform Data Systems, 830 West Maude Avenue, Mountain View, CA 94043. An Equal Opportunity Employer Taking Affirmative Action M/F/H.

**MICROFORM
DATA
SYSTEMS**

The ROMAC DIFFERENCE

A Local Call Goes A Long Distance

Call or visit the Romac office nearest you, and make contact with our expert personnel consultants. Experienced executives constantly in touch with key executives and top management in EDP, Accounting and Banking.

Your local call gives you access to Romac offices in 12 major eastern cities. You're not restricted to searching your immediate area. You have access to the best openings, in your industry as well as the best professionals available. All that for just a local call. That's the Romac Difference.



ROMAC

& ASSOCIATES/
Personnel Consultants

Contact Romac & Associates, A. L. Lemay, President, 2 Sun Life Executive Park, Wellesley Hills, MA 02181 for transmission to our Partners in Atlanta, Boston, Buffalo, Charlotte, Hartford, New Haven, New York, Philadelphia, Portland, Rhode Island, Rochester/Syracuse, Stamford.

PROGRAMMERS/ SYSTEMS ANALYSTS

SPERRY UNIVAC is expanding in the Los Angeles and Sacramento areas. We are interested in talking with Analysts familiar with Univac operating systems and hardware. Specifically, we are in need of the following talents:

- A working knowledge of DMS 1100 internals, including generation and dump analysis; QLP/QLR;
- User knowledge of some standard Univac processors/compilers;
- A working knowledge of 1100 Assembler in basic principles of a transaction system;
- Internal or user knowledge of TIP 1100 and CMS;
- BAL knowledge.
- 1100 ASCII COBOL

SPERRY UNIVAC offers an exceptional salary and benefits package including a newly implemented dental plan and an outstanding employees stock purchase plan.

Please respond with resume and salary requirements to:

Employment Manager

SPERRY UNIVAC
COMPUTER SYSTEMS

10880 Wilshire Blvd.
Los Angeles, CA 90024
Equal Opportunity Employer M/F

DATA BASE ANALYST

FLORIDA

SALARY \$15-20K

Large state agency in Tallahassee has immediate openings for Computer Systems Data Base Analysts.

REQUIREMENTS: College degree + 4 yrs progressive experience in development of computer systems. Experience as required above may be substituted on a year-for-year basis for required college. Burroughs B6700 DMSII experience a plus. Candidates will participate actively in design and implementation of major data base system. Send Resumes To:

Jerry W. Meyer
Data Base Administrator
Dept. of Health &
Rehabilitative Services
Office of Management Systems
1323 Winwood Blvd.
Tallahassee, FL 32301

IMMEDIATE OPENINGS IN WESTERN COLORADO!

As prime contractor for the Department of Energy's expanding National Uranium Resource Evaluation Program, we have current openings for:

SENIOR LEVEL SYSTEMS ANALYST

Requirements include a BS degree plus 4-8 years' applicable experience in systems analysis, design and implementation of financial data systems, geoscience data systems or other complex systems using data base management systems software. Opportunities exist in the development and/or implementation of financial software, the development of systems requiring DBMS support, the analysis and programming of geoscience applications.

We offer competitive salaries, relocation assistance, and excellent benefits. U.S. Citizenship required.

Please send resume, including salary history to:

Field Engineering Corporation
P.O. Box 1569

Grand Junction, Colorado 81501
An Equal Opportunity Employer M/F
No Agency Referrals Please

Bendix

TEST PROGRAMMERS

Dynamic, fast growing computer Co. seeks da-
greed indiv. w/exp. in
hardware, logic design
and field service. Co. will
train the right indiv. in
assembler prog.
\$18 - \$22,000 (Fee Paid).

**ROBERT HALF
PERSONNEL AGENCIES**

140 Federal St.
Boston, Mass. 02210
(617) 423-6440

SUPERVISOR OF PROGRAMMING

Position requires a minimum of 3 years supervisory experience and 10 years programming experience in COBOL and Assembly language, familiarity with SHAS desirable. Please send resume and salary requirements to the Personnel Department.

NASSAU HOSPITAL

Second St.
Mineola, N.Y. 11501

Equal Opportunity Employer

SOFTWARE ENGINEERS Mini-Computers/ Micro Processors

We are the leader in the design and development of environmental control systems and continuing to grow. We have several opportunities for software engineers who'll be responsible for designing and developing our software packages.

PROGRAMMER ANALYSTS-

BSEE, BSCS, BS in Math or related degree plus a minimum of 2 years experience in assembly language real-time programming is required. Experience with micro-processors and distribute intelligence systems is desired. Talented individuals with 5 or more years of experience in these areas would be considered as candidates for positions as Senior Programmer Analysts.

STAFF PROGRAMMER ANALYST-

MSEE or MSCS plus 8 to 10 years experience in designing software packages for real-time computer control systems is required. The selected candidates will act as our divisions technical authority and consultant in software development and may also act as chief programmer on major software systems development.

We offer an excellent compensation package, a modern working environment and good growth potential. Interested parties please submit resume to: Staffing Administrator, HONEYWELL, 1500 W. Dundee Rd., Arlington Heights, Illinois 60004, or call (312) 394-4000, Ext. 304. (Northwest suburb of Chicago).

An Equal Opportunity Employer M/F

Honeywell

position announcements

position announcements

position announcements

position announcements

position announcements

ARIZONA STATE UNIVERSITY COMPUTER CENTER/DATA BASE SYSTEM SUPPORT STAFF

ASU is recruiting system staff to bring up and support an OS/VS1-IOMS operating environment. The hardware for this data base oriented system will be installed during the summer of 1978. Resume/applications for the following positions will be accepted through 18/January/78. All listed openings are sensitive and require a criminal history record check.

MANAGER SYSTEM SUPPORT

This position has primary responsibility for planning/directing the data base and operating system installation and managing a staff of about 4 system support analyst/programmers. Position reports to the computer center director. Starting salary is \$19K-\$20K. Requirements for this position include:

- Superior communications skills, both verbal and written
- Thorough knowledge of IBM operating systems
- BS/BA with major in engineering, math, computer science or related field
- 5 years data processing experience (1 to 2 years as manager) and recent OS/VS involvement

SUPERVISOR SYSTEM SUPPORT

This position is essentially a project leader on the system support staff. This person will be responsible for specific projects while directing the efforts of several system support analyst/programmers. Position reports to manager system support. Starting salary is \$17.9K-\$18.8K. Requirements for this position include:

- Superior communication skills
- Knowledge of IBM operating systems
- BS/BA with major in engineering, math, computer science or related field
- 3 to 4 years DP experience (at least 1 yr in supervision) and have worked on an OS/VS system

SENIOR SYSTEM SUPPORT ANALYST

This position, under general supervision, is responsible for aiding in the design of accounting system, accurate modification, etc. Position reports to either manager system support or supervisor system support. Requirements for this position include:

- Good communications skills
- Knowledge of operating systems
- BS/BA with major in computer science, engineering, math, or related field
- 1 to 2 years data processing experience

Starting salary is \$16.1K to \$17.5K

SYSTEMS ANALYST

Systems analyst to work with IOMS in data base administration group. Experience in database design, implementation, security, and recovery procedures on IBM compatible equipment a must. Degree preferred. Salary to \$21K, commensurate with experience.

Send applications/resumes to Arizona State University, Personnel Department, Tempe, AZ 85281. Application period ends 18/January/78. Equal opportunity/affirmative action employer.

Data Processing

PROGRAMMER \$15,500

We have an IBM 370-138 operating under DOS/VS. Prior experience in BAL-COBOL can open the door to your career horizon.

Excellent fringe benefits. For appointment call:

Don Telford, Manager
Personnel Dept.
(312) 648-7810

**WESTERN RAILROAD
ASSOCIATION**
222 S. Riverside Plaza
Chicago, IL 60606

equal opportunity employer m/f

DATA PROCESSING

System Analyst/Coordinator

Washington County, Oregon is seeking a highly motivated Data Processing Systems Analyst/Coordinator to manage its computer acquisition project and develop a new data processing department. Minimum of 5 years of Data Processing experience including systems design, supervision, and project management of on-line systems implementation on medium size hardware is required. Position offers challenge and opportunity to the right person. Salary: \$1530-\$1953 per month. Send resume to Washington County Civil Service, Administration Building, Room 305, 150 N. First Ave., Hillsboro, Oregon 97123. An Equal Opportunity Employer, women and members of minorities urged to apply.

Systems Analyst

The Catholic University of America has an immediate need for a systems analyst. The university DEC system 1090 supports up to 65 concurrent time sharing & batch jobs to support administrative, academic & research requirements.

SYSTEMS ANALYST

Expert in the area of student records & registration, user oriented background & strong communications skills req. Knowledge of on-line systems & current data processing technology helpful. The analyst will be assigned to the computer center interface with other offices & assist in the development of a comprehensive university information system.

Catholic University offers outstanding tuition & other benefits for employees & their families. For further information about these career positions, submit your resume with salary requirements to: J.K. Milligan.

CATHOLIC UNIVERSITY
620 Michigan Ave., N.E.
Washington, D.C. 20064
Equal Opportunity Employer

MINI

CONFIGURATION SPECIALIST

Software/Hardware
\$32,000-\$36,000
Exeter Associates

Executive Recruiters

James O. Haselton, V.P.
Suite 602, 1111 N. Westshore
Blvd.
Tampa, FL 33607
(813) 877-6072

SITUATION WANTED

Programmer/analyst/technical writer with 5 years international experience seeks 1 to 4-month working visits with facilities and software projects in North America. Desires experience with mid-user and end-user applications in diverse environments. Can contribute programming, writing and/or work with junior programmers on skill development in design and programming methodology. Experience with OS and MVS on 370, including PL/I, JCL, TSO, WYLBUR, SPB, SPSS, FORTRAN. Modest remuneration desired. Send inquiries to Unit RM-1, Ethnotech, RFO 2, Lincoln, Nebraska 68505.

DATA PROCESSING MANAGER

Excellent opportunity for a person with good experience in all phases of casualty insurance computer applications. Must have system design and programming experience. Salary based on ability and experience. Send resume with salary history in confidence to E.H. Harton, Secretary or call (717) 763-1422 for more information.

**PENNSYLVANIA HOSPITAL
INSURANCE COMPANY**

P.O. Box 53
Camp Hill, PA 17011

DP professionals

project leaders programmer/analysts

ARBAT SYSTEMS seeks qualified data processing professionals who wish to work in an innovative and progressive environment. ARBAT supplies sophisticated mini-computer systems to the international banking industry on an 'ever-increasing' scale. For an opportunity to participate in a challenging and rewarding environment, please send your confidential resume to:

ARBAT SYSTEMS LTD
61 Broadway
New York, N.Y. 10006
212/943-1300

Equal Opportunity employer

SYSTEMS SOFTWARE & MICROPROGRAMMING

- Virtual Machine
- Data Communications
- Utilities
- Compilers

We have immediate openings for systems software & microprogram development. We seek those interested in the design, implementation, evaluation and support of microcomputer systems. This involves virtual system interpreters (firmware), data communication procedures (firmware), utilities (firmware/software), compilers (firmware/software).

To qualify you must have a BS degree in Computer Science, Electrical Engineering/Math with emphasis on Computer Science or the equivalent experience/training.

We offer you an excellent salary, complete employee benefits and the stability and growth of our highly successful company. For prompt and confidential evaluation of your credentials, please call: Manager of Professional Employment 1-313-453-1400.

BURROUGHS CORPORATION

41100 Plymouth Road
Plymouth, Michigan 48170
Equal Opportunity Employer M/F

MANAGER

EDP SYSTEMS & PROGRAMMING

The Mount Sinai Medical Center has an immediate opening for the right individual as Manager of EDP Systems & Programming for a 17 person staff in our 270/148 equipped computing center. Applicants must have a suitable background in managing applications development as well as computer languages (COBOL, BAL), operating systems (VM, OS/VS1) and teleprocessing (CICS/VS). Particular expertise in the intervals of the above tools would be most beneficial. Responsibilities of this position include participation in evaluating requests for development of new systems, designing systems solutions and planning development & implementation utilizing project management & controls. This individual will also be expected to plan & manage currently operational system maintenance tasks. Administrative responsibilities will include budgeting, scheduling and personnel recommendations & promotion. The ability to communicate verbally and in writing is essential for this position. Please send resumes, indicating salary to:

PERSONNEL DEPARTMENT

THE MOUNT SINAI MEDICAL CENTER

19 East 98 St., New York, N.Y. 10029
An equal opportunity employer

Senior Systems Analysts

Challenge yourself with an intriguing career with the American International Group, a leader in world wide insurance.

Due to our unprecedented growth, we have positions available in EDP Systems leading eventually to management rolls within the organization.

The ideal candidates will be motivated to develop their initiative in a diversification of interests. A minimum of 5 years experience in ANS/COBOL, BAL and JCL with full exposure to DOS/VS and/or OS/VS. Additional experience with Major Projects (MIS) in Insurance Accounting or General Insurance Systems. MARK-IV programming desirable and above average oral and written communicative skills a must. Bachelors degree plus formal Systems training necessary.

We offer excellent salaries commensurate with experience, a fine benefits package, and a tremendous career opportunity.

Interested applicants should forward resumes in complete confidence to:

Mr. Brian Madden (212) 791-7469



**American
International Group**

102 Maiden Lane, N.Y., N.Y. 10005

An Equal Opportunity Employer M/F

University of Petroleum and Minerals Dhahran, Saudi Arabia

The University is seeking experienced:

- Systems Programmers: IBM 370 equipment; with 3-5 years experience in MVS system generation and maintenance; TSO; Performance Measuring and Monitoring.
- Scientific Analysts: with good working knowledge of FORTRAN; and a background in one or more of the following: Statistical Packages; Online Graphics; CAI/CMI; TSO; Documentation.
- Analysts/Programmers: with 3-5 years experience in business systems preferably University Business Systems; and a strong COBOL background in IBM OS/VS environment.
- Data Processing Staff Trainer: with 3-5 years experience in planning professional DP training programs; experience in instructing DP course in OS/VS environment.

Minimum regular contract for two years, renewable. Excellent salaries and allowances, free air-conditioned housing, free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for school-age dependent children. Local transportation allowance in cash each month. Paid vacation each year.

Apply with complete resume on academic and professional background, list of references, and with copies of degrees, including personal data such as family status (wife's maiden name, names of children, age and sex) home and office addresses, telephone numbers to:

Director-Research Institute

University of Petroleum and Minerals

P.O. Box 986
Pasadena, Calif. 91102

position announcements

position announcements

position announcements

position announcements

position announcements

DATA PROCESSING PROFESSIONALS

Multi-billion dollar Mid-Atlantic bank is seeking Data Processing professionals for its rapidly expanding Data Processing Division. You will join the movement toward a large scale on-line system integrated into a total data base with the accent on state of the art equipment and systems.

PROGRAMMERS

We are looking for Programmers with BURROUGHS IPS and/or IBM 370 experience. Minimum of TWO YEARS' experience is necessary.

TELECOMMUNICATIONS ANALYST

The individual will be responsible for installing and maintaining communications networks and coordination with carriers, equipment vendors and user departments, software analysts and computer operations for installation and network maintenance.

SYSTEMS PROGRAMMERS

The candidate should have ONE YEARS' experience in a MVS environment.

MANAGER—ADVANCED TECHNOLOGY PLANNING DEPARTMENT

Responsible for conceptual integrated systems and operations planning, EFT systems development and implementation, and teller automation project development.

Even if you are satisfied with your present position, we encourage you to spend a few minutes with us and review our exciting plans for the future. These positions provide an excellent salary and benefits package. Please submit a resume or brief letter of inquiry to:

CW BOX 1378

797 Washington Street, Newton, MA 02160

An Equal Opportunity Employer, M/F

IBM S/3 MODEL 150 PROGRAMMER/ANALYST CHEYENNE, WYOMING

Immediate opening for the right individual with the following qualifications:

- Minimum 3 yrs. experience on IBM S/3
- RPG II and Cobol
- CCP experience definite asset
- Banking knowledge desirable
- Ability to work projects from design stage thru documentation
- Able to communicate effectively with user departments

If you have these qualifications we can offer you an excellent position in a growing bank with excellent employee benefits. Cheyenne is a growing western city of 40,000 located near the Rocky Mountains, only 90 miles from Denver, with fine outdoor recreation.

Please send current resume, with salary history, salary requirements and availability to:

Personnel Officer
AMERICAN NATIONAL BANK
P.O. Box 1528
Cheyenne, Wyoming 82001
An Equal Opportunity Employer

SOFTWARE PROJECT ENGINEER San Francisco Peninsula

AJ has a Senior level opening for a creative individual with extensive minicomputer operating system design and implementation experience.

- MS in Computer Science or equivalent and minimum 5 years directly applicable experience is required.

The successful candidate will provide technical leadership in the design of new operating systems for AJ's next generation of intelligent terminals and small business systems.

- Please reply in confidence to Cleve Hart, Manager Advanced Systems Development.

ANDERSON JACOBSON

521 CHARCOT, SAN JOSE, CA. 95131

An equal opportunity employer

Positions Available Nationwide
Call Toll Free

800-426-0342

Assured Confidentiality
and Employer Retained.

SYSTEMS ANALYSTS . . . 17-23K
370 OS or VS with mfg. of finan. background.

PROJECT LEADERS . . . 21-25K
370 OS exp. with BS in Comp. Sci. or Math.

APPLICATION PROGS. . . . 18-22K
Mfg., Ins., & banking experience.

PROGRAMMER/ANALYSTS 17-22K
Need several with ERISA experience.

PROGRAMMERS . . . 18-21K
Honeywell & IBM, Cobo & Bal.

SYSTEM PROGS. . . . 21-25K
OS/CICS & H6000

PARKER PAGE ASSOCIATES

P.O. Box 12308
Seattle, Wa. 98111
Offices in Wash. D.C.,
Chicago, Atlanta, Portland, Or.

EDP SPECIALISTS

Nationwide

- Director MIS NYC location To \$45K
- Dir MIS Retail Midwest location To \$40K
- Project Ldr Midwest location To \$27K
- Pos Proj Ldr Midwest location To \$27K

Fees assumed by client co's

DENNIS E. KAVANAGH
505 5th Av., NY, NY 10017
(212) 661-0670 (agency)

SENIOR PROGRAMMER/SYSTEMS ANALYST

Requirements: Minimum of a bachelor's degree in computer science or related field with three to four years experience as a programmer/analyst with some statistical background. Knowledge of Burroughs and DEC machines, Fortran, Cobol and SPSS required. Must have good verbal and written communication skills. Responsible for the coding and testing of systems designed for institutional research and financial planning. Independent work and judgment in the design of systems and the analysis of data required. Also responsible for analytical assistance and statistical support for administrative and academic departments of the University. Available immediately. Send resume and required salary by January 20 to: Mr. Anthony Graziano, Office of Institutional Research and Financial Planning, 305A Hüllihen Hall, University of Delaware, Newark, Delaware 19711.

An Equal Opportunity Employer
Affirmative Action Employer

INFORMATION SYSTEMS ANALYST

to develop integrated reimbursement system; identify short and long-term goals, review operations, problems, develop plans, design and implement systems.

Five years computer systems analysis experience; B.S., Masters preferred. Salary negotiable. Resume and desired salary to:

CW Box 1380
797 Washington St.
Newton, MA 02160

The Department of Computer and Information Science at Cleveland State University has permanent positions open at the Assistant or Associate Professor level starting September, 1978. Salary range is \$18,000 to \$20,000. Responsibilities include graduate and undergraduate teaching and research participation. Applicants should have a doctorate in Computer Science or a related area and teaching and research interest in applications of computer science. Inquiries and current vitae should be directed to:

Dr. James D. Schoaffler, Chairman
Dept. of Computer and Information Science
Cleveland State University
Cleveland, Ohio 44115
(216) 687-4760

EOE/AAE M/F/H

EDP SALES District Manager

Immediate openings in the Dallas and Chicago areas for two dynamic sales executives. If you're a self-starter, with degree, a broad background in computer marketing, and a proven track record in hardware sales, CIG offers unlimited earning potential plus a substantial benefits package.

We're a national leader in the sale and leasing of IBM systems and plug compatible peripherals; AMEX-listed; with strong history of continuity and customer service.

Please send detailed resume, including earnings requirements to:

Bob Applegate
CIG COMPUTER PRODUCTS, INC.
303 Cameron Street, Alexandria, VA 22314

CIG

Health Care Data Processing Consultants

Expanding hospital management consulting firm is seeking an experienced professional for its St. Louis office. Candidates should have the following qualifications: three years experience in an automated hospital financial systems development and implementation (including patient accounting); Bachelor's degree; good communications skills.

In addition to exciting challenges and a variety of responsibilities, you can expect an attractive compensation and benefits package. 30-40% travel should be anticipated.

Qualified candidates should send their resume and salary history in confidence to:

CW Box 1369
797 Washington St.
Newton, MA 02160

Operations Analyst

If you're skilled enough to handle key assignments on your own, contact Atlantic Richfield's fastest growing division.

Our Synthetic, Crude & Minerals Division is seeking an analyst who can join the expanding Systems & Computer Services section of our Planning and Control Department.

You'll work with a high degree of independence—operating, monitoring, analyzing the performance of distributed SCMD PDP-11/70 computer systems. Scope of responsibilities will include developing computer programs that improve operating efficiency and creating standards and procedures consistent with needs of all satellite work stations.

Position requires degree or equivalent industrial experience, strong analytical skills, and three or more years experience on small computer systems—including PDP-11/70. Programming background in FORTRAN or BASIC languages also necessary.

We offer commensurate salary, comprehensive benefits, and the opportunity to make the kind of visible contributions that lead to recognition and growth. Send resume, including salary history to: T. M. Jenkins, Atlantic Richfield Co., 515 So. Flower Street, Los Angeles, CA 90071

AtlanticRichfieldCompany ♦

An Equal Opportunity Employer, M/F

position announcements

position announcements

position announcements

position announcements

position announcements

ANALYST PROGRAMMERS

M.I.S. International, an internationally known computer systems integration and management consulting organization, requires specialized professionals for top assignments in southeastern Michigan, Indiana and Ohio areas.

MIS is developing advanced systems in:

• Financial Systems, Process Control, Communications, Data Base Management

Knowledge of the following computers is desirable:

• MINICOMPUTERS: ModComp IV, CAI/LSI-11, POP-11

• LARGE COMPUTERS: B6700/4700, IBM 370, H6000

Top salaries, fully paid fringes include life, health and dental insurances, moving allowance and educational benefits. To arrange an interview, call or send your resume to Mr. Gene Bryant.

M.I.S. INTERNATIONAL, INC.

31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010

FACULTY POSITION

Purdue University
School of Engineering
and Technology

An opening in the Computer Technology Department of IUPUI (Indiana University-Purdue University at Indianapolis) is available in mid-August, 1978. Applicant must have a strong background in IBM Assembler, COBOL and commercial systems, with programming experience in either FORTRAN or PL/I. Teaching experience, work experience, and a minimum of a bachelor's degree are required. Rank and salary dependent on qualifications. Closing date for receiving applications, including resume and three letters of reference is February 15, 1978. Contact Professor Paul M. McLeer, Chairman Search and Screen Committee, IUPUI, 1201 E. 38th Street, Indianapolis, Indiana 46205. An Affirmative Action/Equal Opportunity Employer.

PROGRAMMER

We have recently updated our hardware to a Honeywell 64/20. We are looking for someone with at least one (1) year's experience in coding in COBOL to work with two other programmers. You will be associated with a small but progressive insurance company that fully supports their data processing effort. You will be located in the heart of Government Center and working under the direction of a Systems Analyst and directly with the people in the areas of Claims, Underwriting and Financial. For more information please call MASS. FAIR PLAN, Ellen Rosen (617) 723-3800.

An EOE/AA M/F.

LIBRARY ANALYST**PROGRAMMER I:**

Position available February 1, 1978. Ability to work with large Burroughs system, COBOL required. Beginning salary \$12,660. Send resume and references to John E. Townsend, Jr., J. Murrey Atkins Library, UNCC Station, Charlotte, N.C. 28223. An Equal Opportunity Employer.

MANAGEMENT CONSULTING

Management consulting firm serving the Health Care Industry has immediate openings in the Southwest and the Pacific Northwest for Data Processing Professionals with demonstrated experience in accounting and financial information systems. Preference will be given to individuals who have designed, programmed, and implemented billing, accounts receivable, and the related management information and control systems. Experience with on-line teleprocessing systems and various languages (COBOL required) desirable. Some travel required.

Excellent opportunity for a person who is seeking a challenging assignment in a vigorous and demanding work environment. Salary is open depending upon qualifications.

Please submit resume, salary requirements, and references in confidence to:

Mr. Curtis L. Wolfe

Kasonic & Assoc., Inc.

20 First Plaza, Suite 407

Albuquerque, N.M. 87102

SUNBELT OPPORTUNITIES

Fees Paid by Client Firms

SR. SYSTEMS ANALYST

To \$22,000 Range

Snowbound? Outstanding opportunity for manufacturing sr. systems analyst located near Gulf Coast resort area. Design & implement business and manufacturing systems. Prefer IBM 370, CICS, RJE background for on-line systems development. Dynamic, expanding Fortune 500 division. No. 2 DP position.

MANAGER OF EQUIPMENT PLANNING

\$30,000 Range

Develop long range DP equipment plans for major NYSE corporation located in North Carolina. Will monitor existing equipment resources and impact of hardware, software & applications systems changes. Prefer diversified experience in hardware/software capabilities.

Contact Jim Morgan, Account Executive, Data Processing Division, regarding these positions and other DP opportunities. Call (901) 767-6800 or forward your current resume, salary and local requirements. DP positions open in the \$14,000-45,000 range nationwide.

EXECUTIVE PERSONNEL CONSULTANTS

5050 Poplar-Suite 1601

Memphis, TN 38157

Recruiting in the Sunbelt for 32 Years

PERSONNEL CONSULTANTS

What should your salary level be

Find out through our "Individual Salary Analysis." DPC is asked daily by client companies to perform salary analyses on their data processing departments. Due to the enormous number of these requests, DPC will make this service available to you.

At no obligation, we'll confidentially tell you what your salary range should be. Mail us detailed information concerning the following:

- Education (high school, college degrees)
- Years of General Hardware/Software Experience
- Years of Specialized Hardware Experience
- Years of Specialized Software Experience
- Application Experience (gen. acctg, inventory)
- Profession Experience (banking, medical)
- Salary History
- Years Experience Geographically (Southwest, North, etc.)
- Realistic Title in Relation to Current Duties

Each of our offices will analyze your background then take a norm for cross-referencing to come up with your very own salary range. We can substantiate our findings by presenting bona fide positions at the determined level. **This service is available to client companies as well as to applicants.**

Inquiries invited through January 26, 1978. Take advantage of our "Individual Salary Analysis" today!

DALLAS
Suite 1109
Stemmons Tower West
Dallas, TX 75207
(214) 637-6360

FORT WORTH
Suite 911
One Summit Avenue
Ft. Worth, TX 76102
(817) 336-4565

HOUSTON
Suite 960E
4615 Southwest Freeway
Houston, TX 77027
(713) 960-9102

KANSAS CITY
Suite 502
6405 Metcalf
Shawnee Mission
Kansas 66202
(913) 236-6268

TULSA
Suite 2
Park 21 Building
2624 East 21st St.
Tulsa, OK 74114
(918) 747-3621

DATA PROCESSING CAREERS**ADMINISTRATIVE DATA ANALYST**

(Salary \$17K)

Responsibilities: design, program, and document for administrative data processing needs of the University. The Data Systems would include budgetary control, accounts payable, personnel, payroll, accounts receivable, etc. Programs to be developed in COBOL-5 for a CDC CYBER-71 computer system. Also required to provide in-house training in systems analysis and programming.

Experience and qualifications: 5 years experience in design and programming of large scale data systems; proven ability for independent program development using COBOL language. Experience in data-base management systems technology would be a plus. A B.S. level degree required. Please send your resume along with your salary history to:

Robert A. Harding
Director, Personnel

University of Lowell

Lowell, MA 01854
(617) 454-7811

The University of Lowell is an equal opportunity/Affirmative Action/Title IX University.

IMMEDIATE OPENING

IBM 370 specialist 3135 and/or 3145

Salary \$32,000-Plus!

Other positions open for trained 370 CE

top pay and benefits.

Call Immediately

(312) 843-0630

Circle Computer

920 Remington

Schaumburg, ILL 60195

PROGRAMMER/ANALYSTS

\$17,000 -- \$23,000

Full responsibility for detail design specifications, programming testing, and installing of new data base applications. 1-4 years experience with COBOL, DATA BASE, and T.P. experience in a 370 environment.

Opportunities offer above average benefits, and good working advancement potential. Various locations available.

For more information call (314) 862-9900 or mail resume to:

E.S.P. DIVISION

CHRISTOPHER AND LONG

7777 Bonhomme, Suite 1801
Clayton, MO 63105

Client companies assume all fees
Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SUNBELT PROGRAMMERS

We have many clients in the sunny recreational sunbelt area looking for programmers, programmer analysts, system analysts, and systems programmers with IBM (OS or OOS) cobol, burroughs, assembler, BAL or CICS experience. Salaries \$14,000 to \$25,000. Submit resume with current and required salary, relocation preference to:

Executive Recruiters
Personnel Agcy., Inc.
3700 Cantrall Suite 104
Little Rock, AR 72205
(501) 664-3313

SAN FRANCISCO

Make a New Year's Resolution to take advantage of the excellent job market in the San Francisco Bay Area.

PROJECT LEADER Systems/Software maintenance and enhancement in a state-of-the-art multiple IBM 370/168/IMS/TSO environment. Salaries to \$30,000 plus relocation.

SYSTEMS PROGRAMMER/ANALYST Prefer IBM 370/OOS/VS/CICS OLI-As-sembly lde. exp.

COBOL PROGRAMMERS with two or more years exp. To design/program/implement systems in large IBM 370/VS/IMS shops.

TELECOMMUNICATIONS CONSULTANT Data Comm. Modems * Dynamic Multiplexors * Broad Banding, etc.

EOP AUDITORS Some EOP Audit with strong writing skills. Prefer "big system" P/A bkgd.



ROBERT HALF PERSONNEL AGENCIES

Jerry Anderson 415/434-1900 111 Pine St. San Francisco, CA 94111
Stan Ings 415/393-6700 2 Palo Alto Sq. Palo Alto, CA 94304
Bob Lewis 408/293-9040 675 No. First St. San Jose, CA 95112

NEW ON-LINE BANKING SYSTEM

We are undertaking the implementation of a new total on-line system, operating under DOS/VS. The computer center will be relocated to Nassau County, Long Island, New York in mid-1978.

Key positions for permanent staff are being recruited with the following expertise:

- SYSTEMS PROGRAMMER
- SYSTEMS ANALYST
- SR. ON-LINE PROGRAMMER
- DATA BASE PROGRAMMER
- TECHNICAL SUPPORT PROGRAMMER

Please submit resume outlining your job history and salary requirement, in confidence to:

Personnel Officer
ANCHOR SAVINGS BANK
5323 Fifth Avenue
Brooklyn, N.Y. 11220
An Equal Opportunity Employer

MINI-COMPUTER PROGRAMMER

One of the nations most progressive management companies is seeking experienced programmer for the Louisville, Ky. area.

Assembler/COBOL experience required. Mini-computer programming experience desired. Four Phase experience a plus. Degree preferred, but not required. Salaries commensurate with experience. Excellent fringe benefits.

Send resume and salary history to:

Ed Wilsmann

Humana
The Hospital Company

P.O. BOX 1438
LOUISVILLE, KY 40201

An Equal Opportunity Employer

PROGRAMMER

Successful candidate should have 3-5 years experience with scientific language and Fortran programming (also exposure to top down structure techniques). Ability to work with Engineering staff in formulating programs based on engineering and systems requirements is essential. Will develop innovative aircraft monitoring systems on sophisticated real-time distributed micro-computer network.

Excellent working conditions in an attractive suburban location. For consideration please send resume with earnings history to:

RALPH HOLTERMANN
CONRAC

Systems-East Division
CONRAC CORPORATION

32 Fairfield Place
West Caldwell, N.J. 07006

An Equal Opportunity Employer M/F

computer hardware and software candidates RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the fool work.

DEALY-ROURKE PERSONNEL SERVICE
1808 West End Building
Suite 121
Nashville, Tenn. 37203
(615) 329-1771

O. BROWN & ASSOCIATES
Orothy Spiegel DP Specialist
610 S.W. Alder, Suite 711
Portland, Oregon 97205
(503) 224-6860

COMPUTER CAREERS INC.
Specialists - Data Processing
4720 Montgomery Lane, # 503
Bethesda, Maryland 20814
(301) 634-9225

EASTERN PERSONNEL, INC.
1002 First Union Bank Bldg.
P.O. Box 1052
Wilmington, N.C. 28401
(919) 762-2624

members of

National
Personnel
Associates
Specializing in DP

PROFESSIONAL

Crackerjack System 32
RPGII Programmer

Small software co. looking for experienced System 32 programmer. Position requires technical experience in business applications & user interface. Candidate must have at least 1 yr experience all phases IBM System 32 & RPGII and/or experience System 3 CCP. Excellent opportunity for individual looking for freedom & responsibility with growing firm. Please send resume & salary required.

Commercial Systems
Planners
1245 Adams St.
Dorchester, MA 02124
No Phone Calls

DATA PROCESSING
FACULTY POSITION

Beginning fall 1978. Applicants should possess a master's degree or significant experience and must have a strong commitment to teaching. An ability to teach in the areas of operating systems, COBOL programming, and system design is required. Resources of the department include a 360/40 OOS system, POP 11/70 RSTS system, plotter, interactive graphics system, and other hardware. Salary commensurate with education and experience. Send resume and supporting documents to Personnel Office, Northampton County Area Community College, 3835 Green Pond Road, Bethlehem, PA 18017. Completed applications must be received no later than March 1, 1978. An Equal Opportunity/Affirmative Action Employer.

FLORIDA

Offers more than just sunny weather and sandy beaches-it also offers opportunity. Right now, for example, Chloride Incorporated, a progressive international corporation, seeks quality personnel-a senior analyst programmer, and an analyst programmer to work with an IBM - 370 and a diversified teleprocessing network. Applicants should be skilled in DOS/VS, CICS, COBOL, VSAM & POWER/VS. Experience in manufacturing and general accounting systems desirable. If you possess such qualifications, why not earn an excellent salary and numerous fringe benefits while enjoying America's vacation land year round. Send resume in confidence to:

D.P. Manager
P.O. Box 24598
Tampa, Florida 33623

ASSOCIATE DIRECTOR
FOR TECHNICAL SERVICES

International research organization has immediate vacancy for experienced manager with responsibility for policy and administration of computer programming, word processing, and graphics services. The Technical Services Department has a staff of forty and hardware including a Burroughs B6700 and an integrated mini based word processing/typesetting system. A major area of emphasis will be expansion of services to the commercial market. Salary range 30-50K. Send resume to:

Personnel Services Division
International Fertility Research Program
Research Triangle Park, N.C. 27709

D P PROFESSIONALS

Our client Companies, include Consulting Firms, Manufacturers, Banks, Insurance companies, Oil & Gas companies and Software Houses. They offer career advancement opportunities, strong benefit packages, company-paid moving and interview expense and, of course, they pay our fee. We have numerous openings in the Southwest, Southeast, West and Northwest part of the U.S. for the Professional Programmer/Analyst with 1-5 years experience, Project Leaders, System Software Programmers, and Managers.

DUNHILL EMPLOYMENT AGENCY OF FORTH WORTH, INC.
901 Riddle Bank Bldg., Fort Worth, TX 76116
If you don't have a resume, call us. We'll help you write one.
(817) 732-8191

OLD DOMINION UNIVERSITY
COMPUTER CENTER, NORFOLK, VA.

The Computer Center operates a OECsystem-10 computer system and provides all phases of computing services for the university. Current enrollment is 14,000.

The following positions are being readvertised:

Assistant Director, Academic Services

The major responsibility of this position is the direction, control, organization and planning for the academic services group within the university computer center. Specific responsibilities of the group include consulting services, training and education, user oriented documentation and reference materials, analysis, acquisition and installation of appropriate software packages.

Qualifications include a B.S. Degree in Computer Science or related field, 2-3 years experience in a user services or similar type computer service organization. Experience in a university environment is desirable.

Systems Programmer

Responsibilities include maintenance of the TOPS-10 monitor, installation of vendor supplied and locally written modifications and enhancements, evaluation of hardware and software performance and recommendations for improvements. This is the senior position in a small Technical Support Group reporting to the Director of the Computer Center.

Qualifications are 2-3 years experience as a systems programmer on a OECsystem-10. Knowledge of TOPS-10 internals is a must. Other desired qualifications include a B.S. Degree in Computer Science or related field and experience in a university computer center.

Send resumes & salary history to:

Personnel Office
Old Dominion University
Norfolk, VA 23506
Old Dominion University is an
Equal Opportunity/Affirmative Action Employer

data processing

PROGRAMMERS

Key Positions with Our Winning Computer Consulting Team in Springfield, IL., Indianapolis and Chicago.

If you're skilled in COBOL, ALC and/or PL-1 and have at least a 2 year success record of accomplishment with large scale IBM systems under IMS... we have the programming and system challenges to match your expertise (also DEC with mfg. applications). These positions require high productivity.

As a member of our professional staff, you'll be rewarded with an excellent salary and benefits. For details call Don Breitfelder collect, from 10AM to 5PM at (312) 786-0220.

INDECON, INC.
300 South Wacker Drive
Chicago, IL. 60606
since 1966

An Equal Opportunity Employer M/F

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support
Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Mall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

position announcements

position announcements

buy sell swap

buy sell swap

buy sell swap

PROGRAMMER/ ANALYST

Challenging opportunity in our Research Programming Department to develop application systems in batch and on-line environments using DEC PDP-11/45 and IBM S/370. Application areas include support for biological scientists, statisticians, and laboratory automation. Minimum of 2 years programming experience including application systems design and a degree in Math, Statistics, or Engineering preferred. Knowledge of BASIC or FORTRAN required, PL/1 or COBOL a plus.

If interested in pursuing this position, please send resume in confidence, including salary history to:

HAROLD F. McCULLOUGH, EMPLOYMENT MANAGER

Merrell

MERRELL NATIONAL LABORATORIES

Division of Richardson-Merrell, Inc.
110 East Amity Rd., Cincinnati, Ohio 45215
An Equal Opportunity Employer M/F/H

MODEL 43 INTERFACES

INCLUDES
• EIA RS232
• 20 MA

TECHNICAL SYSTEMS, INC.
11300 Hartland St. North Hollywood, CA 91605
213 769-6772

MAGNETIC TAPE SALE

Slightly used, Money-Back Guarantee
U.S. Government Archives

Manufactured to G.S.A. Specs!

2400' 1600'bpi/3200fci
w/Hanging Seal \$4.50 ea.

Freight prepaid on orders over 200
Tapes. Shipped within 48 Hrs.

CALL or WRITE:

Computer Tape Mart

31 Sprague Ave., Amityville, NY 11701

(516) 691-2309

(Brokers Inquiries Welcomed)

IBM EQUIPMENT FOR SALE OR LEASE

2501/B2 Card Reader 3505/3525 Reader & Punch
2520/B2 Card Punch 3803/1 w/7 & 9 TR RPG
2821/5 w/PFR 3830/2 (w/Madrids)
3330/3333 Model 1 & 11 Disks 370/125 HO w/PA & Byte MPX
3420/3 & 5 Tapes

WANT TO BUY

3270 Display Equipment
3340/A2 & B2 w/Fixed Head & RPS
3420 Tape Drives-All Models
3780 RJE Terminal
3830/2 Disk Controller
370/145 Processor
Call

**FORSYTHE
McARTHUR**

(312) 943-3770

Dealer &
Lessor in IBM
Computers

FORSYTHE/McARTHUR ASSOCIATES, INC.
919 North Michigan Ave. Chicago, IL 60611

Member, Computer Dealers Association

DATABASE DATA COMMUNICATIONS SYSTEMS

BOSTON

Mr. James P. Seviaro
COMPUTER PARTNERS, INC.
31 Washington Street
Wellesley Hills, MA 02181

We're one of the fastest growing systems consulting firms, and have immediate openings in our Boston and Chicago offices. And that can be good for you. You'd be involved in more varied projects. More action. More opportunity to do your own thing. And because we're still relatively small, your contributions would be more readily recognized. Which means more rapid professional growth and piece of the profit pie. If this sounds like you, and you qualify for any of the following immediate openings, we'd very much like to hear from you.

An Equal Opportunity Employer

CHICAGO

Mr. Charles Costello
COMPUTER PARTNERS, INC.
1111 East Touhy
Des Plaines, Ill. 60018

Senior Analyst/ Project Leader

Minimum of 4 years experience. Proven hands-on experience with IMS-TP or other database/telecommunications systems. Excellent writing and verbal communications skills a must.

Analysts/ Programmers

Minimum of 2 years experience in business applications in an IBM370 environment.

Please send resume to the appropriate address above.

BUYING SELLING Leasing

370/

135
138
145
148
155
158
165
168

214/630-6700

Pioneer Computer Marketing
1165 Empire Central Place Dallas, Texas 75247

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115 370/125

ECONOCOM

ECONOCOM
1255 LYNNFIELD ROAD
P.O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER - COMPUTER DEALERS ASSOCIATION

MINICOMPUTERS & SYSTEMS

Don't waste company time or money. Check with us before you buy or sell.

New DEC Equipment
Immediate Delivery

RK11-RK05 Disk Systems -
\$8500
PDP 11/04s and 11/34s - 20% off list

DZ 11

DEC Station 78

New DG Equipment

Immediate Delivery

DG 10 Mbyte Disk Systems from \$7500

DASHERS - 15% to 25% off list

Nova 3/12 or 3D - 20% off list

Immediate delivery for MOSI

Inventory Clearance

call us for free brochure

**MINICOMPUTER
EXCHANGE**

(408) 733-4400
TWX 910-339-9272



dearborn giveth:

370 CPU's; 370-155J w/out dat. avail. feb 1;
370-145J, avail. may 1.

360 CPU's; 2050I 2 chan., avail. feb. 1;
2040H avail. feb. 15.

peripherals; 2821-1; 2804-1; 2401-1; 2401-2;
3411/3410-3 single.

dearborn taketh: 370/145's, 370/155's;
all tapes, disk and card equipment.

Call Tom Millunchick: (312) 827-9200 or any
dearborn office



dearborn
computer company

dealer - IBM computers
systems software
leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788

BUY SELL SWAP

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap


**BURROUGHS EQUIPMENT
FOR SELL OR LEASE
COMPUTERS**

B700 Complete System available
April, 1978. B1700 Systems and
Peripherals. B700 Systems.

PERIPHERALS

Tape Drives and Head-Per-Track
Disk.
1600 BPI Mag Tape Drives

TERMINALS

TC732/735 Teller Terminals TD
700's with Expanded Memory.
(303) 922-8331

2480 W. Alameda Ave.
Denver, CO 80223
Lawrence G. Lyon

BUY • SELL

**TELETYPE
MODELS**
43 • 33 • 32

NATIONAL
TELETYPEWRITER CORP.
207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444

IBM
3033
AVAILABLE
Dec. '78
(914) 238-9631
THIRD
PARTY
MAINTENANCE

Contractors interested in being
placed on bidders list please send
statement of qualifications.

System-H400
Location-SE United States
Stuart-Feb. 1, 1978
CW Box 1373
**757 Washington St.
Newton, MA 02160**

IBM PROCESSORS & PERIPHERALS

PROCESSORS PERIPHERALS

SELLING:	3145H-Now	3420-6 w/6425
	3155J02-Jan.	Avail. January
	3165-2-Now	
LEASING:	3165-4 MEG	All 3420
	7 Channels	Tape Drives
	3033-August	
BUYING:	3158	3420-4, 8
	3168	3333-1, 3330-11

The Logical Choice COMDISCO

9701 W. Higgins Rd. Rosemont, Ill. 60018
(312) 698-3000

San Francisco
415 944-1111

Fort Worth
817 534-1774

Atlanta
404 256-5956

Minneapolis
612 854-8107

New York
201 568-9666

Paris, France
374-1130

FOR SALE

**IBM 370/158 MEMORY
1.5 MEGABYTES**

Available Immediately
CAPITAL FUNDING CORP.
2175 Lemoine Ave.
Fort Lee, N.J. 07024
(201) 461-3158

**WANTED TO BUY
IBM 370/145 1 meg**

• IBM core
2 • Selector channels
ISC not required
6 • 3420 MOD 3
with CTL unit
1 • 1403 NI
1 • 2540
1 • 2821
1 • TELEX 6833-11
3 • TELEX 6316-10
1 • 3272
6 • 3277
Needed by 3/1/78. May be either
cash purchase or operating lease.
Call Tom Lannen at Computer
Task Group, Inc., Buffalo, New
York 14221, (716) 634-8090.

**SAVE ON
COM**

Datacorp has used BetaCOM
700's available for sale. Recorders
have been on full maintenance. If
you need backup or want one of
these alpha/numeric and graphic
recorders at less than 1/2 today's
selling prices, call Roger Pearson,
(503) 225-5085, or your local
Datacorp office. Datacorp prices
range from \$40,000 to \$60,000.

914-723-3800 The End User Connection

Our clients need your IBM 370's for lease, sublease and purchase
For delivery now through June 1978

Please call or write now.

Your Best Option - Data Options Corp.

Station Plaza
Hartsdale, N.Y. 10530

12 Month Lease

On Your Owned or Leased

370/158-168

(Term & Rate based on acquisition cost)



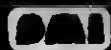
COMPUTER CAPITAL CORP.
1351 Washington Boulevard
Stamford, Connecticut 06902
Tel 203 357 9663

155's

BUY-SELL-LEASE
CMI CORPORATION
GARY SMITH — 313-642-8000

PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS

Bob Russell
Jack Emery
Dave Hepburn
Paul Baillie


FOR SALE/LEASE

DEC LSI 11[®]
PDP 11V03 SYSTEMS
LA 36 DECwriters
LA 180 * VT 52
In Stock For
IMMEDIATE DELIVERY
Call: Glenn Burnett



UNITRONIX CORP
1081 U.S. Hwy 22
P.O. Box 6515
Bridgewater, N.J. 08807
(201) 725 2560

Mini-Computers

BUY-SELL-TRADE-LEASE

**FOR SALE
D.E.C. CPU'S**

11/04-DC \$ 3,800.00
11/40-BK \$ 9,500.00
PDP-8E 8K \$ 3,800.00
11T34BA New & Used \$28,000.00

D.E.C. DISCS

RP04AA \$20,000.00
RP04 & Controller \$28,000.00
RP03 \$11,000.00
RK05J \$ 3,500.00
RK11D & 2nd RK05J \$ 8,900.00

D.E.C. CRT'S

VT05 \$ 1,100.00
VT50HA \$ 1,000.00
Hundreds of Miscellaneous Modules & Cables Available
CALL FOR OTHER COMPONENTS IN STOCK

DATALEASE

700 North Valley Street, Anaheim, CA 92801
(714) 533-3920 **TELEX 692439**

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SHORT TERM LEASE

370/158 K 5 Channels, ISC, Madrids & 3213-1

Available January 10, 1978 - Any Term

370/158 U34 5 Channels, ISC, Madrids & 3213-1

Available February 1, 1978 - Any Term

370/145 I2, 1421, 4660, 6982, 6983,
7855, 8810, 8100, & 3215

Available Immediately — Any Term

370/168 U34 ISC, Madrids, 4525, 3855, 3066-2,

3067-3, 2860-3, 2870-1, 2880-1, (2) 2880-2

Available January 1978 - Any Term to 48 Months

WE WILL MIX OR CHANGE CONFIGURATIONS AS REQUIRED

FOR SALE OR LEASE

360/50 H - 2 Channels

Available Now - Any Term

Two 2244-B2 Disk Drives

Available March 1978 - Any Term

512 K Intel

370/145 Memory

Available Now

FOR LEASE

Block Mutliplexer Channel

(1435) for 370/155

Contact:

George Prussin or Dave Wygoda

OPM

O.P.M. Leasing Services, Inc.

99 Wall Street New York, New York 10005

(212) 747-0220

out of state call (800) 221-2674

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

If you won't read these 7 signals of cancer...

You probably have the 8th.

1. Change in bowel or bladder habits.
2. A sore that does not heal.
3. Unusual bleeding or discharge.
4. Thickening or lump in breast or elsewhere.
5. Indigestion or difficulty in swallowing.
6. Obvious change in wart or mole.
7. Nagging cough or hoarseness.
8. A fear of cancer that can prevent you from detecting cancer at an early stage. A stage when it is highly curable. Everyone's afraid of cancer, but don't let it scare you to death.

American Cancer Society

SURPLUS HARDWARE FOR SALE

DATA GENERAL

- NDVA 1200 JUMBO (32KW)
- 4010 I/O BOARDS
- 8K Memory Boards (1200)
- NDVA 1220 (32KW)
- NOVA 3/D (80KW)

DDC

- FIXED HEAD DISK (1 MB) WITH CONTROLLER
- MEDIA 3
- CONTROLLERS & FORMATTERS for CDC Storage MODULE DRIVES

PAPER TAPE PUNCH COMPUTER CABINET

BEST OFFER IMMEDIATE DELIVERY
FREY ASSOCIATES, INC.
(603) 472-5185

FOR SALE

TEXAS INSTRUMENTS 990/4 EQUIPMENT IMMEDIATE AVAILABILITY

990/4 COMPUTER SYSTEMS Including:

- 4 990/4 CPU W/4K RAM
- 8 12K Memory Expansion Modules
- 8 Dual Floppy Drives
- 4 733 ASR Silent 700
- 8 Bell Data Set Interface Kits
- Plus miscellaneous chassis, cables, and panels. Never used.
- 990 Prototyping System/16K TI Model 102, plus options:
- EPROM Programming Adapter
- PROM Programming Kit Table Top

Serious parties, please call at once for information, or address bids to Charles Baughman.

DIEBOLD

INCORPORATED
Department 9-61/TI
Canton, Ohio 44711
Phone: (216) 489-4471

FOR SALE USED COMPUTER EQUIPMENT

- Nova 3D 48K
- 9 Track Tape
- 96 Mb Disc 600LPM
- Data Printer
- Misc: 026 GE
- Terminet PDP8E
- ASR33 3 Calsus
- Drives 2 Selectrics
- Mr. Wagner
- (314) 534-1111

SALE OR LEASE - BEST OFFER (by user) Available IMMEDIATELY

NCR CENTURY 101

615-101	32K	CPU
682-101	300 CPU	Card Reader
657-102	60MBYTE	Disc + Controller
646-201	1200 LPM	Train Printer
(2) 796-101		CRT Terminal

Contact: David H. Goldner
WESLEY ASSOCIATES
45 E. Wesley St., South Hackensack, NJ 07606
201-488-4200 Ext. 21

BUY

Surplus DEC And Data General Hardware For Sale

SELL

PHIL THOMAS

(305) 272-8753

Thomas Business Systems, Inc.

3033 WANTED

Want to Buy 3033-6 meg
With May Delivery
Will Pay Cash Plus 3033-6 meg
With September Delivery
Please Contact:
Dick Hynes

138-J AVAILABLE

For Sub-Lease
Serial Number 20193
Available Now

27 month lease	\$9200
36 month lease	\$8300
48 month lease	\$7800

Please Contact: Howard Richcreek

UNICOM COMPUTER CORP.

2829 Bridgeway Blvd.

Sausalito, CA 94965

415/332-2585 TWX 910-482-4458

We are buying, selling, & leasing!

Buying: 3830, 3420
Selling: 360/65, 360/40
Leasing: 370/155, 360/65

Please contact:

Linda Vaughn / (415) 955-0220

Tommy Talbot / (415) 955-0238

ITEL
CORPORATION

3505-B2
W/8103
3525-P3
46,000.00
AVAILABLE
JAN. 20, 1978
SUN DATA
404 449-6116

FOR SALE IBM SYSTEM/34

DELIVERY
MARCH & APRIL 78
64K 27MB DISK
300LPM 4 CRTS
NEED
RENTAL CREDIT
SYSTEM/3-15B,
C or D
Lemay
Corporation
(612) 854-8386

BUY·SELL·LEASE·TRADE

PURCHASE LEASEBACK / RENTAL CREDITS

Write or call collect today
to these representatives!

SYSTEM/3
All Peripherals
call Ted Arbuckle

370's
All Peripherals
call Don Norris

SYSTEM 32's, 34's
3270 CRT's
call Marilyn Morris

EAM EQUIPMENT
Refurbished, eligible for
IBM M/A
call Don Norris
or Duke Crumpton

360's
All Peripherals
call Duke Crumpton

MCC

(214) 634-2750

TWX 910-861-4171

METROPLEX COMPUTER COMPANY, INC.

Suite 1206 Honeywell Bldg.

1111 W. Mockingbird Lane Dallas, Texas 75247

Industry's Fastest Growing Computer Dealer



buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
Wanted for Purchase or Lease Spring, 1978 3X 370/158 Memory Only 2 Megabytes above Model K Call Collect DPF INC. 141 Central Park Ave. South Hartsdale, N.Y. 10530 Attn: Norman Usher (914) 428-5000	CMI BUY LINES BUY-SELL-LEASE-TRADE 3031/3032/3033 (Lease Only) John Mills (313) 642-8000 370/165 370/168 Bob Van Hellemont (313) 642-8000 370/158 Ron Baker (313) 642-8000 370/155 Gary Smith (313) 642-8000 370 148/145/138/135 Pam Hoban (313) 642-8000 370/115/125 Bob Southwell (313) 642-8000 3420 3803 3333 3830 3330 3340 Darryl Hastings (313) 642-8000 IN CANADA IBM 360 370 System / 3 Don DuPuis CMI Company P.O. Box 893 Windsor, Ont. N9A 6P2 (519) 258-8910 1403 2821 2501 1442 1443 If you rent any of these and are returning them to IBM call me. I'll show you how to make money using your rental credits. We buy and sell all of these units. Kathy Housey (313) 642-8000 360 30/40/50/65 Gary Smith (313) 642-8000 3270 CRT's Printers/Controllers Jim Carleton (313) 642-8000 129-029-059-026 System/3 Model 15 Jerry Roberts (313) 642-8000 3742 3741 5496 Jerry Sharon (313) 642-8000 360/20 1130 Jim Carleton (313) 642-8000  CMI CORPORATION The IBM Specialists 1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000			How much change does our American Economic System need: A lot? A little? None? The more we all know about our system and how it works, the better we can decide what to preserve, what to change in the years ahead. That's why this special booklet has been prepared. Every American ought to know what it says. For a free copy, write: "Booklets," P.O. Box 1887, New York, N.Y. 10001
FOR SALE DISK Available April 1978 2 3333-11 W/8150, 2 3333-11 10 3330-11 DISK PACKS 19 3M 3336-11 Type Contact Monte R. Hutchinson Blue Cross and Blue Shield of Kansas 1133 Topeka Topeka, Kansas 66601 (913) 232-1000	BUY-SELL-TRADE For Computer Call Action Write CAC P.O. Box 80572 Atlanta, Ga. 30366			

BUY-SELL-TRADE IBM EQUIPMENT

IBM 370 Memory-Buy & Sell

For Sale Now

370/135 Memory: IBM FE to GF (96K to 192K)
370/135 Memory: INTEL 96K to 320K
370/135 Memory: AMS 192K to 320K
370/135 Memory: AMS 240K to 384K
370/135 Memory: AMS 256K to 384K
370/135 Memory: INTEL - any 256K increment
370/135 Memory: AMS - any 512K increment
370/145 Memory: INTEL - any 256K increment
370/145 Memory: AMS - any 512K increment
370/158 Memory: INTEL 1 Megabyte - For lease

CALL DICK BAKER (305) 561-5207



Intracoastal Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207



For Sale
XEROX
DISK SYSTEM
MODEL 7275
Controller
W/86 MB Disks
Call
Telefile
(714) 557-6660
Ask for
Mrs. Weddle

FOR SALE
Burroughs B700

Mini Computer including 180 LPM Printer and 4 2.3M removable disk drives
Phone or write:
Allen Sorce
DeHater, Inc.
114 State Street
Peoria, Illinois 61602
(309) 674-8107

To make way for our new computer we must sell

SYSTEM/32 Model C43
285 LPM Printer
9 Megabyte Disk
16K Main Storage
for June 1,
1978 Delivery
Please Write to:
D.P. Manager
Terra Hall Clothiers
10 West 20 Street
NYC, NY 10011

Short Term Lease or Sale by Owner
S/370 Model 155II
Serial Number 10132
2MB, 4 channels, DAT
Available January 1, 1978
Contact Jim Jamieson
(804) 643-9123
Commonwealth Computer Advisors, Inc.
707 East Main Street
Richmond, Virginia 23219
(804) 643-4200

Rent-Sell-Buy
Immediate Delivery

- Texas Instruments 733-745-810
- DEC Writer II-III
- Teletype Model 43
- IBM Punch Card Equipment

Call Collect: Stewart Krakover or Barry Thompson
Data Rentals/Sales Inc.
8611 Hayden Pl., (213) 559-3822 Culver City, CA 90230

FOR SALE
DEC PDP 11/40
RSTS/E
Time Sharing System
• 11/40 CPU with 256K bytes memory and CPU options
• RP11-CE 40M byte disk drive and controller
• 5 DL11-E Line Interfaces
• CM11 mark-sense and punched card reader
• DB11-AA Bus repeater
• H960-DA Expansion Cabinet
Contact: G. Stuart
CAMOSUN COLLEGE
1950 LANSLOWNE Rd.
Victoria, B.C. V8P 3J2
Canada
(604) 592-1281
(No Brokers)

FOR SALE
QANTEL 1200
32 KB Memory
12 MB Disk
200 LPM Printer
Console Typewriter
2 Video Terminals
Duane Didier
Jack Frost, Inc.
Box 1106
St. Cloud, MN 56301
(612) 251-3570

PREVIOUSLY OWNED EQUIPMENT & SYSTEMS
N.C.R. & BURROUGHS
N.C.R. 31, 32 & 151 & 152 Teller Units
735/735 & 745 Mag. Tape Enc. & Line Printers
N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S
Also B-700 Thru B-4700 Systems w/wo Peripherals
WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS
BUYING OR SELLING-CALL US FIRST.
KEY-EXIMPORT CORP.
256 LIVINGSTON ST. P.O. BOX 1291 NORTHVALE, N.J. 07047
TELE. N.J. (201) 767-3444 N.Y.C. (212) 736-7736
TELEX 125149 CABLE KEYEXIMP NORTHVALE NJ

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------



INDEPENDENT

**WE BUY - SELL -
INSTALL & REPAIR**
AT REASONABLE PRICES

**HONEYWELL USED
SERIES 200 EQUIPMENT**
COMPUTER SYSTEMS
PARTS — PERIPHERALS

Now in stock

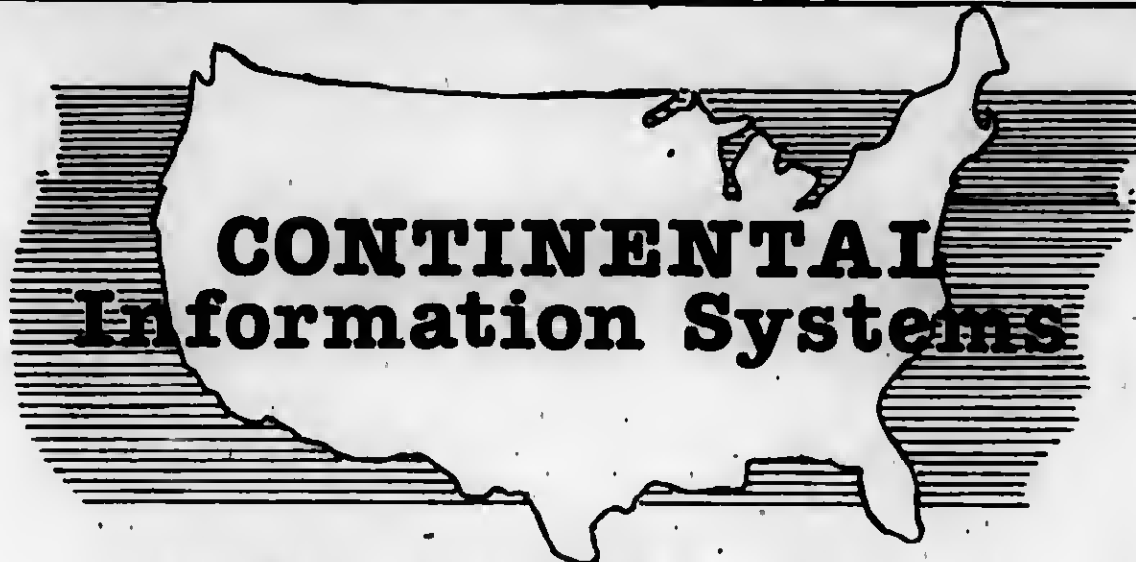
2040-64K M7-32K M9
120-1250 — TAPE DRIVES
READERS, PRINTERS, PUNCHES
3200-131K Avail. 6/78

CALL NOW

Wilson Grubbs (513) 874-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati, Ohio 45246



BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

WERE YOU A WINNER IN THE IBM LOTTERY?

IF NOT, CIS is having a supplementary drawing for winning alternatives to the 3031, 3032, and 3033. We can deliver the following IBM 370 equipment to meet your needs:

Jan. 78 155-DAT available
165-DAT available
158-New, ITC qualifying
168-New, ITC qualifying

Mar 78 158
158-New, ITC qualifying
168-New, ITC qualifying

Feb 78 158
158-New, ITC qualifying
165-DAT available
168-New, ITC qualifying

Apr 78 155-DAT available
158-New, ITC qualifying
168-New, ITC qualifying

Several 370 systems available beyond April, 1978.

If you hold a winner in the IBM lottery, we will buy your currently installed IBM equipment from you.

Call Us!



CIS Corp.
600 MONY Plaza
Syracuse, NY 13202
Telex: 93-7435

315-425-1900

FOR SALE

1403-N1 Printer
2821-2 Control Unit
Both with UCS
Available Immediately

**Niagara Computer
Sales, Inc.**

State Tower Bldg.
Syracuse, N.Y.
(315) 424-0001

THIS SPACE COSTS
\$110.60

AND COULD BE WORKING
FOR YOU!

Call Donna Whalen
965-5800 X116

WANTED

NCR 299 - 399 - 499
270-279-775

BURROUGHS
All L Series
TC Series - TD700

IBM
360-370; Syst 3 &
32 Peripherals

PDP 8 And 11 CPU's
Peripherals

IOA
DATA
CORP.

383 LAFAYETTE ST. N.Y. 10003
212 673-9300

BUY-SELL-LEASE

026-\$ 850 085-\$ 750
029- 1850 514- 800
082- 650 552- 750
083- 1800 557- 2500

Mohawk-6401-6403
NCR-736

Shredders
Bursters & Decollators
Call Stan Pelc

DP
SERVICE
Inc.

5505 N. MENARD AVENUE
CHICAGO, ILLINOIS 60630
PHONE 312 / 774-2556

FOR SALE IBM Sys 3

5415-021 Ser. # 40979
3277-001 Ser. # 30840
6421-001 Ser. # 12512

1403-N1
3340-A2

3411 optional

Avail Feb. 15-78

* Will be furnished
at closing of contract



DATA AUTOMATION COMPANY, INC.
4466 CASH ROAD DALLAS, TEXAS 75247
SAC 214 837-8870

Wanted To Buy
**3672-Memorex storage
control unit**
3673-Memorex disc controller
3670-Memorex disc module
3675-Memorex disc module

Contact:

Harry Blair 713-524-1401

MOVING?

Please notify Computerworld at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

efm computer
leasing, Inc.



3000 marcus avenue
lake success, ny 11040
(516) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65
360/50 370/135

BUY - SELL - LEASE BROKERAGE

Let the
"NATIONS LARGEST WHOLESALE DEALER"

Buy, sell, lease, sub lease, or be your agent in placement
of your pre owned IBM 360/370/System 3, or other units

COMPUTER INTERNATIONAL, LTD

CWC's international division

experts in foreign markets, freight, customs

REACH COMPUTER CORPORATION, CWC's Leasing Division

COMPUTER WHOLESALE CORP., (504) 581-7741

SUITE 507/508 FIRST NATIONAL BANK OF COMMERCE BLDG

NEW ORLEANS, LOUISIANA 70112



MEMBER OF COMPUTER DEALERS ASSOCIATION

DEC HARDWARE

PDP 11 PDP 8

Processors Peripherals
MemoriesVT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATESSeekers and Sellers
(516) 585-0800

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.
026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.
029	\$1800	\$55/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.
046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.
056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.
059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.
077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.			

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202
Chicago, Illinois 60611
(312) 944-1401

115 Harbor Island Rd.
Newport Beach, CA 92660
17141 675-2810

TELETYPE

Telex - TWX

New & Used

Model 43-33-32

Large Selection Model 28 & 35

Dec Writer

LA 36-120-180

Sell or Lease

Immediate Delivery

Before you lease, rent or buy, give

ABLE a try!

ABLE COMMUNICATIONS

20142 State Rd.

Cerritos, CA 90701

213/924-3378 714/761-5661

call... the
Matchmakers
1-800-654-9179
TOLL FREE!

ESR COMPUTER
SALES INTERNATIONAL, INC.



buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WANTED TO BUY
IBM 370/155
 with or without DAT
Contact: Harry Blair
(713) 524-8249

370/125's
For Sale* Lease* Purchase
***Purchase Leaseback**

Specialists in 125 Systems
 3410's and 3411's Also Available



CORPORATE COMPUTERS, INC.

(203) 661-1500
 115 Mason St., Greenwich, CT 06830

Member
 CDA

dataserv

buy • sell • lease • trade

370
 115 and 125
 Steve Lacny
 800-328-2406

For Sale or Lease
 Any 115/125 configuration
 Sending 115/125
 Back to IBM
 Call us! We'll show
 you how to make money
 using your rental credits.

370
 135 through 168
 Dave Miller
 616-637-8481

For Sale or Lease
 135 - 145 - 155
 CPUs — Peripherals —
 Memory
For Sale or Lease
3344-B2
Available Jan.

370
 Peripherals
 800-328-2406

For Sale or Lease
 3211/3811 3340/A2,B2
 3272/3277 3410/3411
 3330/3333 3420/3803
 STOP! Before you send
 any of the above machines
 back to IBM call us. We'll
 show you how to make
 money.

360
 CPUs and Peripherals
 Neal Johnson
 800-328-2406

For Sale or Lease
 360/30 - 40 - 50 - 65s
 CPU — Peripherals —
 Memory
 We'll Buy
 Any 360 CPU
 IBM Peripheral
 Non-IBM Perph/Memory

Sys/3
 CPUs and Peripherals
 800-328-2406

For Sale or Lease
 5406 - 5410 - 5412 - 5415
 CPUs — Peripherals —
 Memory
 We'll Buy
 Your 5406/5410
 5415 — Rental credit
 machines
 Peripherals — Memory

Call Toll Free 800-328-2406
or 612-544-0335

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
 P.O. Box 9488, Minneapolis MN 55440

BUY SELL LEASE

370, 360, 1401 & 1440
 SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
 3803, 3420, 3340's

IBM UNIT RECORD
 EQUIPMENT

026, 082, 083, 084, 085, 087, 088,
 402, 407, 514, 519, 548, 552, 557,
 029-059-129

Call us for all your needs. we buy
 rent and sell all types of IBM unit
 record equipment. Over 12 years
 of serving commercial and govern-
 ment requirements. Contact ACS
 for proposal.

7126 Mullins 77081
 Houston TX (713) 666-2122
 (713) 666-2122
 TWX 910 881 1526

ACS
EQUIPMENT CORP.

FOR SALE
IMMEDIATE DELIVERY
DEC
PDP8E COS300

System 16K
 RK05 Drives
 Centronics 101A Printer
 VT05 Terminal
 DEC Maintained
 (516) 443-9191

FOR SALE
IBM SYSTEM 32
 Model B34, including 13.7
 megabyte disk, 24K, 64 char-
 acter set, 115 ipm.

\$33,750

Available 2/78
 COLUMBINE SYSTEMS, INC.
 P.O. Box 740
 Golden, CO 80401
 (303) 279-4000
 Call Collect

SALE ALL
IBM Unit Record
Equipment
129 & 029's
 East Coast
 (717) 564-8870
 West Coast
 (415) 332-6265
 Unit Record
 Leasing Company
 110 Hivista Road
 Sausalito, Calif.

DEC
BROKER IN NEW
&
USED DEC COMPUTER
SYSTEMS
& COMPONENTS
C.D. SMITH

730 N. Post Oak Rd.
 # 301
 Houston, TX 77024
 (713) 686-9405

BUY SELL LEASE

SYSTEM/3

Models 15, 10, 8, 6
 Systems 32 & 34
 All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298

Memphis, Tn. 38128

Phone 901/372-2622

Member CDA

FOR SALE
ENTIRE BURROUGHS
B-500 SYSTEM

Including:

8691 600 KC Controller
 B9241 1100 LPM Printer
 B-374.3 DF DTTU
 B3742 DF Controller
 B9373 EU
 (3) B-9374 SU
 (2) B-9390 MTU's
 (2) B002 19.2K Memory
 (1) B9341 SPO
 (1) B9111 800 CPM Card Reader
 \$20,000 or best offer takes it.
 Buy all or any parts - negotiable.

Contact: R.B. Wagner
 DesignPak Incorporated
 175 Maple St.
 Marlboro, MA 01752
 (617) 485-0280

Distribution
Management
Systems, Inc.

DMS 330

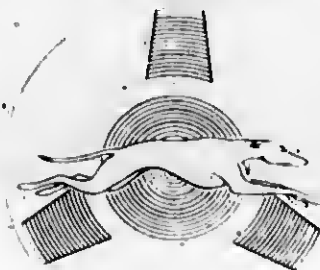
ON LINE ORDER ENTRY
 INVENTORY MANAGEMENT
 ACCOUNTING SYSTEM

for
 Large Scale Wholesalers
 Light Manufacturers

Data Base System Permits total
 access by name, part number, gen-
 eric group, family, relational, city,
 phone. 50 terminal DMS system is
 demonstrable, affordable — the
 most revolutionary cash flow
 machine available anywhere at
 any price.

■ Omaha, Nebraska 68124

■ (402) 391-8210



GO GREYHOUND

When you plan to
 Buy or Sell your
 Computer Equipment

For complete information
 call the Greyhound Repre-
 sentative in your area.

FOR SALE

3145-HO
 360/65J

WANT TO BUY

3340-A2 & 3340-B2
 3135 w/4655, 6981, 6982,
 7855, 7861

U.S.

Home Office
 New York
 Chicago
 Dallas
 San Francisco

T.A. Takash
 Oick Ventola
 Pete Ahern
 M.W. "Bill" Tucker
 Henry Paulson

602-248-6037
 914-949-1515
 312-298-3910
 214-233-1818
 415-283-8980

INTERNATIONAL

Canada
 J.K./Europe
 Mexico
 Austro-Asia
 Eurasia

Don Meunder
 Joe Gold
 Andres Contreras
 John Hallmark
 Don Haworth

416-366-1513
 022-61-27-54
 905-543-6850
 214-233-1818
 214-233-1818

NON IBM

Ocellas

John Hallmark

214-233-1818

FOR SALE
DECsystem-10

- KI-10 Processor (with TOPS10-6.03 Monitor)
- DK-10 Fast Clock
- MF10 Core Memory (64K/3 ports)
- DF-10 Data Channel
- RP-10C Disk Controller
- 2-Calcomp 268 Dual Spindle Disk Drives
 (RP03 plug compatible-50 Megabytes per spindle)
- DC10A Data Line Scanner
- 5-DC10B 8 Line Groups

AVAILABLE: February, 1978

CONTACT: C.E. Burgart
 Science Applications, Inc.
 P.O. Box 2351
 La Jolla, CA 92038
 Phone: (714) 459-0211

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

IBM RENTAL CREDITS

We will pay for your rental credits on FTP, ETP, and MAC machines. Call us before sending your machines back to IBM.

IPB

Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

FOR LEASE**145 10**

available immediately on long or short term lease

FOR SALE**165K II**

DATED, up to 4 megabyte For Sale or Lease

155J

available now with or without new DAT

14512

available now with ISC

3420-3, 5&7

available now with controllers

158 ISC

available now

I/O Sets

all combinations avail. for sale or lease

360/501

Priced to move now

PURCHASE/LEASEBACK

370/125 Systems Save rent starting today Call for a quote.

WANT TO BUY

370/168, 165, 158, 155's IBM Tape Systems and Disk Systems All 370 Memories

**FOR SALE OR LEASE**

Immediately Available

IBM 3330/001's**IBM 3330/011's****IBM 3333/011's**

with features #8150

Contact: Harry Blair 713-524-8249

WILLIAM MARION COMPANY, INC.
P.O. BOX 309 • HACKENSACK, N.J. 07602

N.C.R.
270-299-399-775
31, 32, 41, 42 etc.
BURROUGHS
"L" TC 500, TC 700
I.B.M.
029-Systems 32/34

BUYING
SELLING

029's & 059's
immediate delivery
Also: 026 - 056 - 082 - 083
084 - 085 - 088 - 402 - 403
407 - 514 - 519 - 548 - 552
557 - Eligible For IBM M/A

FOR MORE INFORMATION CALL- (201) 343-4554

BEFORE YOU BUY, SELL, OR LEASE,
TAKE A 'SECOND' LOOK!

FOR SALE

3505-B1 and 3525 P3
3135-GF -- Fully Loaded
3155-J with Dat Box

WANT TO BUY

370/145 IBM Mem. I2-J2
370/135 IBM Mem. GF-H.

3-1403 N 1**1442 N 1****3420-5 Single Density**

COMPUTER INDUSTRIES INC.

3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO - 312/298-5650
WASHINGTON - 703/525-3074
LOS ANGELES - 213/370-4844

**CP/M™ COMPLETE OPERATING SYSTEM:**

- Includes Editor, Assembler, Debugger and utilities.
- Runs on 8080 or Z-80 Systems.
- For IBM-compatible floppy disks.
- \$70.00 — Diskette and Documentation.
- \$25.00 — Documentation (6 manuals) only.

MAC™ MACRO ASSEMBLER:

- Runs with CP/M.
- Compatible with new Intel macro standard.
- Complete guide to macro applications.
- \$70.00 — Diskette and Manual.
- \$15.00 — Manual only.

C BASIC:

- Commercial business language.
- Runs with CP/M.
- \$100.00 — Diskette and Manual.
- \$15.00 — Manual only.

DIGITAL RESEARCH

P.O. Box 579
Pacific Grove, CA 93950
(408) 649-3896

FOR SALE OR LEASE**3340-B2**

S/N 20595

(2) 1403/2821

1100 LPM UCS

S/N 92140, 20717

2501-B1/B2

S/N 20520

(3) 3420-3 Wanted SVSCOMP

2150 Crestview Drive
Excelsior, MN 55331
(612) 474-5875

"FOR SALE OR LEASE"

Immediate Delivery

IBM 360-20 (C1) 8K**IBM 2203 (A1)****IBM 2560 (A1)****4 lines print****IBM 2501 (A2)**

Thomas Computer Corp.
600 N. McClurg Ct.
Chicago, Illinois 60611
(312) 944-1401

WANTED!!

2 Ampex Model DM-323
Disk Drives With DEC
RP03 Option!

CALL

Management Computer
Services
Jim Miller
or Warren Ellis
(614) 272-0202

FOR SALE

Litton Model 1252 Accounting
Machine with hi-speed attach-
ment, all software for manufac-
turing company. Immediate avail-
ability. Under maintenance con-
tract since conception. Best offer.
CW Box 1372, 797 Washington
St., Newton, Mass. 02160.

WANTED TO BUY**370/115 GEO**

3203/2 3340 A2
3540 B1

Rental Credits Available
Contact:
COMPUTER BROKERS, INC.
P.O. Box 28298
Memphis, Tenn. 38128
Phone (901) 372-2622
Member COA

WANTED TO BUY

IBM 370/145 1 meg IBM core
2-Selector channels-ISC not re-
quired
6-3420 MOD 3 with CTL unit
1-1403 NI
1-2540
1-2821
1-TELEX 6333-11
3-TELEX 6316-010
1-3272
6-3277

Needed by 3/1/78. May be either
cash purchase or operating lease.

Hel Conner Call At:
Computer Task Group, Inc.
5501 Main St.
Buffalo, N.Y. 14221
(716) 334-9090

WANTED

029-129
3741-3742

We Buy
Rental Credit Machines
Continue to Rent at A
Discount From IBM Prices
Call: Stewart Krakover

Data Rentals/Sales
(213) 559-3822

For Sale Or Lease
System 3/15
Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.
Also complete inventory tapes — disks.
Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

IBM	FOR SALE	QTY	AVAIL
3830-2	3350 Controller	1	3/24
3803-2	2 ch. & 2 x 16	2	1/7
3420-6	6250/1600 BPI	15	1/7

Tom Robbins
7710 Computer Avenue

(612) 831-6088

Computer Properties, Inc.
Minneapolis, MN 55435

Sale or Lease
2) 370/145-12

Serial = 10515 and 11192
Available 2/1/78

Combination 3145 Inferum to 3031 lease
Plans also available.

Contact Jim Jamieson



(804) 643-9123

Commonwealth Computer Advisors, Inc.
707 East Main St. Suite 1650
Richmond, Virginia 23219
(804) 643-4200

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

**For Sale:
No brokers please**

IBM 3/16 - 96 K
2 - 5445's
4 - 5444's
BSCA/LCA
1403 - 600 lpm
MFCU - 250 cpm
3741 direct
attach
3271 - 1 control unit
Northeastern Wallcoverings
292 Summer Street
Boston, MA
(617) 542-8145
John Gallagher

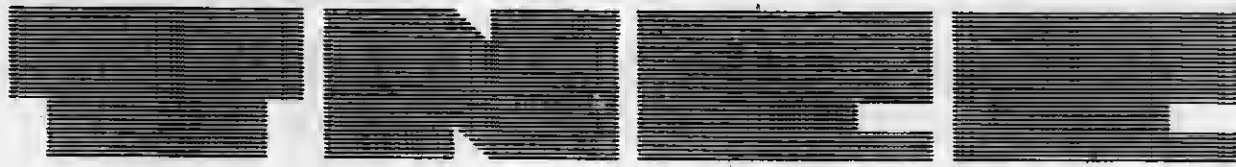
OFF-LINE PRINTER

DP ACT 5200
1000 LPM 64 Char.
Factory reconditioned
10 hours use since
Best offer
SORBUS Maint.
(202) 296-5592
Box 40521
Wash, D.C. 20016

**WAITING FOR A 3031 AND
NEED AN INTERIM CPU?**

TRY OUR
3155 WITH DAT
AND AMS PSU

One Year Lease Cost Less Than IBM's Rate on a 3148
at Twice The CPU Power 2, 3, 4, & 5 Year Leases Available



THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle - (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman - (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Huntington Station, New York 11746

NCR

633-119 TAPE DRIVES
40KB-9 TRACK-800 BPI

640-200 1500/3000 LPM
626-101 PRINT. CONTR.

Contact Gary E. Zywojko
(612) 884-0758

Computer Connection Corp.

8120 Penn. Ave. South
Minneapolis, Minn. 55431

**For Sale
Burroughs B1724**

Complete System

131K Main Memory
4 KB Control Memory
6 MHz Processor
Console Printer
1-96 Col Card Punch
(Attached)
1-96 Col Data Recorder
(Off-Line)
200 Meg. Disk Drive
6-100 Meg. Disk Packs
A9247-2 Line Printer
(450 LPM)
3 CRT's TO701

AVAILABLE
FEBRUARY 1, 1978
(803) 345-3751

Ask For
James E. Sullivan
ELLETT BROTHERS INC.

BUY SELL LEASE

SYSTEM/3

Models 15, 10, 8, 6

Systems 32 & 34

All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298

Memphis, Tn. 38128

Phone 901/372-2622

Member CDA

**Data Systems Marketing
Delivery from Stock****Microcomputer Systems**

Digital PDP 11/03 Family with Both Floppy and Hard Disks,
VT-78 Micro B, Word Station-7B

Data General: Micronova Family

Printer Terminals

Digital: LA-36, LA-35, LA-180, LS-120

Teletype: Model 43

Data General: Dasher 30 and 60 CPS

Diablo: Hyterm 1620 and 1610

Lear Siegler: Hydra Series 200 180 CPS

Texas Instruments: 743, 745, 810

Video Terminals

Lear Siegler: ADM-3A, ADM-2, ADM-2B, ADM-1A, VDP-400

User Programmable

ADDs: Regent 100 and 200

Digital: VT-52

Data General: Dasher 60S3 and 60S2

Data Communications and Accessories

DSM: Acoustic Couplers, 103F, 113A, 113B

General Data Comm-113B Direct Connect, Frequency Division

Multiplex Equipment

Sykes: Single and Dual Drive RS-232 Floppy Disk, IBM 5100,

Compatible Floppy Disk

Techtran: 81S, B410, B400, B420, B421 Single and Dual Cassette

Software

General Purpose, Disk Operating System, Fortran and Business

Basic for PDP 11/03 and Micronova Families

Distributed Processing: Remote Job Entry, Asynchronous and

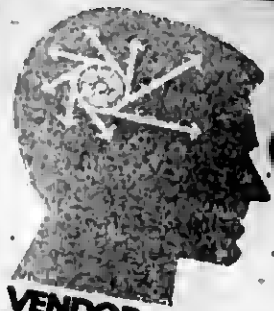
Bisync Communication for PDP 11/03 and Micronova

Families

Business: Public Accountant Client Write Up and Complete Set

of Business Accounting Packages for PDP 11V03

Call 714-560-9222, 800-532-3717 (California)
or 800-854-2684 for DSM Showroom Nearest You

**The
billion-dollar
connection.**

VENDOR
INFORMATION
SERVICE
BY THE NATIONAL MINORITY
PURCHASING COUNCIL, INC.

This no-cost, no-nonsense
folder from the National Minor-
ity Purchasing Council is the best
connection to minority suppliers
a corporate purchasing agent
could have.

It will give you access to a
computerized directory of more
than 8,000 minority vendors—
where they are and what they
supply, along with data on plant
size, service area, and sales volume;
credit and customer references;
plus a narrative description of
product lines, special features
and areas of concentration.

The National Minority
Purchasing Council is a not-
for-profit corporation formed
to promote increased purchases
from minority-owned firms.

Chief executive officers of about
a thousand major corporations
are involved and actively sup-
port the Council's efforts, with
predictably practical results.

Purchases by member corpora-
tions from minority suppliers
are up from \$86 million in 1972
to \$700 million in 1976.

This year our goal is a billion
dollars, and we've only just
begun. All we need is more
top-level connections.

Call (312) 346-4511, or write:
National Minority Purchasing
Council, Inc., 36 South Wabash
Avenue, Chicago, IL 60603.

**National Minority
Purchasing Council, Inc.**

Our strongest recommendation
is a business recommendation

A Public Service of This Magazine
& The Advertising Council

**PDP-11**

Available for immediate delivery:

DS357
11/34 64K, 2-RK06, LA180
1-VT52 CTS300

11T34-AA
11/34 64K, LA36, 2-RK05s,
RSX11-M

11/03-KA
PDP11/03 16K with
Power Supply

MM11-DP 16K Core
PR11 High Speed

Paper Tape Reader
OU11-DA Synch. Interface

K011-P LSI 11 Board
Minicomputer Sales Corp.

14 W. 40th St.
New York, N.Y. 10018
(212) 221-7270

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
AND PERIPHERALS

WE BUY • SELL • LEASE • TRADE

transdata

P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

**370/165
For
Sale or Lease**

- Will Configure to your needs
- Immediately Available
- DAT Available
- Short-term or interim lease
available to 30XX System

ALANTHUS CORPORATION

111 High Ridge Rd.

St. Louis, MO 63114

(314) 438-4470

**SOFTWARE
FOR SALE****SAVE****RPG/RPG 11 TO COBOL TRANSLATOR**

This package accepts all types of RPG and produces ANS
COBOL while approaching 100% error free conversion. The
resulting COBOL program is modular in design and easy to read
and maintain. Several client service options are available: Per-
petual Lease, Conversion only, Clean Compile and full imple-
mentation including production JCL, test and installation. Over
100 satisfied customers.

For Prompt Reply Write or Call Us Today

DASD
CORPORATION

Park Ridge, Illinois 60068, Suite 315
1480 Renaissance Dr., (312) 299-5005

software for sale

software for sale

software for sale

software for sale

time & services

**OTS
AN ECONOMICAL TSO**

3270 Local and Remote Batch
Job Submit Full Screen Edit Facility

- PDS and Sequential Files
- Panvalet Interface
- Librarian Interface

Data Set and Catalog Utilities
HASP and VS1 Print Interfaces
Extended Command Language
Data Security and Logging Online
Compiles User Task Facility
Dynamic Data Set Allocation

OS and VS
BTAM and VTAM
JLB SYSTEMS
3930 SW Kanan
Portland, OR 97221
(503) 249-1474

RELIEF

Now DOS/DOSVS Cobol programs can display core in vertical hex with "BITDUMP"
Send \$25 for object, \$50 for source to Sierra Software, 1600 Shirland Tract, Auburn, CA 95603.

**HOSPITAL
SOFTWARE/SYSTEMS
WANTED**

Our client hospitals range in size from 35 to over 1200 beds along the east coast. They are in need of on-site and/or off-site Information Processing Systems/Services. Our search is for Financial, Data Collection and Clinical Systems. If you currently have such systems available, please contact or send information to:

Mr. Joseph E. Nadeau
COMPUTER Consulting
9719 S. Dixie Hwy, Suite 12
Miami, FL 33156
(305) 666-7100

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCOOPER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCOOPER (7070) to COBOL
- COBOL to COBOL
- AUTOCOOPER/SPS to COBOL

For more information on our translators, write or call today.

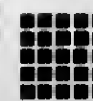


Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

**REMOTE
JOB ENTRY****PHOENIX-HECHT**

- IBM 370/158-3
- Nationwide Incoming Waite lines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, HASP, INTERCOMM, MOSCOW
- Complete data security including off-site storage

For information
call Walter Czerniak
at (312) 861-7100



PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

TONE 3

is
TSO FOR VS1

but
without TCAM and the
overpowering overhead of VS2
(check these points)

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with remote support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- Interactive program execution
- Operations additional console support
- Dataset maintenance
- Catalog management
- ISP support
- Remote entry subsystem support
- Enhanced 3270 usability
- Full ASCII terminal support
- Interactive computing
- Data inquiry

TONE
Software Corp.

write
for
details

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

**ACCOUNTING SOFTWARE
FOR DEC RSTS/E
CTS-500 USERS**

From one of the pioneers in commercial data processing using RSTS. Successful installations in manufacturing, distribution, service bureau uses. Completely on-line, interactive systems. If you are installing or have installed a RSTS/E or CTS-500 system, contact us first for cost-effective solutions in: ACCOUNTS PAYABLE; GENERAL LEDGER; FINANCIAL REPORTING

The design specifications for these packages were developed by accountants for use by accountants. All packages provide excellent audit-trail, extensive user prompting, fast data entry, full file maintenance and inquiry capabilities, modular design and construction. These are consolidating packages and support multi-division company and multi-company corporate accounting functions. For more information, contact us at:

(219) 936-2183
p.o. Box 180
Plymouth, IN 46563
Div. of Young Door Co.

Plycom services

RSTS/E**SOFTWARE PACKAGES**

- KDSS, a multi-terminal key-to-disk data entry system.
- TAM, a multi-terminal transaction-processing "front-end."
- FSORT3, a new, very fast sort. Directly sorts RSTS/E files containing up to 16 million keys or records. Up to 70 times as fast as the RSTS-11 Sort package in CPU time.

(All three are implemented in assembly language as run-time systems for efficiency.)

Evans Griffiths & Hart, Inc.
65 Waltham St.
Lexington, MA 02173
(617) 861-0670

RPG II SYSTEMS

- A/R-OPEN ITEM OR B/F
- ACCOUNTS PAYABLE
- GENERAL LEDGER
- PAYROLL AND LABOR DIST.
- INVENTORY
- CREDIT UNION MAILING, ETC

Extensive Documentation Provided
Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

**Datacenter
370/158**

3 meg VS2
Specializing in
Remote Job Entry
and Batch
Excellent Technical Support
Very Attractive Rates
Contact: Stu Kerievsky
(212) 564-3030
Datamor
132 W. 31st St.
New York, N.Y. 10001

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Data Craft, Data General, CDC, DEC, EMM, Febri Tek, Honeywell, GAI, HP, Interdata, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Varian, XDS.

Any Manufacturer's Memory

THREE DELTA CORP.

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

**SOFTWARE
WANTED****Can you help us.**

We require ESP programming ability.

Mr. C. Shepherd
**adp Computer
Services Ltd.**
318-510 W. Hastings St.
Vancouver, B.C.

**PROBLEM SOLVER
NEEDED!**

Our firm has a new DEC 308, similar to the DEC 310. We wish to communicate by phone with an insurance company's CICS network being operated on an IBM 370. The other remote terminals in their systems are IBM 3773 which are programmed to imitate an IBM 2780 for which the original programs were written. Can You Help? ICS, Box 429, Middletown, Ohio 45042. Phone (513) 424-1656.

**TIME
AND
SERVICES****WE ARE
BROKERS OF
COMPUTER
TIME**

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1940
(201) 676-1961

**PROVEN Packages
from Professionals**

- Financial
 - General Ledger and Financial Reporting System
 - Accounts Payable
 - Accounts Receivable
- Manufacturing
 - Material Requirements Planning
 - Master Production Scheduling
 - Capacity Planning
 - Shop Floor Control
- Comprehensive Report Generator FILETAB
- Small Business Systems System 3
 - General Ledger and Financial Reporting System
 - Accounts Receivable
 - Accounts Payable
- Burroughs B 1700 1800
 - General Ledger and Financial Reporting System
 - Accounts Receivable

Get all the details. Today.

Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip _____
Phone _____ Computer _____
Other email computer system application products available soon. Please specify computer and need.

**SOFTWARE
INTERNATIONAL**

Elm Square, Andover, Mass. 01810 (617) 475-5040

Atlanta • New York • Washington, D.C. • Philadelphia • Chicago
San Diego • Toronto • Houston • Columbus, OH • San Francisco

Registered trademark of Software International

CWC 1978

the choice of

**GENERAL HOST
CORPORATION**
Leading Conglomerate

**ACCOUNTING IV
GENERAL LEDGER**

Our software packages—General Ledger, Accounts Receivable, Accounts Payable, and Standard Cost—are the choice of leaders like General Host... not by chance, but by design. For details, call (201) 488-2100

Informatics Inc.

World's Largest in
Software Products
65 Route 4, River Edge, N.J. 07661

**GENERAL LEDGER
\$400 FULL PRICE**

- *Check Register *Journal Register
- *General Ledger *Trial Balance
- *Balance Sheet *Income Statement

Complete bookkeeping system for any medium to small company. Over 500 customers processed during the last ten years. Modular parameter design can be adapted to any small computer. Written in low level IBM Cobol. Price of \$400.00 includes Source programs, sample JCL with test data, and complete operating procedures.

FREE SAMPLES
& DOCUMENTATION

GENE SUMRALL
4211 S.W. Freeway
Suite 106
Houston, Texas 77027

COMPUTER TIME FOR SALE**LOCATION****NORTHERN NEW JERSEY**

IBM 370/148 1 MEG WITH:
6-3340 Fixed Head Disk Drives
3-3420/Mod 7 Tape Drives (320KB)
1-3505 Reader 1100 CPM
1-3525 Card Punch 300 CPM
1-3203/Mod 4 Printer 1200LPM
2-3277/2 CRTS

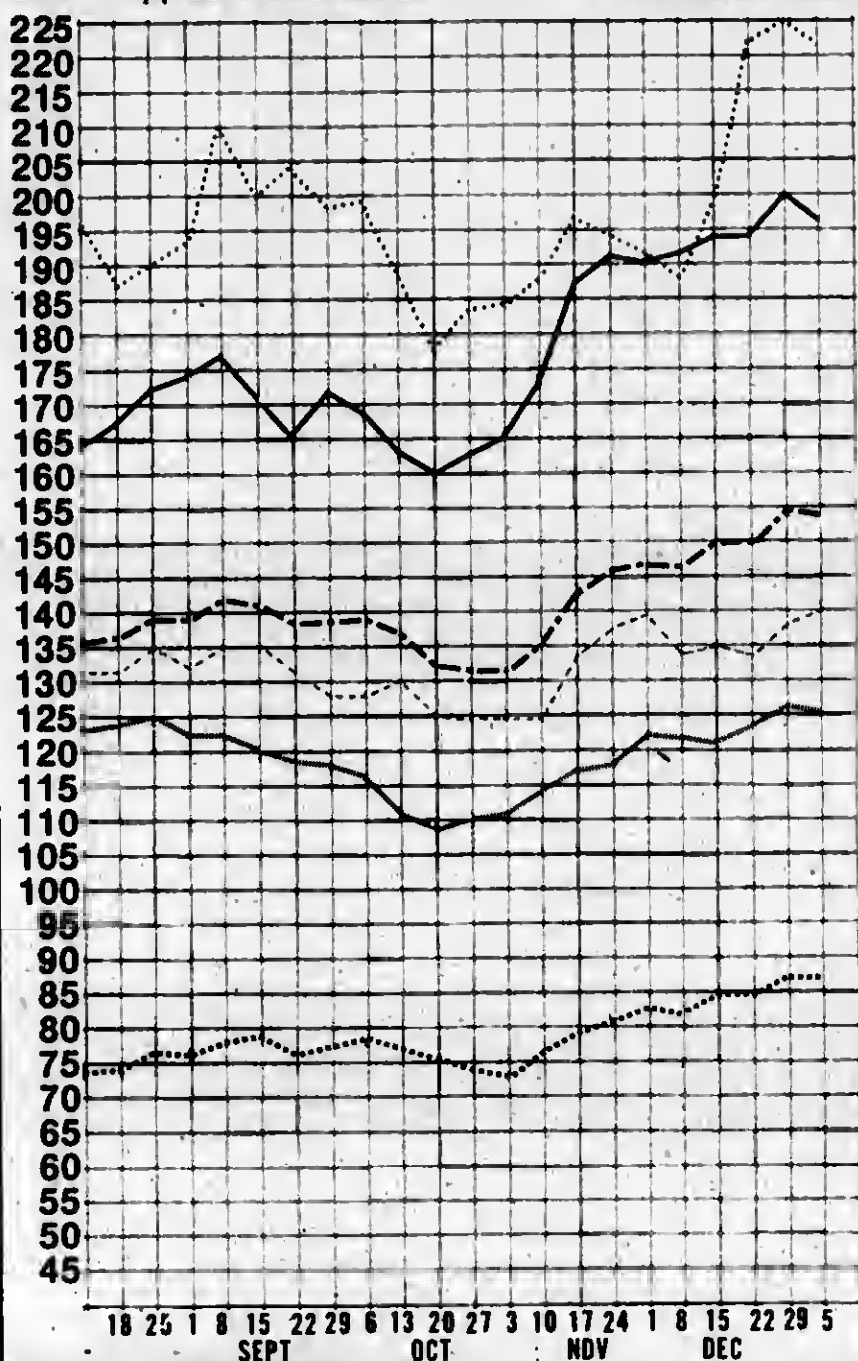
DEDICATED OR PARTITION
TIME AVAILABLE

FOR FURTHER INFORMATION

CONTACT (201) 488-4200 Ext. 47

COMPUTERWORLD Computer Stocks Trading Indexes

Computer Systems Software & EDP Services
Peripherals & Subsystems Leasing Companies
Supplies & Accessories CW Composite Index



Earnings Reports

MATHEMATICAL APPLICATIONS GROUP

Six Months Ended Sept. 30

	1977	1976
Shr. Earnings	\$1.17	\$0.95
Revenue	995,338	835,400
Earnings	144,476	44,388

MEDICAL COMPUTER SYSTEMS

Three Months Ended Sept. 30

	1977	1976
Shr. Earnings	\$0.09	\$0.11
Revenue	2,806,065	2,330,024
Earnings	237,555	308,910
9 Mo. Shr.	.32	.30
Revenue	7,724,764	6,708,887
Earnings	870,980	819,888

MOHAWK DATA SCIENCES

Three Months Ended Oct. 31

	1977	1976
Shr. Earnings	\$1.18	\$1.10
Revenue	38,851,000	35,048,000
Tex. Cred.	30,000	414,000
Earnings	1,236,000	746,000
8 Mo. Shr.	.41	.29
Revenue	72,466,000	73,994,000
Tex. Cred.	75,000	050,000
Spec. Cred.	887,000	
Earnings	3,128,000	2,182,000

e-Gain on retirement of debt.

NATIONAL COMPUTER SYSTEMS

Three Months Ended Oct. 31

	1977	1976
aShr. Earnings	\$4.45	\$4.41
Revenue	7,222,000	3,832,000
Earnings	736,800	561,700
a9 Mo. Shr.	1.08	.88
Revenue	18,883,700	8,585,300
Earnings	1,785,600	1,107,300

a-Adjusted to reflect a 50% stock dividend payable in December 1977.

THRESHOLD TECHNOLOGY

Three Months Ended Sept. 30

	1977	1976
Loss	\$85,101	

e-Comparable figures unavailable; company changed fiscal year-end to June 30 from July 31.

WYLY

Three Months Ended Sept. 30

	1977	1976
Revenue	\$17,800,000	\$15,400,000
Loss	1,100,000	1,900,000
O Mo. Rev.	52,800,000	48,400,000
Oiso Op.	300,000	(65,300,000)
Loss	2,900,000	89,700,000

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreihofner
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezellan
Account Coordinator
COMPUTERWORLD
1212 Hearst Building
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Judy Milford
Account Coordinator
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

West Germany
Hans-Jürgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 4, 1978

All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

E X C H	PRICE				E X C H	PRICE				E X C H	PRICE										
	1977-78 RANGE	CLOSE JAN 4 1978	WEEK NET CHNGE	WEEK PCT CHNGE		1977-78 RANGE	CLOSE JAN 4 1978	WEEK NET CHNGE	WEEK PCT CHNGE		1977-78 RANGE	CLOSE JAN 4 1978	WEEK NET CHNGE	WEEK PCT CHNGE							
COMPUTER SYSTEMS																					
A	AMOHL CORP	22-55	51 1/2	-1 3/4	-3.2	D	ADVANCED COMP TECH	0-2	1 3/8	+1/8	+10.0	D	DATA ACCESS SYSTEMS	4-5	3 1/4	0	0.0				
N	BURROUGHS CORP	55-91	72	-3/4	-1.0	O	ANACOMP INC	7-10	8 5/8	-1/8	-1.4	O	DATA TDO	6-11	9 3/8	-1/2	-5.0				
O	COMPUTER AUTOMATION	18-30	27	0	0.0	A	APPLIED DATA RES.	5-10	9 1/8	+1/8	+1.3	A	DATA PRODUCTS CORP	9-19	16 1/2	-5/8	-3.6				
V	CONTROL DATA CORP	20-29	27 7/8	0	0.0	V	AUTOMATIC DATA PROC	23-30	28 1/4	-3/8	-1.3	O	DATA TECHNOLOGY	3-4	4 1/4	0	0.0				
O	CPAY RESEARCH INC	15-31	28 3/4	-1/4	-0.8	O	COLEMAN AMERICAN COS	2-2	1 3/4	0	0.0	O	DATUM INC	1-2	2	0	0.0				
V	DATA GENERAL CORP	35-54	48 5/8	-1 1/8	-2.2	O	COMPU-SERV NETWORK	9-15	11 1/4	0	0.0	O	DECISION DATA COMPUT	2-3	1 7/8	+1/8	+7.1				
N	DATAPoint CORP	10-41	38 3/4	0	0.0	O	COMP ELECTION SYSTEMS	6-10	9 1/2	+1/4	+2.7	O	DELTA DATA SYSTEMS	1-1	5/8	+1/8	+25.0				
N	DIGITAL EQUIPMENT	37-53	45 1/4	-1 5/8	-3.4	O	COMPUTER HORIZONS	1-1	1	0	0.0	A	EDUCATION INC	6-11	10	-1/8	-1.2				
V	ELECTRONIC ASSOC.	2-3	2 3/4	+1/8	+4.7	O	COMPUTER NETWORK	6-11	9 3/4	-3/8	-3.7	O	DATAPAM CORP	2-24	21 1/2	+1/2	+2.3				
A	ELECTRONIC ENGINEER.	8-14	13 1/4	-3/4	-5.3	N	COMPUTER SCIENCES	7-10	8 7/8	-3/8	-4.0	V	ELECTRONIC M & M	4-5	4 1/2	-1/8	-2.7				
O	FOUR-PHASE SYSTEMS	13-23	20 3/4	-1/2	-2.3	O	COMPUTER TASK GROUP	1-2	1 3/4	+1/8	+7.6	O	FABRI-TEK	1-2	1 1/8	+1/8	+12.5				
N	FOXBORO	32-54	31 5/8	-17 3/8	-35.4	O	COMPUTER USAGE	1-3	1 1/2	-1/8	-7.6	O	GENERAL COMPUTER SYS	0-2	1 3/4	+1/8	+7.6				
O	GENERAL AUTOMATION	6-9	7	-1/8	-1.7	O	COMSHARE	5-8	7	-1/2	-6.6	V	HARTLINE CORP	8-12	10 1/4	-1/4	-2.3				
O	GRI COMPUTER CORP	1-1	1 1/2	-1/4	-33.3	O	DATA DIMENSIONS INC	3-5	4 1/2	-5/8	-12.1	N	HAPRIS CORP	28-47	44 1/8	-2 1/4	-4.8				
N	HEWLETT-PACKARD CO	69-87	71 1/8	-2 7/8	-3.8	O	DATATAB	1-2	1 3/8	-1/8	-8.3	A	INCOTERM CORP	10-19	18 1/8	-1/2	-2.6				
N	HONEYWELL INC	43-55	44 5/8	-1 3/8	-2.9	V	ELECTRONIC DATA SYS.	14-20	15 5/8	+1/8	+0.8	O	INFOREX INC	4-7	6 7/8	+1/8	+1.8				
N	IBM	245-286	270 3/4	-1/4	0.0	O	INSYDE CORP	2-3	1 1/4	+1/8	+11.1	O	INFORMATION INTL INC	9-14	9	+1/4	+2.8				
O	MANAGEMENT ASSIST	5-10	9 3/8	+1/8	+1.3	O	IPS COMPUTER MARKET	1-2	2 1/4	0	0.0	O	INTEL CORP	38-57	44 1/2	+1	+2.2				
O	MICRODATA CORP	7-18	12	+1 1/8	+10.3	O	KEANE ASSOCIATES	3-4	3 3/8	-1/8	-3.5	A	LUNOV ELECTRONICS	3-6	3 5/8	-1/4	-6.4				
O	MODULAR COMPUTER SYS	5-9	8 5/8	-1/8	-1.4	O	KEYDATA CORP	1-2	1 1/4	-1/4	-16.6										
N	NCR	32-47	38 7/8	-3/4	-1.8	A	LOGICON	7-17	13 1/8	+5/8	+5.0	O	MSI DATA CORP	6-15	13 7/8	-1/4	-1.7				
N	PRIME COMPUTER INC	12-25	23 3/4	+3/8	+3.8	A	MANAGEMENT DATA	1-2	1 1/8	0	0.0	O	MEMOPLEX	23-34	30	-3/8	-1.2				
V	PERKIN-ELMER	17-22	19 3/8	-3/8	-1.8	A	NATIONAL CSS INC	10-18	17 5/8	+1 5/8	+10.1	V	MOHAWK DATA SCI	5-8	6	-1/8	-2.0				
N	RAYTHEON CO.	16-35	32 5/8	-1 1/4	-3.6	O	NATIONAL DATA CORP	4-7	7 3/8	+1/8	+1.7	O	PERMIL CORP	2-6	6 1/4	+1/2	+8.6				
N	SPECTRA PAND	30-42	35 7/8	-1/2	-1.3	A	ON LINE SYSTEMS INC	16-22	18 1/4	0	0.0	N	PERTEC CORP	7-11	10	-3/4	-6.9				
O	SYRAC INC	8-20	19 1/2	+1/8	+0.6	N	PLANNING RESEARCH	3-6	4 3/8	-1/8	-2.7	A	POLTEP INSTRUMENT	2-2	1 3/4	0	0.0				
A	SYSTEMS ENG. LABS	5-12	12	+1 1/4	+11.6	O	PROGRAMMING & SYS	1-1	3/8	+1/8	+50.0	O	PPCISTON INST.	2-2	2	0	0.0				
A	WANG LABS.	10-14	13 3/8	+7/8	+7.0	O	RAPIDATA INC	2-3	2 7/8	0	0.0	O	QUANTOP CORP	3-5	3 1/4	0	0.0				
LEASING COMPANIES																					
O	ALANTHS CORP	3-5	4 5/8	+1/8	+2.7	O	REYNOLDS & REYNOLD	17-21	20	-1/4	-1.2	O	SCAN DATA	1-2	1	0	0.0				
O	BOOTH COMPUTER CORP	8-14	13 7/8	+3/8	+2.1	O	SCIENTIFIC COMPUTERS	1-4	4	0	0.0	O	STORAGE TECHNOLOGY	10-22	21	-1/4	-1.1				
A	COMISED INC	10-15	14 1/4	-1/2	-3.3	O	TMSHAP INC	14-23	22 3/8	-5/8	-2.7	O	T RAR INC	7-13	13 1/8	+5/8	+5.0				
A	COMMERCE GROUP CORP	1-3	3/4	0	0.0	A	URS SYSTEMS	4-5	5	+3/8	+8.1	O	TALLY CORP.	4-6	4 1/4	-1/4	-5.5				
A	COMPUTER INVSRTS GRP	1-2	3/4	0	0.0	N	WYLY CORP	1-2	7/8	0	0.0	A	TFC INC	7-10	6 7/8	0	0.0				
V	DATRONIC RENTAL	0-2	1 3/8	+3/8	+37.5	PERIPHERALS & SUBSYSTEMS										N	TEKTRONIX INC	29-40	37 1/8	-3/4	-1.9
A	DEL INC	1-3	3	-1/4	-7.6	N	ADDRESSOGRAPH-RULT	10-16	14 3/4	-1/4	-1.6	V	TELEX	2-3	3	-1/8	-4.0				
V	DPE INC	6-10	8 1/2	-1/2	-5.5	O	ADVANCED MEMORY SYS	7-9	7 1/2	-1/2	-6.2	O	WILTEK INC	1-1	5/8	-1/8	-16.6				
N	IEEL	13-22	19 1/2	-1/8	-0.4	O	AMPEX CORP	8-11	10	-1/4	-2.4	SUPPLIES & ACCESSORIES									
N	LEASEN CORP	19-27	24 5/8	-1	-3.4	N	ANDERSON JACOBSON	3-6	5	-3/8	-6.9	A	AMERICAN BUS PRODS	6-8	7 1/4	-1/8	-1.6				
O	LEASPAR CORP	1-7	1 3/4	+1/4	+16.7	V	APPLIED DIG DATA SYS	10-20	13 1/2	-1/4	-1.8	O	BALLY WRIGHT	1-4	1 3/4	-1/8	-6.6				
O	NRG INC	1-1	1 1/8	-1/8	-50.0	O	BEEHIVE INTL	5-12	5 7/8	+1/4	+4.4	O	HAPPY WRIGHT	10-17	16	-1/4	-1.5				
A	PIONEER TFX CORP	5-11	5 5/8	0	0.0	A	BOLT-BERANEK & NEW	7-9	6 7/8	-3/8	-5.1	O	CYBERNETICS INC	1-1	1	+1/8	+14.2				
V	U.S. LEASING	10-16	13 1/4	-1/2	-3.6	N	BUNKER-RAND	8-13	11 1/2	+3/8	+3.3	O	DIPLIX PRODUCTIONS INC	14-20	20	+5/8	+3.2				
															N	EVANS BUS. FORMS	6-8	8 1/4	0	0.0	
															O	GRAPHIC CONTROLS	13-18	17	0	0.0	
															N	3M COMPANY	45-56	47	-1 1/4	-2.5	
															O	MIKROP CORP LTD	24-37	26 3/4	-3/4	-2.7	
															N	NASHUA CORP	16-28	18 5/8	-2 1/4	-10.7	
															O	STAMPAID REGISTER	18-22	21 3/8	0	0.0	
															O	TAB PRODUCTS CO	8-19	8 1/8	+1/8	+1.5	
															N	HAPER	18-22	22 5/8	-3/8	-1.7	
															A	WASHAM MAGNETICS	10-15	11 1/2	-1	-8.0	
															V	WALLACE PJS FORMS	17-21	20 3/8	-3/8	-1.8	

EXCH: N=NEW YORK; A=AMERICAN; PHIL=PHILADELPHIA; BALT=BALTIMORE; WASH=WASHINGTON; L=NATIONAL; M=MINNEAPOLIS; C=CHICAGO; THE=THE; CUNTO=; J-T-C=PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID 111 TO NEAREST DOLLAR

MSA WINNER PICKS SUPER BOWL WINNER DENVER 14 DALLAS 9

Picked by J. Donald Bruch, Richmond, Virginia, Winner, MSA Super Pool.

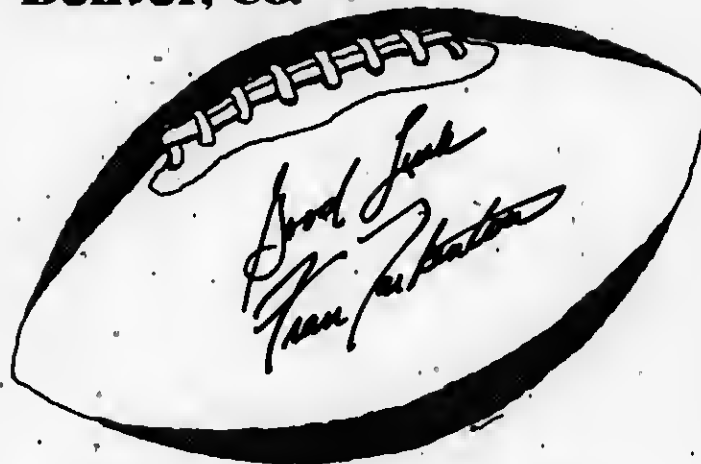
From among 11,786 entries in MSA's 1977 Super Pool, one grand prize winner has survived. He is the winner of four of Fran Tarkenton's Super Bowl tickets and a trip for four to New Orleans to see the game. In addition, two second prizes were awarded. These winners each received two Super Bowl tickets and a trip for two to New Orleans.



The Winners

Grand Prize Winner
J. Donald Bruch -
Richmond, Va.

Second Prize Winners
Robert E. Saska -
Richmond, Va.
Peter C. Williams -
Denver, Co.



22 Third Prizes Awarded

The lucky winners of third prizes each received a leather NFL autographed football from Fran Tarkenton and MSA. In a season filled with Monday Night upsets, these winners should be truly proud. They will have a memento from Fran that will remind them that they were among the best pickers of 1977.

Third Prize Winners

M.W. Collins Houston, Texas	Warren Jarmel New York, N.Y.
Everett R. Conger Miamisburg, Ohio	John D. Karen Denver, Co.
Donald W. Ennis Indianapolis, Ind.	Randy LeBlanc Baton Rouge, La.
Robert G. Finn Meadville, Pa.	Mary Macklewicz Englewood, Colo.
D.M. Fitzgerald San Jose, Ca.	Leila Newkirk Hot Springs, Ark.

Robert Freeman
Chicago, Ill.

Lowell C. Gaertner
Tecumseh, Mich.

Bill Giannitti
Stamford, Conn.

Barbara J. Granacher
Bellaire, Tex.

Denise Haight
Everett, Wa.

James D. Harrell
Annapolis, Md.

Leonard J. ... wak
San Francisco, Ca.

Dale H. Pearson
Des Moines, Ia.

Dick Rehmann
Redondo Beach, Ca.

Daisy P. Scott
Santa Barbara, Ca.

Randy F. Stephens
Statesboro, Ga.

Marguerite Vargo
Gaithersburg, Md.

Congratulations To All



Fran Tarkenton and MSA would like to take this opportunity to congratulate the winners and to thank every one of the over 11,000 entrants in MSA's 1977 Super Pool.

MSA markets a full line of financial software throughout the world and our more than 2,800 users can attest to the fact that you are always a winner with MSA. For more information about our products, call Marge Kimbrough at (404) 262-2376.



THE FINANCIAL SOFTWARE COMPANY

MSA markets financial accounting software packages including: General Ledger, Payroll, Personnel, Accounts Payable, Accounts Receivable, Supplies Inventory, and Fixed Assets



The Winning Teams Were:

Oct. 3	Oakland	at Kansas City
Oct. 10	Los Angeles	at Chicago
Oct. 17	Cincinnati	at Pittsburgh
Oct. 24	Minnesota	at Los Angeles
Oct. 31	N.Y. Giants	at St. Louis
Nov. 7	Washington	at Baltimore
Nov. 14	St. Louis	at Dallas
Nov. 21	Green Bay	at Washington
Nov. 28	Buffalo	at Oakland
Dec. 5	Baltimore	at Miami
Dec. 12	Dallas	at San Francisco
Dec. 17	Minnesota	at Detroit

COMPUTERWORLD

NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

January 16, 1978

75¢ a copy; \$18/year

To

Oil at Last,
Turchin Eager
to His Work

By Arnst
Staff

NEW YORK — Years of harassment that included six lengthy police interrogations as well as apartment searches and seizure of personal papers, Dr. Valentin Turchin, a noted Soviet computer scientist, has arrived here with his family — empty-handed, but free.

A slight, graying man, Turchin had offended the Soviet government by protesting the treatment of dissidents, particularly Andrei Sakharov, the highest ranking dissenter in the Soviet science community, and for founding the unofficial Moscow branch of Amnesty International [CW, Aug. 13, 1975].

Had Turchin not agreed to emigrate permanently, the alternative was arrest and a possible prison sentence of up to 70 years for activities "harmful to the state."

Turchin has accepted a position as a research scientist at New York University's Courant Institute of Mathematical Sciences, where he will continue the work he started at Moscow's Institute of Applied Mathematics. That work was halted when he was fired in July 1974 for his political activities.

Turchin never held another job. For the past three years he, his wife and three sons lived on his wife's salary of 100 rubles per month — about \$100 — earned as an engineer.

Forced to Renounce Citizenship

Turchin tried to leave the Soviet Union for some time. In 1975 he was denied a temporary exit visa to accept a position as a visiting scholar at Columbia University. When he renewed his request in July 1977, he was told he could leave — but only on permanent basis and with Israel as his final destination.

Turchin, however, is not Jewish and was not invited to immigrate to that country; further, he knew he could go anywhere he wanted once he left Russia.

By accepting these conditions, Turchin was forced to deny his Soviet citizenship — "the final harassment" by the government, he said in an interview here last week. "I hope that someday I will be able to return, at least to visit," but he said he would not consider living there again until "I can live as a normal human being with freedom of self-expression."

Turchin chose to immigrate to the U.S. because "this country showed more interest in human rights than Europe" and it was Americans who first tried to help him.

The computer facilities are also "far better" in the U.S. than in Russia "and my first thought on arriving was that at last I can continue my research."

Seeking Cybernetics in Language

Turchin, who has an excellent command of English, spoke openly about his experiences in Russia, but he was most animated when discussing his work. In the late '60s, he recalled, he developed a "meta-language" called the Recursive Functions Algorithms Language (Refal), which he described as a tool for depicting the process of evolution.

Refal "is not a purpose in itself, but a means for implementing certain developments in programming philosophy," Turchin said. The first stage of his work, developing a technique of programming in Refal, was almost completed when his research was interrupted by the state.

Although the students who worked with him tried to continue the research, little was accomplished, and Turchin now estimates it will take two to three more years to reach his final goal.

That goal is to develop a cybernetic approach to the
(Continued on Page 6)

Technology, Actions by IBM Spur Plunge in 1977 Prices

By Molly Upton
CW Staff

During the past year, a revolution has taken place in the prices of medium- and large-scale computer systems, recent figures compiled by Computerworld show.

Prices for hardware in these size ranges have fallen dramatically, riding a downward slope greased by technological developments as well as IBM's willingness to cut prices to become price-competitive.

The beneficiary of all this is unquestionably the user, who now has more alternatives available at startlingly lower prices. For example, an IBM

3032 with 4M bytes of memory costs less than the March 1977 price for a 2M-byte 370/158-3 — \$2.1 million vs. \$2.2 million — even though the internal operating speed of a 3032 is two to three times faster than a comparable 370/158-3.

But the most surprising development is the relative ranking of IBM in the price comparisons: At the beginning of 1977 IBM was clearly the high-priced alternative, but now the umbrella is gone and IBM is in a prominent position at the low end of the pricing totem pole.

CW asked vendors what systems they would bid against a

2M-byte 3031, a 4M-byte 3032 and a 6M-byte 3033. The "specifications" included 6 channels on both the 3031 and 3032 and 12 channels on the 3033. Quoted prices were to include CPU, memory, power supply, operator's console and channels.

Prior to the introduction of the 3033 and IBM's concomitant price reductions on its 370s last spring, the 158-3 and 168-3 were positioned firmly in the higher price bracket [CW, June 13].

A 168-3, with a ticket of \$4.26 million for a CPU, power supply and 4M bytes, was topped only by Amdahl
(Continued on Page 6)

Also Has Communications IBM 5100 Offspring Offers Disk

By Esther Surden
CW Staff

ATLANTA — IBM last week beefed up its 5100 desk-top system by unveiling a version with double-sided floppy disk storage, faster throughput, increased communications capabilities and improved screen management techniques for less than \$10,000.

Also introduced with the 5110 were applications packages for general ledger, accounts payables and report generation.

Present 5100 users can upgrade their systems to the 5110 in the field for \$3,800 to \$5,800 depending on the model they have, IBM said. This upgrade price does not include the enhanced communications options and the parallel I/O channel feature, the firm noted.

IBM will continue to sell and support the 5100, according to a spokeswoman.

The combination of all the enhancements introduced allows the 5110 to operate three to 30 times faster than the 5100, the company claimed. Like its predecessor, the 5110 offers 16K to 64K bytes of main memory and either APL or Basic languages.

The language-handling techniques used have been enhanced, IBM said. Language interpreters for the system are contained in read-only mem-

ory on 72K-bit and 96K-bit modules, "providing twice the density" of that available on the 5100, IBM said.

While the system's keyboard and numeric pad are similar to those of the earlier system, some major changes have been made in the system's 1,024-character display. The 5110's display can accommodate several additional functions under program con-

trol. One is the ability to write data anywhere on the screen. The 5100 only permits users to write data from the bottom of the screen.

Another function allows the screen to display data in both upper and lower case.

An optional audible alarm for the system signals for operator intervention or
(Continued on Page 4)

Plan to End LEAA Leaves System Planners in Dark

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Attorney General Griffin B. Bell has proposed that the Law Enforcement Assistance Administration (LEAA) be abolished and replaced by a National Institute of Justice.

Bell's plan probably won't affect federal aid to state and local law enforcement information systems as long as the funding level for these programs remains the same, but it might affect the amount of federal money available at the planning stages of such projects, according to an LEAA official.

The reorganization plan does not address the question of LEAA support or funding of state and local law enforce-

ment information systems, Robert F. Diegelman, director of LEAA's Policy Planning Division, noted, adding it is "impossible" to say whether computer funding will be affected by creation of the National Institute of Justice.

The basic structure of LEAA programs will remain intact and the states will have more flexibility in administering federal grants, Diegelman said.

Ceiling on Support

Bell's proposal calls for an overall ceiling on federal monetary support for planning. The states would be required to draw up three-year rather than annual plans for using the grants, according to
(Continued on Page 8)



EDITORIAL

Editor E. Drake Lundell Jr.
Deputy Editor Ronald A. Frank
Managing Editor Nancy French
Associate Editor Donald Leavitt
Associate Editor Esther Surden
Associate Editor Molly Upton
Assistant Editor Frank Vaughan
Washington Bureau Edith Holmes
Staff Writers Catherine Arnst
Jeffrey Beeler
Timothy J. Scannell
Brad Schultz

Chief Copy Editor Cheryl M. Gelb
Copy Editors Barbara T. VanScoyoc
Susan Gerrard

Photography Editor Ann Dooley
Editorial Assistant Denise Petski
Editorial Cartoonist Jim Orton

Bureaus:
London Roger Frampton
Munich Hans-Jurgen Ballnath
Asia Hidetsuna Sasaki

Contributors:
Education J. Daniel Couger
Legal Roy N. Freed
Taylor Reports Alan Taylor
Human Connection Jack Stone

SALES

Vice President/
Marketing Roy Einreinhofer

Advertising Administrator Terry Williams
Display Advertising Mary Anne Furlong
Classified Advertising Donna Whalen

Recruitment Advertising Kathy Steinberg

Sales Promotion Director Jack Edmonston
Market Research Kathryn V. Dinneen

CIRCULATION

Vice-President/
Circulation Margaret Phelan
Circulation Manager Barbara Jeannetti
Customer Service Rep Peggy Kelly
Assistant Maureen Burke

PRODUCTION

Manager Lee Vidmer
Supervisor Henry Fling
Assistant Manager Peter Holm
Typesetting Supervisor Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 Munchen 40, Tristramstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S. — \$18 a year; Canada and PUAS — \$28 a year; Europe and Middle East — \$50 a year; all other foreign — \$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/
Publisher Patrick J. McGovern
President W. Walter Boyd
VP-Marketing Roy Einreinhofer
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Asks Full Denial

IBM Mistrial Filing a 'Sham': U.S.

By Catherine Arnst
CW Staff

NEW YORK — IBM's recently filed motion for a mistrial in the U.S. vs. IBM antitrust trial "is wholly devoid of merit" and a "sham" and should be denied in full, the government charged in its response filed last week.

IBM's motion contended that the government changed its market definition claim through the testimony of Dr. Alan K. McAdams, the Department of Justice's chief economic adviser for the case, and asked Judge David N. Edelstein to abort the case [CW, Jan. 9].

In its response, the government charged that "IBM counsel knows full well that the government has not changed the market definition . . . IBM must have had other ends in mind for the filing, ends having nothing to do with the relief ostensibly

sought . . .

"Aside from the obvious side effects of many of IBM's massive and frivolous motions as taxing of the time and energies of the government and the court, the instant IBM motion adds up to a 66-page attempt to disparage the testimony of Dr. McAdams," the government wrote.

IBM claimed in its mistrial motion that McAdams' definition of a general-purpose computer system, a central issue in the case, was inconsistent with that used by the government in its statement of triable issues because his definition took on different characteristics for different time periods.

The changes in McAdams' definition are analogous to the changes in the "passenger automobile," according to the government's response.

"The characteristics of the passenger automobile have changed dramatically

over its life; for example, from Model T, to Chrysler Airflow, to the modern low-pollution, increased-mileage vehicle; but the market for passenger automobiles can still be determined as the unchanging line of commerce, the 'passenger automobile.' The same is true of the line of commerce of general-purpose computer systems," it said.

"Government counsel have, repeatedly and unequivocally, stated that the government has not changed its position," the response paper said. The document referred to a remark made in court by government attorney Lewis Bernstein: "It is not relevant to these issues to consider the details of the specific mention that different people in the computer industry give to the term 'general-purpose computer system' when referring to an electronic digital computer system for some purpose other than attempting to delineate an economic market."

IBM's mistrial motion rose out of its "obvious attempts and purpose to obfuscate the market definition issue in this case," the government charged.

Funds for IRS System Axed

WASHINGTON, D.C. — Congressional concern over the privacy and cost implications of the Internal Revenue Service's (IRS) proposed Tax Administration System (TAS) has led to a decision to kill funding for that system for fiscal 1979.

Acting for the Carter Administration, the Office of Management and Budget decided against recommending to Congress that it budget 1979 funds for FAS after receiving letters from Representatives John E. Moss (D-Calif.) and Dante B. Fascell (D-Fla.) and six senators expressing "serious misgivings" over the system [CW, Jan. 9].

Because its present caseload threatens to outstrip its 20-year-old centralized tax accounting and collection system, the IRS will need to expand its computer system before too much longer.

The agency proposed TAS more than three years ago as an alternative to building on to the old system.

Moss Planning to Retire

WASHINGTON, D.C. — Rep. John E. Moss (D-Calif.), long concerned over individual privacy in the context of federal computer systems, will retire from Congress at the end of this year.

The 62-year-old, 13-term congressman has decided not to seek reelection for many reasons — "primarily personal," according to a spokeswoman.

Moss said he feels a need to be relieved of the pressures of the office which have grown during his nearly 26 years in Congress. In addition, he would like to recover fully from a car

accident he suffered last April and has a strong desire to be with his daughters and grandchildren.

Among the computer systems Moss has questioned on grounds of privacy and cost-effectiveness over the last few years are the Federal Bureau of Investigation's National Crime Information Center; the Internal Revenue Service's Tax Administration System, the Veterans Administration's Target system and the Social Security Administration's computer complex in Baltimore.

On the Inside This Week

NEWS

POS Options for Retailers Branch Out at Show . . . 4
FBI Defends Use of OS/MVT by NCIC . . . 5
Hopper: Fester CPUs Not Answer to Future Needs . . . 8
Service 'Psychs Out' Gridiron Teams' Strategies . . . 9
Acpe Criticizes ACM's Break With Soviets . . . 10
Tennessee Tex Applies to In-House Software . . . 12
Alabama High Court: Software Not Taxable . . . 13
Something Fishy In Japan . . . 14
DP Bills Keep Congress Busy . . . 15

EDITORIAL

Editorial: Keeping the Lines Open . . . 16
Human Connection: Crooks Going Unnoticed . . . 17
Taylor Report: Lost Controls Mer Systems . . . 17
Auditor Must Be Included In Design Phase . . . 20
Eureka Armplit: Programmer Extraordinaire . . . 21

SOFTWARE & SERVICES

User-Coded Requests Improve Decisions . . . 25
'Cadmat' Manipulates Large Data Collections . . . 27
'DMS/OS' Compresses PDS . . . 28
Performance Monitor Helps Control TSO Use . . . 29
Holding Company Banks on On-Line Programs . . . 31

COMMUNICATIONS

Detegrems Seen Boon to Network Users . . . 33
Data Net Helps Optimize Firm's Operations . . . 34
PTS-100 Gets Boost to Beck 32 Terminals . . . 35
BR Modular Terminal Built to Handle EFT . . . 36

TERMINAL TRANSACTIONS

Oil Firm Uses CRT Net to Personalize Service . . . 37

SYSTEMS & PERIPHERALS

Texens on Drives: The Bigger the Better . . . 39
Key-to-Disk Setup Eases Data Entry Growth . . . 40
MIC to Sponsor Seminar on Data Entry . . . 44
Approach Eases Use of Old Software . . . 45

MINIWORLD

Metal Firm Gets First IBM System/34 . . . 49
In-House System Eases Commercial Scheduling . . . 50
System Adds Control to Cataloging Operation . . . 55
System Eases Transfer Between Syte, 360/370 . . . 56
HP Minis Get More I/O, Memory Price Cuts . . . 58

MICROCOMPUTING

Book for Learners Starts From Scratch . . . 59
Unit Gives Micros Remote Control . . . 61

COMPUTER INDUSTRY

'Defensibility' Behind IBM Unbundling . . . 63
IBM Releases Dividend; Stock Split Coming? . . . 63
Shift to Software Pricing Seen Growth Spur . . . 64
IPI Sees Opportunity In CPU Independence . . . 65
IBM's High Court Plea Unfounded: Greyhound . . . 68
IBM-Indle Debece Offers Blueprint for Future . . . 69
Scope Focusing on Electrosensitive Printers . . . 70
'Regulatory Maze' Seen Problem for U.S. Firms . . . 71
Innovative Marketing Seen Micro Use Key . . . 74
DG Revenues Gain 47% In Quarter . . . 78

FIRST CLASS

**DOS, DOS/VS users:
You are no longer
restricted to the
beginners' slope
and the rope tow.**

**(You can now take the Syncsort
chair lift right to the top!)**

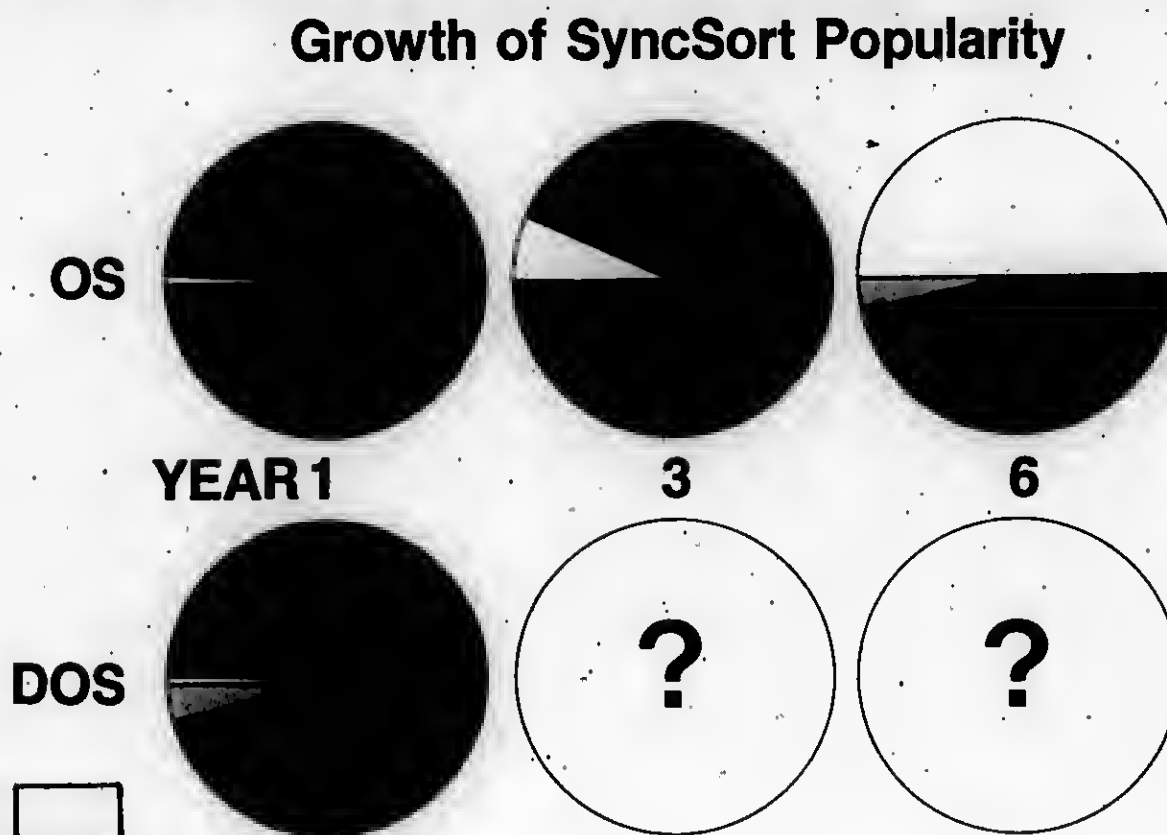
Call (201) 568-9700.

**Located at
the summit of
Mt. Sort.**

OVERSEAS REPRESENTATIVES —

Brussels: CAP/GEMINI Belgium
Dusseldorf: CAP/GEMINI GmbH
Geneva: CAP/GEMINI Switzerland
Hague: CAP-GEMINI/PANDATA
Johannesburg: Computing Benefits Ltd.
London: GEMINI Ltd.
Melbourne: Shell Oil Co. of Australia
Milan: SYNTAX
Paris: CAP/SOGETI PRODUCTS
Stockholm: BRA
Tel Aviv: ADVANCED TECHNOLOGY, Ltd.
Vienna: CAP/GEMINI GmbH

SYNCSORT 
IBM 
OTHERS 



Congratulations, DOS and DOS/VS sort users of the world. You are about to get a fair shake at last!

Until now you've been victims of a very curious sorting situation. While OS and OS/VS users could cut their use of machine and human resources by switching to SyncSort, you weren't so lucky.

You could only choose among lesser evils — a bunch of IBM DOS sorts that had grown "too soon old and too late smart." (Maybe it was the Computer Giant's revenge for your refusal to migrate upward on signal.)

Fortunately, with the introduction of our new SyncSort for DOS and DOS/VS, that's all history. About 1% of DOS and DOS/VS users — we call 'em the "leading edge" — have already discovered the pleasures of sorting with our new program.

Which means that the popularity of SyncSort DOS stands today almost exactly where that of our OS program stood a bare six years ago. The charts below show how it "evolutionized" OS sorting in this country:

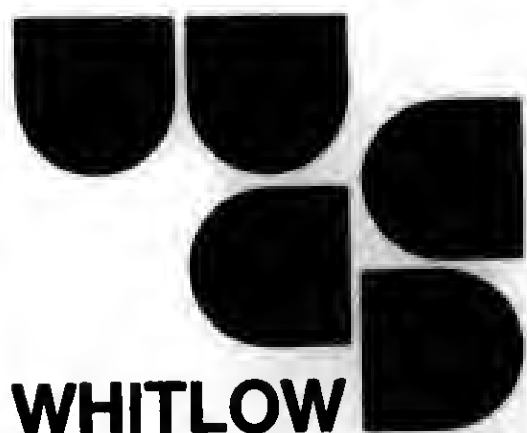
Will SyncSort DOS do as well? Our guess is that it probably will. Because it offers some advantages that no other DOS sort program can come near matching:

SyncSort does more for less. Compared with its IBM counterparts, SyncSort simply gives you more mileage for less fuel:

- 30-40% reduction in Elapsed Time.
- 30% reduction in True CPU Time.
- 40-50% reduction in Disk Work Space.
- 30% reduction in I/O Time.

And it goes without saying that you'll get the same kind of technical support in DOS that has made us famous with OS users.

So come on up to the summit and enjoy the sorting view. It sure beats clinging to a slippery rope with frozen mittens!



WHITLOW

COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

POS Options for Retailers Branch Out at Show

By Ronald A. Frank
CW Staff

NEW YORK — Point-of-sale (POS) devices were branching out to provide more information to management at the National Retail Merchants Association (NRMA) annual convention here last week.

TRW Retail Systems, Los Angeles, showed a prototype of what was described as an "electronic timekeeper" that accepts magnetic-striped cards and can be interfaced with existing retail communications networks. Three of the wall-mounted terminals can be attached to one controller to capture employee timekeeping information that would be transmitted to a central DP center over existing lines. A system consisting of three terminals and a controller would cost about \$6,000 to \$8,000, a spokesman said.

Employees would enter data using credit card employee IDs and this data would be captured in real time to form the basis for payroll information. This type of system could save the interim data-entry process now required to get timekeeping information into a DP system, the company said.

IBM introduced a retail merchandising software system for System 32 users that is designed to operate in stores having sales of about \$500,000, a spokesman said. The user-developed program runs on a CPU with 24K of

main storage, an 80 char./sec printer and a 5M-byte disk. It reportedly calculates gross margin, gross mark-on and gross cost percentages by item class; provides salesperson productivity data; analyzes sales by time of day;

communications capability is expected to add \$500 to the cost of the basic system.

Sweda International of Pine Brook, N.J., unveiled its L 35 terminal designed for general merchandising ap-

Mass., showed its DTS 540 super-market checkout system with scanning that reportedly costs 40% less than comparable IBM systems. A basic system with 15,000-item data base, scale, inter-register communications and Ans-R-tran communications costs \$9,000 per lane. A typical 10-lane system costs \$90,000 compared to \$140,000 for an IBM system, a Data Terminal spokesman said.

Planning Aid Shown

IBM also showed its Planning Aid for Retail Information Systems (Paris) which was described as providing retail executives "with a road map for developing an integrated retail information system." The management system provides retailers with a five-manual series that includes such subjects as corporate planning, personnel planning and scheduling and merchandising. The Paris system is available at no cost to retailers, an IBM spokesman said.

Jay Corp., Chicago, Ill., showed its Model 630 programmable terminal designed for universal, rental and food service applications. The microprocessor-controlled unit is said to handle 22 standard departments. Programmable capabilities include pricing, taxable unit itemization and charge-posting functions. The basic unit costs \$2,295 on 90-day delivery.

CW at NRMA

and provides flash sales information. Written in RPG-II, the software is available for a monthly license fee of \$340 for a 12-month period.

For Smaller Stores

Several terminals priced at about \$2,000, were introduced for smaller specialty stores. Datatrol, Inc. of Hudson, Mass., showed its IDT-6050 POS terminal that includes a printer, cassette, keyboard and electronics to capture sales data, provide inventory control and handle payroll information, accounts receivable and store security. The terminal costs \$2,000 and reportedly can handle "more than 300 types of transactions."

A 16-digit display can handle major credit card numbers and product ID information. Options include bar code wand, remote display and credit card reader. Software is being developed to transmit data directly to a corporate DP center, a spokesman said. The

applications. The unit is scheduled to be officially introduced soon and will cost \$1,995 including cassette and printer for multipart sales slips, a spokesman said.

NCR showed its 8359 communications processing system designed to add on-line capabilities to the 255-726 food and mass merchandising terminal system as well as the recently introduced 2140 retail terminal.

March Delivery

The first configuration is scheduled for March to operate with the 255-726 and includes a 150 line/min printer, CRT console, cassette reader, CPU with 64K of storage and 9M bytes of disk. It will be priced at \$81,000, a spokesman said.

The system is designed for multiline polling networks and will be programmed with Cobol and NCR's Neat 3 language.

Data Terminal Systems, Maynard,

EDITOR/WRITER

We're one of America's largest business newspapers, and we have an excellent opportunity for someone with at least one year's reporting and writing experience and a knowledge of computers or the computer industry. You'll be reporting, writing and editing for the leading weekly newspaper for the computer community. Excellent chance to grow as we do. Good starting salary, depending on experience and broad benefits, including profit sharing. To apply, please send your resume or a detailed letter — including salary requirements to:

COMPUTERWORLD

THE PUBLICATION FOR THE COMPUTER COMMUNITY

An equal opportunity employer

E. Drake Lundell
797 Washington Street
Newton, Mass. 02160
No phone calls please

IBM 5110 Features Disk

(Continued from Page 1)

error-condition, the company noted.

The primary difference between the 5100 and the 5110 is the mass storage each uses. The 5110 comes in two versions, but only one, the Model 1, accommodates the same 204K-byte tape cartridge used in the 5100.

In addition, the Model 1 can handle either one or two double-sided floppy disk drives for up to 2.4M bytes of random-access storage and an auxiliary tape drive.

The Model 2, with only diskette storage, can accommodate up to 4.8M bytes of diskette memory, IBM said.

The 5110 includes a number of functions in read-only memory to support file handling including initializing diskette, recovering data, compressing data, displaying label information and copying data, according to the firm. Data reportedly can be copied from tape to tape, tape to diskette and diskette to diskette.

Communications Capabilities

With the additional communications capabilities, the IBM 5110 can communicate either with an IBM 370 asynchronously in 2741 emulation mode or bisynchronously in IBM 2770 or 3741 emulation. The latter feature, available in June, can be programmed using APL or Basic, the company said, and allows the 5110 to interact with remote IBM 3s, 32s, 34s, 3741s or other 5110s.

To accompany the system, IBM also announced the 5103 models 11 and 12 printers. Users can "overlap the printing with applications processing," IBM stated. Both printers are bidirectional, capable of printing 80- and 120 char./sec respectively.

I/O devices can be attached to 5110 with either serial or parallel interfaces, the company added.

A low-end 5110 with Basic, 16K bytes of memory and a diskette capability costs \$8,475. It costs \$9,875 with both diskette and tape capability.

The 5114 diskette unit costs \$4,150 and a second drive for the unit costs \$1,900.

A system with both APL and Basic and 64K bytes of memory with diskette capability is priced at \$17,125. Auxiliary tape units can be purchased for \$1,850 each and the printers range in cost from \$3,200 to \$3,700.

NOTICE

The world's most successful
computer data security system is

Secure

It's available now from
Boole & Babbage.

Boole & Babbage, Inc.
Operations Division
200 Oakmead Parkway
Sunnyvale, CA 94086

In California
(408) 735-9550
Outside California a collect call
(800) 538-1872

Sees No Conflict With Privacy Act

FBI Stands Behind Use of OS/MVT by NCIC

By Edith Holmes
CW Staff

WASHINGTON, D.C. — A Federal Bureau of Investigation official recently claimed the National Crime Information Center's (NCIC) use of IBM's OS/MVT operating system does not conflict with the Privacy Act of 1974, even though the system had been found to be less than secure for other agencies.

Conrad Banner, deputy assistant director of the FBI division that houses NCIC, contended the center's use of OS/MVT on an IBM 360/65 does not conflict with the decision made by the U.S. Comptroller General last year that blocked the U.S. Navy's use of a similar system to maintain personnel records [CW, Dec. 19].

The Comptroller General denied the use of OS/MVT not on the basis of the Privacy Act, but after studying the Navy's request for proposal (RFP) for the time-sharing system, Banner said. "The Navy wrote its specifications in hopes of satisfying the Privacy Act," he added.

"The language of the Privacy Act is broad," Banner continued, noting that neither the law itself nor the regulations written to help federal agencies implement it identify mechanisms for ensuring the confidentiality of records.

No Read Protection

On Jan. 14, 1977 and again on June 13, the Comptroller General told the Navy it could not accept a Computer Network Corp. (Comnet) proposal that OS/MVT be used as the basis for the time-shared personnel record system. Comnet's proposition was in violation of the Navy's own RFP that "established various requirements regarding the Privacy Act of 1974 and computer security," the Comptroller General said in his decision.

The Comptroller General quoted from the Navy's RFP: "Main memory protection must ensure the integrity of the user's area during operations... The proposal must include a detailed description of all security measures and procedures." He interpreted these RFP requirements to mean the system had to offer read protection.

While OS/MVT provides write protection, it cannot prevent the unauthorized reading of the records it governs. "The lack of read protection in OS/MVT is well known," the Comptroller General noted in his opinion.

Comnet had modified OS/MVT to provide "a measure of read protection in those situations where dumps are involved," the Comptroller General agreed, but these changes did not mean "full read protection." The Navy would not have been able to prevent a user's program from accessing areas of main memory outside the user's assigned segment, he concluded.

Apples and Oranges

In the final paragraph of his second decision against the Comnet proposal, the Comptroller General expressed the General Accounting Office's (GAO) belief in "the importance of the Privacy Act and related computer security requirements" and suggested this belief was the basis for his judgment.

ment.

Banner also maintained that the GAO decisions do not apply to the FBI's NCIC because while the center is an in-house effort, the Navy expected to go to an outside contractor for a time-sharing system that would have involved non-Navy users. To compare NCIC and the Navy's personnel record system is, therefore, to mix "apples and oranges," the FBI official said.

In the case of NCIC, the computer is under the control of the FBI and all the system's users — federal, state and local law enforcement agencies — have a right to all the data maintained by the center, Banner argued.

Sources inside and outside the FBI expressed concern that the bureau's plans to develop a communications system for switching criminal histories between state and federal users would accentuate the privacy problem inherent in OS/MVT.

Chiefly because of congressional concern, the Office of Technology assessment is now studying the creation of a national Computerized Criminal History (CCH) index and an NCIC/CCH message-switching system [CW, Nov. 28].

One of the message-switching plan's strongest critics, Rep. John E. Moss (D-Calif.), recently received assurance from Walter M. Fiederowicz, associate

deputy attorney general of the Justice Department, that the department "shares your views concerning the importance of this issue, and for this reason we have attempted to conduct our reexamination of this issue."

A reevaluation — "full and fair" — will precede any move the Justice Department and the FBI make to go ahead with NCIC message switching, Fiederowicz told Moss.

The congressman also received word from the White House that members of its staff "are quite familiar with the NCIC and feel, as you do, that expansion of that system should only proceed after the most thorough and careful consideration."

SMALL 370's CAN HAVE A MODERN TP SYSTEM

If you are the proud owner of a 370/115 or 125 or maybe a 360/40, you will have every right to expect your computer to run an efficient and sophisticated on-line system.

SHADOW II is the world's most Advanced TP Monitor, and runs as happily on a 370/115 as it does on a 370/168.

Our medium and large size users like the enormous range of facilities provided with SHADOW II, and of course the world-renowned performance compared with any other system.

Our smaller users also appreciate these benefits of course. But they also find that their application programmers can write TP programs under SHADOW II as easily as writing in batch. And they get terrific performance without costly upgrades, because SHADOW II requires miserly quantities of Main Memory and CPU time. Just 2K of real storage under DOS VS for instance.

SHADOW II is a true Multi-tasking, Multi-threading system which allows you to grow from your first small TP applications, to your larger systems of a few years hence without a difficult and costly rewrite.

We don't ask the small user to accept an "Entry Version" with limited facilities and poor performance. SHADOW II is BIG on facilities but SMALL on resource requirements.

Get a BIG system without a BIG budget. Return the coupon for a copy of the SHADOW II Concepts and Facilities manual and a User Reference List.

Shadow II
The World's most advanced TP Monitor
altergo

Altergo Software Inc.
Wellesley Office Park
55 William Street
Wellesley
Massachusetts 02181
Telephone: (617) 237-6132

Please send me the Concepts and Facilities Manual right away.

Name

Title

Organization

Address

Zip Phone

My computer is IBM Op. System

Present TP Package

Our need is ☐ immediate
☐ 3-6 months
☐ over 6 months

Model Characteristics	IBM 3031	IteI AS/5 7031	Burroughs B6817	CDC Cyber 173	NCR V8590	Univac ⁷		HIS ¹¹	
						90/80-3	1100/80	68/80	68/DPS Level 1
Purchase Price CPU and 2M Bytes (No. of Channels)	1,000,000 (6)	1,100,000 (7) ²	975,000 (40)	1,196,920 (12) 98,000 (60-bit) words	808,640 (6)	1,035,540 (6) ³	1,447,870 (6)	3,337,200 (24)	1,312,913 (24)
Price/Mo With Maintenance (Lease Term in Years)	25,000 (4)	Not Available	23,515 (5)	25,687 (5)	20,718 (5)	22,813 (5)	28,060 (5)	85,385 (5)	33,045 (5)
Maintenance/Mo ¹	3,070	Not Available	4,551	3,621	3,017	2,733	2,420	7,058	4,253
Memory Size in Megabytes (Minimum-Maximum)	2-6	1-8	1.5-9	65,000- 282,000 60-bit words	2-6	2-4	2-4	1-8	2-16
Memory Cycle Time (Nsec)	345-805 ¹³	Not Available	325 ³	400 ⁴	475 ⁵	457-588	600-100 ¹⁰	See Footnote 12	See Footnote 12
Machine Cycle Time (Nsec)	115	100	Not Available	50	56	98	50	Not Available	Not Available
Channels (Minimum-Maximum)	6	7	40	12-24	4-24	4-8	6	58-224	56-224
Price/Channel					14,440	15,840 ⁹		Not Available	Not Available
Memory Buffer	32K	32K	No	See Footnote 5	No	No	16K	2K	2K

1. IBM maintenance is minimum monthly charge, 10 hour/day, 5 day/week. Burroughs maintenance is 24 hour/day, 7 day/week.
2. Seven standard channels, six operational.
3. Read access is 325 nsec.
4. Effectively 50 nsec.
5. Scheduling arrangement for peripheral

processor units and CPU to access main memory. Buffer could be one to 12 CDC's 60-bit words. System quoted has 10 peripheral processor units.
6. Also features four-way interleaving.
7. Univac prices include software.
8. Five block, one byte multiplexers.

9. For each block multiplexer.
10. Speed is 650 nsec for 16 bytes in "rear memory" and 100 nsec from "forward memory" to CPU.
11. HIS expects to offer other systems in this range based on Level 66 with Gcos operating system. The 68/DPS units have Multics

CW Chart

operating system. The 68/60 is what HIS would have bid prior to October 1977; the 68/DPS is the firm's current offering.
12. Memory access time is 750 nsec.
13. Depends on type of work being done.

Revolution in System Pricing Takes Place in '77

(Continued from Page 1)

Corp.'s 470V/6-II's \$4.6 million ticket. The 2M-byte 158-3 was alone at the top with a price of \$2.2 million until Amdahl introduced the 470V/5 with a sales tag of \$2.4 million.

Reviewing the 370 price changes, multiple motivations seem clear. Not only was IBM becoming price-competitive with its 370 line, but it was setting the stage for the 30 Series and its pricing.

But IBM was not the only one adjusting its prices and products last spring.

After a flurry of consultation with slide rules, several other firms also reduced prices, especially in the larger systems area.

For instance, Burroughs Corp., Honeywell Information Systems, Inc. and Amdahl all adjusted prices on systems competing with the 168-3, indicating their intent to remain to some extent under IBM's price — or at least close to it.

Many of these vendors apparently predicted the pricing range of the 30 Series, as few felt the need to reprice

after the 3031 and 3032 were announced. In November, HIS was the last to lower prices with its revamped systems called the Level 68/Distributed Processing Systems (68/DPS).

The Level 68/DPS series shows a sizable price reduction compared with its predecessor Level 68/80 range.

In the ranges of the 3031, 3032 and 3033, HIS is no longer the high bidder. As a result of the changes, HIS has abandoned its stratospheric position and ranks in the bottom half of the

pricing on the 3032 field.

Although IBM was relatively unsuccessful in abandoning the umbrella pricing for its 168-3, which had only three competitors with higher price tags, the new price of IBM's 158-3 was underbid by only one machine, Control Data Corp.'s Cyber 173.

Those topping the 168-3 price were CDC's Cyber 175, Amdahl's 470V/6-II and the HIS 66/60. The prices include CPU, 4M bytes of memory, (Continued on Page 7)

Turchin, Now in U.S., Eager to Get Back to Work

(Continued from Page 1)

theory of evolution which encompasses the "evolution of everything, including moral principles," he said. "I call it, meta-science — the science of science, the theory of how to create theories."

Although excited by discussion of his work, Turchin became subdued and answered quietly when asked what had happened to the research he had already completed. He said he was allowed to bring nothing out of Russia that pertained to his work, but he hopes progress will not be slowed too much by this loss.

"By the time I was fired, we had already published the essential portion of what is needed," he said. These theories were recently published in English by Columbia University Press in *The Phenomenon of Science, A Cybernetic Approach to Human Evolution*. The book "attempts to establish a relation between the pursuits of science and the overall ethical and moral concerns of society," according to the jacket notes.

Refal is largely machine-independ-

ent, but there will still be some problems implementing it on non-Soviet computers, Turchin said.

The differences between the equipment available to him here and in Russia are astounding, he added.

Unreliable Hardware

The hardware in the Soviet Union doesn't compare in reliability, according to Turchin. "Several top institutions have contemporary models which work very badly, with printers that constantly jump or miss letters."

"When I first saw an IBM printout, I was amazed that the printing could be so legible," he said. "Also, you cannot imagine how many sufferings we had with magnetic tape because it never worked." However, he did praise Russian electronics for being better.

Noting that Russia imported several different models of the IBM 360 line in 1970, Turchin said the Russian EC system is "a complete imitation of those, including the software." Soviet computer technology will therefore always lag behind the U.S., he believes, because the country didn't de-

velop its own.

Data processing in the Soviet Union equals only 1% of its use in the U.S., Turchin estimated. When computers first emerged in Russia, they met ideological opposition; cybernetics was defined as "a bourgeois pseudo-science whose meaning is to distract the masses from class war," he said.

However, once it was realized that computers were essential to military and scientific projects, that position was reversed. Now, a computer is a symbol of prestige and progress and, because economic considerations are secondary to Soviet organizations, computers are used even at times when it would be less expensive to do the same work by hand, he said.

Because of their unreliability, however, the computers used in business applications are "always the object of jokes." The important scientific institutions generally have access to foreign-built computers and have better luck, he said.

Russian scientists also depend heavily on foreign research and follow closely what is done in the West,

Turchin said. He applauded the Association for Computing Machinery (ACM) for its recent decision to cut all ties with Soviet computer scientists "until the climate of intellectual freedom clearly improves" [CW, Dec. 12].

"I am absolutely sure ACM's decision is correct. If more organizations took that lead, it would constitute a serious pressure. It is a very correct decision and an important example," he said.

Russia fears the loss of cooperation with the Western scientific community, but pays little attention to threats, Turchin said. "It is important for groups to take harsher steps that will really hurt Russia," he said.

Turchin will reside in the Forest Hills section of Queens, N.Y., which he likes because it has trees and open spaces as well as a growing Russian community. He has managed to negotiate the New York subway system but, like most New Yorkers, he bemoans the 35 minutes it takes to reach his office in downtown Manhattan.

Model Characteristics	IBM 3032	Amdahl 470V/5	Itel AS/8 7032	Burroughs B7811	CDC Cyber 175	Univac ^a		HIS ^a	
						1100/81	1100/82	68/80 (2 CPUs)	68/DPS Level 2
Purchase Price CPU and 4M Bytes (No. of Channels)	2,142,000 (8)	2,650,000 (8)	1,960,000	2,811,540 (26) For 4.5M Bytes	3,353,823 (12) 131,000 60-Bit Words	1,821,690 (6)	2,547,410 (8)	4,010,130 (24)	2,099,487 (24)
Price/Mo With Maintenance (Lease Term in Years)	51,380 (4)	72,875 (4)	Not Available	56,555 (5)	89,425 (5)	35,135 (5)	59,585 (5)	79,287 (5)	50,889 (5)
Maintenance/Mo ¹	8,820	9,150	Not Available	7,100	7,588	2,875	4,530	8,662	6,467
Memory Size In Megabytes (Minimum-Maximum)	2-8	2-8	2-18	3-6	131,000- 262,000 60-Bit Words	2-16	4-16	1-8	2-16
Memory Cycle Time (Nsec)	320	300	Not Available	See Footnote 2	400 ⁴	600-100 ⁷	600-100 ⁷	See Footnote 9	See Footnote 9
Machine Cycle Time (Nsec)	60	32.5	72	Not Available	25	50	50	Not Available	Not Available
Channels (Minimum-Maximum)	8-12	8	6-16	28	12-24	6-52	6-52	56-224	56-224
Price/Channel	360,000 (8 channels)		50,000			54,075 (4 Channels or 1 Block Multiplexer)	54,075 (4 Channels or 1 Block Multiplexer)	Not Available	Not Available
Memory Buffer	32K	16K	64K	12K ³	See Footnote 5	32K	64K	2 Buffers Of 2K Each	2 Buffers Of 2K Each

1. IBM maintenance is minimum monthly charge, 10 hour/day, 5 day/week. Amdahl and Burroughs rates cover 24 hour/day, 7 day/week.
2. Access time is 50 nsec/byte.
3. Consists of 12K program buffer plus data

buffer and storage as well as central data register.

4. Effectively 50 nsec.

5. Scheduling arrangement for peripheral processor units and CPU to access main memory. Buffer could be one to 12 of CDC's

60-bit words.

6. Univac prices include software.

7. Speed is 600 nsec for 16 bytes in "rear memory" and 100 nsec from "forward memory" in CPU.

8. HIS expects to offer other systems in this

range based on Level 68 with Gcos; the 68/DPS units have Multics operating system. The 68/80 is what HIS would have bid prior to October 1977; the 68/DPS is the firm's current offering.
9. Memory access time is 750 nsec.

Pricing Revolution Hits

(Continued from Page 6)

operator's console and power supply, but no channels.

Prices of systems bid against the re-priced 168-3 ranged as much as 32% below IBM's price (CDC's Cyber 174) to 10.7% above IBM's price (HIS 66/60). For the 158-3 range, prices varied from 16% below IBM (CDC's

Cyber 173) to 57% above (Amdahl 470V/5).

Indeed, in the re-priced 168-3 area, IBM left considerably more difference — 32% — between its price and that of its lowest priced competitors, CDC with the Cyber 174, than was the case with the entire 30 Series.

The largest variations in price among

systems competing with the 3031, 3032 and 3033 are in the 3031 field and range from only 19% below (NCR Corp.'s V8590) to 44% above (Univac 1100/80).

In the 3033 area, the other machines ranged from 2.9% below IBM's price (Amdahl 470V/6-II) to 36.9% higher (Univac 1100/84).

The 3032 competitors range from 14.9% below IBM's price (Univac 1100/81) to 6.3% above (CDC Cyber 175).

The 30 Series CPUs are clearly in the lower end of the pricing range. Looking at price alone, the 3033 is underbid only by the Burroughs B7821 and the Amdahl 470V/6-II.

In the 3032 area, the IBM offering is in the middle, with HIS' re-priced offering of the Level 68/DPS Level 2, Itel Corp.'s AS/6 Model 7032 and Univac's 1100/81 below IBM in price.

The only models priced below the 3031 are the Burroughs B6817 and NCR's V8590.

Model Characteristics	IBM 3033	Amdahl 470V/6-II	Amdahl 470V/7	Burroughs B7821	CDC Cyber 175	Univac ^a		HIS ^a	
						1100/83	1100/84 ^a	68/80 (4 CPUs)	68/DPS Level 5
Purchase Price CPU and 8M Bytes (No. of Channels)	3,605,000 (12)	3,500,000 (16)	3,700,000 (12)	3,528,000 (12)	3,998,629 (12) 262K 60-Bit Words	4,326,148 (12)	4,936,868 (12)	6,183,270 (24)	4,031,325 (24)
Price/Mo With Maintenance (Lease Term in Years)	77,480 (4)	96,250 (4)	Not Available	73,969 (5)	82,888 (5)	83,565 (5)	95,350 (5)	123,386 (5)	99,779 (5)
Maintenance/Mo ¹	8,320	10,200	10,200	10,900	8,832	6,895	8,120	12,640	9,271
Memory Size In Megabytes (Minimum-Maximum)	4-8	4-8	4-16	3-8	131,000-262,000 60-Bit Words	6-16	8-16	1-8	2-16
Memory Cycle Time (Nsec)	290-464 ¹¹	300	280	See Footnote 2	400 ⁴	600-100 ⁷	600-100 ⁷	See Footnote 10	See Footnote 10
Machine Cycle Time (Nsec)	58	32.5	28.5	Not Available	25	50	50	Not Available	Not Available
Channels (Minimum-Maximum)	12-18	16	12-16	56	12-24	12-104	12-104	56-224	56-224
Price/Channel	320,000 (4 channels)		150,000 (4 channels)	Not Available	85,660 (12 Channels and 4 Peripheral Processors)	54,075 (4 Channels or 1 Block Multiplexer)	54,075 (4 Channels or 1 Block Multiplexer)	Not Available	Not Available
Memory Buffer	64K	32K	32K	24K ³	See Footnote 5	96K	98K	4 Buffers Of 2K Each	5 Buffers Of 2K Each

1. IBM maintenance is minimum monthly charge, 10 hour/day, 5 day/week. Amdahl and Burroughs rates cover 24 hour/day, 7 day/week.
2. Access time is 50 nsec/byte.
3. Consists of 24K program buffer plus data buffer and storage and central word register.

4. Effectively 50 nsec.

5. Scheduling arrangement for peripheral processor units and CPU to access main memory. Buffer could be one to 12 of CDC's 60-bit words.

6. Univac prices include software.

7. Speed is 600 nsec for 16 bytes in "rear

memory" and 100 nsec from "forward memory" to CPU.

8. To achieve advertised performance levels close to Amdahl 470V/7, the 1100/84 should have 8M bytes of memory, bringing memory buffer to 128K.

9. HIS expects to offer other systems in this

range based on Level 86 with Gcos operating system; the 68/DPS units have Multics operating system. The 68/80 is what HIS would have bid prior to October 1977; the 68/DPS is the firm's current offering.
10. Memory access time is 750 nsec.
11. Depends on type of work being done.

Hopper: Faster CPUs Not Way of the Future

By Frank Vaughan
CW Staff

SAN DIEGO — Increased computing power will not be found in ever faster CPUs because CPUs cannot continue to get faster — technology will eventually run up against the laws of physics that "Mr. Einstein so graciously provided for us."

That was the word last week from Capt. Grace M. Hopper, special advisor in the Naval Data Automation Command, as she keynoted the OCR Users Association (OCRUA) Winter Conference here. Hopper said users may have to look to the past to find the answers for the future.

In 1944, the Mark I could perform an addition in 333 msec; by 1951, the Univac could do the same thing in 282 microsec. In 1964 the Control Data Corp. 6400 could perform an addition in 300 nsec, and it will not be too long before a CPU can perform the addition in 300 picosec.

But that is not where the answer to large-scale computing needs is going to be found, Hopper said. "We should [look to] our common sense, but as far as I can see, that is the last thing that we ever use in the computer industry," she said.

Common sense "doesn't have any exponents, it has no subscripts, no interval signs, no summations; it doesn't look learned at all," she noted.

"We should look at our early history.

Our forefathers didn't have any huge tractors and heavy trucks to move things around; they used oxen. So if they had a great big log down on the ground and one ox couldn't budge it, they didn't try to grow a bigger ox."

CW at OCRUA

"They didn't write out an order for an elephant or a dinosaur — they used two oxen," she pointed out.

Greater computing power in the future is "not going to be a question of getting a bigger computer, it will be a case of getting another computer," she added.

Changing Worlds

"We are going to have to move from the world of computer systems to the world of systems of computers. This has already started to happen and it will increase over time," Hopper said.

What this is going to mean, she added, is that "more than ever before the whole flow of information through a system is going to be the primary thing with which we must be concerned. We are going to need a lot more good systems analysts, people who can look at the information we are processing,

find the node and decide what computer power or what facilities are required where, to manage that flow of information.

"As you represent one of the senses to that flow of information, more importantly than ever, you are going to have to be more aware not only of what information you are reading, but also where it is going next and who is going to process it and what you are going to do with it," she told the attendees.

"We are going to be faced with tremendous differences in the cost of doing things. As fast as the cost of computer power has gone down, line costs have gone up. This is another reason for pushing some of the processing out to the source of the information," she pointed out.

"You are going to have to check and validate the information at the source, not after you send it a couple of hundred miles to a CPU. You are going to have to have more powerful tentacles or senses to check information when it happens, rather than a couple of hours later — when it takes forever to go

back and get it corrected," she said.

The advent of the microcomputer, with its very low cost and its ability to control fairly large amounts of storage, is going to cause a tremendous number of people to change their minds, she said. A 64K microcomputer is "a darn powerful little computer," she added. "Every once in a while 'they' tell me, 'You can't do that on a microcomputer.' I have to remind them that we did it on Univac II, which only had 24K."

"They have forgotten what you can do with a dedicated computer. They have forgotten what dedication will do for security."

"We have forgotten a great many things we once knew," she said. "However, there are a few major forces driving us toward the use of mini- and microcomputers. One of them is the tremendous need for speed of processing. That's because of the increased demand for data processing."

"The second great need is that we cannot live any longer with computers that go down. We must have reliability in our systems," she said.

Bell Seeking End to LEAA

(Continued from Page 1)

a Nov. 21 memo he sent to President Carter.

Further, no more funds would go to the 460 regional planning boards now in existence.

According to the Attorney General's plan, the institute would continue LEAA's two main functions: conducting crime research and administering federal aid for state and local law enforcement. Bell expects the reorganization to provide tighter controls and to reduce paperwork, however.

The eight-year-old LEAA dispenses more than \$600 million annually in crime control funds. This funding level, which is set by Congress, was not addressed in the memo to Carter.

"The critical element to watch in this reorganization is the proposed budget for LEAA programs when and if they are placed under the institute," Diegelman said.

No one will see these funding requests for a while because they would be made in fiscal year 1980 budget development. "We're just submitting the fiscal year 1979 budget to Congress now," he noted.

The LEAA official also pointed out that Bell's proposal has gone no further than the President and will have to receive congressional attention before any action is taken. Diegelman expects the LEAA reorganization plan to go to the House and Senate in mid-year.

Matching Requirement

Under Bell's proposal, which questioned the value of many LEAA programs, federal funds for administrative costs incurred by states and local governments would be more restricted. In addition, every dollar of federal funds spent on planning and administration would have to be matched by a dollar of state and local funds.

For some states and localities, such a matching requirement might create problems. Florida, for example, will receive \$2 million in planning and ad-

ministrative funds alone from LEAA this year. Illinois will garner \$2.6 million and Indiana will get \$1.3 million in federal planning monies during the year.

"When faced with matching amounts of this size, states may decide to decrease their information systems support," Diegelman said, "but that would be a state decision."

Included in the National Institute of Justice would be a justice research and development institute, a bureau of justice statistics and offices of community anticrime, juvenile justice and state and local assistance, the Attorney General said.

Bell said he will prepare a draft bill for submission to Congress, to the President and to the Office of Management and Budget by mid-January.

J.J. Wasserman Dead at 45

WEST ORANGE, N.J. — One of the leaders in the field of computer security and auditing, Joseph J. Wasserman, died of a heart attack at his home here last week.

Wasserman, 45, was president of Joseph J. Wasserman Associates, which specialized in computer security, audit and fraud detection. He was the developer of the Computer Audit and Retrieval System (Cars), a widely used audit package. Prior to founding Joseph J. Wasserman Associates, Wasserman was president of Computer Audit Systems, Inc., which he founded in 1969. He was also active in the Institute of Internal Auditors, having served as president of the Southern New England chapter, and was a certified internal auditor.

Wasserman graduated from Bryant College and served in the U.S. Navy. He is survived by his wife, Adrian, and two daughters.

Lodestar tape cartridge drive. The 11.5 megabyte superstar.



Reliable, compact storage on a 3M type cartridge makes Lodestar an attractive alternative to floppys and even reel-to-reel tape transports. It's a superstar for file save and restore, program load, archival storage, data logging and similar applications.

Proven 4 track serial mode MFM recording technology gives you 6400 bpi data densities with a transfer rate of 25K bytes per second and 30 ips read/write. Search and rewind rate is 90 ips.

Interface is easy. Our formatter is compatible with standard 9 track PE controllers.

Lodestar. Simple, compact, reliable storage. Built and backed by Microdata.

Contact one of our local sales offices or the Director of Peripheral Sales, Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.

Microdata OEM Peripherals

A significant difference.

SALES OFFICES:
Anaheim, CA: 714/533-8035 • Atlanta, GA: 404/252-9700 • Bellevue, WA: 206/455-0152
Dallas, TX: 214/387-3073 • San Francisco, CA: 415/573-7461 • Scarsdale, NY: 914/472-1141
Schiller Park, IL: 312/671-5212 • Tampa, FL: 813/872-1557 • Washington, DC: 703/620-3995

Opponents Use Data for Game Plans Service 'Psychs Out' Gridiron Teams' Strategies

By Tim Scannell
CW Staff

LOS ANGELES — A number of professional and college football teams around the country are using the services of a large-scale mainframe, based here, to plan strategies for upcoming games.

Apex Data uses an IBM 370/158 to tabulate information gleaned from a team's game films and construct a "tendency" report. This report is given to the team's coach, who uses the information to formulate his game plan based upon the opposing team's strengths and weaknesses.

Detailed information of everything that occurred during the past three games played by a future opponent, both offensively and defensively, is taken from the films and recorded onto "take-off" sheets, a spokesman explained. This information includes downs and distances, formations, plays, results, penalties, fumbles, interceptions, pass coverages, red dogs and blitzes.

These "take-off" sheets are then passed on to Apex, which offers over 200 programs, each one giving a different perspective of the information submitted. If a particular coach requests plays by down and distance, the printout from this program reveals what the opponent would do from that standpoint in all game situations, the spokesman stated.

Although some of the teams rely on the computer charts completely, most Apex clients supplement them by carefully viewing game films and constructing their own charts and figures, according to Bruce Gagnier, programming manager with Apex.

"One team, at one point in time, would take a selective amount of reports and still do the reports by hand, using the computer printouts to countercheck what they have come out with," he said.

The IBM system used by Apex also doubles as a switching network, re-

ceiving information from terminals located in various cities. "We have one team right now that actually has a system in its office. It transmits data into our computer and then selectively picks the reports it wants, so we don't have any interference with it whatsoever," Gagnier said.

Because data related to an upcoming game is privileged information and its release could handicap a team's efforts, security precautions are taken, he added.

"If a team is discovered to be very concerned with the rushing gain, the other team might decide to alter its game plan. Security, therefore, is based on not sending out a whole set

of reports and not revealing what type of report the other team might be ordering," he explained.

"There's also no way the data, when it's coded up for one team, can be understood by another," he continued. "Whereas one team might call a play a 'front,' another team might call it an 'under-or-over,'" he pointed out.

No Room on the Bench

While a computer is used for its speed in analyzing plays and determining a team's tendencies, Gagnier doesn't see the day when a terminal will occupy a seat on the bench.

"I doubt very seriously if you would ever get any on-line terminals on the

sidelines ... that's an impossibility," he said.

But computers definitely do have a place in football, according to Ed Alsmann, assistant coach for the San Francisco 49ers.

"There's not as much difference as you might think from club to club — they're all good football players," he said. "The real difference between winning and losing is the little things, getting the edge, and that's what the computer does for a football team."

Presently, Apex is under contract to 17 professional teams, including the Detroit Lions, Los Angeles Rams and New England Patriots and five college football teams.



'It's Getting So We'll Be Having Yearly Models Coming Out Like the Auto Companies.'

Vendors

THE SOUTHEAST
DIRECTORY OF COMPUTER
INSTALLATIONS

FDR-DSE 2000 USERS

Fast Dump Restore

- Dump/Restore Full Volumes
- Diagnostic Processing

Data Set Functions

- Dump/Restore up to 250 Individual Data Sets
- Restore Data Sets from FDR Full Volume Backups

Volume and Data Set Level Password Protection Performance — Reliability

Supporting

2314 • 3330-1 • 3330-11
3340-35 • 3340-70 • 3344 • 3350



For further information or Free 30-day Trial,
call or write to:

**INNOVATION
DATA PROCESSING**

970 Clifton Avenue, Clifton, NJ 07013 • (201) 777-1940

Acpa Criticizes ACM's Break With Soviets

KENSINGTON, Md. — The Association for Computing Machinery (ACM) erred in cutting ties with the Soviet Union to protest persecution of dissidents there, according to another professional society.

The Association of Computer Programmers and Analysts (Acpa) believes that severing relations "deprives those very citizens who are most oppressed of that vital

link to outside information and communications," according to a recent Acpa policy statement.

Exchange to Continue

While agreeing with the ACM that the Soviets' "almost total disregard for the basic human rights of its citizens is deplorable," Acpa intends to "continue whatever semblance of professional and intellectual exchange of ideas

... is possible" while continuing "an open attack on every form of subordination of human rights practiced by that government," Acpa Chairman Robert L. White said.

White asserted that "Soviet lives and technology are too valuable to the rest of the world for us to ignore their existence. If the door to free communications is closed, Acpa wants it done by the

guilty country."

The ACM sent a letter to Soviet Academy of Sciences President A.P. Aleksandrov announcing its cut-off intentions [CW, Dec. 12].

Intervention Sought

The letter stated that the ACM "will not cooperate with or cosponsor meetings in your country until the climate of intellectual freedom clearly improves" and asked Aleksan-

drov to personally intervene on Sharansky's behalf.

The ACM has also asked each of its 35,000 members to weigh the situation of Sharansky and others like him in deciding whether to visit the Soviet Union or publish in Soviet journals.

Sharansky was jailed on March 15 for alleged treason and involvement with the Central Intelligence Agency. He has been held since then without being formally charged.

Other computing professionals have joined the protest, including attendees at last fall's Fifth International Joint Conference on Artificial Intelligence.

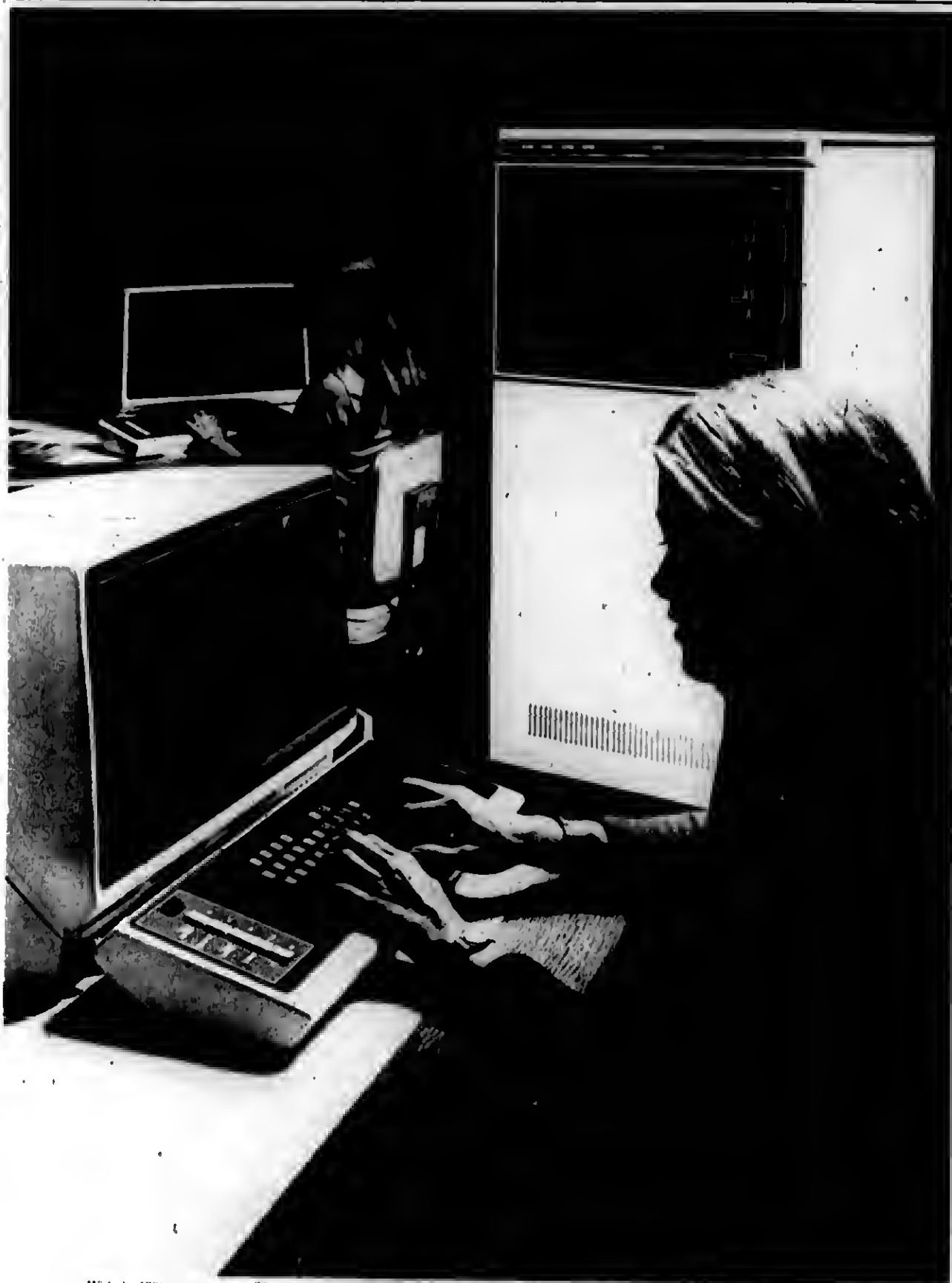
DP Architecture To Be Subject Of Annual Prize

NEW YORK — An annual award for "contributions to computer and digital systems architecture" will be jointly given by the Association for Computing Machinery (ACM) and the Institute for Electrical and Electronics Engineers (IEEE) Computer Society.

The award, consisting of a certificate and \$1,000 in cash, will be called the Eckert-Mauchly Award in honor of Univac I developers J. Presper Eckert and John W. Mauchly, the ACM said.

Nominations for the Eckert-Mauchly Award will be solicited each year in the monthly *Communications of the ACM* and the *IEEE Computer* magazines.

The award will be presented at the Annual Symposium on Computer Architecture, which is cosponsored by the ACM Special Interest Group on Computer Architecture (Sigca) and the IEEE Computer Society Technical Committee on Computer Architecture, the ACM said, adding that contributions for which the award is granted can take any form that demonstrates and propagates computer architecture concepts.



With the 1300, you can consolidate remote job entry and batch data entry applications without compromising either function. The system features expandable disc storage (up to four 10 Mb. drives) foreground and background editing and bisync communications.

INFOREX: THE SIMPLEST SOLUTION TO ALL YOUR DATA ENTRY PROBLEMS.

The simplest and best solution to all your data entry problems is right here: the Inforex data entry family.

Simplest because we design them for ease of use and speed of throughput.

Best because we've been a leader in the innovation and development of key-to-disc data entry products and capabilities right from the start.

Which is why our family's got it all. From the basic keypunch replacement 1300 IKE System to the tremendously powerful maxediting System 3300.

So whatever your needs—modest, middling, or immense—the growing Inforex data entry family will meet them.

You don't have to settle for a compromise system. You don't have to sweat out an unsatisfactory price/performance choice. All you have to do is choose the system that's best for you.

And that's where an Inforex Support Team comes in. They'll help you select just what you need. They'll provide expert installation. And they'll give you the benefit of their years of experience in other installations.

But even after all that, you won't be left high and dry. Whenever and wherever you need help, an Inforex Support Team will be available with the support you need.

The Inforex data entry family. You shouldn't settle for anything less.



Inforex 1300 and 1301 offer highly cost effective data entry capability for smaller installations (4 to 8 keystations) or remote locations where you can take advantage of our communications capabilities.



The 1303 provides medium range data entry capacity, with about triple the disc capacity of the 1301. It supports up to 16 keystations and the addition of edits, table look-ups, range checks and cross-footing. The 1303 also offers communications capabilities such as spooling, HASP and RJE.



The Inforex 3300 is a powerful pre-processing system that allows you to edit data at the point of entry, enabling you to offload your mainframe. Its sophisticated editing capabilities can also handle many of those applications which you haven't had time to put on your present mainframe.

I would like more information on the following:
☐ Key-to-disc data entry ☐ Distributed processing
☐ Computerized records management
☐ I would like to talk with an Inforex Sales Representative

Name _____

Title _____

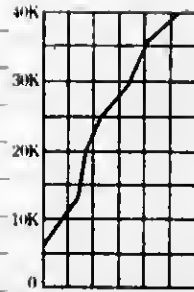
Organization _____

Address _____

City _____

State _____ Zip _____

Telephone _____



CW-1

Offices in major cities throughout the United States, Canada and Europe. Distributors worldwide.

INFOREX

Inforex, Inc., Dept. 321, 21 North Avenue, Burlington, Mass. 01803

**CalComp.
Zeta.**

Compare.



Zeta Research

2300 Stanwell Dr. Concord, CA 94520
(415) 671 0600

A Division of Nicolet Instrument Corporation

The world's best DBMS announces the end of the chain-pointer generation.

**Adabas has broken the chain-pointer barrier.
For the first time in history, an inverted list DBMS is No.1
in both throughput/efficiency and ease of use.**

For years, others have said you could have *either* throughput *or* ease of use. Adabas has always said you can have *both*.

Datapro '77, conducted with *Datamation*, is the latest in a long series of surveys that proves our point. The user community also gave us the highest average rating for all categories. Who could ask for anything more?

Every day, more people realize that the rigid hierarchical structures of the past are giving way to

the relational approach of tomorrow.

The trend is clear. The future is here. It's Adabas. Combined with Com-plete, Software ag's tele-processing system, Adabas is the most powerful DB/DC system available anywhere.

Seeing is believing.

We've just made a lot of claims, and we want to prove them. That's why we'd like to give you a free presentation at your convenience. Simply call us, or return the coupon below.



Reston International Center 11800 Sunrise Valley Drive
Reston, Virginia 22091. Phone (703) 860-5050

1. ☐ I'd like more information on Adabas.
2. ☐ Please send more information on Com-plete.
3. ☐ Please call to arrange a free presentation.

Name _____ Company name _____
Street _____ City _____
State _____ Zip _____ Phone _____
Type of computer _____ Operating system _____

Available Worldwide



Member SIA  Software Industry Association

Tennessee Tax Applies to In-House Software

By Molly Upton
CW Staff

NASHVILLE, Tenn. — Software developed by a firm's DP department for its own use, like software that is sold, is subject to this state's new sales and use tax, according to a spokesman for the Tennessee Department of Revenue.

Recent legislation which specifically defines software as tangible personal property

and, therefore subject to the tax [CW, May 2, 1977] applies to both types of software, he said.

The legislation, promoted by the governor, was designed to circumvent a decision by the Tennessee Supreme Court in *Commerce Union Bank vs. Tidwell* that decreed computer software intangible and therefore not subject to the state sales and use tax [CW, Aug. 30, 1976].

In its interpretation of the law, the state is drawing a parallel between in-house program development and the in-house construction of manufacturing machinery, according to Donald W. Jackson, executive vice-president of the Tennessee Taxpayers Association.

The law states: "Tangible personal property" means and includes personal property, which may be seen, weighed,

measured, felt or touched, or is in any other manner perceptible to the senses. It specifically includes customized computer software, which is defined as information and directions loaded into a computer which dictate different functions to be performed by the computer, whether contained on tapes, disks, cards or other device or material."

Jackson explained he had

been under the impression that the legislation would apply only to purchased software that was customized or packaged by a company specializing in the sale of such software.

But officials in the Department of Revenue informed him the use tax will apply to computer programs developed by employees of the company that uses the software, he said.

The state's position is that the legislation applies to banks, manufacturers and other users who may have in-house staff developing software, Jackson said.

In making this interpretation, the Sales Tax Division cited another section of the Sales Tax Act, TCA 3004:

"Where a manufacturer, producer, compounder or contractor erects or applies tangible personal property, which he has manufactured, produced or compounded or severed from the earth, such person so using the tangible personal property shall pay the tax herein levied on the fair market value of such tangible personal property when used"

In deciding how to assess the use tax, the state asks users to calculate the number of programmer hours involved in production of the program, their salary and fringe expenses, as well as overhead costs, Jackson indicated.

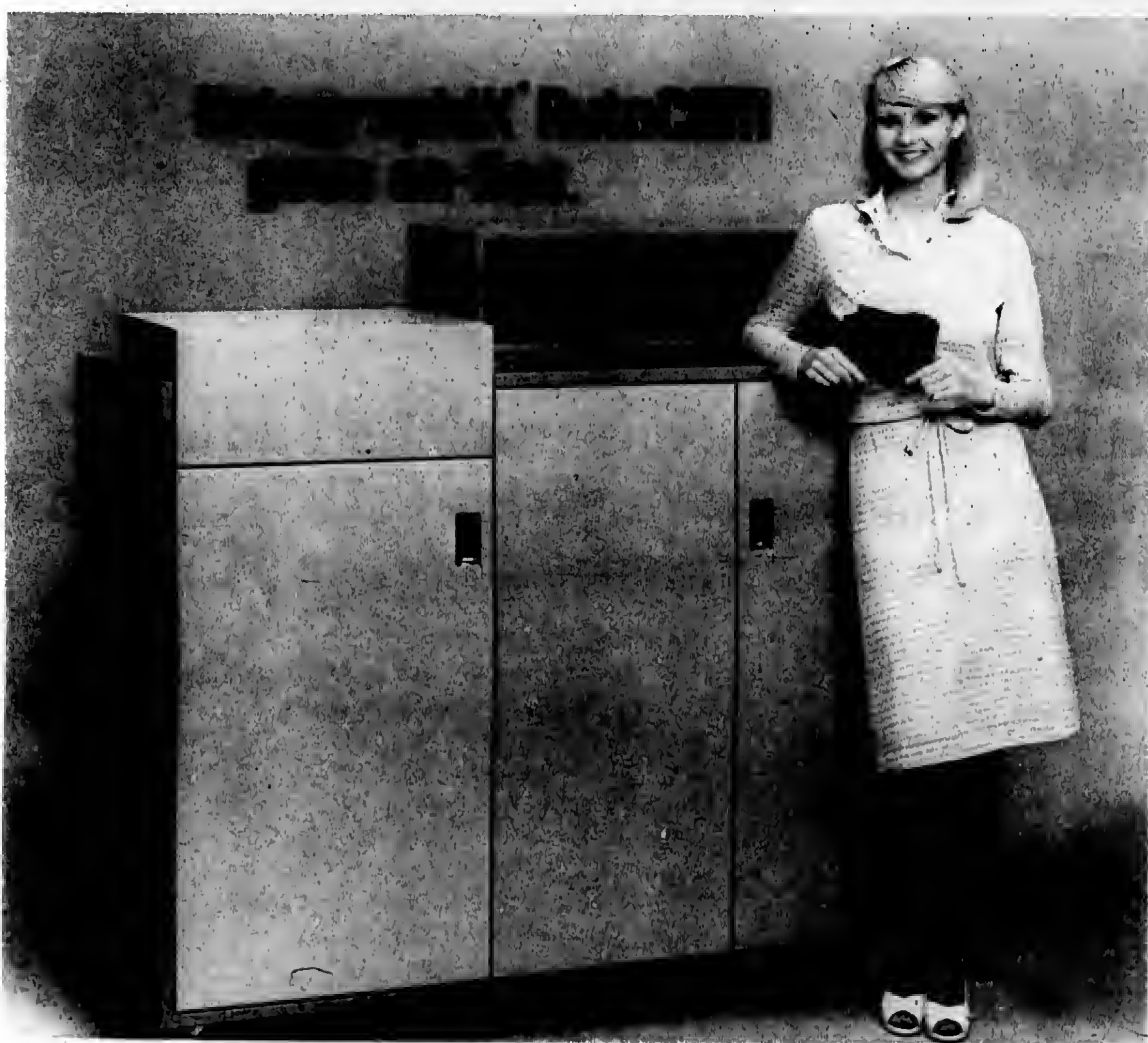
The Tennessee Taxpayers Association plans to fight this new legislation, he said.

NYU to Present DP Job Seminar

NEW YORK — A three-hour seminar on career opportunities in the field of DP will be offered to the public free of charge here on Jan. 19 from 6-9 p.m.

Presented by New York University's School of Continuing Education, the course will cover current trends in DP that have created new employment possibilities.

For further information, call (212) 598-2105.



Now you can wind up with microfiche and never unwind a reel of tape.

The simplicity and convenience of AutoCOM™ made on-line recording a natural. So we developed an on-line version to interface directly to the central processing unit of virtually any IBM 360/370 computer. That means you never have to bother with tape loading or rewind time.

Right on queue, on-line AutoCOM delivers cut, dry microfiche ready for immediate viewing. That means computer output

can be checked without waiting.

You get better efficiency because there is a full-page 16,000 - byte buffer system. This decreases channel connect and contention time.

A built-in test simulator contains its own diagnostics so there's no need to interrupt the CPU for maintenance. And on-line

AutoCOM is simple enough to be delivered, installed and operational in one day.

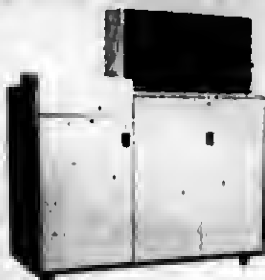
The AutoCOM product line includes models for every COM application.

Standard off-line AutoCOM.

And now on-line AutoCOM, the system that lets you wind up with microfiche without ever unwinding a reel of tape.



Off-line AutoCOM



MiniAutoCOM



The new on-line AutoCOM

**CalComp.
Zeta.**
In a Class
by
Themselves.



Zeta Research

2300 Stanwell Dr. Concord CA 94520
(415) 671-0600

A Division of Nicolet Instrument Corporation

Upholds Lower Court Decision

Alabama High Court: Software Not Taxable

By Molly Upton
CW Staff

BIRMINGHAM, Ala. — The Supreme Court of Alabama has upheld a lower court ruling that software is intangible and therefore not subject to use tax.

In 5-3 decision, the State Supreme Court upheld the Court of Civil Appeals' ruling that Central Computer Services, Inc. does not have to pay \$13,519.91 in state use tax for eight programs obtained from University Computing Co.

The Supreme Court's decision in Alabama vs. Central Computer Services, Inc. cited two earlier cases: Boswell vs. Paramount Television Sales, Inc. and Commerce Union Bank vs. Tidwell.

In Boswell, the tax question concerned leasing movie films. There the presiding court found the right to publish or broadcast motion picture film was physically inseparable from the movie film itself, and therefore film was tangible personal property.

In Tidwell, the Tennessee Supreme Court ruled computer software purchased by the bank was not tangible personal property subject to that

Alabama Ruling Cited as Threat To Tax Credits

BOSTON — Once a company has successfully proven in the state courts that software is intangible, as Central Computer Services, Inc. did in Alabama, it will have "considerable difficulty" persuading the federal government that the same software is tangible and qualifies for investment tax credit, according to a copyrighted article in "Computer Law and Tax Report."

Today the investment tax credit is 10% of the purchase price and constitutes a valuable benefit to the user. This tax credit could be substantially increased by the Carter Administration, Robert Bigelow wrote in the December 1977 issue of the newsletter.

The effort to avoid sales, use and property tax laws on software by having it declared intangible will not have a long-lasting effect, Bigelow also warned. While such efforts may help the user by preventing the imposition

(Continued on Page 14)

DATA ENTRY PROBLEM SOLVER

World's leading authorities present—Keys to successful Data Entry operations. New 275 page Manager's "How To" guide—"DATA ENTRY PROBLEM SOLVER"—Tells how to

- INCREASE KEYSTROKING RATES
- SELECT SUCCESSFUL OPERATORS
- DECREASE COSTS AND COMPLAINTS
- STOP CONTINUAL ABSENTEEISM
- REDUCE OPERATOR TURNOVER
- BUILD DEPARTMENT MORALE
- SUPERVISE WITHOUT PROBLEMS

FREE DETAILS

DATA ENTRY DIGEST
10522 Ridgeway Dr., Santa Ana,
Calif. 92705, (714) 838-2060

state's use tax because the knowledge contained on the tapes was what was purchased, not the media on which it was stored.

The Alabama court drew a distinction between movie film and software, ruling magnetic tapes and punched cards are distinguishable from movie films because the "physical presence of magnetic tapes and punched cards is not essential to the transmittal of the desired information from its creator at University Computing Co. to Central Computer Services."

The information could be transmitted via telephone or "brought into Alabama in the mind of an employee of University Computing Co.," the

court added.

It thus concluded: "We find in the present case that there is an incidental physical commingling of the intangible information sought by Central Computer Services and the tangible magnetic tapes and punched cards themselves. We therefore hold that the essence of this transaction was the purchase of nontaxable intangible information."

Dissenting Opinion

The dissenting opinion admitted other courts have ruled that software is intangible, but indicated it could not distinguish between the Paramount movie case and software.

Content of the films also could be transmitted into the state or brought in via actors and actresses, the dissenting opinion observed.

Programs are tangible property and can be the subject of theft, the dissenters said, citing the case of Hancock vs. Decker. In that 1955 case, Robert F. Hancock was convicted of grand larceny for photocopying programs belonging to Texas Instruments and attempting to sell them to Texaco for \$5 million, according to *Computer Law and Tax Report*.

The court held the program should be valued at more than the \$35 cost of the paper on which the programs were written.

EDP books you can't afford to be without

THE INFORMATION SYSTEMS HANDBOOK

by F. W. McFarlen & R. L. Nolan
769/29X Pub. Pr., \$35.00 Club Pr., \$25.50

DATA PROCESSING MANAGEMENT

Methods and Standards
by D. H. Brendon, A. D. Pelley and A. M. O'Reilly
787/203 Pub. Pr., \$29.95 Club Pr., \$21.50

MINICOMPUTER SYSTEMS

Structure, Implementation, and Applications
by C. Weltzman
788/770 Pub. Pr., \$19.50 Club Pr., \$14.50

AUTOMATIC DATA PROCESSING HANDBOOK

Edited by The Diebold Group, Inc.
168/075 Pub. Pr., \$33.50 Club Pr., \$23.75

TOP-DOWN STRUCTURED

PROGRAMMING TECHNIQUES
by C. L. McGowan & J. R. Kelly
769/052 Pub. Pr., \$15.95 Club Pr., \$13.50

HIGH LEVEL COBOL PROGRAMMING

by G. W. Weinberg, S. E. Wright, R. Keufman and M. Goetz
788/595 Pub. Pr., \$17.95 Club Pr., \$14.95

THE DESIGN OF THE MANAGEMENT

INFORMATION, 2/E
by D. Q. Matthews
788/882 Pub. Pr., \$12.95 Club Pr., \$10.95

MINICOMPUTER SYSTEMS

Organization and Programming (POP-11)
by R. H. Eckhouse, Jr.
788/841 Pub. Pr., \$18.95 Club Pr., \$13.95

DATABASE PROCESSING

Fundamentals, Modeling, Applications
by D. M. Kroenke
769/931 Pub. Pr., \$16.95 Club Pr., \$12.95

BASICS OF DATA COMMUNICATIONS

Edited by H. R. Karp
191/59X Pub. Pr., \$19.50 Club Pr., \$15.95

CHARGING FOR COMPUTER SERVICES

Principles and Guidelines
by D. Barnard, J. C. Emery, R. L. Nolan and R. H. Scott
771/863 Pub. Pr., \$10.00 Club Pr., \$8.50

A DISCIPLINE OF PROGRAMMING

by E. W. Dijkstra
770/115 Pub. Pr., \$17.50 Club Pr., \$14.50

DATA BASE DESIGN

by G. Wiederhold
701/30X Pub. Pr., \$21.50 Club Pr., \$15.95

MICROPROGRAMMING PRIMER

by H. Ketzen, Jr.
333/874 Pub. Pr., \$17.95 Club Pr., \$13.95

REAL TIME SYSTEMS

Management and Design
by D. Tebbs and G. Collins
844/828 Pub. Pr., \$13.95 Club Pr., \$11.75

SOFTWARE RELIABILITY

Principles & Practices
by G. J. Myers
769/885 Pub. Pr., \$19.95 Club Pr., \$15.75



any two
of these great
professional books
for only
\$2.95
values up to
\$68.50

Introductory offer to new members of the Computer Professionals' Book Club

Two special bonus books come to you for \$2.95 with your first club selection

THIS new professional club is designed to meet your day-to-day on-the-job needs by providing practical books in your field on a regular basis at below publisher prices. If you're missing out on important technical literature—if today's high cost of reading curbs the growth of your library—here's the solution to your problem.

The Computer Professionals' Book Club was organized for you, to provide an economical reading program that cannot fail to be of value. Administered by the McGraw-Hill Book Company, all books are chosen by qualified editors and consultants. Their understanding of the standards and values of the literature in your field guarantees the appropriateness of the selections.

How the Club operates: Every month you receive free of charge The Computer Professionals' Book Club Bulletin. This announces the Club's featured book of the month as well as alternate selections available at special members' prices. If you want to examine the Club's feature of the month, you do nothing. If you prefer one of the alternate selections—or if you want no book at all—you notify the club by returning the card enclosed with each Bulletin.

As a Club Member, you agree only to the purchase of four books (including your first selection) over a two-year period. Considering the many books published annually, there will surely be at least four you would want to own anyway. By joining the club, you save both money and the trouble of searching for the best books.



VALUES UP TO \$30.00 WITH MAJOR DISCOUNTS ON ALL OTHER CLUB SELECTIONS. Your bonus books come with the first selection, and you may choose both of them from the books described in this special introductory offer.

EXTRA SAVINGS: Remit in full with your order, plus any local end state tax, and McGraw-Hill will pay all regular postage and handling charges.

NO RISK GUARANTEE:

If not completely satisfied return selections for full refund and membership cancellation.

MAIL THIS COUPON TODAY

COMPUTER PROFESSIONALS' Book Club P.O. Box 582 Princeton Road, Hightstown, New Jersey 08520

Please enroll me as a member and send me the three books indicated. I am to receive the two bonus books at the introductory price of \$2.95 plus my first selection, plus tax, postage, and handling. If not completely satisfied, I may return the books within 10 days and request that my membership be cancelled. If I keep the books, I agree to take a minimum of three additional books during the next two years at special Club prices (guaranteed 15% discount, often more). I will receive the Club Bulletin 13 times a year. If I want to examine the featured selection, I need take no action. It will be shipped automatically. If, however, I want an alternate selection—or no book at all—I simply notify the Club by returning the convenient card always enclosed. I will always have a minimum of 10 days in which to return the card and you will credit my account fully, including postage, if this is not the case. Membership in the club is continuous but cancellable by me at any time after the four-book purchase requirement has been filled. This order subject to acceptance by McGraw-Hill. Orders from outside the continental U.S. must be prepaid. Company, business, or institutional tax exemption status is not applicable to purchases made through individual Club memberships. All prices

subject to change without notice. Offer good for new members only.

Write Code # of 1st Bonus book selection here

Write Code # of 2nd Bonus book selection here

Write Code # of 1st book selection here

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

P39293

Something Fishy in Japan

By Tim Scannell
CW Staff

TOKYO — The Japanese have initiated a project involving computer-controlled fish farms that is expected to produce 400,000 to 500,000 tons of fish per year.

Under the plan, an extension of the limited fish farms already operational in Japan, scientists will attempt to increase production by controlling and monitoring each stage of fish development, according to Dr. Akira Suda, an official at the Japanese Fishery Agency's Research Department.

Such factors as environment and the fish's

growth rate will be input to the computer which will, in turn, track the entire life cycle, Suda explained.

The program was initiated because newly established 200-mile offshore limit laws have eliminated many of Japan's worldwide fishing grounds. Japan will lose approximately 600,000 tons of fish per year as a result of the recently implemented laws, a spokesman said.

The fish will be produced by artificially hatching the spawn and feeding them artificial nutrients to accelerate their growth rate, the spokesman said.

Alabama Software Ruling Seen Threat to Tax Credits

(Continued from Page 13)

of taxes for past years, "it seems likely the future will find software subject to these taxes" through legislative action, he added.

The Internal Revenue Service has consistently taken the position that software programs are intangible and don't qualify for investment tax credit, Bigelow said, but noted there have been court cases

that have found differently.

A number of years ago, Robert F. Hancock was convicted of grand larceny when he photocopied 59 computer programs belonging to Texas Instruments, Inc. and attempted to sell them to Texaco for \$5 million. Hancock argued he stole only \$35 worth of paper because the programs were not tangible property, but the court held that the programs should be valued at more than the cost of their media.

Bigelow also predicted that efforts to avoid property, sales and use taxes by defining software as intangible could have other ramifications.

If, for example, software is defined as "an intellectual creation residing within an electronic computer represented in patterns of electrical or magnetic bits of information that, when logically executed within the circuitry of the machine, cause the hardware to perform specific predetermined functions," awarding of patents could be affected.

"Patents are available for inventions of apparatus or processes; the proposed definition would not seem to suggest either of these," he said. "Under the new copyright act, effective in January, a work of authorship must be 'fixed in a tangible medium of expression; it is not clear that the intellectual creation represented by patterns and bits will fit this definition."

"Computer Law and Tax Report" is published monthly by Warren, Gorham & Lamont, Inc., 210 South St., Boston, Mass. 02111.



'Burster? I Thought You Said Shredder!'

Take an in-depth look at in-house timesharing:

You know the problems facing the data processing department:

Other departments in your company want faster response, broader capabilities, better service.

And your management wants you to hold down your operating costs.

You're probably looking hard for a solution. A closer look at in-house timesharing could give it to you.

Fast, long-lasting relief

Unlike upgrading a large central computer, expansion to an in-house timesharing system isn't a time-and-money-consuming ordeal.

And unlike buying outside computer time, you're not building in a monthly bill that inevitably keeps building up.

Adding an in-house timesharing capability is a shrewd way to add computer power. Because it won't add significantly to your operating costs; in fact, it can pay for itself by reducing current costs.

Especially if you add the system specifically built for timesharing: our BTI 4000.

A timesharer's timesharer

The BTI 4000 Interactive Timesharing System is made by us:

Basie Timesharing, Inc. We're the computer manufacturer with timeshare experience. Which has helped us produce a computer uniquely right for timesharing.

To help you do more—while helping your company spend less.

Easy to begin, room to grow

You can own your own BTI 4000 for as little as \$35,950. For that you get a ready-to-go system with 10 megabytes of storage and 8 ports—just add terminals.

And start-up won't cause a departmental hang-up. The BTI 4000 can be installed and working for you in one working day.

Expanding to do even more work takes even less work. The

BTI 4000 features modular construction, so system downtime for expansion is minutes, rather than days. You can add disk storage to 400 megabytes; increase user capacity to 32 ports; add peripherals like industry-compatible magnetic tape and a line printer.

Hard working, always working

The BTI 4000 is a true timesharing system. It allows doing any mix of tasks, all at the same time, all completely independent.

It also gives you continuous system availability, because software housekeeping can be performed while users are on-line.

There's also off-hours job-stream processing. So the BTI 4000 can be working for you, even when no one's around.

The BTI 4000 uses BASIC-X, an unusually powerful extension of the BASIC user language, enhanced for business programming.

What's more, the BTI 4000 offers heirarchical account organization and stringent security so that you can maintain total con-

trol over who's using it, and what they can do.

And it does all this without a full-time operator.

Inexpensive help

Used during typical office hours, the operating costs for a BTI 4000, including maintenance, are about \$1 per terminal hour. And should you grow to 24 hour usage, your operating costs shrink to less than 10¢ per terminal hour.

Around-the-clock help

We back our BTI 4000 with any-hour, anywhere, on-line support with dial-up access for problem diagnosis. Yet in a typical installation, our maintenance plan costs less than 1% of the system's purchase price per month.

Look to us

The BTI 4000. The interactive timesharing system that will help your data processing department do more, for less.

For more information, just look to the Basie Timesharing office nearest you.



The BTI 4000 Means Business.

**CalComp.
Zeta.**
The Greatest
Names in
Plotting.



Zeta Research

2300 Stanwell Dr. Concord, CA 94520
(415) 671-0600

A Division of Nicolet Instrument Corporation

Calendar

Feb. 9, Baltimore, Md. — **Third Annual Data Processing Day**, with vendor exhibits and seminars, sponsored by the local Data Processing Management Association Chapter. Contact: M. Stanley Baker, Commercial Credit Corp., 300 St. Paul Place, Baltimore, Md. 21202.

Feb. 14-16, Orlando, Fla. — **Second International Learning Technology Congress & Exposition on Applied Learning Technology**. Contact: Dr. Carl R. Vest, Society for Applied Learning Technology, 41 Culpepper St., Warrenton, Va. 22186.

Feb. 14-16, London — **All Electronic Show**. Contact: British Information Services, 845 Third Ave., New York, N.Y. 10022.

Feb. 15-17, San Francisco — **ISSCC 78** sponsored by the Institute of Electrical and Electronics Engineers (IEEE). Contact: IEEE, 345 E. 47th St., New York, N.Y. 10017.

Feb. 15-17, Washington, D.C. — **Data Communications: An Introduction to Concepts and Systems**. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 15-17, Chicago — **Effective Computer Operations Management**. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 15-17, Washington, D.C. — **Data Base Management Systems: General Concepts and Planning Guidelines**. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 21-23, Washington, D.C. — **DataComm 78**. Contact: Conference Manager, DataComm 78, 60 Austin St., Newton, Mass. 02160.

Feb. 22-24, San Francisco — **Queueing Systems**, sponsored by Technology Transfer, Inc. Contact: Technology Transfer, Inc. P.O. Box 49765, Los Angeles, Calif. 90049.

Feb. 23, Detroit, Mich. — **Annual Association for Computing Machinery (ACM) Computer Science Conference**. Contact: Seymour J. Wolfson, Wayne State University, Detroit, Mich. 48202.

Feb. 23-24, San Francisco — **Minicomputers and Microcomputers: Selection and Usage Guidelines**. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 27-March 1, Cherry Hill, N.J. — **Data Entry Management and Supervision Seminar**. Contact: Management Information Corp., 140 Barclay Center, Cherry Hill, N.J. 08034.

Feb. 27-Mar. 1, New York — **Data Processing: An Introduction to Concepts and Systems**. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

The CW Calendar generally appears in the first and second issues of each month, and events are listed a month in advance. All conference announcements should be sent to the CW Editorial Department, 797 Washington St., Newton, Mass. 02160, at least six weeks prior to the month in which the event is slated to occur.

DP Bills Keep Congress Busy

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Congress considered nearly 300 bills related to computers during its 1977 deliberations, according to the American Federation of Information Processing Societies (Afips).

In response to a request from Afips' Washington office for data on DP-related legislation, the House of Representatives Information Systems (HRIS) staff produced a 420-page printout summarizing 328 pertinent bills and resolutions before the House and Senate at the end of October.

While some of these proposed laws dealt with manual information systems, 80%, or 273 bills and res-

olutions, were related to automatic data processing, Afips said.

More than half of those 273 pieces of legislation — 142 resolutions and bills — involved telecommunications in general and the Consumer Communications Reform Act, or "Bell Bill," in particular; Pender M. McCarter, research associate with the Washington office, noted in the January "Afips Washington Report."

Eighty-six pieces of legislation, or 32% of the 273 bills and resolutions, treated the privacy issue and its effect on recordkeeping by the federal government, hospitals, financial institutions, educational organizations, employers and others, Afips found.

Such data bases as those proposed for medical information patient care systems and a national adoption information exchange system commanded congressional attention in 26 bills, 10% of the DP-related legislation proposed during 1977.

Finally, Afips discovered that seven pieces of legislation dealt with the revision of the Communications Act of 1934, begun by the 95th Congress; four involved electronic funds transfer (EFT) systems; and five concerned such matters as the acquisition of DP equipment by the federal government.

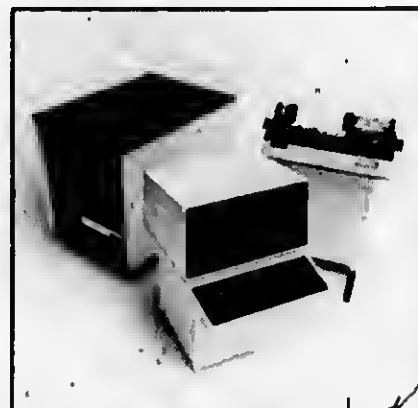
HRIS's survey for Afips included only those pieces of DP legislation brought up before the October cut off date.

General Computer Systems, inc. reports a record year.

General Computer/Systems, Inc. is pleased to announce the most profitable year in its history. Consolidated gross revenues reflect a 38% increase over 1976. We attribute this increase to several factors.



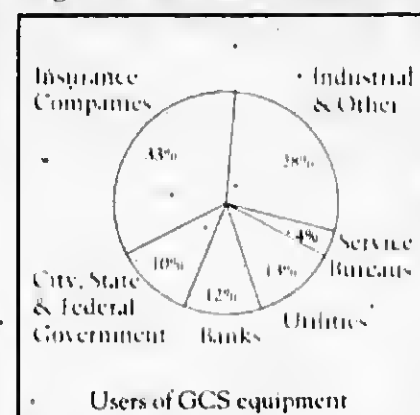
The introduction of our new 211 Data entry system which is designed on a modular basis to allow the user to start with a small configuration and expand according to his needs.



During this period we also introduced our DataText III - a shared logic word processing system featuring two types of

workstations, up to 30,000 pages of storage, and the ability to add various peripherals such as printers, tape drives, and discs. Communications and remote printing capabilities are also available. The ability of GCS to handle Word Processing Center and electronic mail type applications gives us the most "State of the Art" Word Processing system available in today's and tomorrow's marketplace.

In addition General Computer/Systems, Inc. has acquired GCS (UK) which is a wholly-owned subsidiary in England. This has enabled us to expand



our marketing goals and service capabilities throughout the common market countries.

To date our systems are in operation in twenty countries around the world. And we have plans to expand our market to include third world areas such as Central and South America, India and Taiwan.

We would like to take this opportunity to pat ourselves on the back, and to thank our many employees, suppliers and customers for making the past year our most successful.



GENERAL COMPUTER SYSTEMS.

Addison (214) 233-5800 • London 579-9401 • San Francisco (415) 434-0494 • Los Angeles (714) 992-1491 • New York (212) 687-8450 • Hartford (203) 633-0230 • Boston (617) 237-6520 • Pittsburgh (412) 464-4110 • Seattle (206) 822-1737 • Chicago (312) 692-7770 • Topeka (913) 235-6050 • Southfield (313) 569-2220 • Brooklyn Heights (216) 351-7444 • Atlanta (404) 457-3701 • Nashville (615) 242-8218 • Sydney, Australia 439-4155 • Bruxelles, Belgium (02) 479-98.80 • Paris, France 542.79.17 • North Point, Hong Kong 5-717231 • Jakarta, Indonesia 5911169 • Torino, Italy 54.50.53 • Tokyo, Japan 584-2351 • Kuala Lumpur, Malaysia 88795 • Manila, Philippines 86-49-51 • Singapore 2211311 • Steinbach, W. Germany (06171) 77-11

Editorial

Keeping the Lines Open

The Association of Computer Programmers and Analysts (Acpa) has announced its disagreement with the Association for Computing Machinery's (ACM) response to persecution of dissident computer scientists in the Soviet Union (See story on Page 10).

The ACM recently cut ties with that country, officially stating that it "will not cooperate with or cosponsor meetings in (the Soviet Union) until the climate of intellectual freedom clearly improves" [CW, Dec. 12]. The association was especially upset over the treatment of computer chess expert Anatole Sharansky, who has been jailed since last March without being formally charged.

Acpa is also outraged by this denial of human rights, but differs with ACM on how to express this and try to effect change for the better. Rather than eliminate them, Acpa has decided to use its ties as a medium of protest, mounting "an open attack on every form of subordination of human rights practiced by that government."

The ACM's action is not without merit; it may prompt other groups to join in the protest, forming a sizable bloc of opinion that the Soviets — since they value their international prestige — might to some extent heed.

In the context of other human rights protests, the ACM action may assist in raising the human rights consciousness of the world community, which might be an added constraint to human rights violations in other countries, if not the Soviet Union.

Yet Acpa's point is well-taken.

Since the dawn of civilization, political states have often maintained communication with each other — indirectly if not directly — in times of intrigue and strife (including war) precisely because such communication was seen as the only means of attaining a resolution or at least limiting the extent of harm.

Of course, the ACM's action can be seen as more than simply curtailing communication.

It can be seen as a boycott, denying the Soviets a desired product — American computing expertise — until they shape up.

But such a boycott can only have limited success because there are alternative ways in which the Soviets can learn about the development of American computer technology, many of them simple and hardly surreptitious.

Though well-intentioned, it is likely that the ACM's action will be admired by some as eloquent but do little to stop or limit deprivation of human rights in the Soviet Union.

The difference between the nature of the ACM's and Acpa's constituencies — the former academic, the latter application- and industry-oriented — does have significant bearing on how the Soviets might regard a severance of relations with each.

The Soviets may well be more dependent on the ACM's expertise in research and development than on Acpa's expertise in implementation, though they would seem to have much to learn from both.

Nevertheless, Acpa's approach is more realistic and is the path the ACM should have taken.



'We Break You In Easy — Your Starting Quota Is Only Five Loads a Day.'

Letters to the Editor

Trial Coverage Distorted

For a number of years, I have been sometimes perplexed and sometimes amused by the continuing inaccuracy of Computerworld's coverage of the IBM cases. My impression is that your reporters generally report accurately, but your anti-IBM editorial policy (especially evident in your headlines) perverts the reality.

The Dec. 19 issue has three good examples of inaccuracies. First is the editorial entitled "No Sunshine Here." You attacked the "President of the United States," the "Department of Justice," "IBM legal counsel," "businessmen representing alleged monopolizers" and "top officials," all concerning their failure to disclose a settlement proposal which you said IBM counsel made to the Department of Justice "a few weeks ago." Did it occur to you that perhaps no such proposal was made?

Second, you stated "IBM's cross-examination of government witnesses has usually taken at least twice as long as the witnesses' direct questioning..." ["IBM Ponders Cutting Witness List in U.S. Case"]. Not true. Total direct examination to Jan. 1 is 19,961 pages and total cross-examination is 21,486 pages.

Third, you announced to the world that a new Cravath attorney representing IBM "is Alan Hruska, whose father, Roman Hruska, served as senator from Nebraska." Alan is my partner and I have known him for more than 20 years. I have known the senator for about 10 years, since I was on the staff of a Presidential commission to study violence of which he was a member. I give you my complete assurance, on behalf of both of them,

that they are not related.

I am sure it will do no good to ask, but won't you please make a New Year's resolution to try to be accurate?

Thomas D. Barr
Cravath, Swaine & Moore
New York, N.Y.

Significant Omission

"Complete System Security Seen as 'Rings' of Defense" [CW, Dec. 26-Jan. 2] had what I feel to be a significant omission.

For years, the Multics system (now owned and actively marketed by Honeywell Information Systems, Inc.; developed cooperatively by General Electric, MIT and Bell Labs in the mid-'60s) has been organized around so-called "rings of security" which implement the sort of structure Adrian Norman seems to desire.

The Multics system is felt (by many authorities more knowledgeable than myself) to be the most sophisticated large-scale computer system extant. It is the only system of its sort in the U.S. government inventory to be operationally running in a two-level military security environment: The Air Force Data Services Center (in the Pentagon) operates a Multics system with the Access Isolation Mechanism (AIM) features activated and has "top secret" and "secret" users and data.

I would also like to comment (and I am not with Honeywell) that I feel this omission is all too consistent with previous articles in CW. While IBM has a major share of the marketplace and deserves a major share of news reporting, Honeywell and the other "dwarfs" deserve a mention when appropriate.

Edward Hart Rice
Alexandria, Va.

Data Past

Five Years Ago Jan. 17, 1973

CAITHERSBURG, Md. — A National Bureau of Standards draft report on the "Means of Achieving Interchangeability of Computer Peripherals" said that no single interface standard should be developed for all peripheral equipment, but the government should begin working on developing selected standards particularly in the tape and disk area.

Two large vendors feuded with users over whether those vendors should provide maintenance on systems with independent add-on memory attached. IBM was prohibited by a court in Germany from refusing to service and maintain its 360/30 computers with Intel memory attached, and Xerox Corp. told one of its Sigma CPU users that it would no longer provide maintenance if independent memory were added.

Eight Years Ago Jan. 21, 1970

ATLANTA — The omission of a single Cobol statement from the card source-deck of a program resulted in issuance of 779 welfare checks totaling \$67,000 to persons who were not supposed to receive them. William H. Burson, director of the Georgia State Department of Family and Children Services, said the error occurred in the process of changing from a manual to a computer-assisted check-issuing system.

DAYTON, Ohio — The National Cash Register Co. announced the "educational services" facet of its recent unbundling, effective Jan. 13, to users of its Century systems. Under the plan, all educational courses were priced separately. Each user, however, would receive a basic educational allowance as part of the rental or purchase price of his system.

85% Still in Operation DP Crooks Going Unnoticed, Undiscouraged

By Jack Stone
And Ida Mason
Special to CW

Do you realize that computer-related bank embezzlements average about \$500,000 — 25 times the typical noncomputerized embezzlement? Did you know that the average loss of all computer rip-offs, at least of those we know about, is vanishingly close to \$1.09 million?

One of us chatted with Donn Parker recently at the Fourth Annual Computer Security Conference. (Parker is the author of the book *Crime By Computer* — must reading for all DP managers — and probably the foremost researcher in this field.) He reported that he has documented over 500 computer-related crimes and has begun to interview some of the criminals to try and uncover common patterns of behavior. He has stated that upwards of perhaps 85% of computer-based crimes have yet to be discovered.

Villain's Portrait

What is the profile of the typical computer crook? Researchers suggest this villain is a male, 18 to 30 years old, bright, eager, motivated, adventuresome, with no criminal record — in other words, the stereotype of the highly desirable DP employee. He also is so skilled at his profession that detection is extremely difficult.

As a matter of fact, computer-based crimes are rarely uncovered by today's audit or security personnel since computer thieves usually

know far, far more about systems and technology. It seems that the culprits are only found out through chance events: A user accidentally notes some discrepancies in the normal pattern of events or an informant goes to work or the crooks have difficulty unloading the loot.

At present, there is no federal law that deters the computer criminal, in that none specifically prohibits the theft of computer time or data. But Sen. Abraham Ribicoff has introduced legislation (S. 1766) that provides up to 15 years behind bars and/or fines up to \$50,000 for misuse of a federal computer system or a system involved in interstate commerce. Some action on this bill should be taken by the end of next year.

Sentencing Situation

In addition, the sentencing situation does little to discourage DP robbers. Many computer bandits receive probation and a company agreement not to prosecute in exchange for a complete revelation as to how the crime was committed.

Then there's the problem that prosecution may cost the company heavily in operational losses. Think of the implications of the case of the programmer who stole and tried to ransom critical programs back to the company for \$100,000. He was caught and the programs were held in evidence.

Since the company had no backup copies, it was facing an operational disaster. So the president took the extreme action of breaking into the sheriff's office and stealing

the programs back. The end of this saga was bizarre: The cops didn't know what programs were and the prosecuting attorney couldn't understand why a company would stop functioning without them so the entire matter was finally dropped.

The Human Connection

Some computer crooks have achieved the professional league status in the hierarchy of crimedom. Witness the Equity Funding fiasco. Here the larcenists were top ranking managers who developed a comprehensive system to help manage the issuance and merchandising of tens of thousands of bogus insurance policies to unwitting insurance companies. The multimillion-dollar fraud resulted in the second largest bankruptcy in the history of American business. There were 22 co-conspirators on the project team.

Scary Outlook

Here are some notes on just a few of the many documented cases of computerized fraud perpetrated by DP employees. When all are viewed together, one develops a rather scary outlook on the problem of controlling internal security.

One programmer embezzled simply by having the machine send him extra salary checks. He was caught

only when someone noticed the checks piling up on his desk during his vacation.

Another programmer salted away about a million dollars from a company which he felt had broken its promise to share its profits with him. He reprogrammed some financial applications which reduced individual income items only by fractions of dollars. He then drew checks in his name for the aggregate of the unaccounted funds.

He finally turned himself in when he realized that, were he to stop cheating, company officials would notice a dramatic increase in profits.

Then there's the Byzantine case where dog track bettors who won their trifecta were short-changed without knowing about it [CW, Oct. 10]. Track workers were accused of substituting their own programs to calculate odds in their favor within a few seconds after the race and then collected the money that should have been paid to legitimate bettors by issuing themselves fraudulent tickets.

A short time before the crime was reported, one of the authors visited the track as part of a tour sponsored by a local DP group. When the DP manager was asked if it would be possible to rip-off the track, he responded, "Absolutely not!"

In next week's column, Stone will take a closer look at the "typical" computer thief.

Ida Mason, a professor of DP at Lehigh (Po.) Community College, is currently on sabbatical doing research on women in management.

Lead to Consumer Distrust Lost Controls, Poor Timing Mar Systems

A long-time member of Computerworld's publisher's staff recently had two occasions to distrust DP, even though her association with it over the years has been generally favorable.

First, the bank Rita McGrath has been using for over 10 years was unable to find her account; then, when it did find it, it sent her a "welcome new account holder" letter. Second, she returned some merchandise and is still waiting for credit.

Neither of these events is earth-shaking in its own rights. Neither of them shows any erroneous DP. However, both indicate the type of system problem we constantly overlook in our computerization methods, and, these problems are giving millions of consumers cause to distrust DP systems.

Unwelcome Letter

The story behind the welcome letter is a case of the lost bankbook.

The book was lost two years ago, and there was an account number change as a result. Everything went well with the new account until one day the bank, having gotten hold of the old number, claimed Rita did not have an account with them and refused to cash her check.

This got straightened out, and the two accounts were apparently merged. However, this merging was mistakenly regarded as the formation of a new account and out went the welcome letter.

Returned Desk

The case of the returned desk is equally interesting in its apparent innocence. Patrick J. McGovern, Computerworld publisher, is tall; even a large desk can make him feel cramped. So he has a tall, stand-up desk in his office and it is quite normal to find him comfortably working away there for hours on end. His only problem is typing.

The solution seemed to appear in a catalog item — a tall table with sloping top. Unfortunately, when it arrived, it turned out that there was nothing to support the typewriter at the necessary angle, so the table was returned.

And nothing happened. No credit

note. No return memo.

When the American Express charge arrived, Rita crossed it off. Now she is waiting, more or less fearing that some month she will forget, pay it and then be out both the money and the table.

Rita reasonably does not like having to remember every month that this item is still open.

Information-Poor

In both of these situations, intermediate controls were lost as computerized systems were merged. This problem is very common and often goes unrecognized.

Who realized that when the card deck was being carried from the tabulating machine to the sorter and the operator looked to see that no cards were still in the tabulator, a control on the number of cards being passed from one phase to another was in process? How many times have you seen that control missed in computerized systems — with disastrous results?

In the case of the returned merchandise, no receipt and no time of entry into the books was provided. It is ironic that the information industry itself is the worst offender when it comes to failing to

provide information.

In a manual system, a receipt would have been issued and the very next monthly statement would have contained the information. This is a control lost because of the expansion of the function to a third party. This created a delay that did not exist before. In Rita's case, this was the time between the return of the goods and the report of the return reaching American Express. No specific time is involved here, so the system is out of control.

It appears we are being taken in with our own name — data processors. In both the above instances, we quite correctly process the data. However, we do so without checking whether we are doing it at the appropriate time (welcome letter) or quickly enough (returned merchandise).

The need, therefore, is to concentrate on providing checks and balances to prevent processing at inappropriate times rather than putting all our efforts into the processing operations themselves.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

The
Taylor
Report
By
Alan
Taylor
CDP

Letters to the Editor

(Continued from Page 18)
proletariat?"

Incidentally, the Soviet Union seems nearly benign, and even bourgeois, in comparison with some of the countries mentioned above. Perhaps that is why the liberal press now begins to dare to criticize it.

Bruce A. Martin
Middle Island, N.Y.

Instead of SPECIFY

I read with interest the letter suggesting a new Cobol verb [CW, Nov. 28]. Ket Watters thought that SPECIFY for switches should be added to the Cobol language. When a friend of mine who is just learning Cobol said the same thing, I was prompted to share the technique I have been using for years.

If the switch (or flag) is marital status, define the switch and its "88 levels" with the same "first" name for easy reading in the sorted crossreference, also define fields that contain the proper values for setting the "88 levels":

05 STATUS-MARITAL-FLAG	PIC X	VALUE '0'
05 STATUS-IS-MARRIED		VALUE '1'
05 STATUS-IS-SINGLE		VALUE '2'
05 STATUS-IS-UNDEFINED		VALUE '0'
05 MARRIED-X	PIC X	VALUE '1'
05 SINGLE-X	PIC X	VALUE '2'
05 UNDEFINED-X	PIC X	VALUE '0'

Then in the Procedure Division, rather than saying "SPECIFY STATUS-IS-MARRIED" we can code "MOVE MARRIED-X TO STATUS-MARITAL-FLAG."

We can use "88 levels" to be clear in IF statements and data names for literals to be clear in MOVE statements.

Additionally, I would like to point out that my version of the code in Data Division defines an initial value that is also the default value of UNDEFINED. The default value could have been "MARRIED" at the discretion of the analyst.

Also, specifying "PIC 99" for a switch or flag is rarely necessary. By coding the flag "PIC X," we can have up to 36 values for the flag (actually, we could go to 258, but it is not recommended). By using alphanumeric data we avoid generating any extra code to handle numeric data as well as using one less byte per record. (If the flag is in a record we obviously will put "MARRIED-X," etc. in the front of Working-Storage with other literals.)

One might think that the SPECIFY verb might generate less code. However, it is only a disguised MOVE and most likely would have to take longer to compile, since it must check to see what value the "88" is set at and generate the code to move the proper value to the flag. This will also require storing the right literal.

I hope this technique and these comments will be of help to some.

M. Patricia McLaughlin
Los Angeles, Calif.

Victims of the System

Heaven help us if billing procedures such as those utilized by Saks Fifth Avenue ["Saks Billing System May Violate ICCP Code," CW, Dec. 28-Jan. 2] are endorsed or

even tolerated by the DP community.

Who knows how many thousands of people are, even today, wondering what happened to their credit balance and shrugging their shoulders as they write another check?

A system designed to allow fraudulent information to be printed on a billing form is not only unethical but immoral.

Jeff Holmes
Springfield, Mo.

Who's Being Unethical?

Public flogging for human error in a simple manual system seems to me to be a greater breach of ethics than the billing error by Saks Fifth Avenue ["Saks Billing System May Violate ICCP Code," CW, Dec. 28-Jan. 2].

Are we back in the era of "yellow journalism"? Is it time for Alan Taylor to switch to writing mystery novels?

Without access to Saks system data, there are some particulars which should be apparent to the outsider:

- There are regulations governing the handling of credit balances by such an organization. These may make an exception procedure advisable.

- There may be some types of processing which should not be totally automated.

- Using a flagged "H3" class bill would allow that bill to be mailed if the clerical procedure determines that the refund (or other exception) has already been processed.

- No professional signoff can prevent manual errors.

In this "trial by media," I suggest that the judge dismiss the case and find the prosecutor guilty of "contempt of court."

Eric Schulz
Los Angeles, Calif.

So That's News?

Just thought I'd mention my appreciation for the headline "LA38 Made Interactive" on Page 30 of the Dec. 19 issue. As many thousands of these have been used interactively with Digital Equipment Corp. machines and others for several years, DEC will no doubt also appreciate the headline. Keep 'em coming.

By the way, the article below that headline merited the attention the headline invoked. We have a number of users who find the LA38 speed a limitation.

John A. Beckett
Collegedale, Tenn.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Computerworld reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

The Computer for the Professional

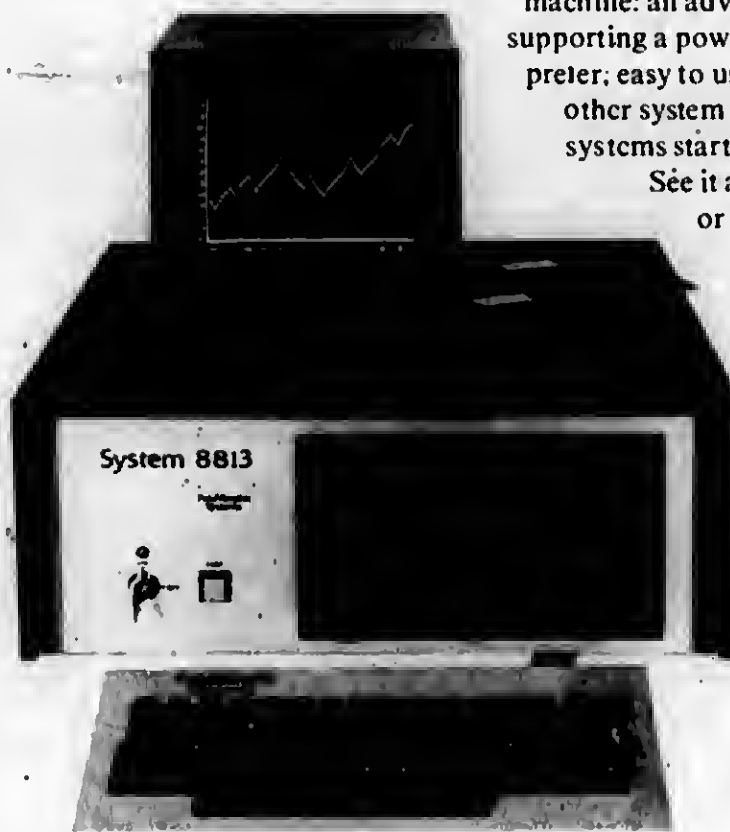
Whether you are a manager, scientist, educator, lawyer, accountant or medical professional, the System 8813 will make you more productive in your profession. It can keep track of your receivables, project future sales, evaluate investment opportunities, or collect data in the laboratory.

Use the System 8813 to develop reports, analyze and store lists and schedules, or to teach others about computers. It is easily used by novices and experts alike.

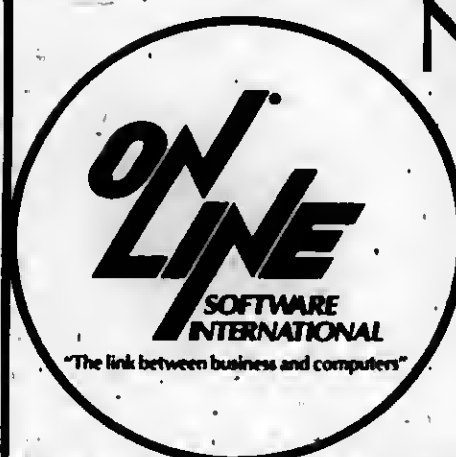
Reliable hardware and sophisticated software make this system a useful tool. Several software packages are included with the machine: an advanced disk operating system supporting a powerful BASIC language interpreter; easy to use text editor, assembler and other system utilities. Prices for complete systems start at \$3250.

See it at your local computer store or contact us at 460 Ward Dr., Santa Barbara, CA 93111, (805) 967-0468

PolyMorphic Systems



New Horizons in CICS Education



● CICS/VS INTERNALS

April 10-14 New York Area
June 12-16 Los Angeles

● RECOVERY/RESTART

Jan. 25-26 Boston
April 19-20 New York Area
June 21-22 Los Angeles

● CICS/VS LOGIC & DEBUGGING

March 27-30 New York Area
May 22-25 Boston

● CICS/VS PERFORMANCE & TUNING

Jan. 23-24 Boston
April 17-18 New York Area
June 19-20 Los Angeles

● CICS/VS APPLICATION PROGRAMMING (Macro Level)

March 20-24 Detroit
May 8-12 San Francisco

● CICS/VS APPLICATION PROGRAMMING (Command Level)

Jan 23-27 New York Area
March 27-31 Detroit
May 1-5 San Francisco
June 28-30 Dallas

OSI offers a set of CICS courses that are unavailable anywhere else. We've structured six unique courses, covering initial exposure, detailed analysis of program logic, internals, and performance criteria.

Our instructors do not market CICS, they teach it. They are experts that have worked with CICS for years, resolving the problems that have brought you today's new enhancements. Their expertise allows you to fully utilize CICS and assures you the finest and most up to date education available.

Also Available for In-House Presentations

CALL NOW FOR COURSE DESCRIPTIONS
AND ENROLLMENT INFORMATION!

TOLL FREE
800-631-8374
or in N.J.
(201) 423-3200

SOFTWARE PLAZA ROUTE 208 HAWTHORNE, N.J. 07506

Auditor Must Be Included In Systems Design Phase, Not Treated as Afterthought

By Ronald B. Smith

Special to CW

The DP auditor should be involved in most of the phases within the development life cycle (DLC) of a system. The purpose of this article is to show the involvement of the DP auditor in the most crucial phase of the DLC.

This phase is called systems design, which is basically the time when the working relations between the parts of a system in terms of their characteristic actions are specified.

In the past, auditors have audited computer systems after they have been implemented. This is auditing after the fact. Often the cost is too prohibitive to go back and modify the system to incorporate adequate controls.

Audit controls should therefore be

Reader Commentary

built in during the system's design phase and not added after implementation of the system.

The DP auditor should be part of the systems development team which includes the users. His role within the team would be as an "independent advisor."

An independent advisor doesn't give or take orders from anyone on the team. The auditor's role is to make judgments on the controls and to make recommendations to the team. These are based on what might happen after the system is implemented.

His evaluations and recommendations should be written up and copies given to management, members of the systems development team and the corporate auditing team.

Guidelines to Follow

The DP auditor might use the following guidelines in his evaluations and recommendations:

1. Define and recognize control objectives as separate design requirements.
2. Look at the following control areas with emphasis on audit controls, audit trails, error correction procedures and adequate design documentation:
 - a. Input preparation by user.
 - b. Input transmission by user.
 - c. Data preparation by the DP department.
 - d. Computer processing.
 - e. Output processing.
 - f. Output reconciliation.

The two most important areas are computer processing and output reconciliation. These two areas should always be present and well documented.

3. Review the original cost/benefits analysis to find out if the design phase was within budgeted cost.

4. Reexamine the budget costs for the subsequent phases within the DLC for any changes.

Auditor as Educator

The DP auditor and systems analysts should have a close working relationship. The systems analyst has two main goals. The first and primary goal is to design a system according to user requirements; the second is to have adequate controls in the system.

The DP auditor's only goal is to have adequate controls in the sys-

(Continued on Page 23)

Getting Yours?

SOMEONE ELSE IS!



Exeter Associates, Inc.
EXECUTIVE RECRUITING CONSULTANTS

BRUCE A. MONTVILLE
MANAGING PARTNER
1001 988-4712

December 21, 1977

Mr. Charles St. Clair
C.I.I. Publications
c/o Correct Images, Inc.
2104 Cain Tower
229 Peachtree Street, N.E.
Atlanta, Ga. 30303

Dear Mr. St. Clair,

Today, we received your 1978 publication of "The Southeast Directory of Computer Installations".

Upon review of your 1978 edition, we were extremely pleased with the intensive coverage of installations you have provided. We do subscribe to many publications for purposes of gathering market intelligence and we must say that yours is the best ever!

As our business requires the recruitment of computer professionals on a national basis, you can imagine what a valuable tool your publication is to us.

Please include us for your forthcoming national directory. Congratulations to you and your staff.

Yours truly,

Bruce A. Montville

BAM/jb

HAMPTON, NEW HAMPSHIRE 03842

Exeter Associates and hundreds of other companies are getting your share of the market in the Southeast. Whether you're an agent/recruiter, a vendor, or an EDP consultant, you can't afford to overlook the ever-changing, ever-growing Southeast data processing market.

THE SOUTHEAST DIRECTORY OF COMPUTER INSTALLATIONS

...with over 1,200 listings in Eight Southeastern states will put you back into the market!

Each listing contains company name, address, phone, key contact, time for sale, hardware, languages, and applications.

Get Into The Southeast... You'll Get A lot Out Of It:

**Immediate Delivery
On All
Directories
Ordered Today**

THE SOUTHEAST DIRECTORY OF COMPUTER INSTALLATIONS

NAME _____	TITLE _____
COMPANY _____	ADDRESS _____
CITY _____	STATE _____ ZIP _____
# BOOKS _____ X \$85.00 = _____	C.I.I. PUBLICATIONS
☐ CHECK ENCLOSED	☐ M.C. # _____
☐ B.A.C. # _____	☐ C.O.D.
☐ C&S # _____	

Suite 22-0
300 Peachtree St. N.W.
Atlanta, Georgia 30308
(404) 659-4145

A Truly Unforgettable Character

Eureka Armpit: Programmer Extraordinaire

By Miles Benson

Special to CW

In my memory bank of Most Unforgettable Computing Characters, Eureka Armpit looms large.

Eureka was not his name, of course. It is, however, appropriate to what is memorable about him. To put it bluntly, Eureka was offensive in just about all the ways a programmer can be offensive.

I have some misgivings about telling this story. I mean, picture the scene. There's Eureka, settling back for a little light reading, cracking open this volume to this page. The realization slowly dawns on him that "Eureka" is really a substitute for his own name. That could be an unpleasant shock.

You see, Eureka never meant to be offensive. He was as good-hearted as any programmer I've ever known. It's just that when the points were given out for regular bathing, or refraining from nose picking, or sock changing, Eureka came in low. Very low.

Episode No. 1

There are two incidents that stand out in my memories of Eureka. One involves another person, the other involves an architectural wonder.

Sociology of Computing

Bonnie Nosegay was a mild-mannered, sweet-as-could-be programmer at the Clever Devil Toy Company at the time Eureka came on-board. In the nice person league, Bonnie was in the 99th percentile.

When Stalwart Axeswinger, head of computer operations, chewed out Bonnie and some of the other programmers in a unique collection of four letter words for lack of cleanliness around the keypunch, it was Bonnie who sweetly agreed that perhaps they had been a little slovenly.

When Clarissa Cardchip misoperated the card reader and returned all the cards read that day to the programmers intermixed in a basket, it was Bonnie who shrugged her shoulders and sorted them all back to their original order.

Bonnie, in short, was impervious to the pressures that totally unnerved the rest of us.

Perhaps it was because of her good nature that Eureka was assigned a desk in her area. Whatever the reason, Bonnie and Eureka became neighbors.

The first day of this misbegotten alliance, a close observer might have spied a slight wrinkling of Bonnie's nose. By the second day, the wrinkle had become severe. On the third day, even unflappable Bonnie had had enough.

It wasn't just the odors that

bothered her, Bonnie told her supervisor. It wasn't even that Eureka scratched himself frequently and vigorously. It was where Eureka scratched himself that finally made her act. Some things, she felt, just shouldn't happen in public.

... Far all of Eureka's strangeness, I still harbor some feeling for the guy. I mean, we computer folk all have our own personal weirdness, right?

Eureka was moved to a new desk in a nearly deserted area that same day. Bonnie's good will was too fine to tax any longer. And that was the end of memorable episode No. 1.

Episode No. 2

The other episode requires a brief description of the Clever Devil facilities. You see, Clever Devil computerized early in the digital game, compared with its competitors. I mean, it leased its spiffy new Marketronics 3 Pi computer as No. 4 on the order list when Marketronics first brought the beastly out in the mid-'60s.

And because Clever Devil was proud of its computerization and its

computer, it entombed it in an architecturally gorgeous mausoleum on the very front of the Clever Devil acreage, right next to the open-to-the-public showroom where toys are available just a teensy bit over wholesale. A decade of excited children have peered in electronic awe through the huge plate glass windows that expose the tape-whirring, light-blinking behemoth to the public.

In fact, so proud was Clever Devil of this edifice and its contents that, to complete this architectural marvel, it erected a giant and lovely fountain beside the front doors. The splashing, night-lighted waters was reflected in the computer center windows, and sometimes the 3 Pi seemed to be arising from a lovely sea, transcending its concrete environment.

And that brings us back to Eureka Armpit. In addition to his other unique traits, Eureka was a hurrier. Where most of us amble, Eureka would trot. Those who wandered the Clever Devil hallways kept a peripheral eye open for the scurrying Eureka, lest they be impaled in a high-speed collision on the pencil he kept nesting on his left ear.

In fact, the kindest nickname among the many which were hung on Eureka over the years was "Dasher." Dasher moved so

(Continued on Page 22)

"We have not yet begun to distribute."

A Special Report on Distributed Data Processing in our February 27th Issue

According to independent studies by Becker Research, Inc., only 20% of Computerworld subscribers' organizations "currently use a distributed approach to data processing," so the buzzword of the late 70's has yet to become a byword.

On the other hand, 27% of Computerworld subscribers say their organizations are now "planning to use a distributed approach to data processing" — which indicates a substantial current interest in what some have called the wave of the future.

Of course, there are still wide differences on just what is meant by distributed data processing. And that's one of the topics to be covered in our February 27th Special Report.

Edited by Esther Surden, this report will gather opinions on what DDP is from several sources, including mainframe manufacturers and users.

It will also give some practical help to DDP users and prospective users — with articles on configuring networks, distributing data bases, and selecting and maintaining equipment.

"Distributed Data Processing" will also report on users' experiences with DDP — both pro and con.

If you're into DDP, planning to be into it, or thinking about it at all; this report is the place to be when our February 27th issue reaches your desk. Closing date is February 10th.

And if you're marketing products or services in the DDP field, make sure your ad is there. Contact your Computerworld salesman, or call Terry Williams at (617) 965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486



Eureka Not Forgettable

(Continued from Page 21)

rapidly, it was humorously said, that he often arrived before his odor.

You may be wondering at this point about the role of the fountain in this story. Or you may not be. You may have perceived that the fountain was an inevitable destination for the full-race Dasher.

Arrive there he did. While hurrying in to work one day, passing other late-arriving employees at 7:59 a.m., Eureka took a shortcut. Heading for the front door of the computer center, Eureka elected to step up onto the lip of the fountain.

Precariously balanced, he thus attempted to proceed with unabated speed toward the front door. He failed to account, however, for the

slipperiness of the fountain edge. First his left foot and then the remainder of his rapidly moving body descended into the water.

The startled throng of late arrivals was first shocked, then amused, by the sight of Eureka, still moving at an only slightly diminished speed, splashing mightily through the Clever Devil fountain. (It is said, apocryphally I am sure, that Eureka only lost two places in his race for the front door.)

Most of us, at least somewhat humiliated and decidedly uncomfortable, would have slunk away home at that point.

Not Eureka. He stuck it out. The full eight hours. Soaked to the bellybutton. Not even dry by noon.

If the dry Eureka cast dubious odors, you can imagine what the wet one did. It was a memorable day for all of us Clever Devil computer types.

Well, there's the story. Eureka Armpit, programmer extraordinaire. And most unforgettable character.

But I have to add one more thought. You there, reading this story, wondering if Eureka Armpit is really a pseudonym for your own. It's not.

For all of Eureka's strangeness, I still harbor some feeling for the guy. I mean, we computer folk all have our own personal weirdness, right?

So I disguised just enough of the story's details to keep the probability of self-recognition down to zilch. Eureka, your own mother wouldn't even recognize you.

Your secrets are safe — even from yourself.

Mr. Data Processing Manager...

want to protect
your keypunch
kingdom?

Then don't
let your boss
see this ad!

It's a recognized fact that over 30% of costs in the average computer installation are for data entry. The unique Laser OCR-ONE optical character recognition system has been specifically designed to reduce those costs. In fact, it's cost justifiable for the replacement of only three key stations.

A Laser OCR-ONE user has reduced their keypunching staff by over 50% ... with savings amounting to more than \$10,000 a month!

We'd welcome the opportunity to give you a demonstration and provide detailed information on the remarkable advantages of the Laser OCR-ONE.



Contact me today for complete cost-saving information.

Billy Grehm
Vice President/Marketing
Optical Business Machines, Inc.
804 West New Haven Avenue
Melbourne, FL 32901
(305) 727-1774

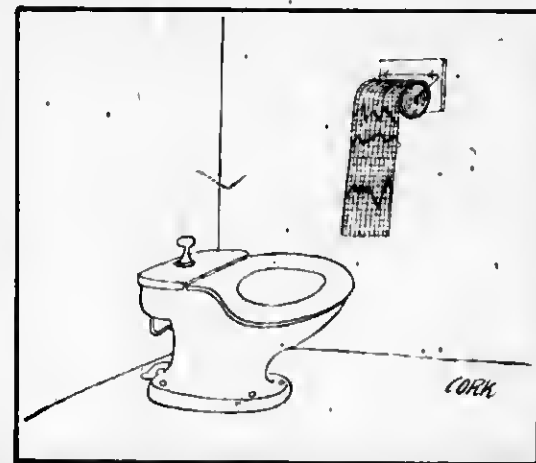
An affiliate of Florida Data Corporation

I'd like more information about the Laser OCR-ONE

Please send descriptive literature ☐
Please have a salesman call me ☐

Name _____
Title _____
Company _____
Address _____
City _____
State _____
Zip _____ Phone _____

J



WANTED

Recently promoted data entry supervisor or manager. Responsibilities include attending the interactive management course for data entry managers and supervisors sponsored by:

MIC Management Information Corporation

140 Barclay Center
Cherry Hill, N. J. 08034.

This 3-day course covers

- department organization
- operator productivity
- training
- personnel motivation
- data controls

The seminar is offered February 27 — March 1, 1978, and May 22 — 24, 1978 at the Cherry Hill Inn in Cherry Hill, N. J.

For more information, call Larry Feidelman COLLECT at (609) 428-1020.

DP Auditor Must Play Part In Systems Design Phase

(Continued from Page 20)

tem. Since the primary goals of the systems analyst and auditor differ, there has to be a meeting of the minds.

It's up to the auditor to educate the systems analyst on the importance of adequate controls. In fairness to the systems analyst, he can't always implement adequate controls because of user requirements and/or the need to meet tight implementation dates.

Since it is his system, the user must be made to realize he has to have complete responsibility for the controls. All too often, the user doesn't know all the controls in his system and doesn't even realize that he should be responsible for the controls.

The user should know that his system must have the proper controls, be aware and be responsible for all of the controls. This has to be part of the user's job description.

Role of Top Management

To make the role of the DP auditor during the systems design phase and the other phases within DLC a success, top management must mandate certain responsibilities for the user, DP department and DP auditor.

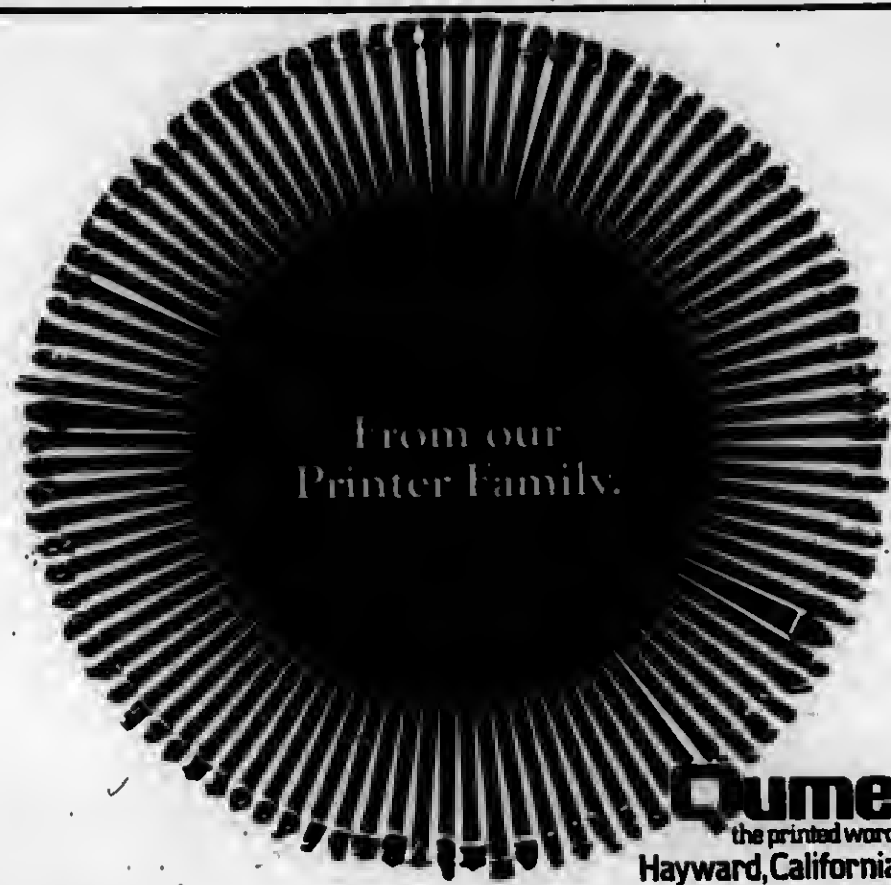
The users must be aware and responsible for all controls in their present systems, ensure proper controls are implemented in pro-

posed or new systems and ensure any modifications to the current systems have adequate controls.

The DP department must include the DP auditor as part of the systems development team and, as much as possible, cooperate with him. The DP auditor should also be made aware of any design modifications to current systems and be invited to any state-of-the-art training sessions for personnel.

The DP auditor must have sufficient DP training and knowledge to make the above happen.

Smith, who has a degree in accounting, is a senior systems analyst at Corrier Corp. in Syracuse, N.Y.



Ampex memory for PDP-11/70. Spend less, get more.

Add Ampex memory to your PDP-11/70. You'll get better performance than you would with DEC's own memory, and you'll only spend around half as much money.

Money isn't the only thing you'll save with Ampex memory. You'll save time, too. Using four-way interleaving, effective cycle time of an ARM-1170 memory is 350 nanoseconds. Even without interleaving, Ampex memory

cycles within 725 nanoseconds.

Ampex ARM-1170 memory comes in increments of 128K bytes and can expand a PDP-11/70 computer all the way to 4 megabytes.

DEC has a great product in the PDP-11/70. And now you can make yours work even better, and save some money at the same time. Order your PDP-11/70 memory from Ampex and get it now.

AMPEX

Ampex Memory Products Division
200 N. Nash Street • El Segundo, California 90245
(213) 640-0150

The only connection between Digital Equipment Corporation and Ampex Corporation is the one you make yourself when you plug our memories into their computers.



'You and Your, Sure, It Will Be a Breeze ... Just Hook Me Up to the Bank's Computer and ...'

Recruiters/ Agencies

THE SOUTHEAST
DIRECTORY OF COMPUTER
INSTALLATIONS

Don't Replace Your 3270s Without Sending For Our Kit.

So far, every company that's bitten on our free 30-day trial offer has decided to keep our equipment. Very good, but not surprising.

Because they all proved to themselves Trivex Plus 70 terminals are more versatile than IBM 3270s. And they did it without biting the bullet. Without danger of obsoleting their systems. Or hurting their user service reputations.

That's the beauty of our Mix and Match Plan: We give you one of our terminals (or a whole system if you want) to try for 30 days. Free. You just plug it in. It's *completely* compatible

with IBM 3270 units. The same goes for our controllers and printers. So you can mix and match our equipment with IBM's any way you want to.

Then you sit back and watch how well our equipment works alongside theirs. You'll see what ours gives you that IBM's doesn't. Features like in-line, on-line and off-line diagnostic capability. Local display-to-print capability. OCR wand. High-resolution, non-glare CRT. Prompting line. Cursor position indicator. Statistical package. And 10-key numeric pad. Features you won't get from IBM for years. If ever. And all Trivex 3270-compatible devices are micro-processor controlled. They're software-modifiable to future changes in network requirements.

Meanwhile, you'll find out our equipment also costs less than IBM's.

Once your 30 days are up, unplug our Plus 70 System and send it back. No problem. Or, like those who've tried it, you can keep it.

Now you've got to admit biting on an offer like this is a lot better than biting the bullet. Just call the number below or write us on your letterhead. A salesman will bring you information on our Mix and Match Plan along with an Executive Decision-Making Kit, complete with operating instructions and a real bullet.

Then we'll give you our best shot.

Write: 3180 Red Hill Ave., Costa Mesa, Ca. 92626 • Phone: (714) 546-7781, (800) 854-3810 or 854-3819.

TRIVEX

Offices in San Jose, Calif. (408) 226-3766/Oakbrook, Ill. (312) 325-8108/Detroit, Mich. (313) 528-2175/Ft. Lee, N.J. (201) 461-4712. European Distributor: Synelec, Telex: 22114 Paris, Brussels, Munich, Amsterdam.

Try One Trivex With Your 3270s Instead Of Biting The Bullet.

You'd like to replace your IBM 3270s with more versatile terminals. It'd make you a hero. But the first step is like biting the bullet because things could blow up in your face.

That's why Trivex invented the free 30-day Mix and Match Plan. It gets rid of the risk of obsoleting your system. Or hurting your user service reputation.

Here's how it works. We'll give you one of our Trivex Plus 70 terminals for a system if you want to try for 30 days. Free. Just plug it in. There's nothing else to do because it's completely compatible with IBM 3270 units.

Our terminals not only cost less than IBM's, you'll find they give you more features you won't get from IBM for years. If ever.

Call the number below or write us on your letterhead. Our sales rep will bring you information on our free 30-day Mix and Match Plan along with an Executive Decision-Making Kit. It's one offer you should bite on.

**Don't Replace Your 3270s
Without Sending For Our Kit.**



TRIVEX

Everyone That Bit On Our 3270 Offer Is Now A Customer. Why?

Study Shows Payoffs

User-Coded Requests Improve Decisions

By Leslie D. Ball
Special to CW

A research project was recently completed which took a look at what would happen if general management were given the opportunity to code report requests, rather than requiring the DP department to code the request for the users. The project was jointly sponsored by Program Products, Inc., which markets the Data Analyzer package and The Tanner Companies, a Phoenix construction firm.

The research team consisted of myself, Dr. Steven D. Wood and doctoral candidates Peter Simis and Raymond Kluczny, all then associated with the College of Business Administration at Arizona State University. Executives from both Tanner and Program Products also participated in the project.

The main objectives of the project were to determine:

- Whether the managers would actually do the coding required to use the Data Analyzer.
- The types of reports that would be requested.
- The features of the software

package that would be utilized.

- The behavioral effects that might result from using the package.
- The benefits that Tanner's managers would find from using the package.
- The difficulties that would be encountered with the system.
- The impact that use of the package would have on Tanner's DP department.

Implementation of the Data Analyzer was completed last March on Tanner's IBM 360/40, which operates under DOS. Prior to implementing the software, the research team developed a data dictionary that identified and described all data items the users would be allowed to access.

A training session was scheduled for potential users. Because virtually all of the company's management, including President Maurice Tanner, were scheduled to attend the session, it was necessary to conduct two sessions.

Thirty-two managers attended either of two one-day training sessions, with a second day

available for those who desired training in the use of the package's more advanced features.

Following the training sessions, users were allowed to code any report request that they wished, provided that the data existed in the company's data files and that they had authority to see such data.

During the four-month project, 53% of the executives who attended the training sessions wrote one or more requests. A total of 112 requests were processed by the DP department.

Of the requests made, 95% would not have been made had the Data Analyzer not been available. The researchers believe this indicates there is a significant number of management information needs that are not being satisfied when traditional procedures are employed.

Much to their surprise, the researchers found the users took an average of only 34 minutes to mentally develop and code their report requests.

The researchers also found:

- Although most upper level

managers made some use of the Data Analyzer, subordinates most often coded the requests.

- Most reports selected and summarized specific information from files containing detailed data.

- Most requests were written employing only the most basic commands available.

- Users developed an increased appreciation for the tasks performed by the DP department.

- Tanner's management felt that the reports it received were valuable to its decision-making responsibilities, that the software package proved an effective management tool and that they learned much about the amount and a type of data available.

- Difficulties were encountered by the users who employed the package in more than a rudimentary manner because of the increased learning time required.

- The DP department should expect to receive long-term benefits because of the increased DP knowledge gained by the users.

Ball is an assistant professor of mathematics at Babson College in Wellesley, Mass.

Report Writer Backstops Cobol Shop

TULSA, Okla. — Pepsico, Inc.'s Transportation Division, based here, includes busy operations such as North American Van Lines, Inc., National Trailer Convoy, Inc. and General Insurance Adjustment Co.

Eighty persons work in the systems section of this division. Charles Rodman, lead systems analyst, and Dan Baker, special projects analyst, work with an IBM 370/155, under DOS/VS and a software line-up consisting of DYL-260 from Dylakor Software Systems, Environ/1 and Total from Cincom Systems, Inc., Epat from SDI, Inc. and The Librarian from Applied Data Research, Inc. The Dylakor system interfaces with the latter three.

"We're a Cobol shop. We use it for our normal development work. But while Cobol is our



Baker (left) and Rodman

standard, we use DYL-260 in conjunction with it whenever time gets tight," Baker said.

Rodman and Baker have used DYL-260 almost from the day it first became available. The divi-

sion operated Dylakor's DYL-250, an extended utility, before that.

"DYL-260 has been an essential part of our operation for years," Baker said. "It's always the first method we consider for accomplishing any time-sensitive project, no matter how complex the project."

Coding, Testing Speed

Rodman explained why: "Our experience has demonstrated that the time interval from project request to finished project is reduced dramatically by using DYL-260 rather than Cobol. The man-hours we save in coding, punching and testing is substantial, and when debugging is necessary, the process is simplified by the DYL-260 comprehensive error analysis, which makes the core dump all but unnecessary."

"The package has been especially useful on special projects which otherwise would be impossible to complete in the required timeframe," he added.

Complex Project

Rodman and Baker described one project in particular which was especially complex and time-critical. "We were required to design a system for tracking vehicle license expirations. DYL-260's update and editing feature gave us the foundation we needed."

"The addition of four report programs, one of which has the ability to look both forward and backward in time to tell us about expirations, enabled us to complete this entire assignment in less than two weeks. We are confident that had we used Cobol exclusively for this job, it would have taken a minimum of four weeks."

You Name it!

Jasper Does it!

JOB ACCOUNTING & BILLING SYSTEM FOR OS, DOS/VS, POWER/VS, DOS

NEW
FEATURES:

Wizard Report
Generator

• CICS
Billing

• RJE
Accounting

FREE
TRIAL

1977
DATAPRO SOFTWARE
HONOR ROLL



Yes! Rush full information about Jasper & the 30 day Free Trial

DATACHRON 174 FIFTH AVE. NEW YORK N.Y. 10010

For faster action call collect (212) 675-5333

NAME _____

TITLE _____

CO. _____

TEL. _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

COMPUTER MODEL _____

SYSTEM _____

LEARN AND BURROUGHS ARE ON SPEAKING TERMS.

You're probably very happy with your Burroughs mainframe.

But you'd undoubtedly like to have the versatility and dependability of Lear Siegler terminals. If only they were compatible with your present system.

Now they are. Complete with standard Burroughs polling and address line disciplines.

What's more, the ADM-2B's forms mode capability is compatible with the TD-820.

The ADM-2B gives you full text editing capabilities. Including erase to end of line/field/page. Insert and delete character and line. Blinking and blanking fields. And tabbing.

Just flick a switch and you can convert the ADM-2B to a standard ADM-2 with Burroughs line discipline.

Line diagnostic mode is switch selectable — which makes it extremely valuable for troubleshooting.

Of course, there's all the support that Lear Siegler is famous for. Throughout the United States and in many foreign countries.

\$2485.

That's the full price. Including serial printer port. Numeric keypad. 24x80 character screen. 16 function keys. 110-9600 baud. RS232 interface. Burroughs two-wire direct connect is available as an option.

The fact is, Lear Siegler's new ADM-2B terminal gives you the best of both terminals. So you can use it right alongside your present Burroughs terminals and mainframe.

So rest easy, Burroughs users. Because now Lear Siegler speaks your language.

For more information contact: Lear Siegler, Inc., E.I.D./Data Products, 714 N. Brookhurst St., Anaheim, CA 92803; (800) 854-3805. In California (714) 774-1010.



**THE ADM-2B.
SMART TERMINAL.
SMARTER BUY.**



'Cadmat' Manipulates Large Data Collections

ATHENS, Ga. — Developed by the National Aeronautics and Space Administration's Aerospace Safety Research and Data Institute (ASRDI), the Combined ASRDI Data Management and Analysis Technique (Cadmat) package form Cosmic enables users to work with large quantities of data organized into records or events and parametric fields.

The records of events can be made up of as many as 32K rows while the parametric fields can be represented by as many as 60 columns. Each data element is presented as

either a single 4-byte floating-point number or a 4-byte "fact" or alphanumeric character string.

The software is particularly useful when data, such as the results of a test program, is continually being accumulated and when the need for retrieval and analysis is ongoing, according to a spokesman for the clearinghouse.

Written for use with IBM's TSS environment, the pack-

age could be modified to run with other operating systems, the spokesman said. An abstract of the program warns, however, that it can accommodate only one user at a time and is not suitable for situations requiring simultaneous multiple-user access.

Cadmat accommodates raw data in virtually any Fortran-readable format, but an understanding of Boolean algebra and set theory is necessary in

order to use the system.

A selection of data analysis features are available to the user. These include the generation of graphs and histograms, alphanumeric sorting, calculation of means and variances as well as statistical and mathematical modeling, the spokesman said.

An administrative facility controls user access to particular files while a secondary access mechanism within each

file partitions sensitive fields and sensitive activities.

Written in Fortran IV for IBM's Fortran H compiler, the package has been implemented on a 360 with 1M byte of memory. Cataloged as LEW-12570, the program code costs \$750, the documentation an additional \$17.

Cosmic is at 117 Barrow Hall, University of Georgia, Athens, Ga. 30602.

DEC Extends CAI Support

MAYNARD, Mass. — Version 2 of Digital Equipment Corp.'s CAI Author Language (Decal), an interactive lesson development system for individualized, computer-assisted instruction (CAI), contains language extensions permitting creation of simulation and gaming exercises.

Decal allows instructors with little or no DP background to create, modify and administer CAI lessons and tests in a variety of subjects, a spokesman claimed.

Version 2 gives the instructor access to 52 user-programmable variables and accommodates Basic-Plus language statements within lessons to provide greater branching, response-checking ability and less flow control, he said.

The update also includes an on-line calculator mode for mathematical operations and a random question selection option. The system logs student activity and test results, DEC noted.

A multiple keyword response feature allows a variety of responses to questions and a response-matching capability enables the system to recognize common misspellings, the spokesman added.

Available now, Decal Version 2 operates in a RSTS/E environment on DEC's PDP-11s and can be licensed for \$1,000. Current users of Decal can obtain the update for the cost of the media, the spokesman noted from DEC's Education Products Group.

Sales/Marketing Incentive Industry

Outstanding opportunities with leader in the incentive industry. See our ad in the Classified Section, or contact:

John Jack

BUSINESS INCENTIVES, INC.
P.O. Box 1610
Minneapolis, MN 55440

An Equal Opportunity Employer

"MARK IV/Reporter taught us what real productivity is all about!"



"We purchased a General Ledger accounting system from a major vendor. After investigating, we found that we were going to have to drastically change the Cobol programs in order to generate all the required reports.

"Rather than this, we concluded that it would be far better to start from scratch and use MARK IV/Reporter for the 75 to 100 daily, weekly, monthly and year-end accounting reports that we produce. We made the right decision. If we had tried to modify the Cobol report writer that came with the system, it would have taken us at least two months longer to complete the project.

"MARK IV/Reporter was installed on our 370/145 within a few hours. The four people who attended a basic MARK IV/Reporter class were using it comfortably within a week. We also have a competent Cobol programmer who took the MARK IV* manuals home and read them over a weekend. He started using MARK IV/Reporter the next Monday morning.

"It runs very efficiently and it's helped increase the productivity of our systems and programming staff. With the confidence we've gained in MARK IV/Reporter we can commit to new projects now that would have been impossible before. We'll be using it for 50% of our new work, which includes a new student records information system. MARK IV/Reporter will be a key part of this new system. "As for Informatics Support, our staff here is very impressed; their people have been extremely competent and the systems engineering support has been excellent."

WHAT IS MARK IV/REPORTER? MARK IV/Reporter is an information processing system which handles all reporting requirements for existing file and/or data base systems. Although extremely flexible and powerful, the system allows non-programmers to produce error-free reports in a fraction of the time required with conventional programming methods. MARK IV/Reporter can be installed and implemented in the U.S. and Canada for as little as \$306.00 a month. MARK IV/Reporter is upward-compatible to MARK IV whose 1,300 installations worldwide make it one of the most successful software products of all time.

informatics inc. Software Products

World's Leading Independent Supplier of Software Products

Member SIA Software Industry Association

Informatics Inc., Software Products, Dept. 1177D
21050 Vanowen St., Canoga Park, Calif. 91304

Name _____

Title _____

Dept. _____ Computer _____

Firm _____

Address _____

Phone _____

City _____

State/Province _____ Zip _____

The acquisition of Mark IV was made possible by a grant of the University of Kansas Endowment Association. Mr. Magnuson oversees administrative DP activities for the Lawrence campus. The views expressed are those of Director Jerry Magnuson and not necessarily those of the University of Kansas.

'DMS/OS' Compresses PDS

SACRAMENTO, Calif. — The DASD Management System (DMS/OS) from Software Module Marketing, Inc. (SMM) now includes support for compression of partitioned data sets (PDS). This allows IBM OS-based sites to allocate space as a function of the content of the PDS, an SMM spokesman said.

DMS/OS supports the FP Hardware Use Cuts Runtimes For Banks' Work

ORLANDO, Fla. — The latest version of Florida Software Services' Certificate of Deposit accounting system, CD III, includes a fast processing option and support for new government regulations as well as better documentation, according to a spokesman.

Users with floating point (FP) hardware can utilize it instead of software to handle parts of the package's processing logic. This can cut runtimes substantially, he claimed.

Logic has been extended to meet all Individual Retirement Account (IRA) requirements recently released by the government, he added. Meanwhile documentation has been expanded and separated into two manuals.

The package is written in Cobol and runs on IBM 360/370s, Honeywell 6000 series CPUs and Burroughs medium-scale systems. It ranges in cost from \$15,000 to \$20,000.

Florida Software Services can be reached through P.O. Box 2269, Orlando, Fla. 32802.

archiving and retrieval of data sets, high-speed but selective dump/restore, a range of scratch options and data set fragmentation control. An interface for teleprocessing and support for reloading from one type of disk subsystem to another are also part of the system, he said.

As the facility is implemented, the compression can be invoked by specifying data set names or by designating volumes to be scanned for

eligible data sets, he added.

Copies of PDS eligible for compression are maintained in case of conditions that would prevent the reloading of a PDS after the loaded version had been rendered inoperative.

The PDS compression is provided free with the DMS/OS basic package, which costs \$10,000, SMM said from the Crocker Bank Building, Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

Deltak Users to Meet

CHICAGO — The 1978 Deltak, Inc. users conference, scheduled for mid-April here, will include keynote addresses by Dr. Herbert R.J. Grosch, president of the Association for Computing Machinery, and Capt. Grace Hopper of the U.S. Navy.

Other speakers will include Dr. J. Daniel Couger, the Data Processing Management Association's man of the year, and Michael Jackson, developer of a structured design methodology.

The April 17-19 meeting will also consider such issues as DP management training, the development of effective instruction and design of a learning resource center.

The registration fee is \$100. Deltak, Inc. is at 9950 W. Lawrence Ave., Schiller Park, Ill. 60176.

Man cannot live

That's why so many companies are firing their small batch systems and hiring the Hewlett-Packard 3000.

Our computer can easily handle your payroll, accounting, general ledger and other number-crunching jobs you're currently running on a time-sharing service or small in-house system.

But it also gives you immediate access to the information you need right now. Today's sales,

inventory status, customer profiles, shipping records, updates on accounts receivables, projections — all these and more can be called up on CRTs or printing terminals.

Just about every business, from manufacturing and distributing to retailing and publishing, needs that kind of up-to-the-minute data. And, with prices starting at \$75,000* it's easy to make the switch to an HP 3000.



The \$75,000 answer.

U.S. domestic price for HP 3000 *at additional cost.*

UP YOUR PERFORMANCE

with the EDP PERFORMANCE REVIEW

A monthly review of techniques and methods, products, literature and services to help EDP management achieve maximum productivity.

- Tutorial Reports
- Products & Services
- Current Literature
- User Experiences

Subscription: \$48.00/year.
Write now for a free sample issue and index.

Applied Computer Research
P. O. Box 9280
Phoenix, AZ 85068
(602-944-1589)

At Canadian MVS Site Performance Monitor Helps Control TSO Use

TORONTO — The Canada Life Assurance Co. operates two major on-line networks, including TSO and CICS, on a 5M-byte IBM 370/168 running under the latest release of MVS. The firm has been using MVS since August 1975 and has used IBM's Time-Sharing Option (TSO) to support corporate users ranging from the British Isles to the headquar-

ters office here as well as a growing base of outside customers.

As TSO usage has increased, precise management of the TSO system has increased in importance, with special interest in controlling the misuse of time-sharing standards, terminal work-habits, and establishing a capacity management capability, according to

Arne Ljungstrom, one of the firm's DP officers.

Until the company acquired TSO/MON from Morino Associates, its attempts at controlling TSO usage were limited. The tools available — including IBM's Resource Measurement Facility (RMF), the Program Control Facility (PCF), an SMF exception analyzer, an on-line MVS

monitor and numerous in-house aids — although valuable for their primary purposes, simply did not provide the information necessary to satisfy their requirements for management for the TSO network, he said.

Although most organizations view a product such as TSO/MON from a "performance" frame of reference,

Canada Life was quick to recognize the product's value for analyzing TSO use, specifically in terms of user productivity and standards enforcement.

TSO/MON has made it possible to study terminal usage patterns to gauge programmer productivity. One approach was to determine an indicator for assessing terminal activity.

In working with IBM, Canada Life postulated that an "active" terminal user would experience an average user think time of approximately 20 seconds. TSO/MON reports verified this hypothesis. With this measure as a yardstick, it will be possible to assess the level of user activity, so that inactive users can be identified, Ljungstrom added.

Additionally, the information provided by TSO/MON enables one to understand what work is being done when, allowing management to track just how much TSO is used on an overtime basis.

Standards Enforcement

In addition to productivity analysis, TSO/MON information reporting features provided a means for standards enforcement. For example, because of the performance impact considerations of a foreground Cobol compilation, a standard has been established prohibiting their execution during prime service times. Yet, in a seven-day period the information provided by TSO/MON identified 154 violations.

In another situation, Canada Life has been able to identify users invoking unauthorized programs, thus uncovering a security violation situation.

The management of the Canada Life data center realized that in order to provide a cost-effective and service-oriented TSO system, it would be essential to monitor and thereby minimize the misuse of the facility. TSO/MON is the tool that satisfies this objective.

An important objective of Canada Life's management is the need for effective hardware/software planning, a function commonly referred to as "capacity management." TSO/MON has already proven to be essential to the capacity management effort.

The obvious advantage provided with TSO/MON is a comprehensive data base of historical TSO usage spanning up to a 13-month history, which can be easily and quickly (usually within seconds) accessed. This simplifies planning and forecasting.

What has been impressive to Canada Life's capacity man-
(Continued on Page 32)

by batch alone.

Two major features put the HP 3000 in a class by itself. The first is our state-of-the-art operating system, a Multiprogramming Executive that can manage a vast workload extremely fast. When we clocked one second of MPE activity, it handled 2,280,000 micro instructions in the central processor, 14 file accesses, seven input swaps and five output swaps.

This ability to "juggle" batch and on-line jobs lets you develop new programs on the HP 3000 while it's running your old ones. And we offer six "big computer" languages to keep your programmers happy. With COBOL, RPG, FORTRAN, BASIC, APL (Series II only), and SPL (our streamlined Systems Programming Language), you can develop the precise programs your company needs.

Virtual memory plays an important role in this performance. It gives you an almost unlimited program size by keeping the code and data on your disc, swapping only those parts that are needed in main memory. This operation is totally transparent to the user. And it's speeded up by our new 50 megabyte discs, with 5 ms seek time track to track.

The second major attribute is the HP 3000's powerful data management capability. Our IMAGE/3000 software, good enough to be named to the Datapro Software Honor Roll, puts a sophisticated Data Base Management system (1) literally in your hands. You can access files of consolidated data with our simple inquiry language, QUERY. Or use KSAM (Keyed Sequential Access Method) on our Series II to call up a series of related files. Our DEL/3000 Data Entry Library simplifies your terminal-oriented transactions.

A variety of HP terminals also makes it easier to input or call up data. For instance, our new graphics terminal (2) provides auto-plots at the touch of a key. And a new printing terminal (3) keeps information flowing from the factory or warehouse.

Another "big computer" feature is fault-correcting memory on the HP 3000 Series II. If a circuit fails, the memory automatically corrects itself and stores information about the faults in a RAM. Our engineers will call up that information during routine maintenance and replace the faulty circuit.

We offer two basic systems, based on CPU speed and main memory size. They're both very easy to expand to fit your needs, with additional discs, tapes, terminals, printers and other I/O devices. And, as we manufacture virtually everything in our systems, we can give you fast, knowledgeable service on any part of them.

So why don't you give us a call? Or write to Bill Krause, Hewlett-Packard, Dept. 315, 11000 Wolfe Road, Cupertino CA 95014. Instead of a computer that does batch but can't handle on-line jobs, you could soon have an HP 3000 that does it all.



HEWLETT  PACKARD

47802HPG11

ARE YOUR PROGRAMMERS ON-LINE OR IN LINE?

If you have already made the move to do online program development and maintenance, you know about the wasted time and clerical functions you have eliminated by being able to test, debug and text edit programs via the terminal. Because Pansophic is a company dedicated to programmer efficiency, we have developed PANVALET/ON-LINE to optimize your online programming efforts.

Working through CICS, PANVALET/ON-LINE provides new tools that streamline the editing, display and processing of programs, while the program library is protected at all times. A complete hard copy audit trail of library change activity is produced automatically. And PANVALET security, control, compression, management reporting, level numbers and backup are all capabilities of PANVALET/ON-LINE.

Across all industries, people in the IBM 360/370 environment USE Pansophic products . . . because they work and because they offer practical solutions to real problems. Call or write today for further information on our complete line of proven software products.

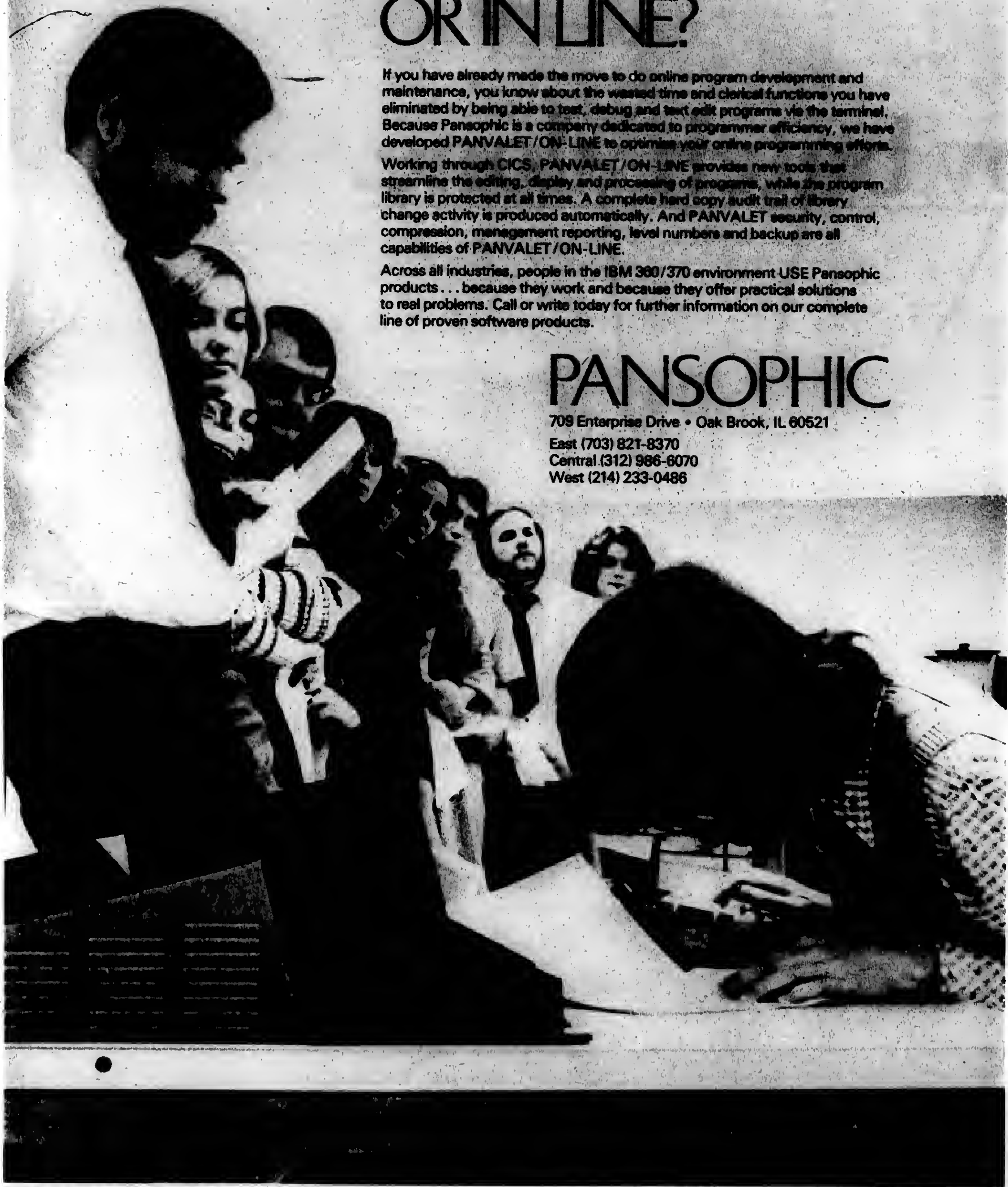
PANSOPHIC

709 Enterprise Drive • Oak Brook, IL 60521

East (703) 821-8370

Central (312) 986-6070

West (214) 233-0486



Holding Company Banks on On-Line Programs

RICHMOND, Va. — Increased competition within the banking community for a share of the consumer credit market has resulted in greater reliance on on-line data processing by today's modern bank. This trend is very evident at First & Merchants Corp. (F&M), a bank holding company with approximately \$1.8 billion in assets and 97 branch offices.

F&M uses on-line CRT terminals to provide Visa credit authorization, to simplify the maintenance of cardholder accounts and to speed processing of sales drafts from branches, agent banks and merchants.

The on-line system for credit card processing is only one of seven major on-line applications at F&M. The others cover the banking spectrum, from demand deposit to commercial loan and corporate trust systems.

All of F&M's on-line applications were developed using the facilities provided by Task/Master, a teleprocessing monitor from Turnkey Systems, Inc.

Consumer Demand

F&M's on-line systems run in a single region of an IBM 370/158. The operating system is now VS1, with a conversion under way to MVS. This conversion is just one step F&M is taking to prepare for the increased demand for on-line banking services.

Much of this demand is expected to be consumer-related. Consumer credit is a segment of the banking business that F&M began to pursue actively when it decided to issue BankAmericards (now being converted to Visa) in 1967. F&M installed its first system for processing credit card transactions a year later.

As the use of credit cards began to mushroom, however, so did the bank's processing requirements. Since each credit card purchase is actually a form of loan to the cardholder, procedures are required to authorize purchases over a preestablished upper limit.

Under the batch system, this was done at F&M's Bank Card Center by authorization clerks who had to look up account balances manually on computer-generated listings.

The manual lookup process "was a real bottleneck," according to Clay Shelton, the senior systems officer now responsible for the overall support and development of F&M's on-line applications. "We never seemed to have enough people or enough listings."

As a result, F&M put credit authorization on-line in 1969 using 10 IBM, 2260s. "This was our first real use of the computer as more than just a bookkeeping machine," Shelton said. "It also represented a significant change in orientation for us."

Since then F&M has upgraded its terminals to Sanders Associates Model 860s and has continually enhanced the system to the point where it is today providing immediate credit authorization for over 12,000 merchants and is fully on-line with the Visa U.S.A., Inc. network for authorization involving non-F&M cardholders.

Under F&M's system, telephoned authorization requests are directed to an operator sitting at a CRT. If the request involves an F&M cardholder, it is handled locally.

If the request involves a cardholder

whose account is not with F&M, it is routed to the Visa network, where a similar lookup and analysis is performed at the cardholder's bank.

Communication with the Visa network is accomplished through a Periphonics T-Comm 7 control unit that operates as a front end to the 370/158. It was the need for software support for this environment, as well as for a flexible package that would accommodate its plans for the future, that led F&M's selection of Task/Master as its communications monitor.

Len Smith, vice-president of technical services, reported that a number of factors went into the decision to acquire Task/Master. "Support for the Periphonics unit was, of course, very important to us," Smith said, "but we

also looked at the stability of turnkey systems and their support for the product and both appeared to be very good.

"Task/Master was also continually being enhanced and that was important to us in light of what we saw coming down the road in on-line banking."

F&M has recently added another element to its credit card processing system, the on-line entry of sales drafts from merchants.

"Based on Visa U.S.A.'s own reports, we've always maintained one of the lowest loss rates of any bank in the country," Shelton said. "Because we're on-line we're able to implement some very tight controls and really stay on top of things."



Clay Shelton

WHO DO YOU THINK HAS HAD 20 YEARS OF EXPERIENCE IN MAKING PRINTER TERMINALS?



Here's How You Benefit From That Experience

With so many makes and models of hard-copy terminals to choose from, how can you select the system most suitable for your needs?

Let Di/An Controls help you. We've been making computer products since 1958 for industrial as well as governmental applications. For general DP as well as specialized applications. If you've recently taken an airline flight, bet on a horse, gone to the theater or attended a sporting event, chances are your ticket was processed through a Di/An printer.

Our 20 years of experience guarantees you'll receive compact, rugged, reliable and cost-effective terminals. We offer a standard product line with a variety of options including special interfaces and APL character set.

Our experienced technical, sales and applications staffs can assist you in the application of our products and in training your personnel to use them. We can also train your maintenance people, or you can use our field service organization.

When you're looking for RO, KSR and ASR hard-copy terminals with up to 1200 baud throughput, come to Di/An Controls, the experienced terminal company that's here today—and will be here tomorrow.



Di/An Controls, Inc., 944 Dorchester Avenue • Boston, Massachusetts 02125
Tel: (617) 288-7700 • TWX No. 710-333-1732

Canadians Control TSO Misuse

(Continued from Page 29)
agement effort is the comprehensiveness of data attainable with TSO/MON compared with standard SMF. The primary reason for the increased data comprehensiveness with TSO/MON is the minimization of SMF data loss.

First, any SMF collection related data loss situations (e.g. data set fill ups) result in a loss of data, which certainly impacts all the processes using the information. TSO/MON has been of great advantage in this area in that a continual reminder message is sent to the operator notifying him that SMF data loss is occurring.

A more important factor affecting the SMF data loss

problem is a result of the session termination method of measurement employed by SMF for TSO, which will normally result in a significant level of SMF data lost for TSO when a system failure occurs.

At Canada Life, in one 30-day period, a number of vendor software problems resulted in a series of system failures. The monthly totals based on TSO/MON and SMF foreground CPU time measurements resulted in TSO/MON showing 24.5 hours and SMF accounting for only 15 hours.

In other words, TSO/MON was able to capture over 9.5 hours of foreground CPU time that would have normally been unavailable through

SMF because of the system failures. The impact of such a dramatic data loss situation on the planning and forecasting process is obvious.

Although Canada Life has not formally utilized TSO/MON as a performance tool, several immediate gains were realized including the savings of more than 60K of real memory due to excessive buffer allocations.

The plan for using TSO/MON as a performance tool calls for using TSO/MON in conjunction with RMF with both systems generating data on a continual basis and reporting at synchronized hourly intervals.

When combined, the two products provide a comprehensive analysis of an MVS/TSO complex, with RMF providing the system level MVS performance indicators (e.g. paging rates, swap rates, swap reason codes, etc.) as well as certain pertinent TSO measures, and TSO/MON providing the analysis of what is actually going on within TSO (e.g., user activity, commands invoked, programs executed, etc.).

Together, these two products provide a powerful monitoring and problem tracking system that the firm expects will greatly facilitate its daily problem tracking and tuning activities.

Ken Starke, the systems support manager, said "even though we had Morino's first

'DYL-260' Gains Full Interface With IMS, DL/1

ENCINO, Calif. — Dylakor Software Systems, Inc. has introduced a full-function interface between Dylakor's DYL-260 report writer and extended utility package and IBM's Information Management System (IMS) — and its DL/1 subset.

The linkage lets DYL-260 users set up, load, update and retrieval operations against IMS or DL/1 data bases and is therefore far broader in its capabilities than the previously introduced, and still available, "retrieval only" interface, a Dylakor spokeswoman said.

Both interfaces work with DL/1 Entry DOS/VS, DL/1 DOS/VS, IMS/VS and IMS/360, she noted, and they support all types of DL/1 access methods including Hdam, Hdam, Hisam, Shisam and Shsam.

DYL-260 rents for \$98/mo. Beyond that, the full-function IMS-DL/1 interface costs \$110/mo, while the "retrieval only" linkage costs \$80/mo. Lease and purchase plans are also available, Dylakor said from 16255 Ventura Blvd., Encino, Calif. 91436.

Savings Banks Backed

LEXINGTON, Mass. — A nine-module package for savings banks equipped with IBM System/34s or other small systems using RPG-II has been developed by McCracken Computer, Inc.

Although they form an integrated system, the modules are also available separately, the company said.

The modules include processing for general ledger, securities, budget, accounts payable and financial modeling. Cost center profitability, new loans, deposit analysis and safe deposit box accounting modules complete the collection, according to a spokesman.

The entire package, including operator training and implementation support, costs about \$25,000; individual modules vary in cost according to their complexity, the spokesman said from 4 Militia Drive, Lexington, Mass. 02173.

MVS product shipment, we have never experienced a systems problem in our nine months of continual operation. I was able to install the product in an evening."

Starke went on to say, "The reports provided by TSO/MON have demonstrated

their value resulting from pertinence, conciseness and readability. With this information now available, we are able to better manage the TSO network at the end user level in terms of the workload as well as the system performance level."

APL COURSES FOR BUSINESS APPLICATIONS

Tailored to your APL implementation.

TEXTS • STUDENT WORKBOOKS • TEACHING AIDS

Numetrix Limited (416) 868-6013
3 Church Street, Suite 602,
Toronto, Ont. M5E 1M2



ACQUISITION WANTED

Boston-based computer terminal lease/service Company would like to acquire Sales-oriented company with Fortune 1000 customer base. Our strong suits are administrative and financial expertise, plus excess cash flow from operations and lines of credit. Qualified organizations are invited to participate in our explosive growth — We double revenues every two years, and earn 10%+ profits. Contact PHILLIP K. CIOLFI, Pres.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300

Available Immediately For SHORT TERM LEASE

370/138 370/148 370/145

3330's and OEM 3330's

360/30 360/40 360/50 360/65's

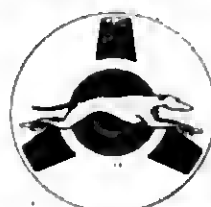
Greyhound Phoenix ICA's

CALL US COLLECT

United States		
Austin	Ron Gail	(512) 451-0121
Boston	Tom Ryan	(617) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dave Hyland	(415) 283-8980

International		
Canada	Don Maunder (Toronto)	(416) 366-1513
Mexico	Andres Contreras	(905) 543-6850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joe Gold (Geneva)	(022) 61-27-54
Austro-Asia	John Hallmark (Dallas)	(214) 233-1818

Non-IBM:		
UNIVAC or)	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**
GREYHOUND TOWER, PHOENIX, ARIZONA 85077

DG Eclipse Fortran 6?

Better yet, CFOR, a user-oriented programming language, is now available for your ECLIPSE. CFOR is easy to learn and implement, and is translated to DG's fast-executing FORTRAN 5. Intelligible control flow and rational syntactic cosmetics lead to "GOTO-less" structured programs which are easy to write, read, debug and modify. A commercial field variable data type extends CFOR to data processing environments while retaining the computational, multi-tasking, interactive qualities of FORTRAN.

Contact David N. Langley

FINNING

FINNING COMPUTER SERVICES LTD.

555 Great Northern Way, Vancouver, B.C., V5T 1E2, (604) 872-7474

Looking for software to sell?

We have a new (fieldtested) software package for all Cobol-users. It is in the \$3,000 area and tailored for mass selling on the international level.

We are now looking for local representatives in various countries on an exclusive right basis.

Interested?

Then send your or your organization's request together with

- Territory wished
- Size of organization
- Sizes of sales/technical force
- Track record of software selling and maintaining (system utility type)
- Other information concerning you or your organization.

To: CW Box 1371
797 Washington St.
Newton, MA 02160
U.S.A.

Added Protocol Urged Datagrams Seen Boon to Network Users

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — Datagrams will allow users of public data networks to send individual packets into the network, addressed so that they will be delivered to the proper receiving terminals, according to John Wheeler, a standards expert with Xerox Corp.

Speaking at a recent symposium on computer networking at the National Bureau of Standards, Wheeler said a datagram protocol should be added to the CCITT X.25 standard, since it provides only for virtual calls and permanent virtual circuits.

Under the present X.25 format, the only way a terminal at one port of the network can communicate with a terminal at another port is by establishing a virtual circuit between the two ports and then carrying on a two-way conversation.

The datagram concept would give the network user more flexibility since all packets would be independent and not associated with a continuous stream of data as they are with a virtual circuit, he explained.

Ongoing Debate

A continuing debate has developed regarding the need, economics and practicality of a datagram service in packet-switched networks, Wheeler said. Most overseas postal, telephone and telegraph authorities and some common carriers maintain that datagram service should not be offered, but on the other side, a strong position has developed that datagram service is urgently needed. The U.S. advisory group for Subcommittee 6 of the International Standards Organization (ISO) has consistently supported this view, he said.

Unitech Terminals Top-Rated

DELRAN, N.J. — Users of batch and remote job entry terminals rate Unitech, Inc. devices higher than others, according to a survey conducted by Datapro Research Corp.

The survey drew responses from 296 users who had a total of 1,990 installed terminals. On a scale of 1 for poor to 4 for excellent, the Unitech terminals received a score of 3.5 for overall performance.

Sixteen makes of terminals were rated by five or more users. Ranking just below Unitech were Data 100 Corp. (3.3); Datapoint Corp. (3.3); Digital Equipment Corp. (3.3); Four-Phase Systems, Inc. (3.2); IBM (3.2); and Burroughs Corp. (3.1).

Users also selected equipment by Harris Corp. (3.1); CMC (3.0); Mohawk Data Sciences Corp. (3.0); Control Data Corp. (2.9); Univac (2.9); Entrex, Inc. (2.8); Sycor,

A recently approved U.S. contribution supports a datagram service because of new data communications applications which require transaction processing. In this case, the messages are independent and can arrive in any sequence. It would be wasteful to go through the process of setting up a virtual call just to send one message, Wheeler said.

Other real-time applications in data acquisition and process monitoring involve redundant data transmissions, and a few missing messages might better be ignored because the most recent measurement is the only important one. These applications could probably benefit through the use of datagram service instead of virtual circuits, he said.

Datagrams would also be important when two separate networks in the packet-switched mode are interconnected. The two nets could both be public data nets operating in different countries or one may be a public data net and the other a private one.

If virtual circuits alone were used for the interconnection between nets, two virtual circuits would have to be established. All traffic between terminals would pass through a single interconnecting link and all packets would have to be arranged in proper

order before they could be forwarded, because of the rules of virtual circuit protocols, he explained. A problem in either virtual circuit or the one interconnecting link would cause a loss of transmission.

But if a datagram protocol were used, a large number of interconnecting links could be used between the two networks. A datagram entering a network could use any one of a number of interconnecting links to provide communications between two terminals. Further, there is no requirement for datagrams to be arranged in sequence so the delays of transmission would be reduced considerably, he said. And the failure of a few interconnection links would have almost no effect on the transmission of datagrams.

Efforts are continuing within the Consultative Committee on International Telephone and Telegraph (CCITT) and ISO to develop a workable datagram protocol. Among the issues to be discussed are the need to maintain a reasonable flow control function at the network interfaces, the problems of packet sizes, methods of identifying datagrams and the possible need for delivery confirmation or nondelivery notice by the network, Wheeler said.

Commercial Union Sets Sites On SNA-Based National Net

BOSTON — Commercial Union Assurance Companies (CU) has begun implementing a network using IBM's Systems Network Architecture (SNA) to provide service to its agents and customers.

This spring, CU automated Massachusetts

automobile underwriting and claims processing and this reportedly became the first insurer to use the IBM 3790 communication system for this line of business. The company plans to extend the system to its offices in more than 30 cities across the country during the next two years.

The company's SNA network currently operates with a 370/158 in Boston and 12 remote sites. Each site has a 3791 controller and 3277 Model 2 CRTs. The network also includes 3793 keyboard printers and 3288 line printers, a spokesman said.

The net, all under Synchronous Data Link Control (SDLC), operates on private lines at 2,400 bit/sec in full-duplex mode. The Model 158 includes 4M bytes of storage and includes a 3705 front end with the IBM Network Control Program (NCP). The CPU operates under Vtvm and CICS/VS.

"Now, when a transaction — be it premium, claim or endorsement — is submitted, a manual search through several paper files is no longer necessary to find out if the transaction is valid," according to Charles Purrelli, CU senior vice-president.

File Integration

The system has enabled CU to integrate into one data base the policy files, endorsements and other policy changes, claims, claims arising, and financial and statistical information. With integrated files in the computer, one entry on a CRT terminal automatically updates all other files for the policyholder, including all business and financially related files. Consequently, up-to-the-minute policyholder data can be instantly retrieved and displayed on the terminal's screen.

"The result has been a reduction in errors, paperwork, clerical and outside service bureau costs — helping us to hold the line on expenses," Purrelli said. "CU is the first major personal lines writer in Massachusetts to process its business in-house, simultaneously integrating the use of distributed processing in branch offices with

(Continued on Page 34)

Terrific? Or Traumatic?

Computerworld is planning a special report in March on the use of data communications terminals. Application stories and tutorial articles written from the user's viewpoint will be featured in this report. Articles should be typewritten and limited to four to five double-spaced pages. Please send them by Jan. 27 to Ronald A. Frank, c/o Terminal Report, Computerworld, 797 Washington St., Newton, Mass. 02160.

COMMUNICATIONS

Data Net Helps Optimize Firm's Operations

MINNEAPOLIS — When a company shifts from centralized to geographically dispersed data-entry operations, an efficient data communications network is key to the success of the operation.

As data-entry operations have been upgraded at International Multifoods Corp., increasing amounts of data have been transmitted back to the Minneapolis headquarters of the firm which runs operations that include Mister Donut and Boston Sea Party restaurants and Hickory Farms cheese shops.

"Processing data from a corporation as diversified and as geographically dispersed as Multifoods would be very difficult without high-speed data communications," according to Gordon

Multz, director of corporate DP.

Data transmitted from remote locations has been an increasing share of the firm's DP workload since it upgraded to a CMC 1800 system from the CMC Division of Pertec Computer Corp.

Using the Telebatch features, the 1800 operates like an IBM Hasp 360/20 workstation to transmit and receive data from IBM 2780-compatible terminals, 360/370 CPUs and other mainframes operating with Binary Synchronous protocol.

Using Ebcidic code and an EIA 232C interface with Bell 201 or equivalent independent data sets, the Telebatch system can transmit at 2,400, 4,800 or 9,600 bit/sec depending on the application.

Multifoods currently has links with affiliates in Minneapolis; Little Chute, Wis.; Chicago and Montreal. The Wisconsin and Chicago locations have

International Multifoods' data-entry operation is described in a story on Page 40.

CMC 3 systems linked to the central DP site by private lines operating at 9,600 bit/sec. The Minneapolis site uses its CMC 3 for general accounting data and also has an NCR 8200 for order processing. These two systems transmit data to the 1800 at 4,800 bit/sec over dial-up facilities.

The Montreal affiliate has its own

DP operation and sends summary data transmission to the Minneapolis DP center once each month over dial-up 2,400 bit/sec lines using an IBM 3747 terminal.

The Minneapolis, Chicago and Wisconsin sites transmit data daily to the 1800 where it is processed on the Burroughs B4700 mainframe and reports are transmitted back the following morning.

The remote sites have the capability for simultaneous data entry and data transmission.

The company is currently evaluating the possibility of expanding its network to Central and South American sites, but current line costs are still considered prohibitive, according to Lavon Ginter, operations analyst.

How to choose between the two best tape filing systems you can buy.

Sperry Remington makes your life a little more complicated. To make it a little easier! By giving you a choice of handsome, convenient, efficient computer tape filing systems. One of them will fit your needs best, and help you get the Boggles out of your tape file system.



Lektriever® 110 System lets you locate your computer tape files directly adjacent to your computer for maximum convenience. This compact, easy-to-use, automated tape file features unique T-Bar tape carriers that let you store hanging-type computer tapes where they're available in seconds. And you can store literally hundreds of tapes with the Lektriever 110. Over 1200 1" tapes in only 34 square feet of floor space. For convenient, efficient, secure, point-of-use tape filing, the lockable Lektriever 110 is the obvious choice.

THIS IS A BOGGLE.

It could be the bug in your tape file system.

Elecompack System V makes high-volume computer tape filing easy and economical. And saves you a tremendous amount of space, as well. This fully automated shelving system uses 46% less floor space than conventional shelves to store the same amount of tapes.

And they're all available at the touch of a fingertip. Plus, System V gives you something no ordinary shelves can: complete lockable security. For high-volume tape filing with space-saving efficiency, your best choice is Elecompack System V.

Lektriever 110 and Elecompack System V — two great ways to unBoggle your computer tape filing. The choice is yours — call your Sperry Remington dealer now or write to

SPERRY UNIVAC

OFFICE EQUIPMENT
P.O. BOX 500
BLUE BELL, PENNSYLVANIA 19422

SPERRY UNIVAC IS A DIVISION OF SPERRY RAND CORPORATION

Send me literature:

☐ Lektriever 110 System ☐ Elecompack System V
☐ Have salesman call

NAME _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

Insurance Firm To Expand Net

(Continued from Page 33)

centralized computing facilities," he added.

"Besides being more accurate, service is faster," he added. "For example, in Massachusetts we have cut the time it takes to issue a check for claims under \$2,500 to minutes for walk-in customers and one day by the mail. Previously, it often took days or weeks using manual processing."

"We intend to automate personal lines nationwide — homeowners and automobile insurance — plus processing and underwriting services for some commercial lines. Worker's compensation would certainly fit this category," according to Lawson Swearingen, chief executive officer of Commercial Union U.S.A.

According to Purrelli, CU decided to adopt distributed — as opposed to centralized — DP because computing power and information are required in the field locations where decisions are made.

\$17 Million Project

"CU is committed to using advanced state-of-the-art automation techniques to improve its service and reduce expenses," executive vice-president Howard Ward said. To underscore that point, he said the company's board of directors has approved a three-year \$17 million project for automation.

The new system enables operators of CRT terminals at field locations to inquire into and display policyholder information, write policies or update customer records through direct links with a 3791 communications controller at the branch. The controller, in turn, is linked via private lines to the central 370/158 in CU's Boston headquarters.

Once the entire transaction is validated, the data is transmitted to the CPU. After processing in Boston, where billing and rating are done automatically, the new policy is printed at the field location for delivery to the policyholder.

If endorsements or policy changes are being made, the 3790 can retrieve appropriate segments of the policy master record from the local control unit or the main computer and then can compare the segments to operator-entered data to complete the transaction.

PTS-100 Gets Boost To Back 32 Terminals

NORWOOD, Mass. — Raytheon Data Systems Co. has doubled the main memory of its PTS-100 programmable terminal systems and increased the number of operator stations that can be supported.

Previously, the terminal was offered with a maximum of 64K bytes of main memory. It is now being supported with up to 128K bytes, which allows the PTS-100 systems to support up to 32 1,920-character terminals compared with a previous limit of 24, according to a spokesman.

Raytheon now offers 480-, 960- and 1,920-character screens, he noted.

Designed to operate in emulation of IBM 3270 equipment, PTS-100 systems support both local and remote processing and feature enhancements designed to reduce communications line time during interactive transactions, Raytheon said.

The system has the capacity

to handle up to 20 line printers and can support any of four keyboards, including typewriter, operator's console, data entry and keypunch.

A PTS-100 remote enhanced emulator system with 32 terminals is priced at \$2,899 on a one-year lease the vendor said from 1415 Boston Providence Tnpke., Norwood, Mass. 02062.

Teleprinter Helps Micro Maker Support Product

LEXINGTON, Mass. — Part of being in the semiconductor business is selling support tools to help make the product easier to use, according to David F. Millet, product manager at NEC Microcomputers here.

The primary support tool offered by NEC Microcomputers is the PDA-80 program development aid, a self-contained system that expedites the development of both software and hardware. A key part of that system is the General Electric Terminet 30 teleprinter.

The microcomputer development system has two functions — writing software and then debugging it. The PDA-80 enables the user to write software for the computer, write the programs and convert them from human-readable to machine-readable form and then debug them.

That's where the teleprinter comes in. "When someone wants to develop software for a computer of any sort, he must have some integrated computer device that has a human interactive interface," Millet said.

"With that, the software can be written and edited and once created in a human-intelligent fashion, converted to something that is machine-intelligent."

"The Terminet 30 was the most cost-efficient answer to our problem. We looked at several dot matrix printers, but the print quality wasn't as good as the GE printer."

Modem Monitor Has LED Display

KING OF PRUSSIA, Pa. — A compact signal-display device that reportedly can be placed in-line between data sets and data communications terminals to provide a means of isolating failures has been introduced by Sorbus, Inc. The unit, which monitors without disrupting communications activity, was designed for data communications suppliers, data terminal users and service organizations.

Plugged in-line, the pocket-size monitor uses LEDs to provide constant status display of seven key signals on the EIA RS-232

25-pin business machine interface. The signals monitored include Transmitted Data, Received Data, Request-To-Send, Clear-To-Send, Data Set Ready, Carrier Detect and Data Terminal Ready, the firm said.

The Traffic Light

Named the Traffic Light, the monitor also has a spare LED circuit that can be used to show the status of any other signal.

The unit, which costs \$89, is covered by a one-year warranty on both parts and labor. Sorbus is at 150 Allendale Road, King of Prussia, Pa. 19406.

Rare bird.

An editing CRT that's ideal for transaction processing.

Lower software costs. Easier programming.

System builders say our Model 1200 Editing Terminal is ideal for transaction processing. We agree.

The Model 1200 makes programming easier because it tells the programmer (and the host computer) the status at the terminal. Communications strap setting, printer errors, operator mode key setting, and more.

The Model 1200 also cuts down on host computer loading by automatically setting modified data "tags," whenever a field is updated, so the host computer can request only modified fields, and skip thousands of needless compare operations.

To further lighten the load on the host computer, the Model 1200 has programmable send keys that let the program regulate the amount of data returned to the computer as terminal loading varies.

More productive operators.

Thanks to a 9 x 12 character matrix, the Model 1200 has crisp, clear, strikingly sharp characters. So operators see their work better and make fewer mistakes.

Data entry is incredibly accurate due to field attributes like low intensity, numeric only, blink, and inverse video.

Editing is fast and easy, too. Single keystrokes insert and delete characters and lines.

All our standard goodies. Only \$1383.*

A big, 12-inch screen, 128-character ASCII set, upper and lower case, 15 cps Typamatic repeat on all keys, and a 24-line display are standard. So is our exclusive No Hassle toll-free 800 number for service. One call gets you service. Where you need it. When you need it. World-wide.

So go ahead. Get a CRT terminal that's specifically designed for transaction processing. Perkin-Elmer's Model 1200 Editing Terminal.

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free 1-800-631-2154.



Quantity 75

PERKIN-ELMER

BR Modular Terminal Built to Handle EFT

TRUMBULL, Conn. — A modular system of on-line data terminals to handle teller transactions and other operations in savings institutions has been introduced by Bunker Ramo Corp.'s (BR) Information Systems Division.

Thrift System 90 was designed to provide increased flexibility and modularity of equipment and software for users in their present operations and for future internal or

external electronic funds transfer (EFT) requirements, BR said.

The system features a variety of CRT terminals and printers for use by tellers, back office personnel and platform officers; a minicomputer for branch office processing and terminal and communications control; and a software package called Thriftran, which controls the interaction between terminal users and the

functions they perform, the company said.

In addition to instant updating and interrogation of central account records, the system provides advanced functional features using the Thriftran software.

The branch minicomputer is program-loaded either by a host processor or locally via a diskette. Communications with host processors (IBM, Burroughs, Univac, Hon-

eywell, etc.) is at speeds ranging from 1,200- to 9,600 bit/sec, with a dial-up fallback facility available.

When communications or the host processor are down, branch transactions can be carried on normally under control of the branch minicomputer. Distributed processing and recording of all transactions expedites end-of-day teller procedures at each branch, the spokesman said.

The minicomputer control unit reportedly can tie other on-line terminal equipment into the DP system of a user institution for EFT operations.

Thrift System 90 includes the minicomputer-programmable control unit, single or dual floppy disk storage device, CRT teller terminal, passbook printer, transaction card reader, customer security keypad for personal identification numbers, administrative terminal and printer.

A typical system including four teller terminals to serve eight teller stations, passbook printing capability and a control unit costs about \$15,000. First deliveries are slated for this year from BR, 35 Nutmeg Drive, Trumbull, Conn. 06609.

Overseas Telex Now Available To Wiltek Users

NEW YORK — Western Union International, Inc. (WUI) has completed an interconnection agreement to provide international Telex service to Wiltek/Wilcom domestic communications users. This makes international Telex service available on a store-and-forward basis to Wiltek subscribers without any additional equipment.

Wiltek provides high-speed data communication terminals and Wilcom, a computer switching service located in Norwalk, Conn. Domestic transmission uses dial-up telephone facilities at speeds of 1,200 bit/sec.

However, for international Telex service, Wiltek/Wilcom subscribers previously were required to access the domestic Telex/TWX networks at standard 66- or 100 word/min speeds using traditional terminals. Now, Wiltek customers can transmit their international Telex traffic directly from the Wiltek terminals at 1,200 bit/sec to the Wilcom computer for relay to WUI's Autosafe system, according to the agreement.

Autosafe is computerized store-and-forward Telex service that offers verification of delivery, automatic redialing service and a cablegram conversion option, WUI said.

An automatic delivery verification report is transmitted to the Wiltek center the next morning, confirming that the overseas messages have been transmitted and including the time of delivery for Telex messages, WUI added.

Charges for the WUI transmission are standard international Telex rates. Wiltek is charging Wilcom subscribers a flat \$50 per month for the automatic relay capability.



Dear Ma:

**The crystal ball is right.
Vadic's new microprocessor
modem is a VA3400, a
212A, and a 103!**

Imagine, Ma, a modem that time sharing houses, and companies using dial-up lines for data communications, can standardize on at the central computer site. With a single phone number for all asynchronous ports from 0 to 1200 bps, if desired.

By ingeniously building in a microprocessor, Vadic's new VA3467 automatically recognizes the calling modem, be it a VA3400, a 212A or a 103, and responds accordingly. All this on a PC board including direct connect (no need to rent your DAAs) for \$850 or less! The VA3467 even tests itself continuously, plus contains all of Vadic's famous diagnostics.

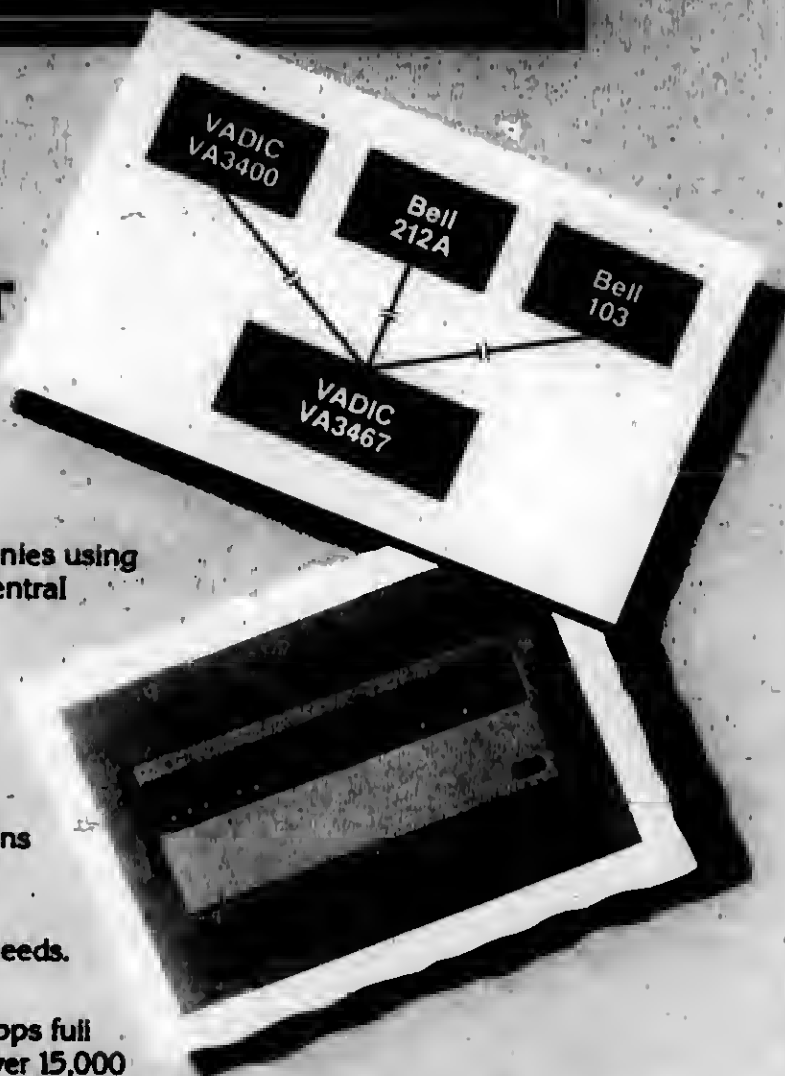
The VA3467 is field expandable, too. You can start with just a VA3400 and later add the 103 or 212A depending on your network needs. That's what firmware does for you.

You just can't seem to catch up, Ma. Vadic invented the 1200 bps full duplex modem (the VA3400) way back in 1973, and has delivered over 15,000 to more than 1,000 customers worldwide. Now, Vadic has leapfrogged ahead with the TRIPLE modem. By the way, Ma, Vadic has just published a booklet comparing the VA3400 to the 212A in 14 critical areas. Better send for one. It's free.

Your independent thinking son,

Alexander Graham Jr.

PS: Vadic has shipped over 150,000 modems to date.



vadic

THE VADIC CORPORATION
222 Casplan Drive, Sunnyvale, CA 94086
Tel: (408) 744-0810 TWX: 910-339-9297

Member of IDCMA

In Credit Operations

Oil Firm Uses CRT Net to Personalize Service

SAN FRANCISCO — A network of CRT terminals has been credited with making Union Oil Co.'s retail credit operations cost-effective and successful.

"Consumer credit on a national scale grew up with the computer," according to G.H. O'Leary, general manager of Union Oil's retail credit-card operations. "Today, computers have helped automate most customer purchases, billings and transactions, but occasionally someone has a problem and needs the help only another person can give."

"To provide this assistance, we established a terminal network to link eight teams of customer service representatives with the central computer and files that contain information on over three million accounts."

Each team consists of 10 persons. A team member working directly with a customer and account information uses one of 83 Honeywell Series 7700 VIP terminals connected directly to a Honeywell large-scale Model 66/40 system.

Each of the eight teams is assigned approximately 375,000 accounts, preselected on the basis of account number clusters. Two additional teams — one working with customers that have special collection problems and the other handling lost or stolen credit cards — also have terminals.

A customer file typically starts when a credit application for a charge card is approved and entered into the data base. New accounts are forwarded to Union Oil's issuance section, where operators use six Model 7760 CRT terminals to feed information into the CPU.

Updated information and account changes are also fed directly into the mainframe from Honeywell terminals and added to one of the nine MSU0451 mass storage units for later use.

Delivery tickets from dealers are processed in San Francisco

at the retail credit card center using a Recognition Equipment, Inc. optical reader that scans account numbers and amount of sale, bar codes the tickets and sorts according to billing cycle. At the same time, dealer information is recorded on magnetic tape to assist in balancing dealer statements.

Most of the application programs have been developed by

Union Oil's systems and programming staff using Honeywell file management techni-

systems were restructured and updated, O'Leary said.

Masks for the terminal

Terminal Transactions

ques. During conversion last year from a Honeywell Model 2070 to the newer large-scale system, many programs and

screens, as well as a special character-compression techniques to maximize space for data storage and usage, have

been developed internally.

The Honeywell Model 66/40 computer system and 89 CRT terminals include 256K words of MOS main memory, a Datanet 6624 front-end network processor, nine tape units, 10 on-line disk units, 1,200 line/min printer, card reader and card punch and an array of optical reader and other data input devices.

Sly buy.

A CRT that costs more but actually costs less.

At \$907, our Perkin-Elmer Model 1100 CRT Terminal has been the price-performance leader in the CRT business for almost a year. Recently, some CRT makers cut their prices to a few dollars below ours.

Don't be fooled. The Model 1100 still costs less. Here's why.

Program debugging takes less time.

You'll save the few extra dollars you spend for our CRT the first time a programmer uses it for debugging a program. The secret? A feature called Transparent Mode, which displays everything coming down the line—including control characters—and helps solve the most complicated host computer and communication link problems in seconds.

Operators make fewer errors.

You'll save money day after day with the Model 1100. Thanks to a 9 x 12 character matrix, the Model 1100 has crisp, clear, strikingly sharp characters. So operators see their work better and make fewer mistakes.

The Model 1100 also has a hooded display to eliminate reflection and end eyestrain. The display is right at eye level, too, which means no bending, no neck problems, and less fatigue.

All our standard goodies.

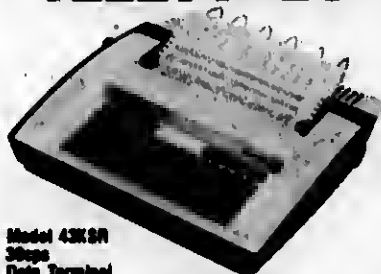
A big 12-inch screen, 128-character ASCII set, upper and lower case, Typamatic repeat on all keys, and a 24-line display are standard. The same goes for our exclusive No Hassle toll-free 800 number. One call gets you service. Where you need it. When you need it. Worldwide.

The Perkin-Elmer Model 1100. Feature for feature, it still costs less.

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free 1-800-631-2154.



TELETYPES®



Model 43KR
30cps
Data Terminal

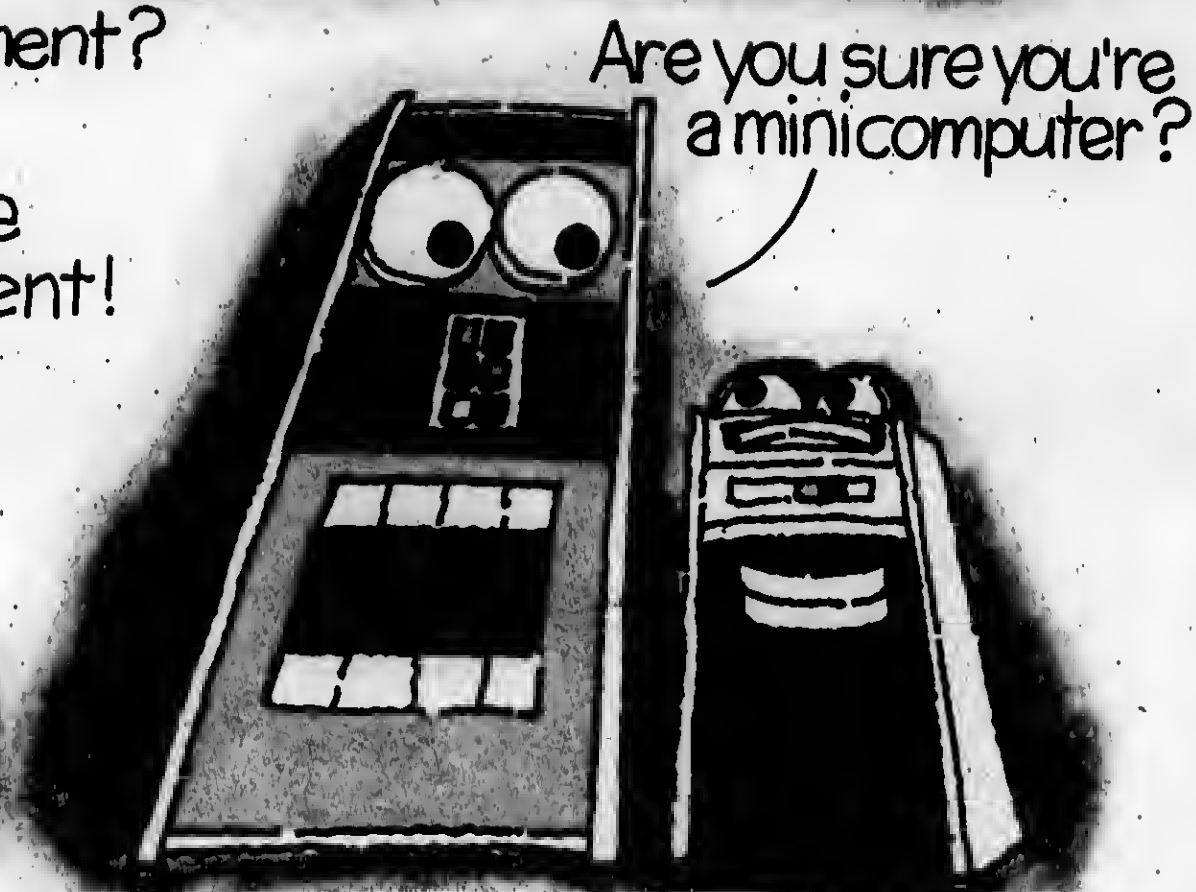
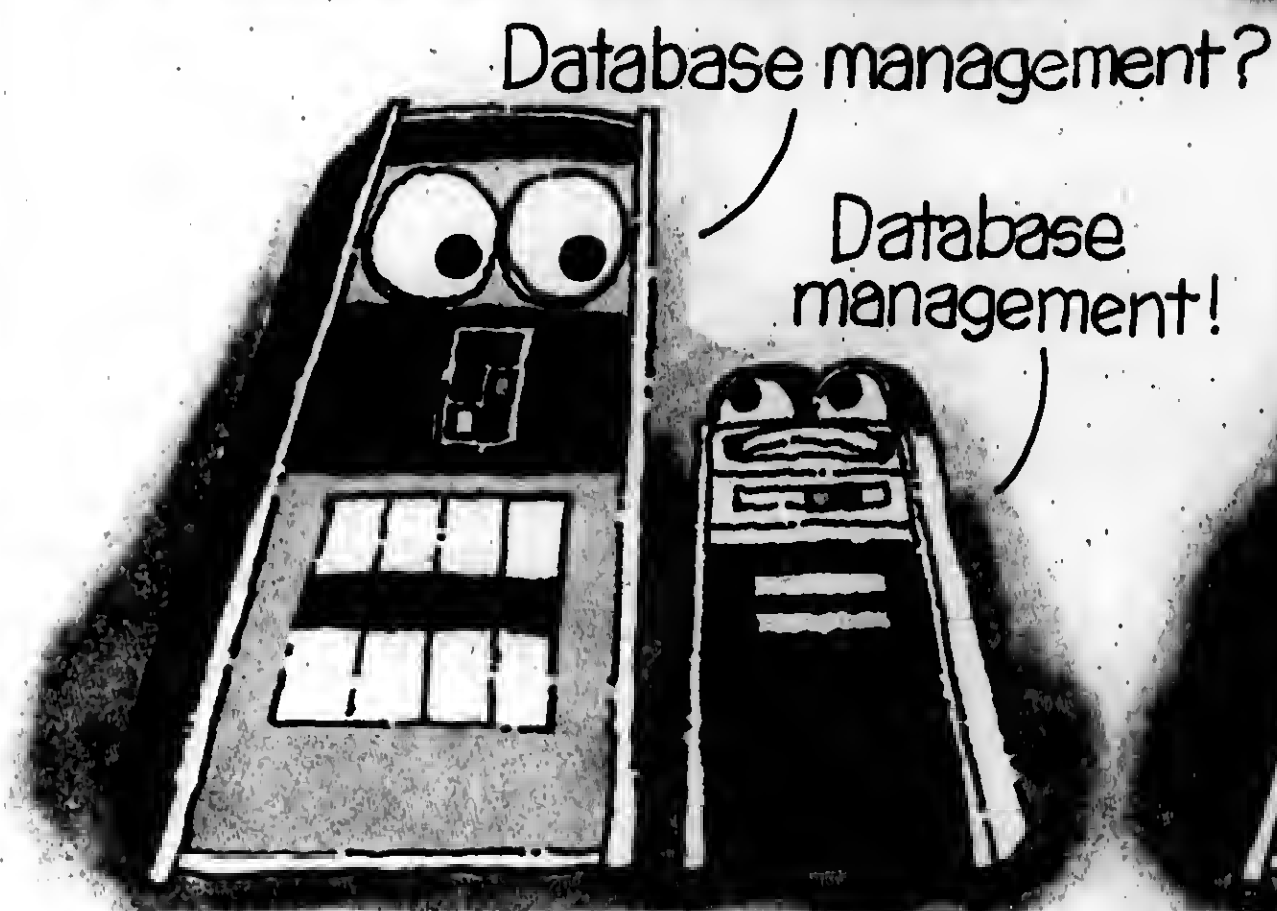
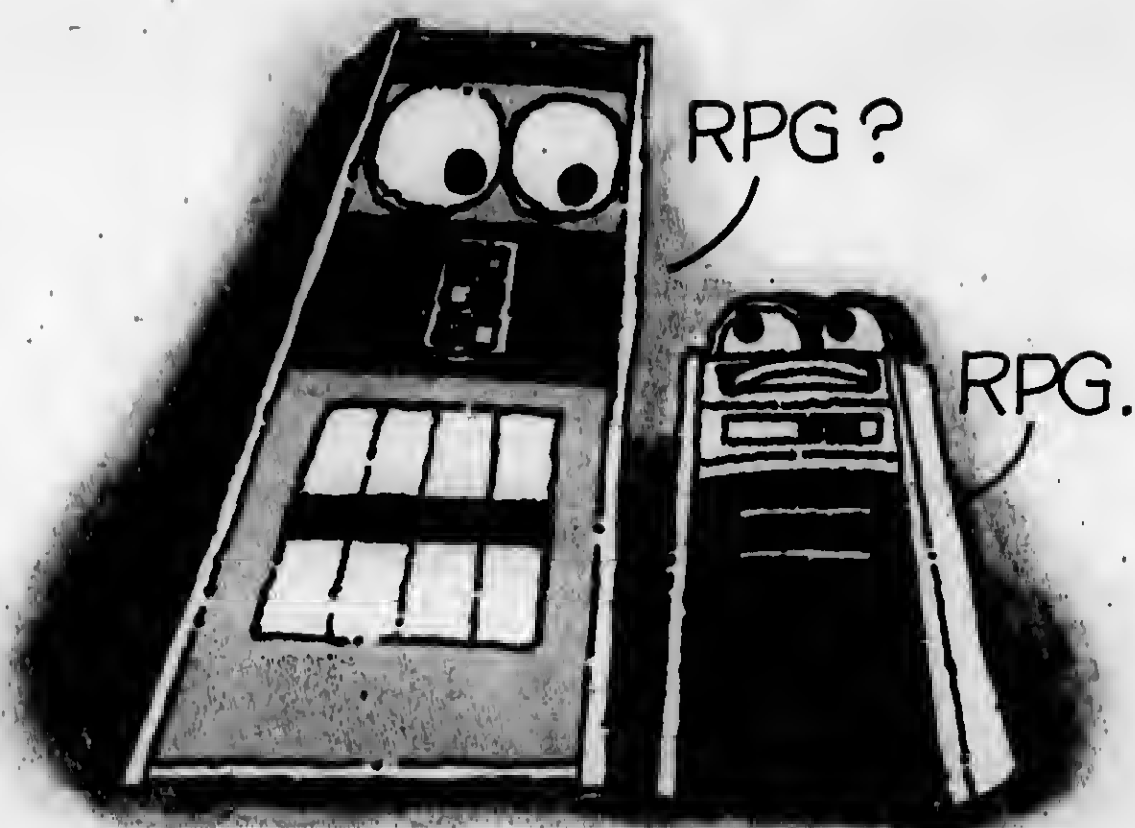
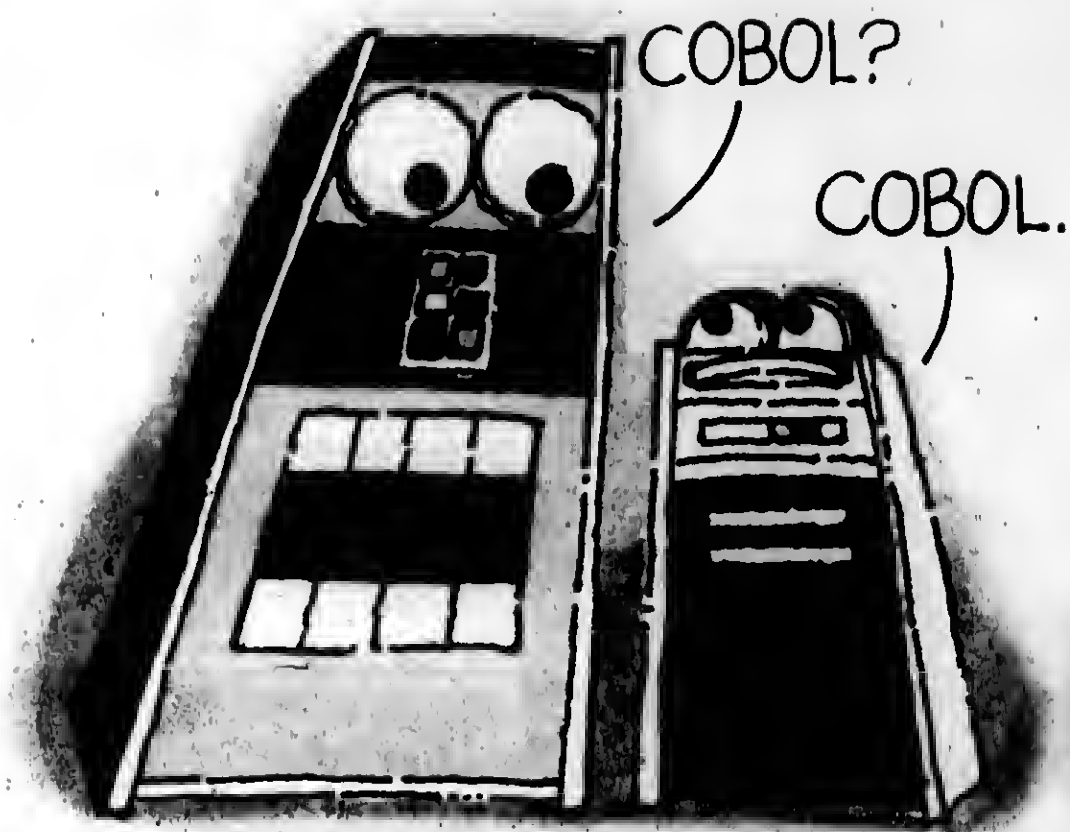
New and Reconditioned
Models 28 • 32 • 33 • 35
40 • 43

FEDERAL Communications Corporation

11105 Shady Trail #107
Dallas, Texas 75229 U.S.A.
(214) 620-0644 TELEX 732211

Quantity 75.

PERKIN ELMER



Our software speaks your language.

Now the largest manufacturer of interactive minicomputers offers the broadest spectrum of commercial software tools: ANSI '74 COBOL, DBMS, SORT, RPG, QUERY, MULTI-KEY ISAM, and more.

That means even better Datasystem functionality in commercial applications. Better because you get:

- great performance in multi-task environments with our new, easy-to-use, interactive, full-function COBOL

- advanced multi-key ISAM data management with our new RMS-11

- fast, versatile report generation with our RPG II

- super fast sorting of data files with our new SORT-11

- advanced data base facilities with our CODASYL-compliant DBMS-11

- quick easy access to data, plus flexible, selective reporting with our new COBOL-compatible DATATRIEVE-11

What's more, we've dropped our prices. And that means even better Datasystem

price performance. For details, contact the nearest Digital office, or Digital Equipment Corporation, Business Products Group, MK-2/H32, Merrimack, N.H. 03054. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital

Expect Enhanced Operations

Texans on Drives: The Bigger the Better

DALLAS — The County of Dallas expects to expand its data base and enhance the overall performance of its DP operations by installing larger capacity disk drives.

A total of 32 Memorex Corp. Model 3650 spindles are on order and are being installed in two phases. These 317.5M-byte units are replacing older Memorex 200M-byte drives.

When all of the higher capacity devices are in place, the county will have a data base capacity of 10.16G bytes, up from the previous 7.2G-byte limit.

The expanded storage capacity will allow the county's DP center to keep pace with a rapidly growing population and the corresponding rise in requirements for community-related services, according to the county's director of data services, Charles Collier.

The Data Services Office supports a wide range of activities such as the sheriff's department, criminal justice system, real and personal property tax rolls and voter registration.

Installation Phases

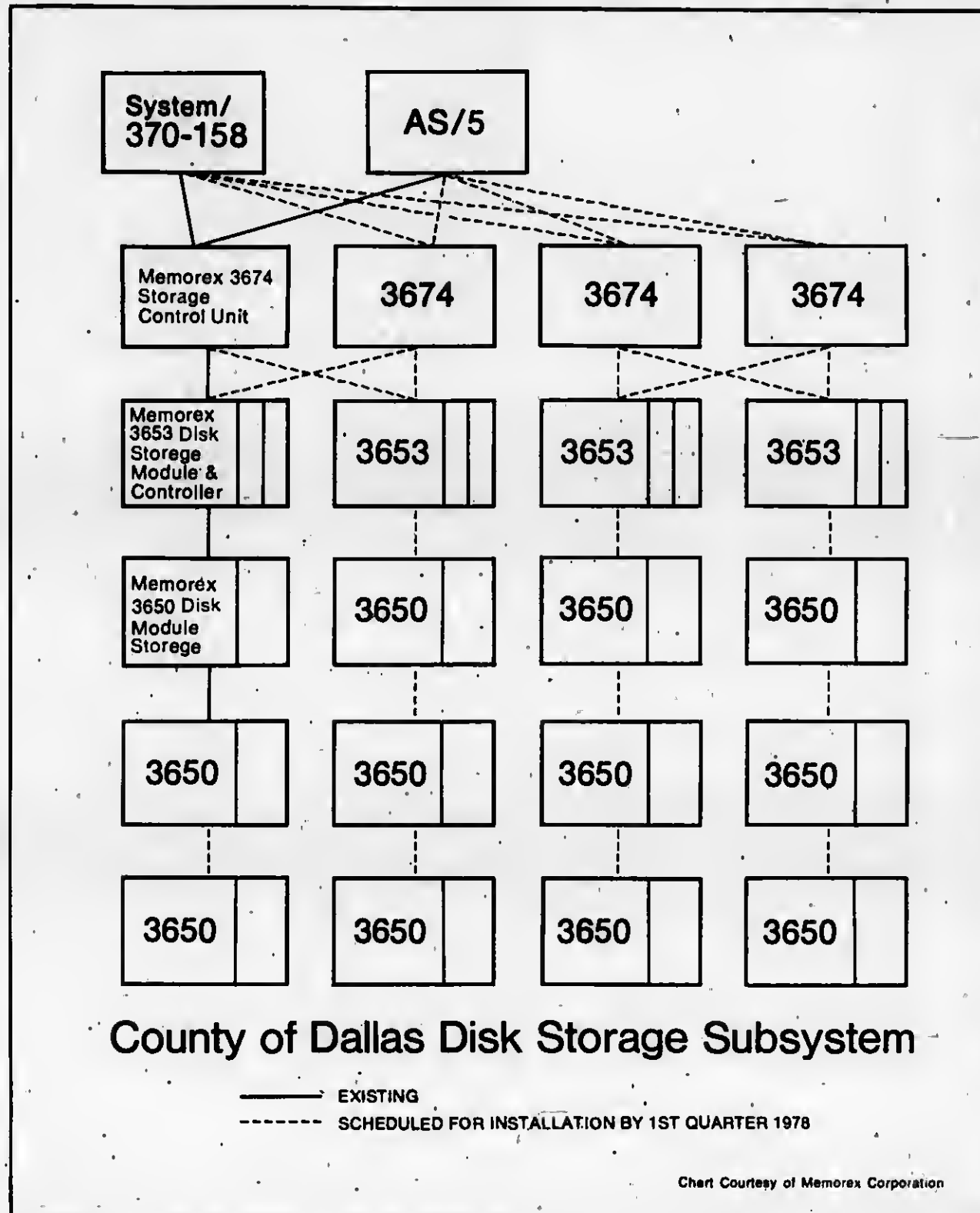
In the first phase of the installation, completed last October, two 3650 disk storage modules with two 317.5M-byte spindles per module, one 3653 disk storage module and controller (two spindles plus controller) and one 3674 storage control unit (SCU) were installed.

The second phase of the installation, scheduled for this quarter, will consist of the balance of the 32 spindles plus three additional 3674 SCUs. A portion of the phase two modules will contain Memorex's optional fixed read/write head feature. This will reportedly provide zero access time for 1.14M bytes per spindle and will be used by the county primarily to store critical and frequently addressed data.

"Installation of the new storage equipment went very smoothly," according to Hank Lipscomb, operations manager for the Data Services Office. "The 3650s were installed during one and a half shifts and they came up clean."

"Since the 3650 modules can emulate 100M-byte Memorex 3670 drives and 200M-byte Memorex 3675 drives, we've had no problems in converting to the 317.5M-byte devices," he added. "This was particularly important to us because we're operating both 200M- and 317.5M-byte drives during changeover."

The Memorex 3650s are being shared between the county's two mainframe computers, and IBM 370/158 and an Ite Corp. AS/5. The use of Memorex controllers enhances configuration flexibility and data availability in this type of installation, Lips-



comb said.

For instance, the 3653 module and controller is string-switchable under program control or manually between the two 3674 SCUs (the county has ordered the optional string switch feature).

The 3674s, in turn, are channel-switchable between the two CPUs. Thus, data stored on any 3650 module in a string are accessible by both of the CPUs. In the event one of the 3674s is unavailable, access can be maintained through the second SCU.

In a typical 370 environment, a 3650 subsystem may be attached in any one of three ways: via the Integrated Storage Control (ISC) on a 370 or via the Memorex 3674 SCU or IBM 3830-2 to block multiplexer

channels. At the County of Dallas, the 3650s are attached to the block multiplexer channels of both the 370/158 and the AS/5.

"The extensive diagnostic capabilities of the 3650 subsystem was an important consideration in our selection of Memorex," Collier said. "Because we provide services to agencies like the sheriff's department and the criminal justice system, we can't afford to have our equipment down. If there's a problem, we have to identify it fast and correct it."

Memorex began shipping its 3650 products in the second quarter of 1977 for pre-production evaluation. The County of Dallas installation represents Memorex's initial production unit installation, he added.

Tired of being last on the routing list?

Subscribe yourself.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SYSTEMS & PERIPHERALS

Operators Work in User Areas

Key-to-Disk Setup Eases Data Entry Growth

MINNEAPOLIS — "We are processing very large volumes of data for our company's remote and head-office user areas — orders, shipments, payments and so forth — on a daily basis. If we didn't have an efficient data-entry system and high-speed data communications, many of the remote locations would probably require their own on-site processing capabilities and would have to be equipped accordingly," according to Gordon Multz, director of corporate DP for International Multifoods Corp. here.

Multifoods operates outfits bearing names like Mister Donut, Boston Sea Party restaurants and Hickory Farms cheese shops. The corporation also

serves a wide range of other consumer-oriented functions.

All of the business data generated by these activities flows into a Burroughs B4700 medium-scale system at Multifoods' corporate headquarters here, where operations are performed in batch mode. Data-entry functions for this centralized system are performed by a CMC 1800, manufactured by Pertec Computer Corp.'s CMC division.

The CMC 1800 is cable-connected to keystations in various user departments throughout the headquarters building, where data is entered into the CMC Distributed Data Entry System for subsequent input to the B4700.

The 1800 also communicates over high-speed private and dial-up lines with three CMC 3 Keyprocessing systems, an NCR Corp. 8200 CPU and an

International Multifoods' communications setup is described in a story beginning on Page 34.

IBM 3747 data converter at remote sites in the U.S. and Canada.

"Twenty-four keypunch devices and operators were required to do our data entry work back in 1972, when we started looking at key-to-disk equipment," Lavon Ginter, operations

analyst, recalled. "We began a systematic search for the key-to-disk vendor best suited to accommodate our particular needs, narrowed the choice to four contenders and did a careful evaluation of each, including sending our operators out to actually try each vendor's system with live data."

"We chose the CMC 5, the most current system offered by CMC at the time, and installed two duplexed systems, since our needs exceeded the disk and keystation capacity of a single system. In 1975 we replaced the CMC 5s with the 1800. We felt that a single key-to-disk system would reduce supervisory problems."

"We also felt that the 1800 would accommodate our expanding data communications workload with virtually no degradation as far as our data-entry activities were concerned," Ginter explained.

Shift in Philosophy

More than just a change of hardware, the shift from keypunches to video display keystations represented a fundamental change in data-entry philosophy. The 24 keypunch operators had constituted a department by themselves — an adjunct to DP, totally separate from the user departments whose data they handled.

"With the installation of the CMC 5s, we began breaking up this department and moving the operators into the user areas where the data originates. At first, most of them were very hesitant about leaving the group because of the close-knit relationship in the keypunch department. But after they had tried working in the user areas, most of them were delighted with the change. They became involved with the user departments, discovered there was more to Multifoods than just the DP area, and many found previously unavailable opportunities for promotion," Ginter noted.

"We've found, too, that they tend to make fewer errors now, and they work more productively, probably because they can relate to the information they are working with, seeing it as real prices or real inventory items rather than just numbers on a source document," she observed.

In a review of the company's move to distributed data entry and its effect in terms of personnel requirements, Harry Donaghy, corporate DP manager, noted, "In March 1973, two months after the CMC 5s were installed, we had 24 operators and 24 keypunch units. Just four months later, we were doing the same volume of work with 18 operators and 18 keystations. Now, we are performing those same functions with just 12 operators and 12 keystations and the volume of work they handle is about 10% greater than it was in March 1973."

"In all," he continued, "we're now using a total of 18 keystations in our Minneapolis building, but six of these are handling new applications we didn't have back in '73."

"In comparing the cost of our past and present approaches, we found that the elimination of just one keypunch operator was enough to recover the lease cost difference between the 24 keypunches and the key-to-disk system," he added.

How to jump into key-to-disk, without giving up your

options

Granted, key-to-disk equipment does good things for data preparation in high-volume applications.

However,

This is one big jump that is best accompanied by a little foot-dragging. Because, in your enthusiasm for the things key-to-disk can do, you may forget what it can't do: read and punch cards.

And the punched card is still very much alive. Particularly as a turn-around document. But the useful unit record is also a pain in the processor for most key-to-disk systems. Leaving you with an awkward I/O problem, and possibly some dissatisfied using departments, too.

But what can you do? Hire, and train, two staffs

of operators? One for keypunch, the other for key-to-disk? Double up on equipment? Establish two different work-flows?

Don't.

Instead, call us. Ask to see one of our key-to-disk-compatible interpreting data recorders. It works *with* your key-to-disk system to give you multi-media capability. You can use it for I/O. Or flip a switch and slip into off-line keypunch mode. Each unit combines keypunch, verify, interpret and reproduce functions so you can have a lot of scheduling flexibility without getting a lot of machines.

The best of both worlds? Why not? Use the coupon to find out just how easy it is, or call 800-523-5948.

Decision Data Computer Corporation
100 Witmer Road
Horsham, Pa. 19044
215-674-3300

- ☐ Send me more information on your key-to-disk-compatible data recorders.
☐ Have your representative call for an appointment.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

We ☐ own a key-to-disk system made by:
☐ are considering a key-to-disk system made by:

- | | | |
|--|-------------------------------------|----------------------------------|
| ☐ CMC | ☐ Entrex | ☐ Inforex |
| ☐ Consolidated Computer | ☐ Four-Phase | ☐ Mohawk |
| ☐ Data 100 | ☐ GTE/IS | ☐ Univac |
| ☐ Other _____ | | |

DECISION DATA
COMPUTER CORPORATION
makes computing cost less

STRUCTURED METHODS, INC.

127 EAST 59TH STREET · NEW YORK 10022 · 212 753-4450

☐ Please enter _____ registration(s) for: _____
_____ and bill me/bill my company.
(Course, City and Date)

☐ Please send me information about the following courses:

Name(s): _____

Title(s): _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Computerworld

FIRST CLASS
PERMIT NO. 2131
NEW YORK, N.Y.

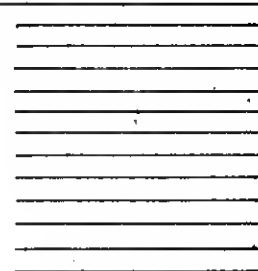
BUSINESS REPLY MAIL

No Postage Stamp Necessary if Mailed in the United States

POSTAGE WILL BE PAID BY

STRUCTURED METHODS, INC.

127 EAST 59TH STREET
NEW YORK, N.Y. 10022





The Structured Caravan...

SEMINAR SCHEDULE

COURSE	DAYS	FEE	JANUARY 1978	FEBRUARY 1978	MARCH 1978
Structured Caravan	1	\$50*	5 Wash. DC 9 Toronto 11 Chi. 13 S.F. 16 L.A. 18 Houston 20 Boston 23 N.Y.		
Introduction to Techniques and Tools of Structured Systems Development	1	175	30 Chi.	22 S.F.	15 Wash. DC 20 Toronto
Managing Systems Development: A Structured Approach	2	325	31-Feb. 1 Chi.	23-24 S.F.	16-17 Wash. DC 21-22 Toronto
Structured Analysis	2	325	30-31 S.F.	6-7 Chi. 27-28 Wash. DC	6-7 Boston 13-14 L.A. 27-28 Toronto
Structured Design	3	475		1-3 S.F. 8-10 Chi.	1-3 Wash. DC 8-10 Boston 15-17 L.A. 29-31 Toronto
Structured Analysis Design Workshop	5	625	30-Feb. 3 Wash. DC	6-10 Toronto 13-17 Boston 27-Mar. 3 L.A.	6-10 S.F. 13-17 Chi. 27-31 Houston
Structured Design Programming Workshop	5	625	30-Feb. 3 Chi.	6-10 Wash. DC 27-Mar. 3 S.F.	6-10 Toronto 27-31 L.A.
Software Reliability	5	625	30-Feb. 3 L.A.	13-17 Chi. 27-Mar. 3 Toronto	6-10 Wash. DC 13-17 S.F. 27-31 Boston
Structured Programming for COBOL Programmers	2	325		23-24 Wash. DC	20-21 S.F.
Infotech/Jackson Design Technology Workshop	10	1400	16-27 Chi. ** 30-Feb. 10 S.F. **	27-Mar. 10 Houston **	6-17 L.A. ** 13-24 Boston **
Data Base and the Organization	3	475	16-18 S.F.	13-15 Wash. DC	20-22 Houston
Data Base Package Analysis & Selection	3	475	9-11 Chi. 23-25 Wash. DC	13-15 Toronto	13-15 Houston 20-22 Boston
Data Base in a Distributed Processing Environment	2	325		27-28 Boston	6-7 Chi. 20-21 S.F.
Data Base Management Systems for Minis—A Comparative Analysis	3	475			1-3 Boston 8-10 Chi. 22-24 S.F.
Systems Design in a Data Base Environment	2	325		6-7 S.F. 27-28 Chi.	27-28 Wash. DC
Designing Effective Data Bases	3	475		8-10 S.F.	1-3 Chi. 29-31 Wash. DC
Transaction Oriented Processing	2	325		27-28 Toronto	6-7 Houston 27-28 Chi.
Transaction Processing Control Systems—A Comparative Analysis	3	475			1-3 Toronto 8-10 Houston 29-31 Chi.
Data Dictionary/Directory Systems—Management Overview	1	175		24 Boston	13 N.Y. 31 Wash. DC

*Entitles registrant to \$50 credit towards any Structured Methods, Inc. product or service

**Weekdays only

DISCOUNT POLICY

Groups of 3 or more—10%

Payment in advance of 21 days for courses beginning on or before Feb. 15, 1978—10%

Registration for consecutive courses listed below reduces fees to the following:

Introduction to Techniques and Managing Development: A Structured Approach	\$475
Structured Analysis and Structured Design	625
Data Base in Distributed Processing Environment and Data-Base Management for Minis	625
Systems Design in Data Base Environment and Designing Effective Data Bases	625
Transaction Oriented Processing and Transaction Processing Control Systems	625

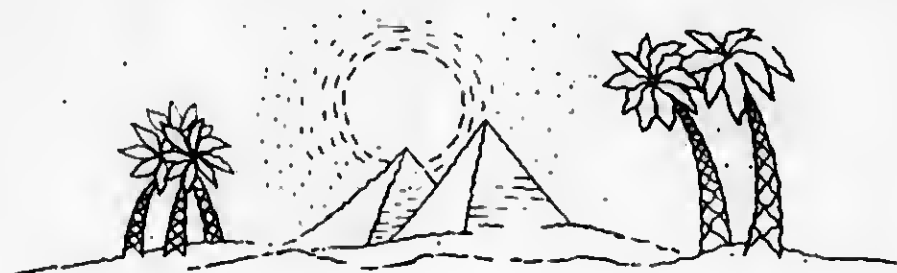
Fees include all materials, continental breakfast, coffee breaks and lunch

Structured Methods, Inc., 127 East 59th Street, New York, N.Y. 10022 212-753-4450

... coming soon to an oasis near you—the dates are in the schedule to the left. Meet the people from Structured Methods, the emerging leader in software development education. Bring along your questions—or just your curiosity—but make sure you attend!

The morning program of the Caravan will consist of three talks: **The Role of Structured Analysis in the System Development Life Cycle**—by Raymond Eisenstark of Structured Methods—**Developing Systems in a Data Base/Data Dictionary Environment**—by Hal Uhrbach of DBD Systems—**Structured Methodologies for Software Development**—by Andrew Pinkowitz of Structured Methods. The afternoon program will allow small groups of attendees to participate in each of three intense one-hour clinics. These clinics will deal with the topics presented in the morning session. The fee for the Caravan, including lunch and all materials is \$50... and we issue a \$50 credit towards any other Structured Methods product or service.

To register, or to receive more information you can call us collect at 212-753-4450, or you can fill out the coupon.



STRUCTURED METHODS, INC.

127 EAST 59TH STREET · NEW YORK 10022 · 212 753-4450

☐ Please enter _____ registration(s) for _____

(Course, City and Date)

☐ Please send me information about the following courses:

Name(s): _____

Title(s): _____

Company: _____

Address: _____

City: _____ State: _____

Zip: _____ Phone: _____

☐ Payment Enclosed ☐ Bill Me ☐ Bill My Company

Charge my: ☐ Visa/ ☐ Master Charge

BankAmericard

(Interbank No.—above your name)

Card No.: _____

Expiration Date: _____

Signature: _____

Focus on Accounts Payable

NEW YORK — A course detailing the development of a computer system for accounts payable will be sponsored by American Management Associations (AMA) here on Feb. 22-24.

The three-day seminar will discuss making the initial feasibility study for a system, setting up the systems team and advisory committee, establishing project work phases and anticipating a company's cash flow, a spokesman said. The course will also cover audits, guarding against in-house fraud, internal money-management controls and microfilm retrieval systems, he stated.

Instructors for the course will be John C. Storck Jr., a principal with Storck Associates, and Charles L.

Swenson, vice-president of Management Science America, Inc.

The AMA said it recommends the meeting for accounts payable managers, accounts supervisors, project leaders, systems analysts, controllers and programmers. Additional courses will be held in Chicago on March 6 and in Atlanta on April 3.

Registration fees are \$460 for AMA members and \$530 for nonmembers. Team fees (for three or more managers attending the same meeting) cost \$390 for AMA members and \$450 for nonmembers. Additional information can be obtained from AMA headquarters, 135 W. 50th St., New York, N.Y. 10020.

MIC to Sponsor Seminar On Data Entry Concepts

CHERRY HILL, N.J. — A three-day seminar involving the concepts of data entry will be held here at the Cherry Hill Inn on Feb. 27-March 1 by Management Information Corp. (MIC).

The course will present such topics as data entry system applications, control techniques, personnel communication and motivation, operator rating procedures and improving data entry productivity, a spokesman said. How to get the most out of keyboard equipment and establishing keying procedures will also be covered, he explained.

The meeting will concentrate on the subject of data entry through discus-

sions with the various instructors who will attempt to provide the participants with solutions to common problems involved with system implementation, he added. MIC said it recommends the seminar for managers, supervisors, lead operators and technical support personnel.

The course will be repeated at the same location on May 22, Sept. 11 and Nov. 13, the firm said. Registration fees are \$395 for subscribers of MIC publications and \$425 for nonsubscribers. Additional information is available from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Bits & Pieces

Bentley Sets Courses On Management

WALTHAM, Mass. — A series of courses focusing on the theory and practice of management techniques and developed in cooperation with American Management Associations' Extension Institute will take place at Bentley College here.

The courses will concentrate on general management; managerial finance and control; and management and the computer, a spokesman said.

Each of the courses is certified. Upon successful completion of six courses, a Certificate in Business Management will be awarded. Classes begin on Jan. 30 with registration fees ranging from \$175 to \$195 per course.

Information and registration materials can be obtained from the registrar's office at the Bentley College Center for Continuing Education, Beaver and Forest Streets, Waltham, Mass. 02154.

Elpac Extends Ugly Warranty

SANTA ANA, Calif. — Elpac Power Systems has announced an increase in its standard product warranty on all linear power supplies manufactured after Jan. 1.

The warranty on that firm's power supplies, nicknamed "uglies," will cover a period of two years instead of one year, according to a spokesman.

Elpac is located at 3131 S. Standard Ave., Santa Ana, Calif. 92705.

HIS Level 64 Rent Fees Grow

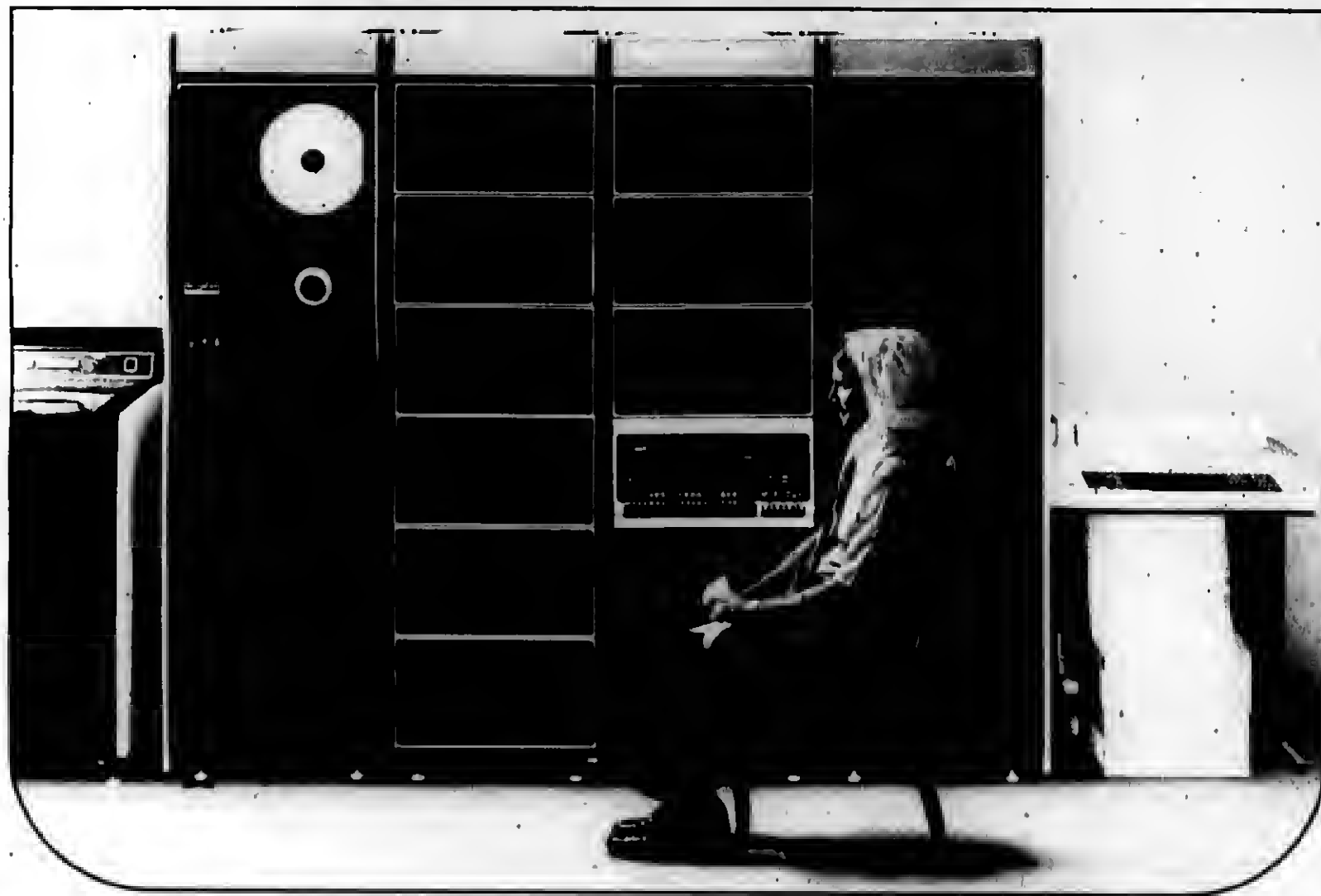
WALTHAM, Mass. — Honeywell Information Systems, Inc. has announced a 5% increase in commercial rental charges for its line of Series 60, Level 64 medium-scale computers.

The increases were effective Jan. 1 for new business and will take effect on April 1 for existing contracts, a spokesman said. Affected are the models 64/20, 64/30, 64/40, 64/50 and 64/60 central systems, he stated.

Correction

The National Computer Centre Ltd. publication *Computer Installation Contracts* is not available from the Hayden Book Co., Inc. as reported [CW, Dec. 5]. Instead, the book is available for \$4, prepaid, from NCC Publications, Oxford Road, Manchester, England.

Does waiting for 11/70 Memory make you feel like Whistler's Mother?



Reflective? Resigned? Reflecting back on when you first ordered your additional 11/70 memory? Resigned to the fact you may age months before you can expand your computer's memory capacity?

If this is your picture... then it's time for another arrangement. Like off-the-shelf delivery of our ECOM® 70 system. (We've been doing it for a long time).

The ECOM 70 composition is perfect. Two chassis configurations are available for greater flexibility. Memory capacity from 128Kb to 4 Megabytes in 128Kb increments.

A remote programming feature with reconfiguration controls to easily select address range... plus a downgrade switch to totally disconnect the ECOM 70 memory without hardware modifications, for ease of fault isolation. And to complete the scene, all programming plugs, I/O cable and manuals are provided to speed field installation. Factory service contracts are available in major cities.

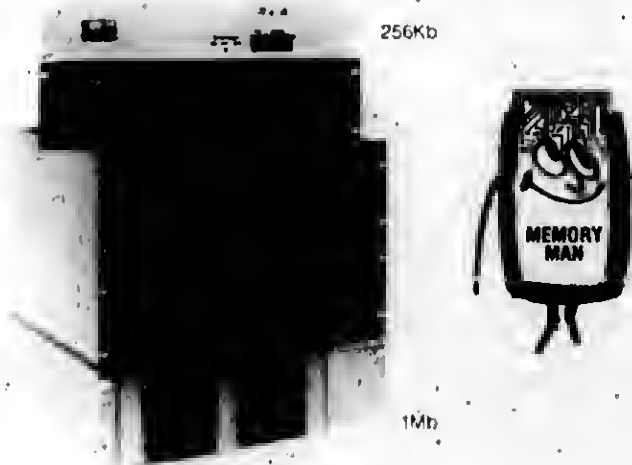
We can put you in an even better mood about PDP 11/70 memories when it comes to the price. Write Trendata/Standard Memories, 3400 West Segerstrom Avenue, Santa Ana, CA 92704, or call (714) 540-3605. TWX 910-595-1596.

For an instant quotation call The Memory Man toll free: (800) 854-3792. (in California) (800) 432-7271.

STANDARD MEMORIES
has grown into a new name

4 Applied Magnetics
Trendata

ECOM® 70 is a registered Trade Mark of Standard Memories.
PDP-11/70, DEC and various model designations are recognized registered Trade Marks of Digital Equipment Corporation.



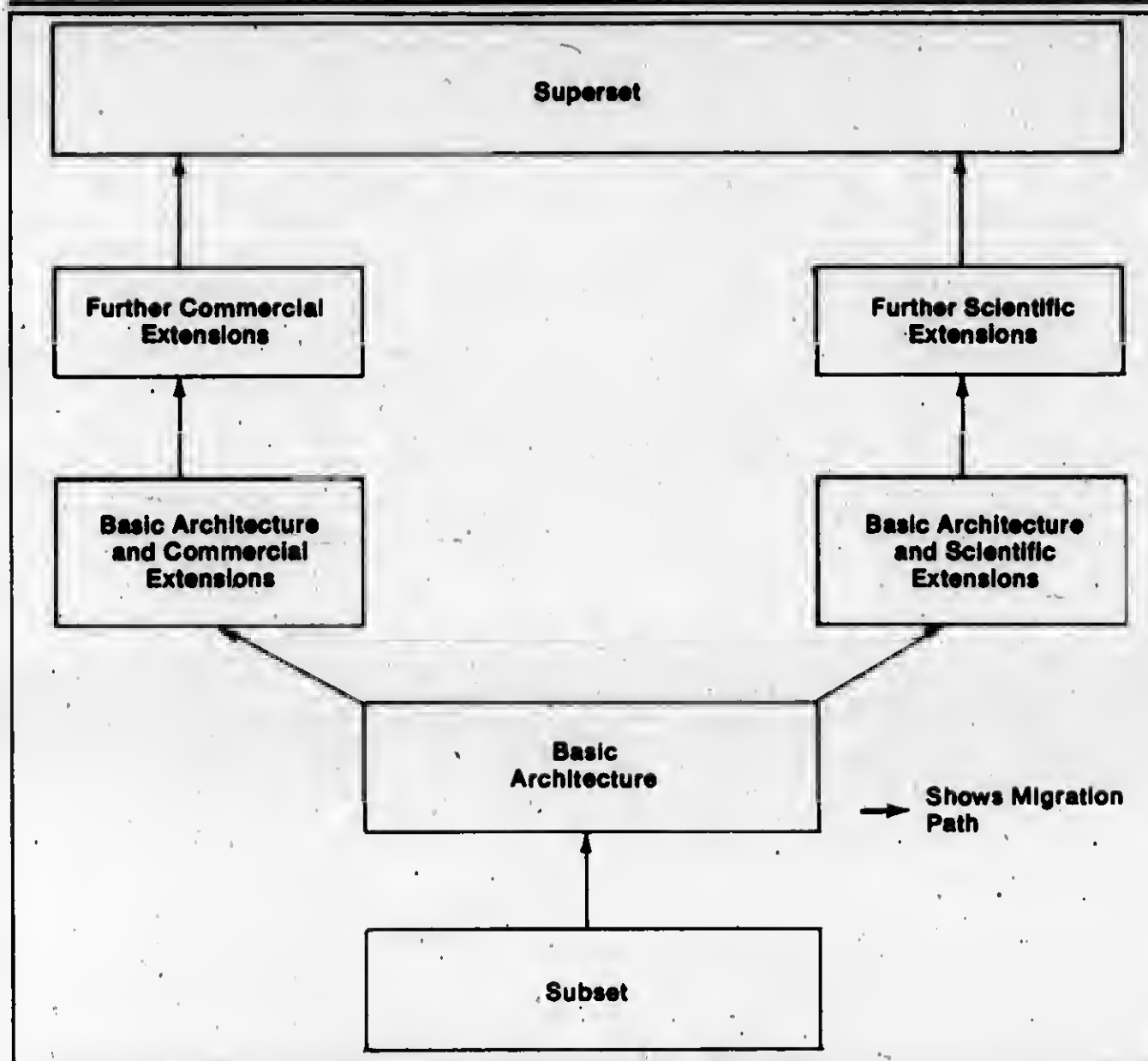


Figure 2. Upward-Compatible Family

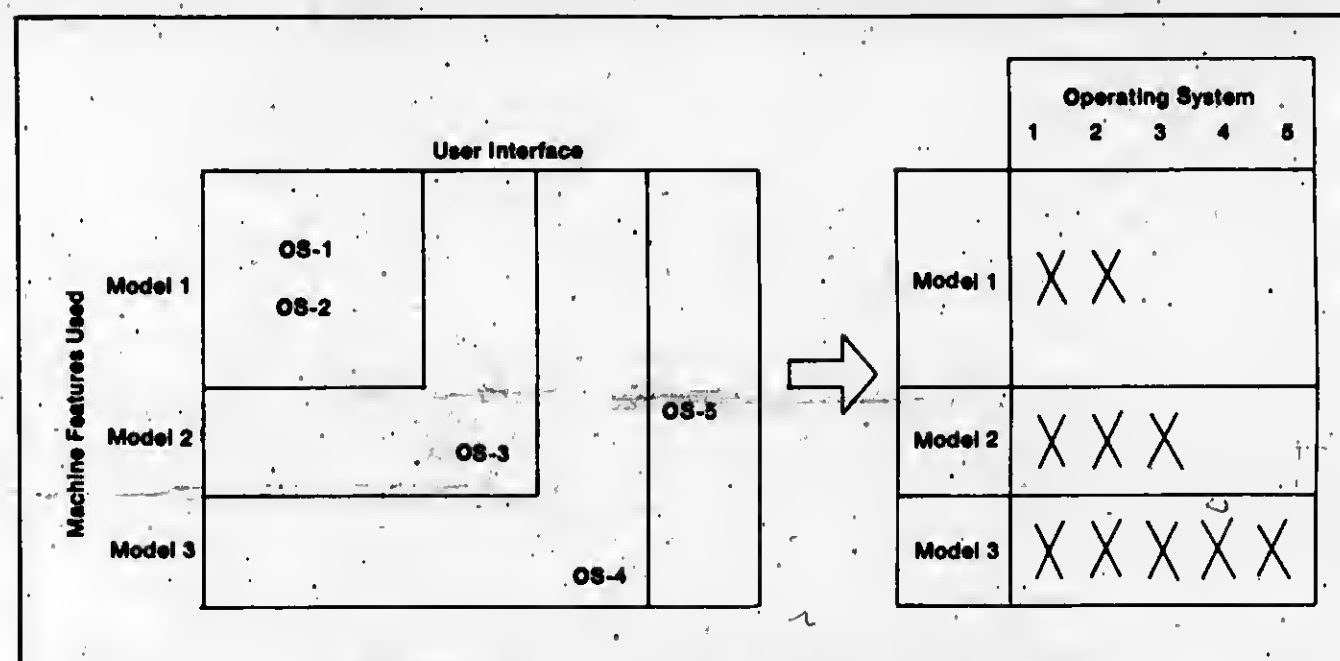


Figure 3. Family of Compatible Operating Systems

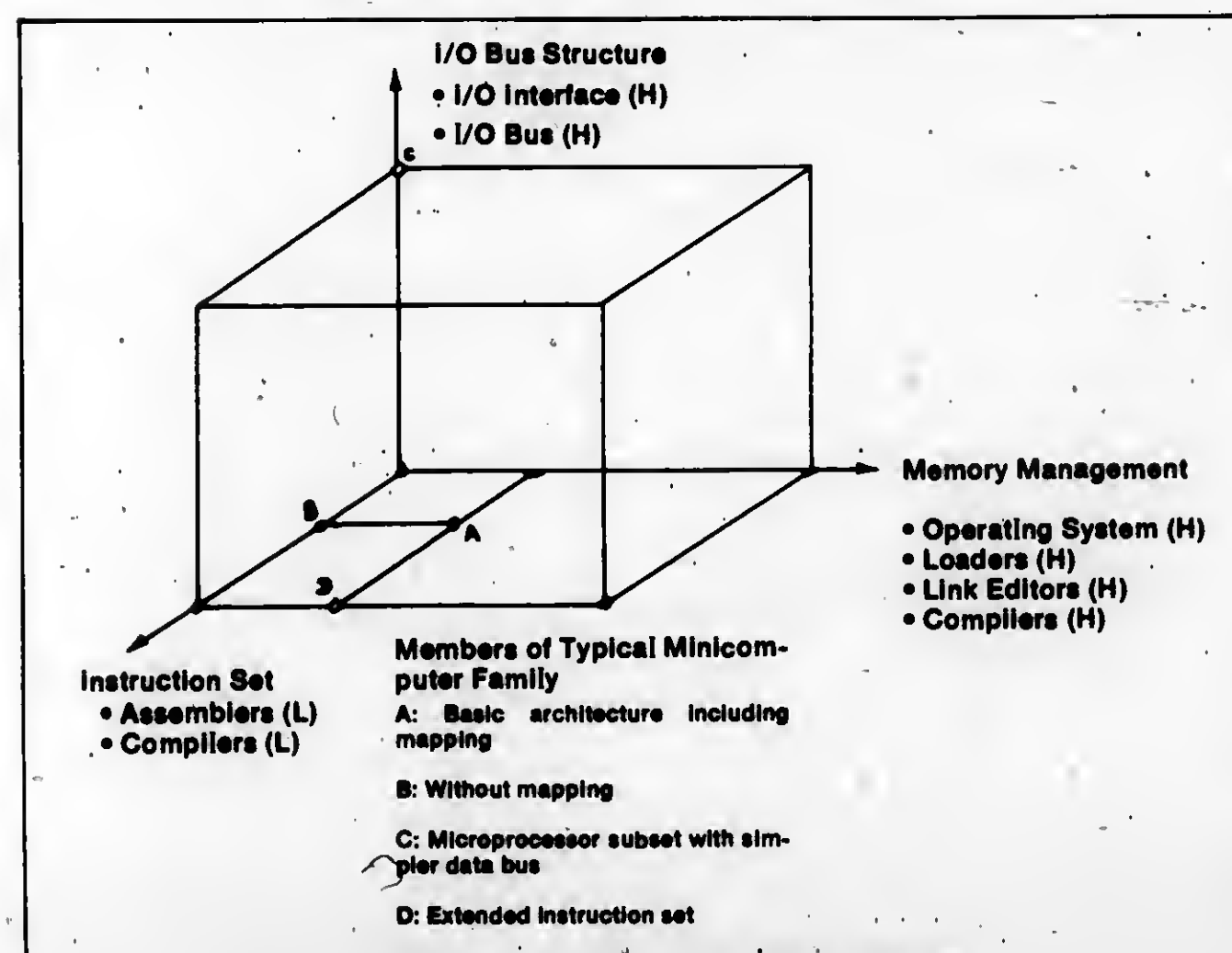


Figure 4. Computer Characteristics Space

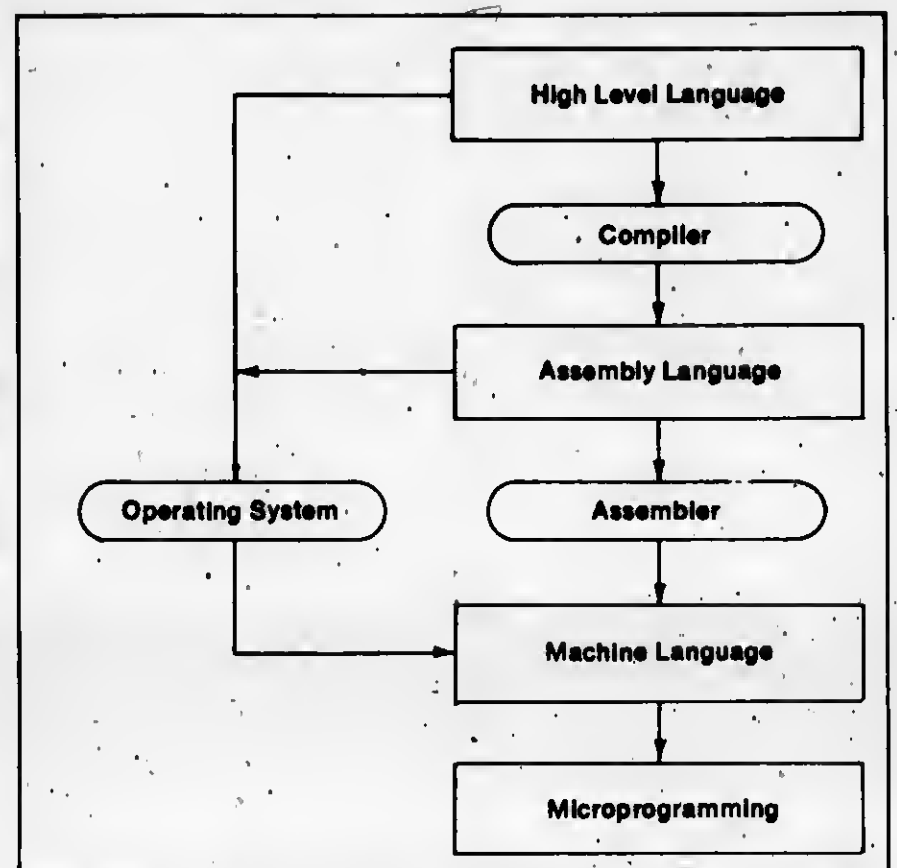


Figure 1. Levels of Computer Usage

Family Approach Eases Use of Old Software On New Hardware

By Dileep P. Bhandarkar
Special to CW

The concept of a family of compatible computers is gaining popularity in the computer industry. This approach is practical — and inevitable — for manufacturers as well as users.

From the user standpoint, the primary advantage is the ability to use old software and equipment with new computers. The manufacturer gains from a standard product line by sharing development and sustaining costs over a wider range of products.

In order to understand the logical constraints on compatibility, it is important to understand the difference between architecture and organization. The architecture of a computer is its conceptual structure and functional behavior as viewed by the programmer.

A given architecture can be implemented in numerous ways. Different organizations correspond to different physical implementations based on appropriate internal data and control structure.

A user may view a computer at various software levels, as shown in Figure 1. The architecture seen by a programmer at any or all of these levels can be standardized.

A high-level language programmer views a virtual machine represented by the definition of that language his interface with the operating system. From this viewpoint, he is not concerned about im-

plementation at all the lower levels.

To the Assembly language programmer, standardization is at the Assembly language level. Strictly speaking, at this level the actual machine language formats are irrelevant.

However, most Assembly language programmers also deal with the machine language representation and therefore require standardization of the actual binary machine codes. Therefore, members in a typical computer family differ only in their micro architecture.

Compatibility from the programmer's viewpoint implies the ability to transfer source programs without modification. The above has to be qualified in terms of whether such movement is totally compatible or upward- or downward-compatible. Compatibility reduces or ideally eliminates conversion costs when programs are moved across a family of machines.

Generally, the machine language level is chosen. If full upward/downward compatibility is desired, a common instruction set, input/output architecture and memory architecture must be defined. This requires careful planning of the entire family.

Most computer families are only upward-compatible. Models line up in a hierarchy where a machine at a higher level can perform all the func-

(Continued on Page 48)

Tektronix 4020 Series

**When you make
your next investment
in terminals...**

**Get something
to show for it.**

The new Tektronix 4020 Series may be your first long-term terminal investment. It's a series of refresh terminals designed to fit your needs today... and your growth picture tomorrow.

For example: The 4025 terminal expands from smart alphanumerics...to forms ruling...all the way to graphics. You start with basics like expandable memory. Familiar typewriter keyboard with complete, easy editing. Scrolling. Easy-on-the-eyes green display with variable brightness.

Now or later, add forms ruling. You can construct separate on-screen workspace and monitor areas that scroll independently. You can recall complex forms with a single key.

Finally, you can add Tektronix graphics. The 4025's 34-line deep screen is the perfect proportion for graphics. Our PLOT 10 Easy Graphing software makes bar charts, pie charts and histograms easy to produce. Alphanumerics, graphics and forms can be positioned anywhere on-screen, in any combination.

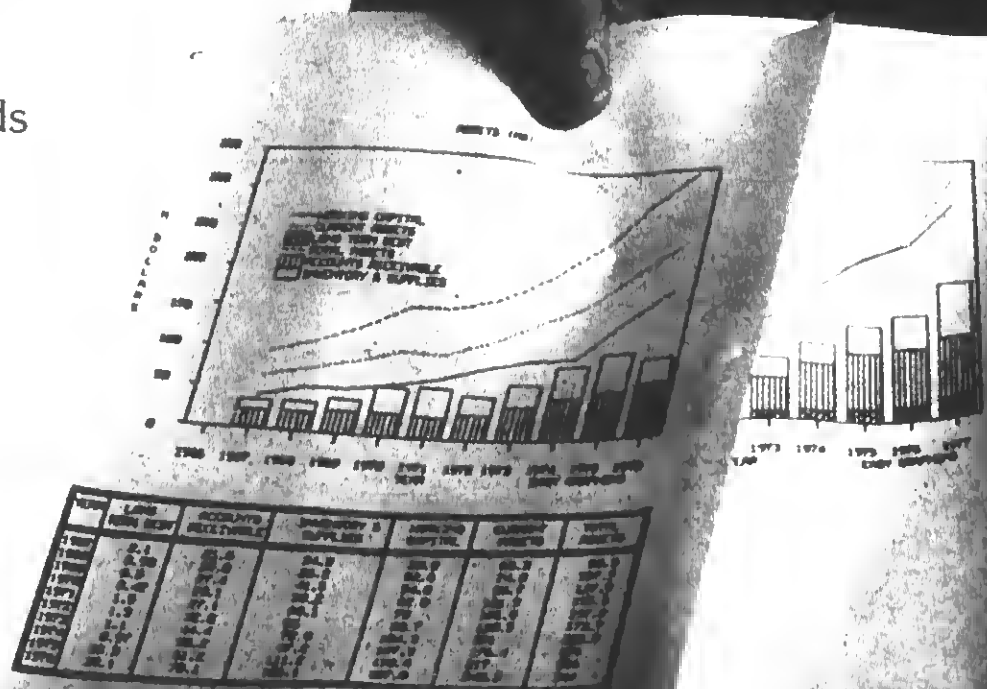
Our companion 4024 provides secondary growth... from alphanumerics to forms.

So you can closely plan and manage your terminal investment with optimum cost control.

Ask your local Tektronix Sales Engineer for a personal demonstration. We'll show you a priced-right, expandable approach to your input and display needs, with the promise of proven reliability and worldwide Tektronix support. The new 4020 Series. It's an investment you can grow with. Even when you're too busy for words.

Tektronix, Inc.
Information Display Group
P.O. Box 500
Beaverton, OR 97077
(503) 638-3411
Tektronix Datatek NV
P.O. Box 159,
Badhoevedorp
The Netherlands

OEM information available
Copyright © 1977, Tektronix
All rights reserved





Tektronix
COMMITTED TO EXCELLENCE

Compatibility Ties Software, New Hardware

(Continued from Page 45)
tions of those below, but not vice-versa.

Such a hierarchy of models might have multiple models at one level that are not compatible with each other, but are compatible with everything below. Subsets of the basic architecture might also exist. A typical scenario is shown in Figure 2.

The architecture of a computer can be viewed along

three major dimensions: instruction set, memory management and I/O.

Changes or rather additions to the basic instruction set have a minor impact on users and the manufacturer. Assemblers and compilers have to be modified to use the new instructions and the Assembly language programmer has to use them in his new software to exploit the new features.

All other system software

continues to run, but does not use the new instructions. Additions that are typically made are floating-point instructions or byte string manipulation instructions.

I/O architecture, especially, must be standardized. In fact, manufacturers have found that different implementations of a given I/O architecture leads to a proliferation of I/O interfaces.

Thus, not only I/O architec-

ture but also I/O bus structure needs to be standardized.

Memory management changes cause widespread problems. Drastic changes in memory management techniques affect operating systems, compilers, loaders and link editors. The user also has a different view of his memory space.

Software compatibility means more than a standard machine architecture. High-

level language specifications need to be standardized. A family of (upward) compatible operating systems is required.

The user interface to the operating system must be standardized. Operating systems and languages designed for specific applications should be permitted as long as their incompatibility is clearly understood by both the manufacturer and the customer. There is always a trade-off between standardization and environment specific optimization.

Operating system compatibility has two aspects: the ability to run on any machine in the family and the user interface. If a computer family has one standard machine architecture, it should be possible to run any operating systems on any processor model.

However, if the family has members with only upward-compatible architectures, then operating systems will run only on higher members of the family. Such is generally the case where lower models do not support memory mapping.

In addition, lower level operating systems will not effectively utilize new features of higher machine members.

A family of operating systems must provide an upward-compatible user interface. This allows users to migrate to large systems with greater ease.

Figure 3 shows the characteristics of a family of operating systems. OS-1 may be a simple minimal system while OS-2 has more elaborate internal software functions (e.g., more intelligent scheduling or resource allocation algorithms).

OS-3 provides more user invoked functions and needs additional machine architectural features. OS-4 represents a similar extension. OS-5 uses the same machine features as OS-4 but extends the user interface.

The ultimate end user needs a further level of compatibility at the applications software level. The end user needs to see a uniform solution to his problem. For example, the same logical file structure should be used across several applications. The end user must be able to evoke a given function in a uniform fashion regardless of the system he is running on.

A computer characteristics space can be constructed where each one of the physical or logical parameters represents a dimension. A simplified space that does show the most salient dimensions is shown in Figure 4.

Bhandarkar is an engineer with Digital Equipment Corp. in Maynard, Mass.

SYSTEM 2000 Puts your resources to work

Data is a valuable resource. Without proper management, it becomes inefficient and impacts the productivity of your other corporate resources.

MRI's SYSTEM 2000 can put your data to work, can make it serve your company in many, many beneficial ways, and can take some of the workload off those other valuable resources.

SYSTEM 2000 is a versatile data base management system designed for users of IBM, CDC, Univac, and Amdahl computers. Working with a wide variety of applications, with data bases ranging from 300,000 to more than 1.5 billion characters, with non-data processing personnel as well as highly-skilled programmers, SYSTEM 2000 provides flexibility and efficiency in even the most complex environment.

To find out how hardworking your resources can be, contact our nearest marketing representative or MRI corporate headquarters. Find out how resourceful and hardworking our people are in ensuring that your needs are met. Ask about the new DOS/VS version and CONTROL 2000, MRI's data dictionary.

Put your resources to work
and take advantage of ours

mri

**SYSTEMS
CORPORATION**

HARDWORKING
THE DATA BASE MANAGEMENT COMPANY
12675 Research Blvd., Austin, Texas 76759, (512) 258-5171

Expects to Halve Payroll Time

Metal Firm Gets First IBM System/34

By Esther Surden
CW Staff

ST. PAUL, Minn. — The first user of IBM's System/34 small business system, introduced last April, expects to cut in half the time it took his firm to do payroll on a card-oriented 3/10.

Union Brass and Metal Manufacturing Co. decided to make the switch from the 3/10 to the 34 because "we were starting to expand

our utilization of the equipment" and the 3/10 could not handle the expected workload, according to Michael A. Poston, the firm's president.

The system was installed in late December and is in the process of becoming fully operational, he said.

Union Brass' DP department surveyed the systems available and decided the 34 could give the company what it needed, most im-

portantly a cardless system and more speed, which were the firm's highest priorities.

"We also wanted to get into more sophisticated work" in the inventory control and production scheduling areas, Poston noted, adding the 34 should afford the company that opportunity.

Poston envisions an on-line system hooked into the plant that will allow workers who have completed work on a given part to insert a card into an IBM 5230 unit and transmit that information instantly into the computer.

The production management people will then be able to tell from the system what procedures are left to be done and how many man-hours it will take to complete them.

Control over inventory will also be enhanced using the system. A bill-of-materials explosion will produce requirements for an inventory of about 350 kinds of parts, castings and product items, according to Theodore A. Brockman, controller.

Another application for the system will be sales analysis, which the firm was in the process of expanding on the 3/10. "With the 34, we will be able to get more sophisticated sales analysis," Poston said.

But the most important application, and
(Continued on Page 56)

PDP-11/70 Users Gaining Free Remote Diagnostics

MAYNARD, Mass. — Users of Digital Equipment Corp.'s PDP-11/70 large-scale minicomputer will soon be able to take advantage of remote diagnosis of system malfunctions as a program to phase in the equipment needed to detect those malfunctions gets under way, according to a DEC spokesman.

Remote diagnostic equipment will be supplied with all new PDP-11 systems. Present users of the systems can opt to receive the units on the anniversary of their field service agreement.

The remote diagnostic capability is being installed at no charge to users, DEC emphasized, although users will have to provide a dedicated, voice-grade telephone line and a Data Access Arrangement. There are currently about 850 users under the service contract, out of the total 2,000 PDP-11/70 users, DEC said.

The Remote Computerized Diagnosis is composed of three elements: a DEC Electronic Console, which is a microprocessor-controlled unit that performs system diagnostic procedures and communicates with the remote host computer; the Service Response Line, a 24-hour, toll-free telephone service that makes the initial determination of whether to attempt remote diagnosis; and the Digital Diagnosis Center, where the host computer, communications equipment and engineering staff are located.

The Electronic Console is used in place of the regular PDP-11/70 front panel, allowing users to initiate operating commands through the system terminal, a spokesman explained. When a system malfunctions, the user dials the toll-free number to contact the Service Response Group, which then arranges for remote diagnosis and contacts the appropriate field service office to schedule a service call.

Configuration files are used to determine proper parameters and diagnostic pro-

cedures for specific systems.

The console also allows the remote host system to log problems for each installation so trends can be identified and flagged.

The Diagnosis Center can arrange for performance evaluation at no charge when the system is not being used, DEC added.

All remote accesses to the system are user-controllable through a key-operated switch on the console and are indicated by a displayed legend, the firm said from headquarters in Maynard, Mass. 01754.

Talking to Mini Makers — Part II

Vendors Say They're Working To End Documentation Beefs

By Esther Surden
CW Staff

Aware that documentation has been a bone of contention between minicomputer users and their vendors, many mini and small business systems vendors are presently revising their methods of preparing it.

Poorly written documentation was one complaint mini users made in replying to a recent survey on minicomputers [CW, Aug. 29]. A random sampling of vendors replied to that complaint.

Documentation must be improved and is being improved, a spokesman for Digital Equipment Corp. contended, because if a user doesn't understand the documentation and thinks there is a bug, that user is going to call field service unnecessarily.

DEC is making a concerted effort to improve its documentation for its users. "We put a senior writing supervisor into Harvard on a nine-month sabbatical to research the question of what constitutes good technical documentation," he said.

The results of that study produced a method of assessing the manuals the firm produces. The attitude at DEC now is that

In July, Computerworld asked readers to tell us what they thought about minicomputers by filling out and returning a survey form. The results of that survey published in August and September issues, showed support and maintenance were areas of great concern to users.

This is the second article in a series that will fill users in on what vendors say they are doing to alleviate some of the problems in those areas.

"the documentation is as important a part of the product as the code," he said.

A vendor "has to do an adequate job in documentation" and in "being specific as to what the software will or won't do," a
(Continued on Page 56)

When we installed our first minicomputer disk system, we talked a lot about RELIABILITY.

4000 systems later, our customers tell the story.



Reliability. We do more than just talk about it. We deliver it. That's one of the main reasons we're now the world's largest independent supplier of minicomputer disk storage systems.

We've delivered more than 4000 systems since we installed our first one in 1971. That's strong evidence of hardware reliability and broad product acceptance.

There's a lot more to the story. Behind our reliable hardware is a reliable company that keeps delivery commitments, provides total software support and responds quickly to customer service requirements. Ask our customers:

We make good disk drives work better through *Extended Emulation™*. This powerful approach adapts software to emulate the CPU manufacturer's operating systems—while still taking full advantage of the unmatched performance offered by our disk system. Whether you need disk storage for mini or micro, you need to know about the important benefits *Extended Emulation* can provide.

The diverse applications for our disk systems are regularly described in our quarterly newsletter, *The Bit*. If you'd like to be on our complimentary mailing list, use the coupon today. We'll send you the current issue. And if you need product data, or help with a specific application, contact the System Industries sales/service office nearest you.

System Industries
an equal opportunity employer

525 Oakmead Parkway, P.O. Box 9025, Sunnyvale, CA 94086
(408) 732-1650, Telex: 346-459

☐ Please add my name to your mailing list for *The Bit*.
Send product data on the follow disk systems:

☐ 2.5 MBytes ☐ 10 MBytes ☐ 300 MBytes

Name _____

Company _____ Position _____

Address _____

City _____ State _____ Zip _____

☐ My need is urgent. Have an applications specialist phone me today: (_____) _____ ext. _____

For Wide-Ranging Broadcasting Firm In-House System Eases Commercial Scheduling

By Ann Dooley
CW Staff

BISMARCK, N.D. — All of Meyer Broadcasting Co.'s advertisement scheduling and business functions are being run on its in-house business system, which has helped the company gain control of a complex and fast-moving business, according to its president, William Ekberg.

In terms of numbers, Meyer Broadcasting's listening audience is not large; geographically, however, it covers five states and two Canadian provinces, giving it the widest ranging daytime coverage in the U.S.

And with three television stations, three FM radio stations, three AM stations and two cable TV systems, automation is essential to the company, Ekberg believes. "I don't know how we could get along without a computer anymore," he said.

Meyer Broadcasting uses an IBM System/3 Model 12 for its cable TV billing, product and sales analysis, accounts receivable, general ledger, payroll and accounts payable. But its most critical job is scheduling the radio and TV commercials.

An advertiser may want a specific time slot or a varying one, so the system must be flexible as well as accurate, Ekberg said. The 3/12 has been programmed so it can rotate a commercial vertically — so it runs at different times — and horizontally — so it runs on different days each week.

Horizontal scheduling "is a better buy than if the message ran at 7 p.m. every Wednesday for seven weeks — the people who watch the Wednesday night movie would see it every week for seven weeks and the people who don't watch the movie would never see the message," Ekberg said.

The system can rotate the ads automatically — a task nearly impossible to do manually with 600 to 700 weekly spots, according to Ekberg.

The system also indicates what spots have already been sold, what is available and what the advertiser's priorities are. Further, it produces Meyer Broadcasting's program log weeks in advance. If an interruption for a special broadcast occurs and a message has to be rescheduled, the system reschedules the entire log.

The small system also prints a confirmation sheet showing which commercials have been aired. In addition, it prints out advertiser contracts that detail the value and number of all daily spots.

The three TV stations are operated in a mother station/satellite mode, according to Ekberg. KFJR in Bismarck is the mother station; all national advertising as well as network programming and the first half of the noon, 6 p.m. and 10 p.m. news and weather are broadcast and fed straight through to the other stations.

The system is therefore responsible for that share of ad scheduling to all

the stations, although the second half of the news programs and their commercials are handled separately by each station.

Two AM radio stations in Montana use IBM System/32s in stand-alone operations that aren't connected to the System/3 in Bismarck.

Meyer Broadcasting first began using data processing in 1966 with an IBM 402. As its needs became more complex, it upgraded from the 402 to a System/3 Model 6, then to a Model 10 and finally to its present Model 12 installed about a year and a half ago.

More Autonomy

At the time Meyer Broadcasting automated, there were few specialized data services, so it decided to build its own system. Now it is happy with its added flexibility in producing reports and generating new data, according to Ekberg.

"When you work with a data service, you are more or less locked into the services it can provide you. We wanted to do some things our way," he said.

One extra feature is the system-generated sales report, which gives national and regional spot sales access to a whole block of time. Allowing two days for adjustments, the last five days are frozen and the time is given over to local advertisers. This has resolved conflicts at the sales level, according to Ekberg, and was easy to do because of

the controlled in-house environment.

One reason the company chose IBM as its vendor was its availability. There aren't a lot of different computer companies in this area, Ed Kautzman, head of DP operations, noted. But the service has been very good even with the long distances, he added.

Meyer's 3/12 system includes dual programming, 80K memory, dual disk drives, five CRTs and telecommunications between the TV stations.

"Our next step is to go on-line in all our applications," Ekberg said. All keypunching will soon be eliminated and all the input will be via CRTs, he added.

Real-time information will give Meyer Broadcasting the ability to immediately know where it stands at all times in its commercial scheduling, Ekberg said.



'He Dropped the CPU!'



WHEREVER YOU SOFTWARE WIZARDS HAPPEN TO BE, YOU CAN TALK TO DATA GENERAL RIGHT NOW.

Call right now. And talk to key managers in Systems Engineering. They can tell you about Data General from your point of view. Because they're software professionals like yourself. They'll tell you how Data General has managed to become the fastest growing minicomputer company in the world. Growing at the rate of 42% per year. Growing so fast that we now have national opportunities in major U.S. and Canadian cities for Software Support Specialists. Specialists who can provide pre- and post-sale software support on a national basis to the field sales force and to Data General customers. You'll be responsible for proposals and presentations, systems software installations and customer software development.

Your background should include a minimum of 2 years experience in one or more of the following areas: assembly language programming; distributed networks and systems; OS and data base systems development and modification; commercial applications development; experience with DGC equipment using RDOS, AOS or INFOS is a plus.

When you call, you'll hear about the great opportunities, advancements, promotions, competitive starting salary, bonuses, car allowance, tuition and relocation assistance, insurance, challenges and possibilities. All this from the company that's the growth story of the industry. The company that's gone from sales of \$1 million to over \$254 million in just nine years. And the company that's sold and installed over 44,500 computers in 45 countries around the world. That means you've got to move as fast as we're moving.

Data General

An equal opportunity employer M/F.

If your Software Interests range beyond field software support, ask about our opportunities in software R & D, documentation, technical support, advanced development, etc. Opportunities exist in the following areas:

New Haven, CT
Hartford, CT
Wellesley, MA
Cambridge, MA
Nashua, NH
Providence, RI
Worcester, MA

To apply for one of the above locations, call Julian Gamill, Regional Systems Engineering Manager, collect at (617) 235-8171, or send your resume, including salary history, in confidence to him at Data General Corp., 888 Worcester Rd., Wellesley, MA 02181.

New York City, NY
Rochester, NY
Buffalo, NY
Blue Bell, PA
Philadelphia, PA

To apply for one of the above locations, call John Kostiw, Regional Systems Engineering Manager, collect at (212) 557-1122, or send your resume, including salary history, in confidence to him at Data General Corp., 144 E. 44th St., New York, NY 10017.

McLean, VA
Melro DC

To apply for one of the above locations, call Mark Splever, Regional Systems Engineering Manager, collect at (703) 893-0910, or send your resume, including salary history, in confidence to him at Data General Corp., 1757 Old Meadow Rd., McLean, VA 22101.

Palo Alto, CA
San Francisco, CA
Seattle, WA
Denver, CO

To apply for one of the above locations, call Jim Ralsio, Regional Systems Engineering Manager, collect at (415) 321-8010, or send your resume, including salary history, in confidence to him at Data General Corp., 2445 Faber Pl., Palo Alto, CA 94303.

Van Nuys, CA
Los Angeles, CA
Santa Ana, CA

To apply for one of the above locations, call Al Scura, Regional Systems Engineering Manager, collect at (213) 973-0401, or send your resume, including salary history, in confidence to him at Data General Corp., 2221 Rosecrans Ave., Suite 204, El Segundo, CA 90245.

Indianapolis, IN
Dayton, OH
Minneapolis, MN
Schaumburg, IL

To apply for one of the above locations, call Ron Pipe, Regional Systems Engineering Manager, collect at (312) 885-0505, or send your resume, including salary history, in confidence to him at Data General Corp., 1111 Plaza Dr., Schaumburg, IL 60195.

Raleigh/Durham, NC
Birmingham, AL
Baton Rouge, LA
Charlotte, NC
Ft. Lauderdale, FL
Knoxville, TN

To apply for one of the above locations, call Brad Habert, Regional Systems Engineering Manager, collect at (404) 325-3181, or send your resume, including salary history, in confidence to him at Data General Corp., 1639 Tullie Circle, Suite 128, Atlanta, GA 30329.

Our Level 6 Minicomputers: modular hardware, modular software, all under one umbrella.



Now one Honeywell minicomputer can let you do a lot of different jobs that once took separate minicomputers and other systems to do.

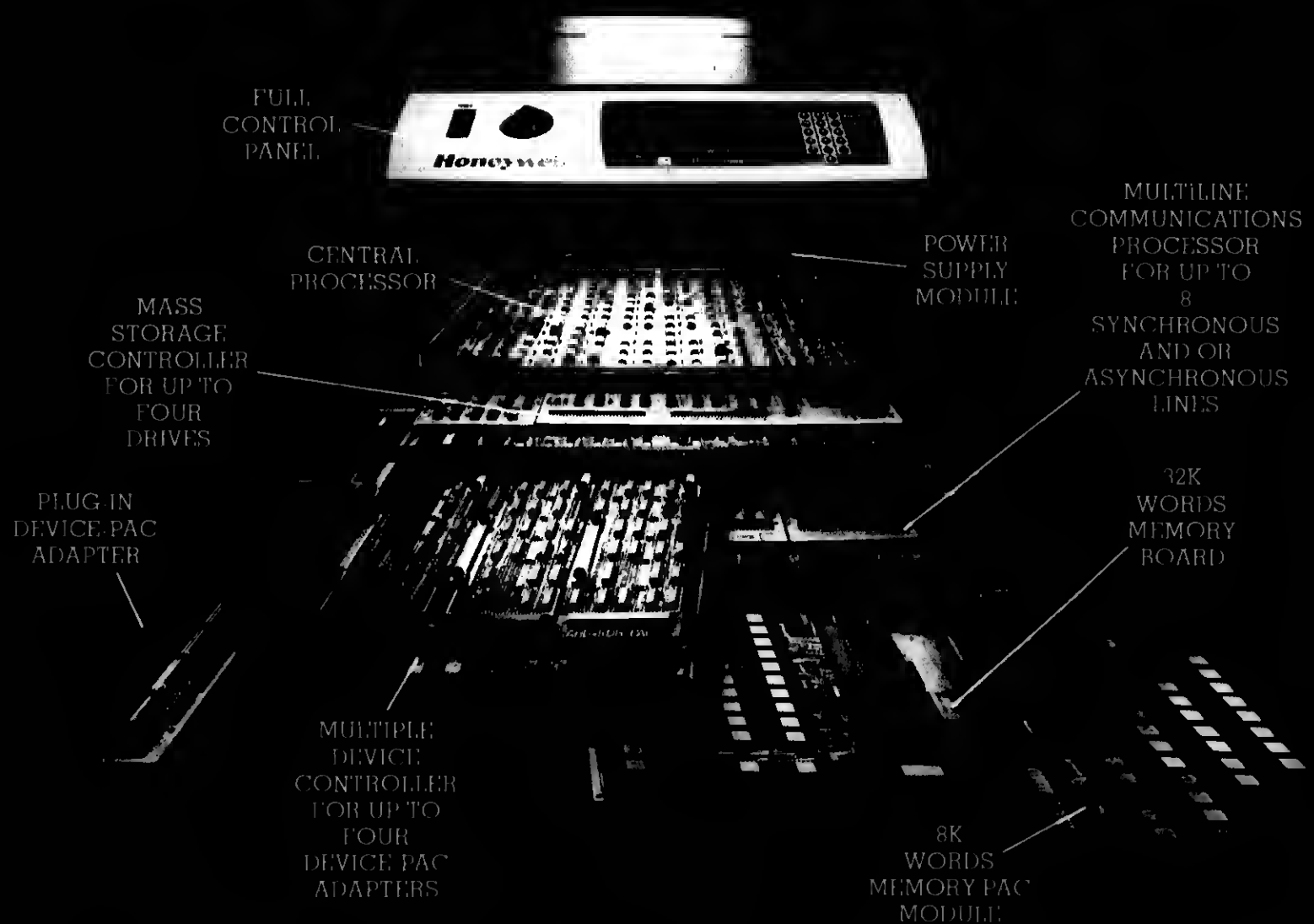
Now you can do things like data entry, transaction processing, communications with a host processor, and data base management—all in a distributed systems environment.

Now you can mix and match these capabilities in any combination you need. And you can expand your Level 6 system as the need arises.

This flexibility comes from having software as modular as the hardware.

And you get the security of having it all from a single mainframe manufacturer with worldwide support facilities.

Modular Hardware.



We design our modular hardware systems with the user's performance objectives in mind. They are often custom designed to meet your specific application and performance requirements. And, they are designed to be flexible. You can add or delete modules as your needs change.

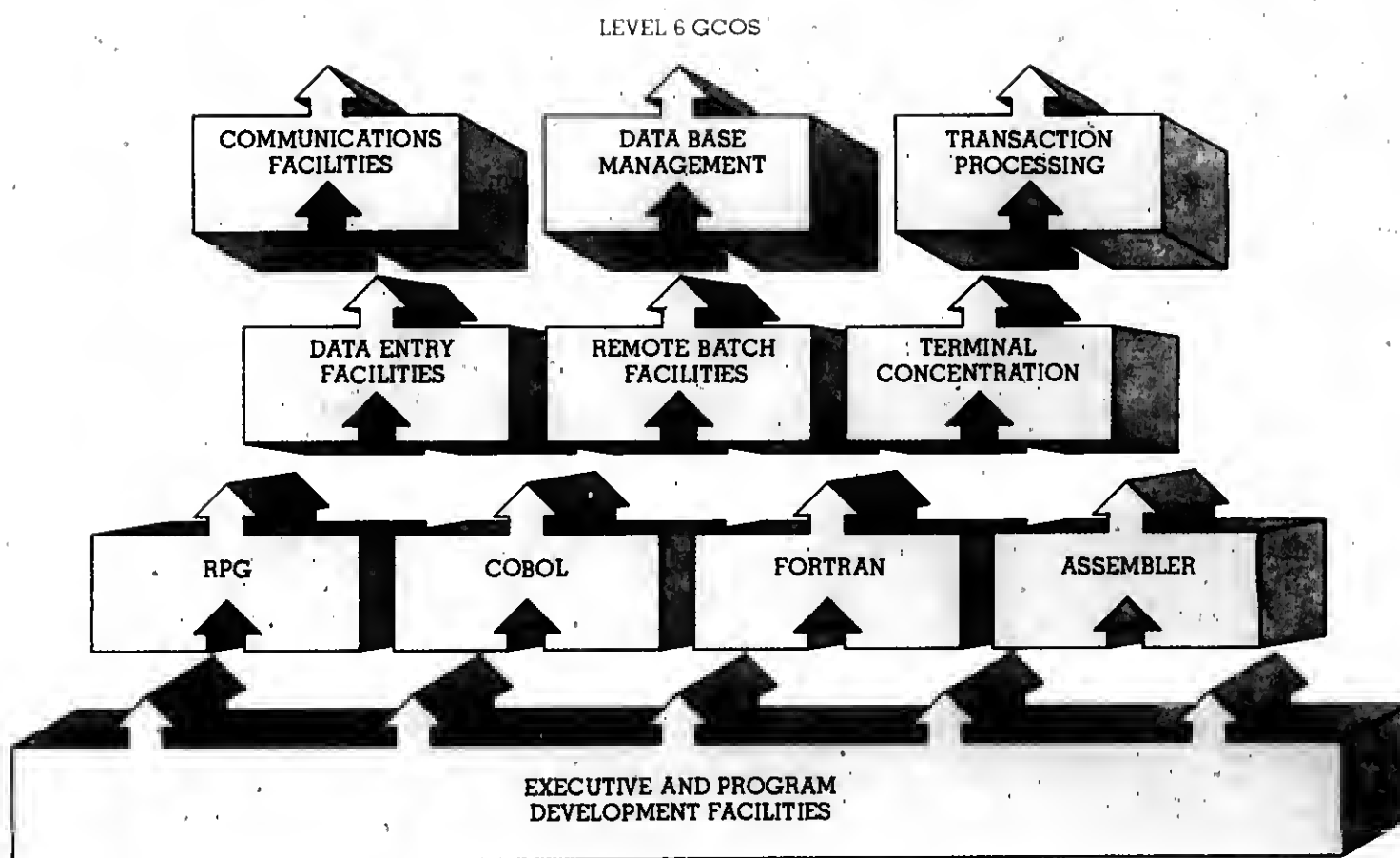
We also have a wide range of software programs that can be adapted to your specific application.

For example, our expanded word processing system can handle up to 100,000 words of text and 100 pages of output. It can also handle multiple users and multiple documents. And, it can be adapted to your specific needs. For example, you can add a printer or a plotter to the system. Or, you can add a communication module to allow the system to connect to a remote terminal.

So, if you're looking for a modular hardware system that can meet your specific needs, look no further than Honeywell.

Our modular hardware systems are designed to be flexible. You can add or delete modules as your needs change. And, they are designed to be reliable. They are built with high-quality components and are tested thoroughly before they leave the factory. So, you can be confident that your system will perform reliably for years to come.

Modular Software.



To complement our modular hardware, Level 6 includes a wide array of modular software.

The GCOS 6 multi-functional software comes in compatible modules that support functional applications such as forms data entry and remote batch with local processing. Plus time-shared program development, terminal concentration,

transaction processing, data base management, and file transmission modules that allow connection to Honeywell and other host processors, all in a real-time, distributed systems environment.

And GCOS 6 lets you process different functions and applications at the same time. For example, you can run your own applications, utilize Level 6 functionality like transaction processing, and com-

municate simultaneously with a host processor on a single Level 6 system.

GCOS 6 modularity lets you design aggressively. With full compatibility of applications interfaces, file systems, and language processors (including RPG, COBOL '74, Fortran '77, and an assembler), you have new freedom to tailor your system to your unique applications.

Whatever your needs, Level 6 lets
you mix and match modules, both hardware
and software, to provide the processing power you need,
when and where you need it.

And Level 6 is backed by Honeywell's
worldwide support facilities. Systems analysts, instructors,
and a field maintenance force of over 3500
in the United States alone.

Modular hardware. Modular software. Worldwide support.
Honeywell has your requirements covered.

Honeywell Information Systems		
200 Smith Street (MS 487), Waltham, MA 02154		
Please send me more information on Level 6.		
☐ I'm an OEM.	☐ Put me on your mailing list.	
☐ I'm an end user.	☐ I've read enough, let's talk.	
Name _____		
Title _____		
Company _____		
Address _____		
City _____	State _____	Zip _____

Computerworld



Honeywell

Honeywell Information Systems, 200 Smith Street (MS 487), Waltham, Massachusetts 02154

System Adds Control to Cataloging Operation

CHURUBUSCO, Ind. — A small business system at a unique division of a Fortune 500 company here is helping the division gain control over its dedicated application.

The company, Dana Corp., is a \$1.5 billion firm based in Toledo, Ohio. Its automotive marketing division, based here, is heavily involved in the replacement parts business and the cataloging application that inevitably goes with that business.

In the mid-1950s, the firm decided the catalog task had outgrown conventional methods, according to Frank Sedlacek, manager of cataloging systems.

Catalog methods have to be timely, accurate and all-inclusive, he said, noting catalogs are drawn from voluminous numerical and constantly changing data.

Sedlacek considered a computer ideally suited for catalog preparation based upon his experience with automation in typesetting applications.

With persistence, he was able to secure time on Dana's central mainframe. Until recently, he continued to use the help of the company's mainframe on a time-sharing batch process basis.

As his cataloging tasks continued to grow, time on the mainframe became harder to get for tasks like his, and batch processing became less acceptable to him. His parts cataloging requirements soon outgrew their welcome on the mainframe.

Each year's new car models add to the volume of parts information that must be managed and presented. "The parts business increases at a fast rate ... newer models are introduced faster than older models are retired," he noted.

Dana, he said, must completely revise and publish 12 master catalogs every two years and supply supplemental catalogs during the interim period.

Quick Growth

The next step for Dana was a switch to a Linolex Systems Co., Inc. small business system that was adequate for its needs at the time. When more power was needed, the firm looked at systems from IBM and Microdata Corp.; it chose a Microdata because

"you couldn't beat the price." That was three years ago.

Systems Management, Inc., a Microdata dealer, recommended a system that consists of a CPU with 20M bytes of disk storage, a 9-track 800 bit/in. magnetic tape drive, two CRT terminals and a 96 char./sec printer. The printer provides both upper and lower case characters.

Two drives, four terminals and 16K of memory have since been added to the system.

Important Benefits

The system was installed in the Automotive Division's Toledo facility in November 1975. When the division was moved to Churubusco, the system went right along "without a slip," ac-

cording to Sedlacek.

With its Reality system, Sedlacek said, the division was able to produce its "Victor" catalog without overtime for the first time. Victor is a Dana brand name, and Sedlacek noted that publication of the previous Victor catalog had cost 1,150 man-hours of overtime, or \$15,000 in out-of-pocket expenses.

Furthermore, Sedlacek added, the catalog was published with a completely new format. He believed that making this format change without the system's help would have cost approximately \$3,200 for keypunching and \$2,100 for purchased time. The system saved \$20,300 on this publication alone, he estimated.

Savings were also achieved with the

system's elimination of the input and proofreading time previously required.

"The system paid for itself within a year," Sedlacek noted.

Sedlacek found he could produce a price list in five working days and "get it out about 10 days earlier." This, he said, allowed the firm to advance the effective data by two weeks.

The system also enabled the division to streamline its manufacturing process. Duplicate parts were identified and have since been eliminated along with the cost of duplicate listing, pricing and warehousing. "This updating has become a continuous cost-saving process," Sedlacek said.

The firm is able to link publications, sales, source and engineering records into one integrated file.

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.



Control Data

Dalapro
Printronic
Codex
Leer Siegler
E M & M
The Morley Company
Vanier Graphics
Total Typography
Wang Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Intorex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Inform
Computer Decisions
Infosystems
T-Bar
Corporate Systems
Dynatech
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems

IBM

General Computer
Atlantic Research
Telelite Computer Products
General Electric
Qume
Moore Business Forms
DataMedia
Texas Instruments
Computerworld
NCI
Deltak
Kodak
BASF
Western Union
Anderson Jacobson
Computer Input Services
Paradyne
ComData
Genesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing

Intel Corporation

Peripheral Products
Applied Digital Data
Epic Data
Sykes Datatronics
Cummins Allison
American Microprocessor
International Data Corp
Programs, Inc.
Beehive International
Interlec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini Computer Systems
Tandem Computer
PCC/Perlec
Computrend
Extel
Mentel
Sycor
Digitronics
TRAC Associates
Computer Services
Datamart
Courier Terminals
SBC
Shasta
Mostek
DIVA

Sperry Univac

Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathematica
Rianda Electronics
Computer Corp of America
AT&T
Cutlance
Hewlett Packard
Pensophic Systems
General DataComm Industries
Continental Peripherals
Computer Associates
Oanter
Diablo Systems
Marketechs
Racal Milgo
Data Systems Specialists
Key Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
Datamation
Communication News
McCormack & Dodge
Data Rentals

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

For complete information on how the 1978 Computer Expo can work for you, use the coupon below or call Kim Wichert, toll free 800-225-4242. In Massachusetts, (617) 964-4550 (collect).



HP System 45 Gains Plot Link

PALO ALTO, Calif. — An interface card that reportedly adds the capability of controlling incremental drum and flatbed plotters to the HP 9800 System 45 desktop system has been announced by Hewlett-Packard Co.

The HP 98040A plotter interface can be used with incremental drum and flatbed plotters that require user-coded data inputs. It enables the System 45 owner to use computer read-only memory (ROM) commands to control plotting functions, including axes, lettering, scaling and plotting of different types of lines, HP said.

Pen selection can also be controlled through the ROM for some plotters with multiple pen capabilities.

The HP 98040A plotter interface costs \$600 from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
- ☐ Have Sales Representative call me
 - ☐ Send Reservation Agreement
 - ☐ Send Copy of 1977 Attendee Analysis

- ☐ I like to attend, please send more info.

- | | | |
|--|---------------|---------------|
| ☐ Southern California Computer Expo | Anaheim/LA | March 21-23 |
| ☐ Northwest Computer Expo | San Francisco | March 28-30 |
| ☐ Southwestern Computer Expo | Houston | April 11-13 |
| ☐ Southeastern Computer Expo | Atlanta | April 18-20 |
| ☐ Gateway Computer Expo | St. Louis | April 25-27 |
| ☐ Midwestern Computer Expo | Chicago | May 2-4 |
| ☐ Mid-Atlantic Computer Expo | New York | May 9-11 |
| ☐ Great Lakes Computer Expo | Detroit | May 23-25 |
| ☐ New England Computer Expo | Boston | May 30-June 1 |

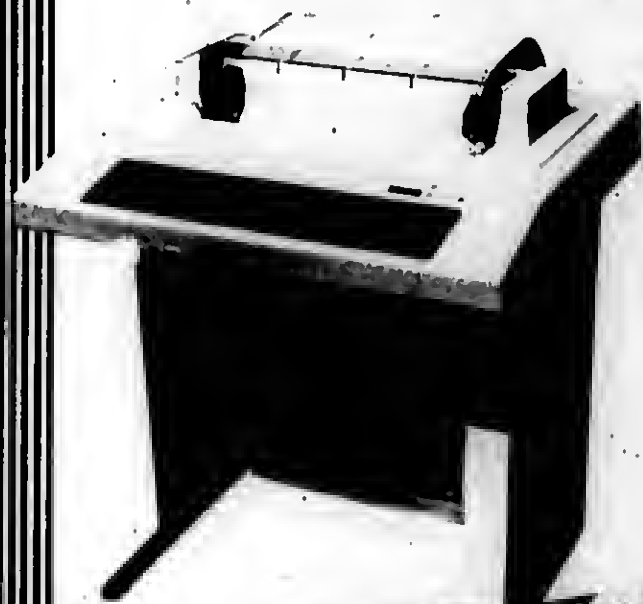
Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (____) _____

limited offer while supply lasts!

LS120 DECwriter III \$2650⁰⁰

While supply lasts, we'll ship you a brand new LS120, wide carriage, 1200 baud impact terminal at this special low price. Call us today and we'll give you a Serial Number. You can talk to us about a trade-in or discuss CDT's other fine quality terminals offered at similar low prices. But you must send cash with order to qualify for this special low price!

IMMEDIATE DELIVERY FROM STOCK



Call toll free
800-227-1500

Consolidated Data Terminals, P.O. Box 2261, Oakland, CA 94621 (415) 638-1222
and P.O. Box 91137, Los Angeles, CA 90045 (213) 670-0400

THERE'S A LITTLE BIT OF THE WIZARD IN EVERY SOUTHERN SYSTEMS PRINTER

And that's why more and more mini-computer users — end DECsystem-10 users, too — are putting Southern Systems printers to work for them. They know a little bit of the Wizard goes a long way... in trouble-free printer performance, in cost-saving (up to 50%), in efficiency of future system expansions.

The Wizard? He's actually just a symbol (but don't tell him that!) of Southern Systems expertise... in the precise configuration of printers... in the design and manufacture of new interfaces and controllers (like our S-10 for DECsystem-10)... in the delivery of printer systems for about half of what you'd pay elsewhere.

Southern Systems printers. For your DEC, Data General, Interdata or others. At speeds from 300 lpm up to 1500 lpm. SSI typically ships within 30 days and offers complete installation and nationwide service.

No wonder our customers keep coming back to us for a little bit more of the Wizard. You will, too.

For more information, call or write to



**SOUTHERN
SYSTEMS, INC.**

Intracoastal Building
3000 Northeast 30th Place
Fort Lauderdale, Florida 33306
(305) 561-5226



Tape System Eases Transfer Between Syfa, IBM 360/370

IRVINE, Calif. — A high-speed magnetic tape system that reportedly functions as a supplementary data transfer link between Computer Automation, Inc.'s (CA) Syfa system and IBM 360/370 mainframes is available from CA.

Comprised of all drive and controller hardware, an operator's panel and utility software, the magnetic tape system is available in either an 800 bit/in. version (MAG-800) or as a switch-selectable 800 and 1,600 bit/in. version (MAG-1600).

Both were designed to function as adjuncts to the on-line hardware supplied with each Syfa system, giving users the capability of transferring magnetic tape data to and from mainframe systems.

Both the MAG-800 and the MAG-1600 operate at 25-in./sec and use industry-standard 10-1/2-in. reels.

Recording is carried out using NRZ format, allowing the system to interface directly with existing IBM-formatted tapes with no need for reprogramming, the company claimed.

The utilities provided with the MAG-800 and the MAG-1600 include DSKTAP and TAPDSK. The DSKTAP utility takes Syfa text files and writes it to magnetic tape in OS-standard unlabeled, fixed-block and fixed record forms, according to a spokesman.

TAPDSK reads magnetic tapes formatted for use on IBM equipment and converts the data to a Syfa text file; both programs may be run in the stand-alone or concurrent mode, he noted.

The MAG-800 costs \$8,275; the MAG-1600 is priced at \$15,000. CA is at 18651 Von Karman, Irvine, Calif. 92713.

Vendors Say They're Acting To Improve Documentation

(Continued from Page 49)

spokesman for Basic/Four Corp. noted.

Producing better documentation has also been made a priority at Data General Corp., a spokesman for that firm said. "In the past, documentation tended to be reference manuals rather than tutorials," he recalled, but with new types of users using the systems, the manuals are being reworked.

"If the documentation doesn't describe how to use it, you've got a problem," he pointed out.

Search for Strategy

A user should check to see if his vendor has a documentation strategy, a spokesman for the Hewlett-Packard Co. said. Vendors should treat documentation as they do other products and put it through the same type of testing. At HP, the documentation is evaluated at the test site along with the hardware and software.

Admitting that about 80% of all user problems are related to inaccurate documentation or inadequate training, the spokesman said HP has made improvement of both areas a goal. "We heavily use our users group for feedback on the documentation," he added.

At Datapoint Corp., two levels of documentation are available to the users of that maker's equipment. The first is a user's manual, which is written by the person who wrote the software program being described and is definitely "not the sort of thing you'd give a noncomputer type," according to a spokesman there.

The second level of documentation is written by Datapoint's marketing communications department. These manuals, written in simpler language, are critiqued by the support group, testing group and product marketing department before they are released to make sure "the user's guide and the programs agree."

Developing good documentation is a recognized problem at Datapoint, but the recently initiated check-and-balance system that requires cross-

checking of the documentation should help, the spokesman said.

Recognizing that most mini companies were founded by engineering types, not user-oriented types, a spokesman for Tandem Computers, Inc. said "we spend a lot of effort to get good documentation. We can make a change in a manual and have printed copies in the mail within a week."

"Most of our documentation is on an engineering level because we are OEM," a spokesman for the Naked Mini Division of Computer Automation, Inc. stated. Because of that division's OEM status, the company feels no need to revise its methods of producing documentation.

Metal Firm Gets First IBM 34

(Continued from Page 49)

one that is already running on the 34, is Union Brass' complicated incentive payroll system. Each week, 100 of the company's 175 employees produce 1,600 labor tickets based on patterns and job numbers.

On the 3/10, the data from the tickets was entered on punched cards. It took two days before an incentive worker knew his productivity.

Using the 34, that time will be cut in half, Poston believes. Data will be entered through a data collection station.

Conversion from the 3/10 to the 34 took several steps, according to Earl Feign, DP manager for the firm. Since the 3/10 was a card-oriented system, the company had to obtain a disk for that system and put all programs on disk.

The disk was then taken to an IBM 3/15 at an IBM office and converted from disk to diskette. That diskette was dumped into the 34 and all changes and recompiling necessary took place.

The System/34 installed at Union Brass has 48K bytes of main memory and 27.1M bytes of disk storage.

DIGITAL ANNOUNCES THE Great 8 Sale.

Because you've made the PDP-8 the biggest success in the minicomputer world, we'd like to say thanks. So we're having the Great 8 sale of 1978. Your chance to pick up great buys on the small computer of the year.

Save 20% on our new packaged systems.

DESIGNATION	MEMORY	OLD PRICE	NEW PRICE	SAVE
8A/T3	16K Core	\$24,629	\$19,000	22%
8A/T5	32K Core	27,829	22,000	20%
8A/T7	64K MOS	31,479	24,500	22%

The computer that's always been right on the money now costs less than ever. 20-22% less, depending on the system.

And all these systems include our DKC8-AA option board with real time clock, console control, 12-bit parallel I/O interface and asynchronous serial line unit. In addition, you get 1.6M word removable disk cartridge drive. A 3.2M non-removable disk drive. Short cabinet and cables. RTS/8 real time operating system and



OS/8 operating system. And your choice of our LA36 DECwriter II terminal or VT-52 CRT.

Save 8-17% on disk drives.

You can buy our RKO5J 1.6M word removable disk and

save 8%. Or our RKO5F 3.2M word non-removable disk and save 17%. Or add both, and save both ways at once.

Save 13-31% on terminals.

The LA36 DECwriter II is the most popular keyboard printer for the PDP-8. And now, it costs 14% less. What's more, it's available in two ver-

sions. One with a 15' 20mA cable. The other with a 9' EIA cable.

You can also pick up video terminals at prices that are hard to

put down. Save 13% on a single VT52 CRT and keyboard. Or buy four and save 31%.

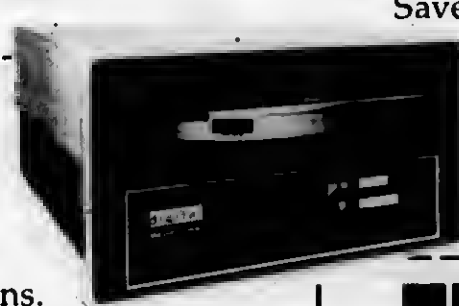
Save 30-40% on add-ons.

We've marked down the

price of the following add-ons until June 30, 1978. So if you act now, you can save hundreds of dollars on selected options.

Save 40% on our fast FORTRAN accelerator for the PDP-8/A. The FPP8-A accelerator includes floating point hardware, OS-8 and FORTRAN IV. It lets the data manipulation portion of your FORTRAN IV programs run up to twenty times faster by implementing floating point arithmetic in hardware instead of software. So you get more speed for less money.

Save 43% on our FOR-



PDP-8/E, 8/F or 8/M. This unit is functionally the same as the one for our 8/A, except it fits into our Hex-size expander box.

Save 33% on our DP8-EA synchronous modem interface.

The DP8-EA is supported by DECnet™/8 software and lets you communicate over phone lines by providing the link between your modem and any model PDP-8 with OMNIBUS™.

Save 33% on our KG8-EA redundancy check option.

The KG8-EA is designed to improve throughput dramatically by performing redundancy checking in hardware.

Save 34% on our MM8-EJ 8K core memory. Now you can add more memory to your PDP-8/E, 8/F or 8/M for less than ever before.



60-day delivery on everything.

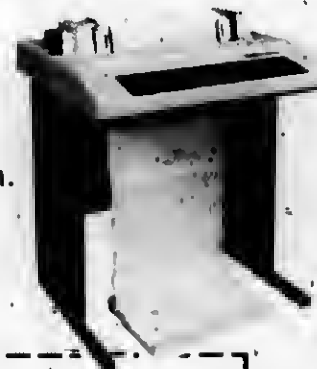
Our 1977 expansion program means fast deliveries in 1978. In fact, it means 60-day delivery on just about everything.

(PDP-8 packaged systems

with more than 32K of memory may take a little longer.)

So act now. And save now. Call your nearest Digital sales office. Or fill out the coupon and send it to PDP-8 Marketing Communications, Digital Equipment Corporation, 129 Parker Street, PK3-1/M34, Maynard, Massachusetts 01754.

European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.



digital

PDP-8 Marketing Communications,
Digital Equipment Corporation,
129 Parker Street, PK3-1/M34,
Maynard, Massachusetts 01754.

☐ Please send me more information. ☐ Have a salesman call.

☐ I am currently a PDP-8 User. Model (such as 8A, 8E) _____

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ OEM _____ End-User _____

Application _____

CW1168

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call end par-call field service at rates much less than the competition.

NEED FAST TURNAROUND? CALL OR WRITE:

COMPUTER SYSTEMS SUPPORT CORPORATION
9112 Gaithers Road
Gaithersburg, Maryland 20760

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

HP 3000-II Model 6 Minis Get More I/O, Memory Price Cuts

CUPERTINO, Calif. — Several field- and factory-installed memory expansion options, an I/O expansion option and two memory price reductions for the HP 3000 Series II Model 6 minicomputer were recently announced by Hewlett-Packard Co.

The firm reduced the price of its 64K-byte boards by about

20%. As system options, they now cost \$3,700, down from \$4,700. Field add-on boards now cost \$4,000, a spokesman said.

The cost reductions are said to allow users of HP's 3000 Model 6 to increase their capabilities without having to upgrade to the full larger Model 8 system.

The maximum main memory

available on a Model 6 has been doubled from 256K bytes to 512K bytes. Users in the field can purchase a memory expansion kit, priced at \$10,000, that allows the expansion to take place. The kit includes a memory power supply, controller, error-correction controller, 64K-byte array board and connecting hardware.

With another field kit, users of the Model 6 with expanded memory can add 13 additional I/O ports so it can handle larger networking operations. This kit costs \$15,000, HP said.

The company is located at 1501 Page Mill Road, Palo Alto, Calif. 94304.

At only \$1088, you can't offer your customers a better buy



Our quantity-50 OEM price for the *Silent 700** Model 743 KSR Terminal is now just \$1088†. In larger quantities, the price goes below \$1000.

And it keeps on costing less because the real payoff is in the cost of ownership. In the long run, it costs less than any other printer terminal with comparable performance.

The reason is easy. Superior design. The 743 KSR is built around a TI microprocessor. So, there are fewer components and circuit boards than in other printer terminals. That means less maintenance and more uptime performance. Plus standard EIA and current loop interfaces in a lighter, desktop package.

The 743 features the speed, reliability and quietness that made the *Silent 700* terminal family so popular. Incoming data is buffered, so you get true 30 characters-per-second throughput.

Data entry. Interactive remote computing. Or as a message terminal network. And it's now available with APL. The 743 is backed by TI's worldwide maintenance and support services.

Find out more about TI's 743 KSR printer terminal. Fill out and mail the coupon today. Or call your nearest TI sales office, or Terminal Marketing, (713) 491-5115, extension 2126.

TEXAS INSTRUMENTS
INCORPORATED

TI's Model 743 KSR

Disturbing noises associated with impact printers are eliminated with the 743's non-impact electronic printing.

Use it as a console I/O for software development. Keyboard terminal for inquiry/response.

Yes! I am interested in the 743 KSR Printer Terminal.

- ☐ Please have your representative call me.
☐ Please send me more information.

SILENT 700
electronic data terminals

Name _____

Title _____

Company _____

Phone _____

Address _____

City _____

State _____

Zip _____

Mail to: Texas Instruments Incorporated, P.O. Box 1444, M/S 784,
Houston, Texas 77001

2-1-CW

*Trademark of Texas Instruments

Copyright © 1977, Texas Instruments Incorporated
†U.S. Domestic Price

TEXAS INSTRUMENTS.

Cobol Aided On Series/1

ARLINGTON, Va. — Advanced Software Products, Inc. will have a microprogrammable attachment card for the IBM Series/1 minicomputer that will act as a hardware assist for Series/1 Cobol programs. The card will reportedly be available in the fourth quarter.

The unit, consisting of an industry-standard microprocessor and loadable control storage, is said to be transparent to the Cobol user. "It is expected that Cobol programs using the attachment will execute faster than the equivalent Series/1 Assembler language programs," the company claimed.

Each unit will be packaged onto a single card to plug into a Series/1 backplane as an I/O attachment. Multiple units can be placed into a Series/1 system, the company added.

Although the company said the price for the unit has not been firmly established, it will be approximately \$2,000, the company said. Advanced Software Products can be reached at P.O. Box 992, Arlington, Va. 22216.

Diskette File Holds 20 Units

COMMACK, N.Y. — A binder-style portable diskette filing system capable of holding up to 20 diskettes was announced by the Data Products Division of Robins Industries Corp.

The Model 78050 diskette file features a floating axle designed to eliminate stress in handling and is equipped with a snap-lock vinyl cover to keep the diskettes in place until the binder is opened.

Purchase price is \$42 per unit from Robins Industries Corp., 75 Austin Blvd., Commack, N.Y. 11725.

Avoids Unnecessary Details Book for Learners Starts From Scratch

By Tim Scannell
CW Staff

BERKELEY, Calif. — "The first dishonest auto mechanic probably swindled his first customer a few months after the first automobile was sold; and the first dishonest programmer probably used a computer for criminal purposes soon after computer programs started to be written." Thus begins a book on microcomputers that attempts to pique the interest of readers "who know nothing about computers."

An Introduction to Microcomputers — Volume O — A Beginner's Book, by Adam Osborne and Associates, Inc., was

written for two audiences: "for those of you have a real interest in learning how to use computers and for everyone else who must live with computers, like it or not, and had therefore better know a little about them," according to the book's introduction.

Chapter One introduces the reader to the various types of equipment involved in a microcomputer system and examines what each system part does. The functions of the CRT, keyboard, interface, printer and, of course, microprocessing unit are discussed along with the specific terminology involved.

"One of the problems associated with microcomputers and microcomputer systems is terminology and language," the book explains. "While a lot of terminology is pure jargon for its own sake, some terminology is necessary," it adds.

The book concentrates on presenting the reader with a basic understanding of the equipment incorporated into a microprocessing system rather than the technical specifications behind that equipment's operation.

On the topic of floppy disk units, the book says "... until you become a real microcomputer expert, you need not concern yourself with exactly how information is stored on a floppy disk ... just as music lovers never concern themselves with how music is recorded on tape, cassettes or records."

Through the creation of Joe Bitburger, an "intrepid" computer hobbyist who is suddenly "seized by a fit of irrationality," during which he buys a microcomputer at his local computer store, the book highlights the variety of micro applications.

The text follows Joe as he "... proudly takes his microcomputer home ... gets his microcomputer to work ... writes his program ... debugs his program ... and triumphantly sits in front of his microcomputer — watching a light chase around and around the display." In the process of telling this story, the book introduces the reader to teletypewriters, memory chips, bootstrap loaders, read-only memory (ROM), printers and paper-tape readers.

In a chapter covering applications, the authors illustrate the concept of physical and logical units by dramatizing one area of Joe's life. "Joe Bitburger requires a 'wake up' logical unit in the morning or he will not get out of bed in time, so an 'alarm clock' physical unit implements the 'wake up' logical unit."

The book explains that a "physical record or file is the form in which information is actually stored by a bulk storage device, whereas a logical unit or record is the way in which you as a microcomputer user visualize and use the stored information."

"You cannot always differentiate between a necessity and an

option ...," according to a section on microcomputer system component options. It proceeds to describe various CRT options such as a cursor, "a small spot or square of light sitting where the next character will be displayed," scrolling, or "the ability to look at lines that are longer than the screen is wide ... or having more lines than the screen will display"; and the graphic display, which "allows you to display pictures as well as characters."

The discussion of keyboard options includes a description of rollover, buffer and debouncing electronics.

Options Evaluated

The book frequently compares and evaluates options and their functions. In discussing mechanical and electrical switches, it states that electrical switches, "... if not designed well, will give you nothing but trouble. Just a small amount of corrosion on the metal surfaces is sufficient to render the switch ineffective."

Some options, the book continues, are added as a psychological crutch for the user. "The commonest option is to have an audible or tactile 'click' accompany a key being depressed. The microcomputer does not need a 'click,' [but] the human operator does; it is there simply to reassure an operator that the key has indeed been depressed.... Touch

(Continued on Page 61)

Micro Bytes

Lead Straightener Adjusts to Width

DANBURY, Conn. — A manual integrated circuit (IC) lead straightener that accommodates widths of .3-, .4-, .5- and .6 in. has been announced by Micro Electronic Systems, Inc.

The Fix-A-Dip, which fits two- to 40-pin dual in-line packages (DIP), can be factory adjusted to the width primarily required by the user, the vendor said.

The unit is basically a dual set of specially cut racks that are spring-loaded in the open position.

The Fix-A-Dip sells for \$199.50 from Micro Electronics Systems, 8 Kevin Drive, Danbury, Conn. 06810.

PCS Adds Plug-In Micro

SALINE, Mich. — Process Computer Systems, Inc. (PCS) has added a model to its Superpac 180 plug-in line of microcomputers — the Superpac 8, featuring an 8-slot chassis and 300-watt switching power supply.

Superpac 8 triples the expansion capabilities of the Superpac 4, the firm said, providing a wider range of I/O capability.

PCS offers three CPU models, incorporating 8080 and Z-80 microprocessors. Real-time operating systems and a Fortran compiler are also available, PCS added.

Complete with CRT, keyboard, power supply and power cord, Superpacs are available in quantity at \$995 per unit from Process Computer Systems, Inc., Saline, Mich.

Correction

One- through four-year lease rates on the Texas Instruments, Inc. Model 810 microprocessor controlled printer [CW, Nov. 7] were reduced \$15/mo.

PCM-12 Gets Interface Modules

SAN RAMON, Calif. — Pacific Cyber/Metrix, Inc. has added a reader/punch interface and a magnetic tape interface to its line of supports for that firm's PCM-12 microcomputer system.

The 12070 reader/punch module interfaces the Addmaster 601 paper-tape reader and the Epson 6110 paper-tape punch to the PCM-12, a spokesman said.

PDP-8 Compatible

The interface is compatible with Digital Equipment Corp. PDP-8 software and uses that company's device codes, 01 and 02, to operate the reader at rates up to 150 char./sec and the punch at 50 char./sec, he stated.

The 12080 mag-tape interface allows an audio cassette recorder to be substituted for the paper-tape reader and punch, the firm

said. Features of the unit include a byte-standard, self-clocking circuitry that reportedly allows operation at a faster rate than that of the reader/punch on a teletypewriter terminal.

Price of the 12070 is \$97 in kit form and \$167 assembled. The 12080 costs \$117 as a kit and \$187 assembled from the firm at 3120 Crow Canyon Road, San Ramon, Calif. 94583.

Prom/RAM Board Occupies Two Independent 8K Blocks

WESTLAKE VILLAGE, Calif. — A programmable read-only memory (Prom)/random-access memory (RAM) board that can conform to system configurations with a minimum of address jumpers was unveiled by Vector Graphics, Inc.

The board occupies two independently addressable 8K blocks and has a 1K on-board RAM and capacity for up to 12K 2708-type

erasable Proms, a spokesman noted. Video boards or disk operating systems can be fitted in the 3K of unused space and a 24-command Prom monitor is available to interface with most I/O boards, the firm said.

The board is priced at \$135 in kit form and \$175 assembled from the firm at 790 Hampshire Road, Westlake Village, Calif. 91361.

Tapes, Text Teach Basic

WILLIAMSVILLE, N.Y. — *Programming in Basic*, a program series of four cassette tapes coordinated with four printed texts, is available from the Williamsville Publishing Co.

The tape and text course is constructed for the microcom-

puter hobbyist and assumes that the individual has no previous programming experience. The learner is afforded the opportunity to hear on tape what he is seeing in the text at the same time, the company said.

The course is authored by

William R. Parks, an assistant professor of computer science at Walters State Community College.

The program is priced at \$19.95 and can be obtained from the Williamsville Publishing Co. Inc., Box 237, Williamsville, N.Y. 14221.

MICROCOMPUTING

ECHO — Refers to a portion of the transmitted signal that has been reflected or otherwise returned with sufficient magnitude and delay to be received as interference.

EDITOR, MICROCOMPUTER — Editors permit designers to prepare the original Assembly language programs and to change or correct them with simple commands. They can add documentation and store, combine and retrieve programs. They also can readily output programs onto paper tape as well as printers.

EIA INTERFACE — Refers to a set of signal characteristics (time duration, voltage and current). For connection of terminals to modem units and specific physical coupler dimensions specified by the Electronic Industries Association.

EMULATION — A procedure designed to imitate one system with another such that the imitating system accepts the same data, executes the same programs and achieves the same results as the imitated system.

ENABLED — 1. Refers to a state of the central processing unit that allows the occurrence of certain types of interruptions. Synonymous with interruptible. 2. In communications, pertains to the state in which a transmission control unit can accept incoming calls on a line.

END-OF-DATA MARKER — Refers to a character or code that designates that the end of all data held on a specific

storage unit has been reached. Not to be confused with end-of-file marker.

END-OF-FILE (EOF) — Refers to the termination or point of completion of a quantity of data. End-of-file marks are used to indicate this point.

END OF MESSAGE (EOM) — Refers to a specific character or sequence of characters which indicates the termination of a message or record.

END-OF-RUN ROUTINE — A specific routine provided by the programmer to deal with various housekeeping operations before a run is ended, i.e., rewinding tapes, printing control totals, etc.

END-OF-TAPE ROUTINE — A specific program either provided by a housekeeping package or written by the user that supplies the special processing required when the last record on a reel of magnetic tape has been reached.

END-OF-TRANSMISSION (EOT) — Refers to a unique character or group of characters used to denote the end of a data transmission to or from a remote terminal.

ESC, ESCAPE CHARACTER — 1. A control character to signal a change in the meaning of one or more of the characters that follow it. 2. A data communications term representing the use of a control character which, when combined with one or more succeeding characters, forms an escape sequence and the development of additional data communications control operations.

LEARNERS EDITION

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc., 207 Kenyon Road, Champagne, Ill. 61820.



COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

MICRODATA REALITY CORE
memory. Manufactured and serviced by Microdata. Jack Hardman (201) 751-3000.

FOR SALE: IBM 5100 COMPUTER
64K, APL, 5103 Printer, Disk, Serial I/O. Software for multiple interfaces, academic and business applications, tapes. Please call Andrew Stadry (313) 651-8282.

Microsoft ("Altair") BASIC for 8080/8502 and FORTRAN IV for 8080/Z80 now available to OEMs, and users. 8080/Z80 BASIC has random, sequential files; double precision; IF ... THEN ... ELSE and more. FORTRAN produces optimized relocatable code, meets ANSI86 except complex. CP/M and ISIS-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 San Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 262-1486.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02160.

I have read the rules, and would like to place my ads as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (_____) _____

Unit Gives Micros Remote Control

NEW YORK — A microcomputer can reportedly operate and monitor remotely located lights, motors, solenoids and other 110V devices with a system introduced by Mountain Hardware, Inc.

The Introl remote control system,

which consists of a controller and a remote unit, installs a microcomputer via an S-100 bus microcomputer and transmits and receives signals through a 110 Vac line. Digital signals generated by the controller board contain an address that selects the proper

remote device and a command to turn that device on or off, a spokesman said.

An interface adapter impresses this digital signal on top of the 110 Vac waveform and isolates the computer from the line voltage, he added.

The board can control or sense up to 64 remote locations, and programs are written in Basic. The S-100 controller board and the AC Remote, sold separately, are supplied with full documentation and software subroutines.

The Introl Controller is priced at \$149 in kit form and \$189 assembled and the AC Remote costs \$99 for the kit and \$149 assembled from Mountain Hardware, Inc., Box 1133, Ben Lomond, Calif. 95005.

LSI-11 Gains Interface

ORANGE, Calif. — MDB Systems has begun marketing an incremental plotter interface for the DEC LSI-11 microprocessor called the MLSI-XYV-11, which provides a parallel interface to Houston Instruments Corp., California Computer Products, Inc. or equivalent XY plotters from the LSI-11 bus.

The interface board includes a data register, control register and a status register. The data register contains instructions for right, left or middle pen down; raise all pens; step pen carrier left or right; and step drum forward or back.

Stepping speed is controlled by ad-

Handbook Starts From Scratch

(Continued from Page 59)

switches are not popular at the present time ... The real problem ... is the fact that when you touch one, it makes no audible click and that upsets many long-time keyboard users."

Printer options and bulk storage unit options are featured in the chapter on system components whose theme is "... What you see is not always what you get."

The last half of the book deals with how a microcomputer works. If "... you do not need to know how the microcomputer system works, then the rest of this book will be of little value to you," the chapter begins. "In order to ride a bus you do not have to know how a bus works; you do not even have to know how to drive one," the authors note.

"However, if you want the increased flexibility of a private car, you must learn to drive; you may even learn how your car works in order to fix it yourself," they add.

The pages that follow cover binary arithmetic, octal and hexadecimal numbers, character codes, computer logic and Boolean operations, the CPU, program memory and data memory. Additional topics include buses, registers, logic concepts and memory addressing logic.

The publication is priced at \$7.50 from Osborne and Associates, Inc., P.O. Box 2036, Berkeley, Calif. 94702.

Input Digitizer Debuts

FAIRFIELD, Conn. — A data input digitizer designed for the collection of X, Y values and compatible with most microcomputers has been announced by the Summagraphics Corp.

Bit Pad is an input peripheral that permits the entry of positional information via an optical stylus, a spokesman said.

Price for the unit, with deliveries beginning this month, is \$555 from the firm at 35 Brentwood Ave., Fairfield, Conn. 06430.

justment of a potentiometer at the connector end of the module, and plotter operation up to 100 ft. from LSI-11 bus is allowed by jumper selection of +5V or +12V to eight control lines.

The MLSI-XYV-11 plotter interface is priced at \$550 per unit. MDB Systems is located at 1995 N. Batavia St., Orange, Calif. 92665.

Register now for DataComm 78!



Call 800-225-4242*

Don't miss the one Data Communications Industry Conference and Exposition held in the city where DataComm policy and regulation are established!

Profit from vital information, insight, ideas brought to you by nationally known data communications experts! Be there in person. Don't get DataComm secondhand!

Call 800-225-4242

Take part in panels and sessions that let you ask your questions, share experiences, express your needs.

Make DataComm your personal conference, choosing your options each day — ranging from tutorials for the beginner to advanced networking panels for the sophisticated user.

Call 800-225-4242

And register for one, two, or all three action-packed days, including:

19 Vendor/User Rap Sessions • 3 Special Management Sessions • 6 Network Tutorials and Panels • All Day Government Miniconference — and MORE!

FREE! The Exposition at DataComm 78 will feature exhibits from manufacturers all over the country. Discuss your needs and plans with key representatives in a quiet-paced, informative atmosphere.

Call 800-225-4242

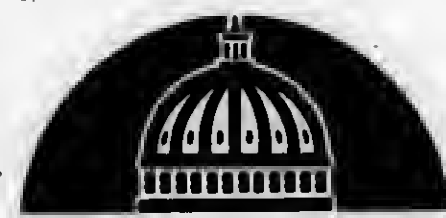
REGISTER NOW!

If this is the first news you've learned about DataComm 78, don't miss this chance to attend.

AFFORDABLE:

UNMISSABLE! Just \$1.15 for the whole DataComm Conference, or \$50 each for single days.

Don't delay! Master Charge, American Express, Visa, BankAmericard accepted. Call our toll-free number now to arrange your attendance at DataComm 78 — the ONE conference you don't want to read about later and be sorry you missed.



DataComm

78

CONFERENCE AND EXPOSITION

February 21-23, Washington, D.C.

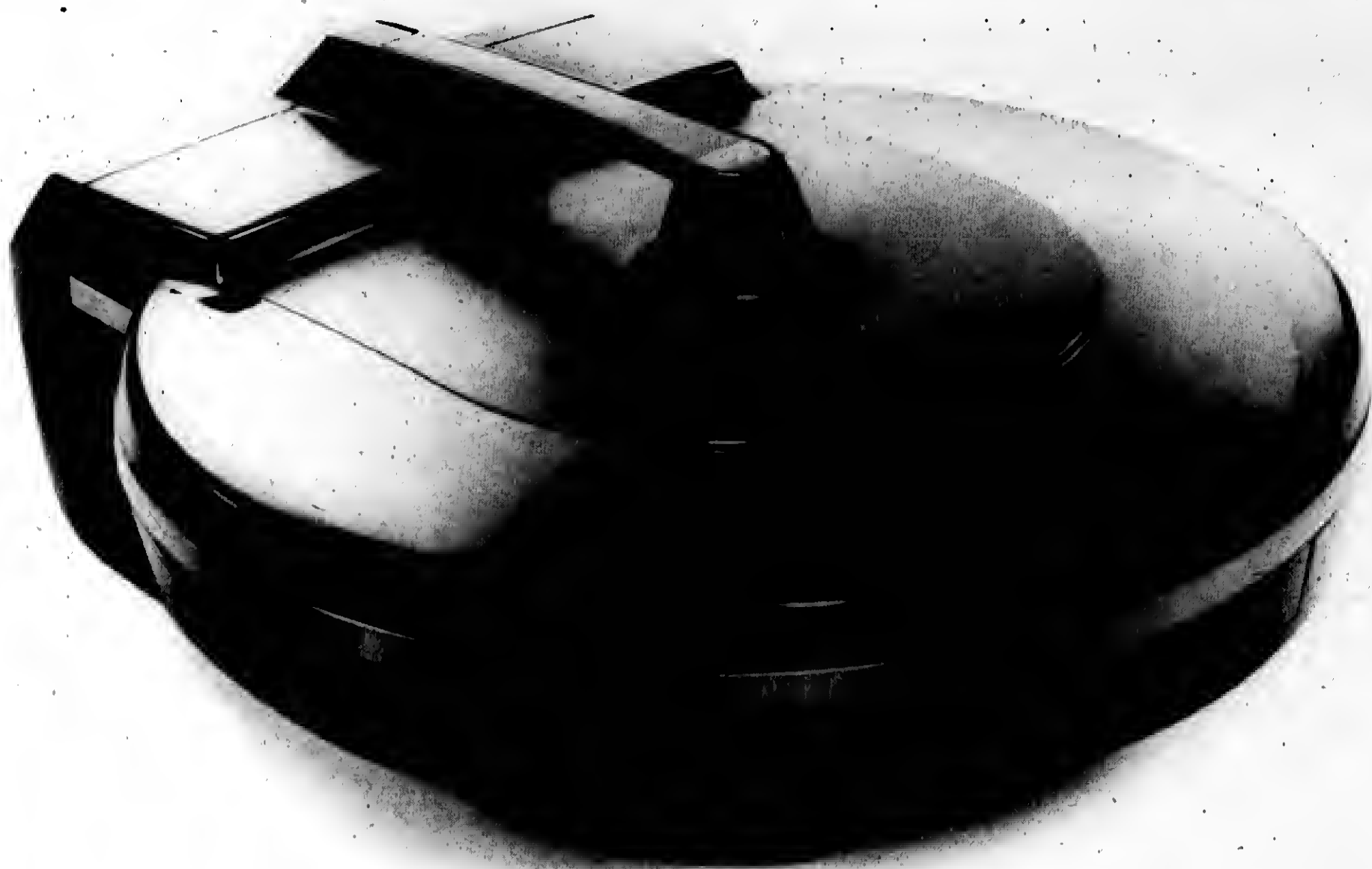
*Inside Massachusetts, call collect: (617) 964-4550. Or write DataComm 78

Registration

The Conference Company

60 Austin Street, Newton, MA 02160

Compare...
BASF offers you
a 30% saving,
lifetime guarantee,
free field service,
and immediate delivery.



The first name you think of in computers may not be the best choice in data modules. While still completely compatible with existing 3340 drives, BASF data modules cost far less than the drive manufacturer's modules, are guaranteed for as long as you use them, offer free field service, and are available for immediate delivery nationwide.

Before you write your next order for data modules, find out why BASF has more to offer.

Call our nearest regional office: in Bedford, (617) 271-4007; in Los Angeles, (213) 451-8781; in Chicago, (312) 343-6618; in Clifton, N.J., (201) 546-9111; in Dallas, (214) 233-6607; in Toronto, (416) 675-3611; and in Montreal (514) 341-5411.

 **BASF** The Original.

Computer Tapes Disk Packs Flexydisk Word Processing Supplies

Corporate Documents Indicate

'Defensibility' Behind IBM Unbundling

By Catherine Arnst
CW Staff

NEW YORK — IBM unbundled maintenance costs from the price of its CPUs in part to ensure that its position was "legally defensible," according to corporate documents used by the government in the U.S. vs. IBM antitrust trial.

A document done for Cravath, Swaine and Moore, IBM's outside counsel, stated that a Services Practices Group was established to "resolve a list of purchase policy irritants related to maintenance and make recommendations to put us in a posture that is legally defensible ... recommend changes to lease and purchase maintenance offerings which will make it easy to unbundle later, if necessary, but do not make any changes that would lead to forced unbundling."

Prior to IBM's decision to remove maintenance costs from the price of the system in 1969, it charged all customers a certain price for a system regardless of how many services were used.

One of the problems with this practice was that it was "not enforced uniformly. Forty-eight customers paid 34% of total extra shift revenue. Department of Justice has notified us of complaints on file," the study said.

An attorney with IBM's legal department also noted that IBM's bundled price was unfair to some users, according to documents. "The basic issue is — are we forcing the customer (or the independent maintenance company) to pay for something he does not want. The answer is 'yes we are' ... Therefore, even though our customer is willing to do without [a particular service], he must pay the charge for that service if it is included in the purchase price. Similarly, if an independent maintenance company tries to undercut our price by offering something less, it would be foreclosed from doing so," H. Bartow Farr Jr. wrote.

Emphasis Grew

Greater emphasis was placed on unbundling plans by IBM after the Department of Justice (DOJ) filed its suit against the firm in January 1969. At an IBM Management Review Committee meeting held that month and attended by the top corporate executives, "there was discussion as to whether the major thrust here was to protect our present [bundled pricing] practices if we possibly could or to make a really objective sort," the minutes of that meeting read. It

was decided to follow the latter course of action.

During that same meeting, "it was further pointed out that there were a great many factors, including competitive reaction, which could change the assumptions for this program," according to the minutes.

IBM recognized that once maintenance was unbundled from the CPU's base price, both the public and the DOJ expected a corresponding drop in that base price, the documents showed.

One document, titled "Rationale for Not Removing Profit From Machine Price," had a note on it: "Not for publication — internally or externally. For use with DOJ in answering questions on our price action."

IBM Raises Dividend 38 Cents; Stock Split Still Speculation

By Molly Upton
CW Staff

ARMONK, N.Y. — IBM shareholders will have some more change in their pockets following a dividend increase, but the question of a prospective stock split remains unanswered.

Directors increased the quarterly dividend on common stock to \$2.88, up 38 cents over the previous \$2.50 a share. The new dividend is payable March 10 to holders of record Feb. 9.

Although some predict a split of 5:1, a split on the order of 3:2 or 3:1 is more likely, according to Harry Edelson, senior analyst at the investment firm of Drexel Burnham Lambert, Inc. He observed the figure of \$2.88 is divisible by 4, 3 and 2.

Splitting stock would benefit IBM in more than one way, he added.

For instance, a stock split could increase the number of shareholders by lowering the price of stock to within reach of a larger number of investors.

With IBM's entanglement in antitrust suits and its entrance into the communications area, regulation of some sort is an increasing possibility, he observed. "More than ever, IBM may desire public support. One way for IBM to gather that support is to broaden its shareowner base," he said.

IBM's task force on unbundling recommended that the base price reduction be calculated on the basis of "direct and direct-related costs of systems engineering, education and programming elements which are being separately priced ... No attempt [should] be made to impute a past profit on these elements and that no consideration be given to including such imputed past profits in the base price reduction," the document said.

The document also covered legal considerations for a price reduction and noted that "Counsel has recommended a base price decrease on grounds of public and governmental reaction to the apparent arrogance of failing to make some price reduction in the face of widespread expectations."

In addition, a split would reduce the earnings per share figures, which are "embarrassingly high."

"The little guy in the street owns a stock that earns 60 cents a share and then he hears IBM earns \$20.75 a share and thinks IBM is earning too much money. He doesn't realize earnings is based on the number of shares and other factors," Edelson said.

"High per-share earnings doesn't sound so good in this age of consumerism," he noted, adding that most companies split when their figures get too high.

IBM has split its stock nine times since 1954, using a 5:4 ratio four times, 3:2 three times and 2:1 twice, Edelson observed.

The splits occurred when IBM's earnings reached between \$11.28 and \$16.38 per share.

The last split was in 1973 with a 5:4 split reducing the estimated earnings per share from what would have been \$13.49 to a realized \$10.79 earnings per share after the split.

Prior to 1968, IBM stock generally split at two-year intervals. But the next split did not come until 1973, five years later.

After a split, the price of IBM stock traditionally has risen, he indicated. In eight out of nine times, the stock increased in value considerably after a split, Edelson stated. The exception was in 1973.

COMPUTER INDUSTRY

InSci
Information Science Incorporated
Personnel
Payroll
ERISA
EEO
OSHA

InSci Headquarters 95 Chestnut Ridge Road Montvale, New Jersey 07645 201-391-1600

Memphis TN 901 761-1845 Menlo Park CA 415 854-1903 Newport Beach CA 714 752-7672 Oak Brook IL 312 986-6460 Raleigh NC 919 781-6095 San Antonio TX 512 690-0110 Waltham MA 617 890-1518 West Palm Beach FL 305 689-8777

Member SIA Software Industry Association

Shift to Software Pricing Seen Growth Spur

By Molly Upton
CW Staff

NEW YORK — Although hardware prices are expected to continue to decrease, mainframers have several methods at their disposal by which they can increase their return on equity and raise the industry's earnings growth rate, according to a report from Kidder, Peabody & Co., Inc.

Investors' fears that profit margins and growth rates in the industry are going to erode over the longer term do not consider the future profit opportunities available, the brokerage firm's report stated.

By unbundling and shifting pricing emphasis to software as well as increasing modularization of both software, microcode and hardware, the mainframers can retain their proprietary edge while increasing profitability, the report said.

Other factors boding well for increased return on equity are the trend toward sale rather than lease of equipment and the increased offering and pricing of maintenance, according to William Easterbrook, a vice-president and author of the report.

With these trends, the computer industry's long-term earnings growth could increase by 12% to 13% from the current rate of 9% to 10%, if the current 80% earnings retention rate continues, Easterbrook observed.

And mainframers, able to provide a broad range of, separately priced software, themselves could raise their return on equity by 10% to 20%, he commented.

Easterbrook expects the trend toward modularization and unbundling will alleviate investors' fears about margins because of declining hardware prices, which he dubbed "commodity-type pricing."

The firms that have the most to gain from the changeover in emphasis from hardware to software pricing are those with current high levels of profitability and large customer bases, such as IBM, Burroughs and Univac, the report remarked.

Mainframers' Territory

Focusing on the question of hardware profit margins among the mainframers, Easterbrook indicated the larger producers will be able to retain their margins over the intermediate term because the recent spate of price cuts has "primarily reflected cost reductions."

However, over the longer term, the growth rate of hardware profit should slow, he stated.

The new trends should help mainframers preserve their territory from further losses to plug-compatible makers and minicomputer manufacturers, according to the report. The brokerage firm estimated plug-compatible makers' shipments, including peripherals and CPUs, are running at about 20% to 25% of the total value of such shipments from IBM.

With the hardware market becoming more competitive, and with IBM and some other large mainframers seeing some of their "strong proprietary edge" eroding, they will be "less able to control the pace of development of new products and improvement in performance/price ratios than in the 1960s and early 1970s," the report stated.

But modularization and unbundling offer the opportunity to regain proprietary advantages:

- "Only the larger suppliers can afford the high cost of developing a comprehensive and sophisticated set of software modules."

- "Software is unique in that its incremental production cost is virtually zero ... Volume sales of software will provide even greater cost and flexibility advantages to suppliers than do volume sales of hardware."

The software supplier can obtain profit leverage by making some modules requisite to others and by controlling the interfaces among the modules and between the software and the hardware, Easterbrook commented.

"Changes in these interfaces, perhaps of a continuing nature, can create havoc for competing suppliers of individual parts of the total system that may not have the resources to supply all the parts of the system," he continued.

Large Revenues for IBM

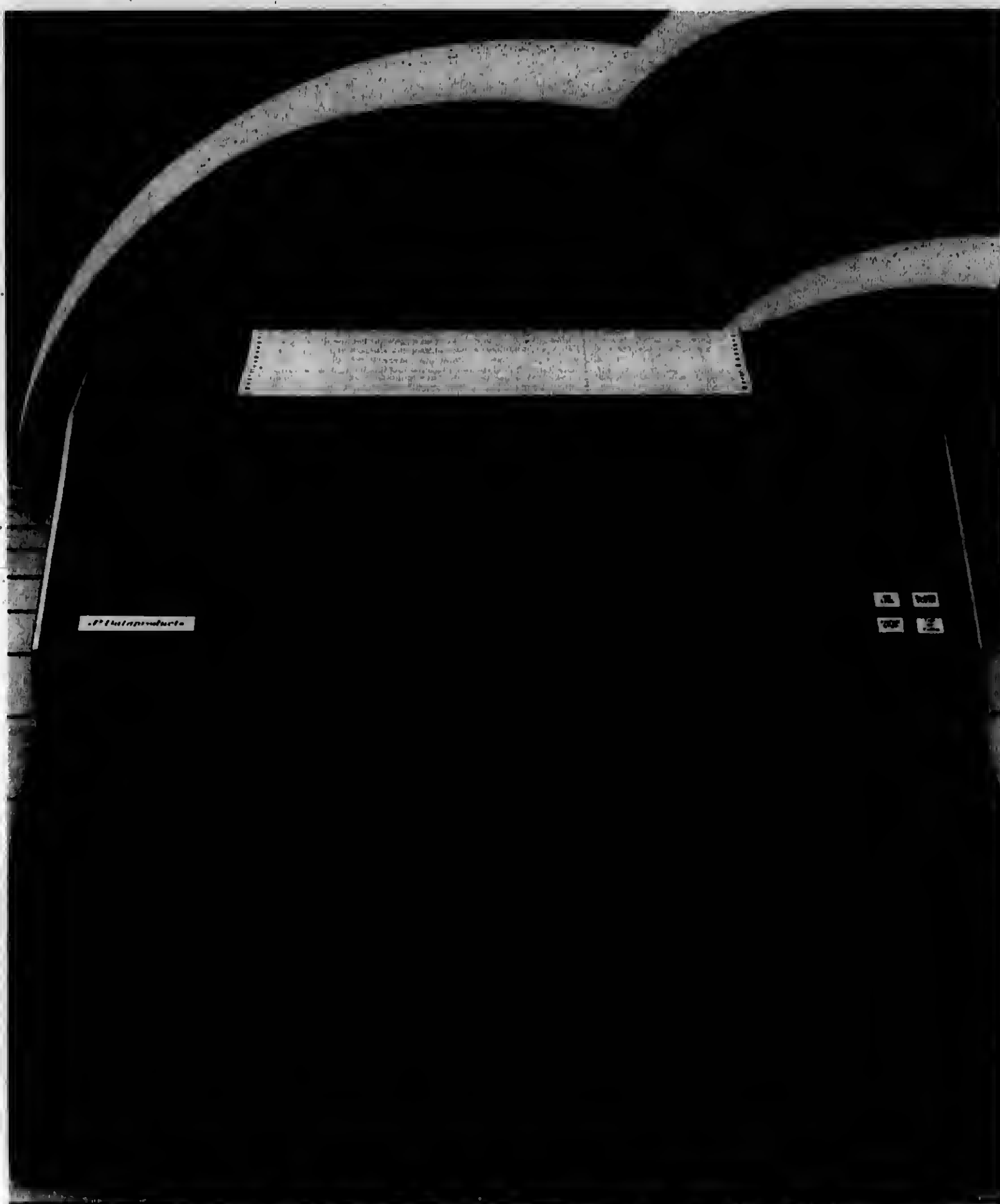
Easterbrook's estimates of the revenues software could yield IBM are sizable. The firm's software product revenues are estimated at \$400 million to \$600 million a year, amounting to about 3% of total revenues. But he foresees software products, or microcoded functions now performed by software, generating as much as 40% to 50% of the firm's revenues within the next 10 years.

Hardware will also undergo a transition toward modularization and specialization of function.

Eventually, software and microcode modules could become largely tied to corresponding hardware modules, Easterbrook continued.

"Such 'associative modularization' would enhance the pricing flexibility of those manufacturers able to provide complete lines of the types of software and hardware modules that the user might desire.

"Furthermore, certain elements of hardware, microcode or software could be made interdependent so that one would be a prerequisite for another, thereby giving the supplier additional leverage," he observed.



Offers Cobol for DG Machines IPI Sees Opportunity in CPU Independence

By Molly Upton
CW Staff

ORLANDO, Fla. — Hardware independence was one of the goals when Information Processing, Inc. (IPI) designed its own operating system and Cobol compiler for Data General Corp. equipment, according to Don Tyra, president of the software house.

A logical extension of that hardware independence is illustrated by the firm's investigation of other hardware on which it might also offer Cobol, Tyra said. "What held the minicomputer industry back was not lack of hardware, but the lack of business software," he stated.

Other firms offering Cobol for

minicomputers tend to provide a batch version that uses the manufacturer's operating system, he noted. IPI's Blis/Cobol, in contrast, was designed for a multuser environment and has its own operating system.

Choice of Role

Why did IPI elect to remain a software house rather than market software in a bundled manner with hardware, as do systems houses?

There are lots of others who are good at selling hardware, and IPI feels its strengths are in the operating systems area, Tyra answered. In addition, he said, there is a need in the marketplace for good operating systems.

DG's fundamental RDOS was process control-oriented, whereas Blis/Cobol represents a language and an operating system designed for business applications, he said.

"To date, software has been used by manufacturers to sell hardware," so they have no reason to offer software that spans a wide range of hardware or fits on the bottom of the line, he said.

"By not being involved with hardware, our software has got to stand on its own merits," he stated.

Range of Compatibility

The Blis/Cobol is upward- and downward-compatible within the DG line from the Eclipse to the Nova, he

added.

The decision to remain a software house was also a marketing decision because IPI supplies systems houses or OEMs and in a sense would be competing with them - if it handled hardware, Tyra observed.

IPI also avoids supplying applications programs, even to its OEMs, he said.

Tyra expects to see more independent hardware and software for IBM's Series/1 minicomputer. "In another couple of years the Series/1 will be like the System/3, with lots of independent offerings."

There is some irony in the fact that while IBM is taking the traditional minicomputer makers iron-only approach in marketing the Series/1, DG is acting more like IBM with the range of software it offers for the CS40.

Saw Need for Standard

In looking at the growth of the mini market, IPI saw that not every systems house could make an investment in developing language compilers and operating systems. The investment in applications programs indicated the need for a standard language such as Cobol, he observed, and that created the opportunity.

Although the technical staff of a system house would rather develop an operating system itself, management needs to get the product to market fast with software that is on the shelf, he continued.

Marketing manager Albin Dolney commented that the firm's Cobol is the Ansi 74 version. As an example of the interchangeability of Cobol programs from one machine to another, he cited one user who converted his programs from an IBM machine to a DG machine using Blis with changes in only seven items.

IPI currently supplies 60 OEMs or systems houses with Blis/Cobol for their DG systems and just under 200 users in the U.S. There are about 35 users abroad.

IPI ships out object code to prevent modification by the OEMs, Dolney said. In addition, each copy is identified so the firm can distinguish the copy from which any reproductions are made, he added.

Master File Kept

The firm keeps duplicate copies of the operating systems it has supplied and also adds new releases that provide more capabilities and/or accommodate different peripherals, Tyra said. With the master tapes at the home office, his staff can duplicate problems in the field and solve them, he pointed out.

Although IPI operates a hot line service to aid its OEMs, it has made only about three trips to the field, he said.

The 13-year-old firm was in the contract programming business until 1972, doing such work as multiuser systems for savings and loan institutions, warehouse control and work for the National Aeronautics such as programmable telemetry.

Tyra's background is in electrical engineering, but he found there was more to be done in the software arena than in the hardware area, he said.

THE NEW ERA IN MATRIX PRINTERS BEGINS WITH THE DATAPRODUCTS M-200.

**Now you can get Dataproducts reliability
in a low-cost 200-LPM Matrix Printer.**

How did we combine the low-cost appeal of a matrix printer with high-performance, high-reliability characteristics?

First, we gave our M-200 Matrix Printer a dual-column, 14-wire head designed to fight heat build-up.

Next, we engineered our two-in-one head for a 300-million character life.

About three years of normal use.

And any operator can change the M-200 head quickly and easily.

Then we set the replacement cost of our heads at less than \$200 each.

Finally, we gave this New Era

printer an average speed of 200-LPM (for 80 columns) and made it interface-compatible with all Dataproducts printers.

The M-200 table-top and pedestal models should require no more than two service calls a year and are designed to eliminate scheduled preventative maintenance.

All of which gives you the extraordinarily low price-performance ratio, low down time, and low life cycle cost you want.

Put our matrix printer in your line for a New Era in reliability and economy.



THE PRINTER COMPANY

NORTH AMERICAN SALES HQ: 6219 De Soto Avenue, Woodland Hills, CA 91365; (213) 887-8451; Telex 69-8492.
EUROPEAN SALES HQ: Darmstaedter Landstrasse 199, Frankfurt, W. Germany, Phone 681034; Telex 841-416344.

Reality[®] was a tough act to follow. Introducing Royale.[™]

The newest family of small business computers from Microdata.

Following an act like our Reality data base management system was tough. But we've done it.

It's called Royale, the new family of Microdata computer systems designed for the expanding needs of your company.

The Royale family of true generalized data base management systems is a giant leap forward in power and responsiveness. It allows you to load more applications on your system than you ever could before without losing speed. And it allows you to add terminals up to the maximum of 32 without any appreciable loss of responsiveness.

The new Royale family of computer systems is totally software compatible from one end to the other. Covering a very wide range of capability. So as your company grows, your system can grow without losing anything you've already invested in hardware or software.

You communicate with Royale using the powerful, simple to use English[™] inquiry language that works like everyday English. The system also includes

easy to use RPG II high-level language and DATA/BASIC.[™]

Royale runs in an on-line, multi-programming, multi-user environment with all system resources and data files managed by a microprogrammed Virtual Memory Operating System.

And best of all, as your company grows, so can your system. You never have to throw away hardware or software. You simply add to what you've got as you need it. We've even protected our existing Reality customers by enabling them to upgrade their systems without losing their software investment.

All in all, Royale is a giant step forward in affordable control for the executive who is too busy running his company to let anybody else run his computer.

Before you decide on a data base management system for your company, contact your local Microdata dealer for a free demonstration of Royale. We think it's an act that's going to be impossible for anybody else to follow.

Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.



Microdata ROYALE[™]
The one to grow on.

Executive Corner

Microdata Authorized Royale Dealers

Anchorage 907/276-2431
 Atlanta 404/266-8900
 Boston 617/273-2920
 Chicago 312/298-3840
 Cincinnati 513/671-1888
 Cleveland 216/621-1888
 Dallas 214/358-2468
 Denver 303/773-1510
 Detroit 313/358-1950
 Harrisburg 717/763-0850
 Honolulu 808/523-1611
 Houston 713/440-6111
 Indianapolis 317/257-6555
 Kansas City 913/321-7902
 Los Angeles 213/685-8910
 or 714/521-4041
 Memphis 901/274-5960
 Miami 305/565-0517
 or 305/940-9994
 Milwaukee 414/679-3127
 Minneapolis 612/835-1000
 Newark 201/964-6700
 New Orleans 318/325-9618
 New York 212/840-1555
 Oakland 415/547-6565
 Philadelphia 609/779-1901
 Phoenix 602/275-7511
 Pittsburgh 412/281-2676
 Portland 503/245-6631
 Raleigh 919/782-6020
 Roanoke 703/563-4444
 Rochester 716/436-2900
 Salt Lake City 801/531-1122
 San Diego 714/560-0777
 San Francisco 415/697-0430
 Seattle 206/641-4990
 Spokane 509/624-1308
 St. Louis 314/946-6757
 Syracuse/Utica 315/797-8062
 Tampa 813/879-5467
 or 813/823-0591
 Washington, D.C. 703/549-4300
 Australia (02) 922-3300
 United Kingdom 0442-61266
 Mexico 905-536-05-57
 Nigeria 21361
 Puerto Rico 809/844-3020
 South Africa 48-0520
 Toronto 416/362-1157
 Vancouver 604/438-7361
 Venezuela 45. 70. 15

- Newly appointed corporate vice-presidents of Pertec Computer Corp. are Daniel R. Carter, vice-president and general manager, CMC Division; Ralph Gabai, vice-president and general manager, Pertec Division; George O. Harmon, vice-president and general manager, PCC Service Division; and Donald F. Orr, vice-president and general manager, Business Systems Division.

- Prime Computer, Inc. has announced the appointment of five new corporate officers. C. David Hetrick has been appointed vice-president, marketing development; Robert W. Vlastnik, vice-president, international operations; Robert G. Claussen, vice-president, domestic sales; Edward T. Cuddy, vice-president, production operations; and Russell E. Planitzer, treasurer. The posts are all new positions.

- John C. Sterling has been appointed vice-president, domestic marketing, and Ken Nelson has been appointed vice-president, international marketing, for Documation, Inc.'s newly formed domestic and international marketing organization.

- James Bruno has been named deputy manager of Perkin-Elmer Corp.'s Data Systems Group. Donald M. Becker has been named the division's president and general manager.

- Don Mattson has been appointed to the position of vice-president and product line manager, diskettes for Information Terminals Corp.

- Marijane K. McDonough has been promoted to senior vice-president and elected a director of Mini-Computer Systems, Inc. Arthur Garofalo was promoted to vice-president of sales and elected a director. Jean-Pierre Durant was named general manager for European operations. Roger Pantton was named managing director of the company's UK subsidiary.

- Stephen M. Berkley has been appointed to the post of vice-president, business department, for Qume Corp.

- Douglas W. Smith, vice-president, data processing, telephone operations of GTE Service Corp., will succeed John B. Renwick as president of GTE Data Services (who has retired).

- Chuck Hall has been promoted to vice-president of product assurance for Documation, Inc.

- Walter P. Saltzman has been elected vice-president and general manager and James A. Zullo, vice-president of sales, for Applied Devices Corp., Instrumentation and Control Systems Division.

- Alice L.F. Pearson has been elected a vice-president and named general manager of Information Science, Inc.'s Eastern Division by the board of directors.

- Robert G. Bartizal has been promoted to executive vice-president of Dataproducts' printer and memory business.

- James Craig Ziegler has been promoted to senior vice-president while retaining his title of president at the Datacom Co., a subsidiary of Data Communications Corp.

- James M. Dismuke has been named vice-president and general manager of health care services by National Data Corp.

- Retired Rear Admiral Melvin T. Gardner of the Canadian Navy has

joined Computer Science Corp., Europe, as vice-president for government systems based at the Brussels headquarters of the organization.

- James B. Brennan, Daniel L. Nussdorfer and Thomas N. Osterland have been elected vice-presidents of Interactive Services Corp.

- Kenneth J. Boekeloo has been appointed director of management systems on the corporate staff at Burroughs Corp.

- Robert C. Morgan has been promoted to vice-president, sales, for Sycor, Inc.

- Robert N. Tullos has been promoted to division vice-president, engineering, for the Pertec Division of Pertec Computer Corp.

- C. Dudley Warner has joined Boole & Babbage, Inc. as vice-president of hardware engineering.

- Richard K. Gerlack has been named vice-president, engineering, at Randal Data Systems, Inc.

- Milton Brandon Jr. has been elected executive vice-president and general manager of Statistical Computing Corp. David M. Nockels has been elected vice-president and assistant general manager.

- James McGuire has been named vice-president of operations for the Interdata division of The Perkin-Elmer Corp.

- Charles W. McCall has been appointed vice-president of sales at CompuServe. Robert J. Massey has been appointed vice-president, eastern division sales, Barry F. Berkov has been appointed vice-president of marketing services, and Jeffrey T. Weisner has been appointed controller.

benefit management?

Will your benefit software produce, on demand, 5500 data, an SSA, an ERISA Benefit Statement and a total management analysis of the real cost of all fringe benefits, per employee?

If it won't, ask Joe Nestor (617) 851-4111, Wang Laboratories, Lowell, MA 01851, about the new Wang Benefits Management Software System for 360/370, Honeywell and Univac.

Fringe benefits cost too much these days to neglect.

WANG

CENTRONICS

102A... 330 CHAR/SEC TTL

103..... 165 CHAR/SEC LSI

INTERFACES FOR PDP-8, RS232, NOVA

IMMEDIATE DELIVERY

84-PAGE CATALOG • 1500 ITEMS

DEC, MINIS, PRINTERS, PERIPHERALS

SEND \$1 FOR 1st CLASS POSTAGE/HANDLING

AMERICAN USED COMPUTER CORPORATION

617-261-1100

P O BOX 68, KENMORE STA, BOSTON, MA 02215

IBM's High Court Plea Unfounded: Greyhound

WASHINGTON, D.C. — The Supreme Court should not review the Ninth Circuit Court of Appeals' order of a new trial in the case of Greyhound Computer Corp. vs. IBM, according to the Greyhound brief filed with the Supreme Court.

The recent IBM request for high court review [CW, Dec. 12] should be denied because it contains no basis for Supreme Court review and ignores the facts of record that support the submission of the issues to a jury, the brief said.

The Ninth Circuit Court of Appeals [CW, Aug. 29] over-

turned a lower court directed verdict because of lack of evidence and indicated that there was sufficient evidence for the case to go to a jury.

The IBM brief asked the Supreme Court to overturn the appeals court decision on the basis that such a decision intimidates competition and burdens lower courts.

In its response Greyhound indicated the appeals court had appropriately determined leasing was a relevant market. The leasing firm labeled "specious" IBM's claims that the market under consideration is the EDP market.

"Not one witness at the trial agreed" to the existence of an EDP market and "indeed, there is uncontroverted, substantial evidence that the primary method of doing business in the industry is through the process of leasing

computers," Greyhound said.

The EDP market, as defined by IBM, consists of all those firms that provide software and tabulating services; their annual sales or fees for DP services "have nothing whatever to do with the leasing of

hardware or the manufacturing of hardware," according to Greyhound.

The Supreme Court has refused petitions of certiorari in four cases decided on similar grounds by the Ninth Circuit,

Greyhound observed.

Contracts

Applied Digital Data Systems, Inc. (Addis) has an agreement with Modular Computer Systems of Fort Lauderdale, Fla., for the purchase of 1,000 Addis Regent Series CRT terminals.

Computer Automation's Commercial Systems Division has been awarded a contract from Woolco, Ltd. to install Syfa network processing systems. The systems will be used in the chain's franchised pharmacy operations.

MSI Data Corp. has received a major contract from Ite Corp. for more than \$3 million worth of MSI's Source 7600 data entry terminals.

The Pertec Division of Pertec Computer Corp. has been awarded a \$500,000 contract by Monchik, Weber and Associates, New York, N.Y., for Pertec's T7000 and T9000 tape drives for use on the Data Pad system.

Computer Sciences Corp. (CSC) has received a \$2.2 million contract from the U.S. Navy's Pacific Missile Test Center, Pt. Mugu, Calif., for its software systems engineering and software management services.

ICE, Inc. has been awarded two contracts totaling \$60,000 annually to maintain five Data General-based minicomputer systems for the U.S. Navy and Air Force. The equipment to be maintained is located in Washington, D.C., at the Pentagon and other locations.

System Development Corp. has been awarded a \$1.8 million contract to develop a Mortgage Insurance Accounting System for the Department of Housing and Urban Development.

Norand Corp. has reached an agreement with Agway, Inc. to build a computer register system for Agway's retail store system.

Bradford National Clearing Corp. and the Pacific Exchange, Inc. have signed a letter of intent preliminary to a joint venture to provide automated trade DP and recordkeeping services for brokerage firms throughout the nation.

System Development Corp. has been awarded a three-year contract worth approximately \$13.5 million to develop and operate a Medicaid Management Information System for the State of Florida.

National Data Corp. has received a contract from Welby Drugs to furnish its Deposit Reporting System.

Applied Devices Corp.'s subsidiary, Datatrol, Inc. of Hudson, Mass., has received an order from American Express for 300 merchant-activated credit authorization terminals called Datacat.

Raytheon Data Systems of Norwood, Mass., has been awarded a \$400,000 contract for a multiprocessor-based system by Trans World Airlines. TWA will use the RDS-5000 minicomputer-based system as a communications data concentrator to reduce communications overhead in its central IBM 370s.

The Pertec Division of Pertec Computer Corp. has been awarded a two-year, \$300,000 contract from Computervision of Bedford, Mass., to supply Pertec's T8000 tape drives for use in its interactive computer graphics system.

Sycor, Inc. has received a contract for 150 of its 290 on-line terminal systems by Computer Professionals Unlimited, Inc. for use in its network of credit unions. The value of the contract is estimated at \$800,000.

Computer Network Corp. has been awarded a contract under the General Services Program to provide teleprocessing services for the Federal Trade Commission over the next five years at a value in excess of \$5 million assuming four one-year options are exercised.

System Development Corp. (SDC) of Santa Monica, Calif., has received a renewal of its contract with Cummins Engine Co., Columbus, Ind., for on-line health-care claims processing using SDC's Claims Administration System.

Rand Information Systems has signed two contracts with the U.S. Civil Service Commission and the U.S. Veteran's Administration totaling approximately \$2.6 million. Rand will transform the Civil Service Commission retirement benefits system and convert the VA's pension, compensation and education systems.

Introducing Shockwatch*



A cure for the common headcrash

You don't swallow Shockwatch impact detectors. You put 'em on your disk packs. If a pack is dropped, Shockwatch turns bright red. So you can identify damaged media before they're inserted in a drive. And that cuts the probability of a costly head crash by up to 50%.

Immunize your disk library against head crash. Ask your disk supplier about Shockwatch. Or call us at 214-350-5725. We're Detectors, Inc., a division of Media Recovery, 2550 Electronic Lane, Dallas, Texas 75229.

Internationally, call your field engineering sales manager at the local Burroughs subsidiary head office.

*Patent pending

SHOCKWATCH
Protection.
Pure and simple.

If your company is buying High Isolation Transformers from one of our competitors, we'd like to know. So we'll give you a 13-function LCD pocket calculator to tell us about it.

Here are the rules:

1. Your firm must be an OEM using 25 or more of our competitor's products each year.

2. The transformers they buy must be controlled interwinding capacitance High Isolation Transformers with 125dB or greater common mode noise isolation.

3. You must be the first person from your company to call us at 800-854-2213 (Toll Free). If you are in California,

call (714) 565-1155 collect. Ask for the HIT Department.

Our rep in your area will deliver the calculator to you personally and, as a bonus, describe Elgar's superior High Isolation Transformer ("HIT") product line, and the excellent OEM arrangements available.

If you're not using High Isolation Transformers, but

suspect you may have a line noise problem, be sure to give us a call anyway. You won't get a pocket calculator but you'll sure get some answers!

ELGAR

8225 Mercury Court
San Diego, California 92111

HIT us for a free calculator



Elgar also is a leading manufacturer of Uninterruptible Power Systems, AC Line Conditioners, and AC Power Sources

At Least for Third World

IBM-India Debacle Offers Blueprint for Future

By Bohdan O. Szuprowicz
Special to CW

When IBM decided to pull out of India last November as a hardware manufacturer, its action was the culmination of a 10-year-old struggle with the Indian government and domestic industry interests whose objectives were always the control of all possible aspects of India's computer industry.

But India is only one developing country where this occurred; already there are indications that other countries such as Indonesia, Brazil, Malaysia and even Nigeria are also eyeing 100%-owned foreign subsidiaries as fair game for their own form of "Indianization."

The IBM-India debacle may have just provided a blueprint for future action in other countries.

Although IBM's decision received a lot of publicity, India's action was not directed solely against IBM or even the computer industry. Coca-Cola and even British tea trading companies have had their share of Indianization problems.

It all stems from the enactment of India's Foreign Exchange Regulation Act (Fera) in 1973. Fera requires foreign firms operating in the Indian market to reduce equity in their Indian subsidiaries to 40% and permits 100% foreign ownership only in manufacturing firms whose output is destined exclusively for export.

IBM Very Vulnerable

IBM found itself particularly vulnerable, however, because unlike other computer hardware manufacturers it insists on 100% control of its foreign manufacturing subsidiaries. In an attempt to compromise, IBM offered to split its Indian operations into two separate companies.

It offered 60% equity to Indian interests in its computer service bureau business, but proposed to retain 100% control of its projected \$10 million export manufacturing business as well as import marketing and service operations. The Indian government rejected this proposal and IBM decided to terminate its operations in India.

Out of a total estimated 350 computers installed in India, about 51% are IBM machines. About 100 of those are second-generation IBM 1401 computers, most of which were imported in form of second-hand parts which were refurbished and modernized at the IBM manufacturing plant in Bombay.

Indian user groups often voiced their displeasure at

what they called the "dumping of second-hand computers in India."

As if in anticipation of the IBM decision, the Indian government was ready to take over the servicing and maintenance of all computer installations in India, having created a special Computer Maintenance Corp., which will step into the void as soon

as IBM evacuates its forces, reportedly by May.

This government organization will be set up under the auspices of the Department of Electronics; its primary function will be to provide maintenance and support services to computer installations.

Control Over Future

The maintenance organiza-

tion appears to possess much more say about the future of the computer industry in India than its modest corporate name would imply. Even supplies of spare parts, tools and test equipment for all imported and domestic computers will be channeled through the new organization.

The company is also to set up testing and evaluation

facilities for peripherals, components and subassemblies. Another major activity will be "Indianization" of spare parts and components for existing computer installations, as well as redesign of installations to use domestic equipment whenever possible.

The company will also be heavily involved in systems

(Continued on Page 74)

11 Ways to Add to Your Computer Know-how

ADVANCED ANS COBOL With Structured Programming

Gary D. Brown

Here's an in-depth examination of the complex statements that have evolved in COBOL programming. The book offers those familiar with programming—either in COBOL or another language—clear explanations and examples of such topics as: Table handling; Character-string manipulation; Report writer; Sort-Merge; Direct and Indexed files; and Communications facility. The book's emphasis on advanced features, programming style and techniques, and structured programming makes expertise in COBOL easier to achieve.

(1-10642-9) 1977 497 pp. \$19.95

MAKING SYSTEMS WORK The Psychology of Business Systems

William C. Ramsgard

Innovative techniques for eliminating the "data pollution" affecting almost every organization today are presented in this new book. It offers a detailed program for identifying specific system problems and developing a rational plan of attack to effectively bridge the gap between system users and those responsible for the system's care and operation. Many aids and guidelines help develop a fully usable information structure, including an in-house training program for the user, with specific recommendations for chief executive officers and their staff.

(1-01522-9) 1977 262 pp. \$18.95

MICROPROCESSORS IN INSTRUMENTS AND CONTROL

Robert J. Bibbero

Discusses the relationship of the microprocessor with its host system—how they should be mated and interfaced, and what must be known and employed to launch the combination successfully. Bibbero provides all necessary background for applying modern microprocessors to instruments and control systems, assuming no previous knowledge of either. He includes complete application case histories and describes software/firmware development for several systems. Emphasizes system and software development.

(1-01595-4) 1977 301 pp. \$15.75

DATA COMMUNICATIONS Facilities, Networks, And Systems Design

Dixon R. Doll

Here is a comprehensive, pragmatic guide to one of the information industry's most vital, yet least understood areas—data communications. This book reviews the basics of terminology, network structures, design tradeoffs, and the functions of typically used network building blocks, then examines in detail important telecommunications services and facilities, both from economic and technical perspectives. Chapter-length coverage is given to present and future teleprocessing terminals... available error control strategies for data communications links... and methods of sharing communications lines.

(1-21768-9) 1977 approx. 480 pp. \$24.95

ABEND DEBUGGING FOR COBOL PROGRAMMERS

B. H. Boar

This comprehensive book presents a study of methodologies and techniques available to debug Abend (Abnormal Ending) core dumps—an event for which most COBOL programmers are inadequately prepared. Using the ANSI COBOL language under the 360/370 OS/MVT operating system as the case study, the book provides systematic approaches to Abends most familiar to the COBOL/OS user.

(1-08413-1) 1976 321 pp. \$18.50

SOFTWARE RELIABILITY Principles and Practices

Glenford J. Myers

Divided into four sections for easy reference, the book discusses software reliability and the major causes of unreliability; design of reliable software; the broad area of software testing; and the important factors related to development of reliable software, such as project organization, programming languages, predictive models, and software support systems.

(1-62765-8) 1976 360 pp. \$21.25

EFFECTIVE USE OF ANS COBOL COMPUTER PROGRAMMING LANGUAGE

Laurence S. Cohn

This summary of the latest applications of the ANS COBOL language eliminates the need to search through scattered texts and other manuals. It offers a wealth of practical tips that normally can be learned only through on-the-job experience. More than half the book contains illustrations demonstrating each step in specific programming procedures. The format is designed for maximum practicality—from the detailed table of contents and extensive index to the spiral binding for "hands-off" reference. An indispensable guide for programmers working with IBM's OS and DOS systems.

(1-16436-4) 1975 178 pp. \$12.25

THE DATABASE ADMINISTRATOR

John K. Lyon

How can you realize the cost and efficiency benefits of centralized data management, while avoiding potential pitfalls? It's all spelled out in this unique guidebook. Lyon brings experience-tested techniques for system planning, start-up, and operation, and clarifies the special management skills needed by the Database Administrator in all phases of the work. Detailed coverage focuses on dealing with hardware and software failures, timing and handling updating, managing growth, staff selection and management, security, and inter-department communication. Includes a wealth of illustrations and examples.

(1-55741-2) 1978 170 pp. \$15.75

ALGORITHMS FOR RPN CALCULATORS

John A. Ball

Now calculator users can discover the vast computational power beneath their fingers when using one of the many hand-held calculators that use RPN (Reverse Polish Notation). Here is an explanation of how to write concise and elegant algorithms for specific individual needs and problems. Scientists, engineers, and students can numerically integrate differential equations, fit curves to data using least-squares techniques, solve transcendental algebraic equations, and evaluate many special functions (such as Bessel functions). An extensive collection of carefully written algorithms which can be readily used on any RPN calculator for solving a variety of common problems in science and engineering makes this an invaluable reference.

(1-03070-8) 1978 approx. 368 pp. \$17.00

THE MINICOMPUTER IN THE LABORATORY

With Examples Using the PDP-11

James W. Cooper

Detailing the use of the minicomputer for the acquisition and analysis of laboratory data, this book describes in simple terms the programming of the DEC PDP-11 minicomputer. Examples and problems take readers through each phase of the programming language. The book also covers the use of the computer as a tool for data acquisition and processing and includes a thorough discussion of signal averaging, spectrum display, plotting, and peak picking. Featured is the first full description of the Fourier transform as implemented in a minicomputer.

(1-01883-X) 1977 365 pp. \$19.50

Wiley Journal

SOFTWARE

—Practice and Experience

Editors: D. W. Barron and C. A. Lang

Publishes papers on "systems" software and "application" software for use in batch, multi-access, interactive and real time environments. Original contributions and tutorial papers.

Volume 8, Bimonthly Subscription: \$75.00



WILEY-INTERSCIENCE

a division of John Wiley & Sons, Inc.

605 Third Avenue

New York, N.Y. 10016

In Canada: 22 Worcester Road, Rexdale, Ontario



Please send the books indicated for
15-DAY FREE EXAMINATION.
(Restricted to the continental U.S.
and Canada.)

Mail to: WILEY-INTERSCIENCE
P.O. Box 092, Somerset, N.J. 08873

☐ Brown (1-10642-9)

☐ Ramsgard

(1-01522-9)

☐ Bibbero (1-01595-4)

☐ Doll (1-21768-9)

☐ Boar (1-08413-1)

☐ Myers (1-62765-8)

☐ Cohn (1-16436-4)

☐ Lyon (1-55741-2)

☐ Ball (1-03070-8)

☐ Cooper (1-01883-X)

☐ SOFTWARE

(Subscription)

NAME _____

AFFILIATION _____

ADDRESS _____

CITY _____

STATE/ZIP _____

☐ Payment enclosed, plus sales tax. Wiley pays postage/handling. We normally ship within 10 days. If shipment cannot be made within 90 days, payment will be refunded.

☐ Bill me. ☐ Bill firm or institution.

Prices subject to change without notice.

092 A8479-57

Searching for Niche

Scope Focusing on Electrosensitive Printers

By Molly Upton
CW Staff

ORLANDO, Fla. — Scope Data is looking for a niche for its electrosensitive printers, according to Walt Plater, director of marketing. The firm is intent on developing faster, lower cost units, he indicated.

The Comm 1200 will be micro-processor-controlled and have bidirectional print speeds up to 500 char./sec while handling 1,200 bit/sec communications, he said. The existing Series 200 prints at 240 char./sec but falls somewhat short of handling 1,200 bit/sec capability, he said.

The new unit is being designed for a prospective customer involved in com-

munications and wire services and will be marketed in lots over 1,000 in comparison with the firm's end-user marketing efforts with its Series 200, he said. Production is scheduled to start in the third quarter of 1978.

Although the major portion of the Series 200 base is used as hard-copy units for CRTs, Plater said the Comm 1200's target is the data communications market. The CRT hard-copy market is trending toward a lower cost unit, he added.

In distinguishing between impact and nonimpact printers, Plater said, the latter type is suited for "rip and tear" applications — and that is what the firm is looking for.

Although thermal printers have been predominant in the "rip and tear" applications area, Plater said that probably thermal printers would not be as popular as they are if electrosensitive printers had been developed first.

Potential for Low Cost

Of all printing technologies, electrosensitive printing offers the potential to achieve the lowest cost, he said. That hasn't happened yet, but the potential is there, he added.

There have been many innovations in the field, and Plater expects more. He mused that if Scope had a model with styli spread across a page, the unit could print very rapidly. There is no

reason why such a unit could not sell for less than \$500, he added.

Paper about 4.5 in. wide could move almost silently, he added.

Because the cost of aluminized paper on the electrosensitive units is about 2.5 times that of plain paper, Plater prefers to compare operating costs between different types of printers.

He thus includes factors such as paper, ribbon, head replacement and service costs. The electrosensitive printers have no ribbons, he observed.

Although theoretically the cost of maintenance on electrosensitive units should be less than that for impact units because of fewer moving parts, Scope's use of a third-party firm dissipates the potential savings, he indicated.

The print head on the Comm 1200 will cost about \$5, giving an amortized cost of 30 cents per million characters compared with the general figures of \$1 per million characters for a matrix printer head and \$1 per million characters for a ribbon.

"I feel the cost of supplies for the Comm 1200 will come close to if not be equal to or less than the total cost of supplies of an impact printer," Plater stated.

Scope is aiming for a mean time between failures of 8,000 hours for the 1200 as opposed to 4,000 hours on the Scope 200, he said.

Demand Increasing

Plater expects an increased demand for a 1,200 bit/sec unit. Currently the hot area in the printer market is for 300 bit/sec units, he added.

Scope has not been without its problems, and although profitable sometimes, at other times has been dependent for sustenance on its parent holding company, Scope, Inc., a "miniconglomerate," he said. The firm has considered being acquired but rejected the idea, he added.

The initial product, the Scope 200, was designed to be flexible, and in fact was so flexible that it almost needed an engineer as a salesman, he said.

The flexibility included various word lengths, data rates, serial and parallel interfaces with CRTs, he noted.

Scope's new product, the Comm 1200, will be easier to interface, he said.

The firm got its start when Repco, another subsidiary of its parent, developed a printer. The product was designed by engineers rather than marketing people and although it was reasonably priced, it had shortcomings in reliability, Plater said.

Scope was subsequently established and spent 2-1/2 to three years redesigning and developing the current Series 200, which met with reasonable success in the market, he observed.

Over the years, paper has evolved from zinc oxide coated to aluminized. The coated stock generated residue and odor, especially at higher speeds.

Impressions on aluminized paper are made through vacuum deposition, he said. Early attempts to reduce costs by making the paper thinner resulted in paper that curled, he said.

Costs of special aluminized paper are decreasing, but Plater doubts that they will ever equal those of standard paper.

There's One Number for the Number One Computer Lease (703) 683-4606

Call Us.

We've been solving leasing problems for end users and brokers since 1967, longer than most leasing firms, and doing it better, too. CIG has been a leader in the lease/purchase field, offering a variety of flexible financing plans. Short-term or long-term leasing, Equity funding, Walkaways.

There's a CIG plan to meet your needs.

Tell us what you need and we'll help you get it. With full financing, flexible leasing terms, the latest IBM/370 systems and plug compatible equipment, and a Technical Service Center which stands ready to help you get the most from your computer investment. Plus, we have a sizable portfolio of IBM/360 systems.

Whether for your own use or for a client, leasing through CIG can save you time and money—your two most precious resources. All negotiations are held in strict confidence for your protection. Our first quote will convince you . . . when you're talking leasing, you're talking our language.

Call CIG today (703) 683-4606.

CIG

CIG Funding Corp.
303 Cameron Street,
Alexandria, Virginia 22314

Call CIG: (703) 683-4606, or mail this coupon today

Tell me more about CIG. I am interested in	
☐ leasing	☐ buying the following system:
I'm also interested in	
☐ Memory Systems	☐ Block Multiplexer Channel
Name _____	
Address _____	
City _____	State _____ Zip _____
Phone number _____	
Mail to CIG Funding Corp., 303 Cameron St. Alexandria, Virginia 22314	

'Regulatory Maze' Seen Problem for U.S. Firms

WASHINGTON, D.C. — The U.S. lack of a consistent national policy on technology transfer poses a dilemma for many high-technology companies, according to William S. Anderson, chairman of NCR Corp.

"Currently the U.S. has the most stringent controls over the export of high-technology products of any Western country. Yet lack of standard criteria and a jungle of conflicting interpretations make it extremely difficult for U.S. industry to assume a responsible position in the transfer of technology to Eastern countries," he said at a conference on "Technology Transfer in Transition."

As an example of the "regulatory maze" that sometimes confronts business, Anderson said the computer industry cannot export automatic bank teller machines (ATMs) containing data encryptors without first obtaining a license from the Office of Munitions Control.

"The fact that the National Security Agency has determined that this type of product is totally 'benign,' to use their own term, makes no difference," he said. "The drawn-out licensing procedure must nevertheless be followed."

"It is time to more clearly define the rules governing West-East technology transfer, to apply those rules consistently and to modify them when and if circumstances change," he said.

"There are encouraging signs that the government is beginning to move in that direction. Currently under review by the Department of Defense are more than 100 so-called critical technologies, to determine which of those technologies should be more closely controlled," he said.

"Meanwhile, the Department of Commerce's Office of U.S. Export Control is studying, on a country-by-country basis, both the risks and benefits of technology transfer."

"The Department of State is currently preparing for the next round of negotiations of the Coordinating Committee on East-West Trade (CoCom)."

"And in Congress, the House Subcommittee on International Policy and Trade is holding hearings on the present export licensing process," Anderson said.

Industry Apprehensive

These efforts merit the support and cooperation of private industry, he continued, but added that there is apprehension on the part of private industry.

"We have a nagging fear that what will finally emerge from these somewhat overlapping efforts will be overregulation of technology transfer. If that happens, there is always the possibility that in curing the disease, the doctor will have killed the patient," he said.

As an example, he said "if the Department of Defense interim policy of requiring the licensing of critical technology transfer to any country prevails, the U.S. competitive position in key world markets will be seriously jeopardized."

"In addition, such a course would raise other serious questions for which, to my knowledge, no answers presently exist."

"As only one example, suppose an overseas subsidiary of a U.S. company

develops a so-called critical technology which it proposes to export. In such a case would that technology be subject to U.S. licensing requirements?" Anderson asked.

"One must also question whether the subsidiaries of U.S. multinationals can, over the long term, remain viable competitors with local companies if their U.S. parent is not allowed to transfer its technology to its subsidiary operations," he added.

"Certainly everyone concerned with the technology transfer process — and that includes government as well as business — needs a clearer idea of whether critical technologies developed for commercial products have contributed, or could contribute, to the military potential of a possible adver-

sary. To date we have seen little evidence that they have ... "The Department of Defense has stated that insofar as West-East transfer is concerned, the fact that a given technology is obsolete by U.S. standards is beside the point," he said.

What matters is whether it would significantly advance the receiving country's military potential.

"Obviously, the determination of what constitutes critical technology is a crucial and still only partially answered question. The current listing, for example, includes technologies pertaining to memory, distributed data base systems, LSI circuits and plasma displays."

"In view of the widespread capabilities in these areas of technology, it

is doubtful that their export by American companies would provide a competitive edge to potential adversary countries," he continued.

The Department of Defense acknowledges that it is dealing with a moving target, and says it will continuously update the list of critical technologies and/or end products whose export will require licensing in order to protect national security, he said.

"As new guidelines for West-East technology transfer are developed," Anderson said, "one hopes the developers will remember that this country's current technological edge in many industries is due — in large measure — to the fact that ours is still a relatively free and open economy."

The superb quality of Verbatim® removable magnetic storage media is now on a dealer's shelf not far from you.

The reason Verbatim is now so accessible is that so many of you like the Verbatim idea: noticeably better quality and durability that show up in tough everyday use. The reason? We make almost everything ourselves, because we found that we could improve on the quality that we were getting from our suppliers.

Being demanding isn't always easy. But it's good for the people who buy and use Verbatim, and it's good for the scores of companies who specify Verbatim for the equipment they make. And we enjoy doing business that way.

Information Terminals Corp., 323 Soquel Way, Sunnyvale, CA 94086. (408) 245-4400. TWX: (910) 339-9381.

In the Far East:
ITC—Far East
404 Roppongi Skyheights
3-2-21 Roppongi, Minatoku
Tokyo, Japan
Telephone: (03) 583-1981
Telex: J 47879

In Europe:
Information Terminals S.A.
Case Postale 296
1215 Genève 15
Switzerland
Telephone: 41 (22) 34-90-55
Telex: 22647 ITGE CH

For your nearest sales office call toll free: (1) 800-821-3648 (in Missouri call: 800-892-7655, Ext. 515)

Ask for it by name.

Verbatim™

minidisks

Verbatim

Dear Verbatim people:
Tell me where my nearest Verbatim dealer is.

My name is _____
Title _____
Department _____ Tel _____
Organization _____
Address _____
City _____ State _____ Zip _____

And while you're at it, send me literature on _____

Information Terminals Corp., 323 Soquel Way, Sunnyvale, CA 94086 (408) 245-4400
89-1-16-78

Mom would be proud of you for picking a data communications terminal system from Trendata.

There's such a selection. Not only in terminals and peripherals, but also in financing arrangements. We offer a variety of lease programs, straight purchase plans, even rental packages. Easy. Convenient.

You deal with one company that guarantees the product and backs it with nationwide service.

You can start with a small investment in equipment and later expand to more capacity without going through a financial hassle.

Our lease and buy programs are just as flexible as our terminal systems. Our equipment is designed to fit your people, our financing programs to fit your pocketbook.

They're both time savers you can really bank on.



**Applied Magnetics
Trendata**

610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086
(408) 732-1790

Our terminal lease or buy programs fit everyone's pocketbook



Attention IBM 370 Sufferers

The 370 is a superb computer—but system bottlenecks can rob you of its full value. VS/Insight breaks bottlenecks, can improve total system performance.

VS/Insight is something rare in software—a monitor system that automatically records information on total 370 activity and individual program efficiency. VS/Insight is fully transparent—installs in minutes, involves no supervisor or IBM software modifications, operates with all releases of DOS/VS. It gives you detailed graphs and summary reports that analyze current hardware and software utilization, and also help you identify future system requirements. Teamed with our Job Accounting System,

VS/Insight can significantly up-grade the overall efficiency of your 370 installation. Write or phone for detailed facts and a free trial offer.

**datapro
HONOR
ROLL**

We earned the
DATAPRO
AWARDS
for our ASAP
and RELO PLUS
systems.

Universal Software

Main Office: Brookfield Office Park, Brookfield, CT 06804
Tel: (203) 792-5100

GSA CONTRACT NO. GS-00C-01200

Orders & Installations

Ross Systems, Inc., a Palo Alto, Calif., management consulting and computer time-sharing firm, has installed its second Digital Equipment Corp. PDP-11/70.

The First National Bank of Atlanta has an agreement with Incoterm Corp. for a pilot installation and testing of five Incoterm Series 7700 automated teller machines in Atlanta.

The American-Press of Lake Charles, La., has ordered a total VDT system from Tal-Star Computer Systems valued at about \$500,000.

The Missouri Basin Power Cooperative of Bismarck, N.D., has ordered a Honeywell HS4400 process computer, high-performance video unit and printer valued at \$2 million for its Laramie River Station project.

The U.S. Army has ordered from CFS, Inc. its proprietary software package Display Operator Console Support for worldwide installation.

Hertz Truck Division of the Hertz Corp. will install 14 NCR I-8250 computers at field offices throughout the country to handle processing of accounts receivable and billing.

Acco International, Inc. celebrated the first anniversary of the dedication of its World Headquarters with the installation of an IBM 370/138.

The Internal Revenue Service has purchased bulk-core memories from Honeywell's Process Control Division to replace magnetic drums.

Quality Mill Supply has ordered a Honeywell Information Systems Level 62 which will be used for on-line order entry and on-line accounts receivable applications.

Red Owl Stores, Inc. has signed an agreement to purchase \$1.8 to \$2.6 million worth of Datachecker systems from National Semiconductor Corp. for its chain of food stores.

Empire National Bank of Newburgh, N.Y., has ordered Quantor Corp.'s first Q118, a minicomputer-controlled computer output microfilm (COM) recorder/processor.

Helms Express, a N. Huntington, Pa., trucking firm, has installed a Harris 8182 intelligent CRT system valued at \$50,150. The system operates on-line to an IBM 360/40 mainframe.

The First Citizens Banks and Trust of South Carolina has begun installing a statewide NCR electronic DP network valued at \$2.3 million.

Oxford Savings Association of Oxford, Ohio, has installed Most (Mini On-Line System Technique), a software package developed by NCR Corp. to cover aspects of a savings and loan association's operation.

The R.L. White Co., a real-estate-oriented publishing firm headquartered in Louisville, Ky., has ordered dual Honeywell Information Systems Model 66/05 large-scale systems valued at \$1.8 million.

Nyman Mfg. Co., a paper and plastic product manufacturer, has ordered a Univac 90/30 system for installation at its E. Providence, R.I., plant.

Wetterau, Inc. of Hazelwood, Mo., has agreed to purchase over \$1 million

worth of National Semiconductor Corp.'s Datachecker point-of-sale systems over the next three years.

Airco, Inc. of Union, N.J., has installed Pertec's CMC 1800 Keyprocessing system.

Colonial Penn Group Corp. of Philadelphia has ordered Incoterm Corp. SPD 300 series equipment valued at \$2.9 million.

National Family Opinion of Toledo, Ohio, has installed a Honeywell 64/50 computer to tabulate and analyze consumer market research surveys.

Baltimore's Franklin Square Hospital has installed a Harris 8170 intelligent CRT terminal system, for admission, emergency, outpatient and billing applications. The system is valued at \$182,000.

Inter-Regional Financial Group, Inc. has purchased Digital Equipment Corp.'s Decsystem-20 to be installed in the Minneapolis offices of Dain, Kalman & Quail, a regional investment firm. The system is valued at \$600,000.

The City of Rialto, Calif., has ordered a Honeywell Level 62 computer valued at \$160,000.

The U.S. Marine Corps has received the first two Control Data Corp. MD640 militarized mass storage systems for integration into its Magis Intelligence Analysis Center. Additional units are to be delivered under a \$415,000 contract for various uses within the Marine Tactical Command and Control Systems Group.

Sportcaster, a ski apparel manufacturer in Seattle, has ordered a Honeywell Level 62 business computer for sales order processing, payroll, accounts payable, accounts receivable and general ledger applications. The system is valued at \$280,000.

The U.S. Department of the Treasury has ordered dispersed data processing systems and services from Datapoint Corp. The equipment will support the Treasury Payroll/Personnel Information System. The order is valued at approximately \$1.9 million.

The Hospital Trust National Bank of Providence, R.I., has installed an IBM 3890 document processor. The 3890 operates on-line to an IBM 370.

U.S. Home Corp. of Clearwater, Fla., has ordered a Honeywell Model 64/30 computer system valued at \$550,000 for financial applications.

Florafax International, Inc. of Tulsa, Okla., has ordered 1,000 low-speed asynchronous modems from General Datacomm Industries, Inc. to implement System XXI, a nationwide order transaction and management information system for the floral industry.

Ohio's School Employees Retirement System has installed a Honeywell Model 66/05 computer valued at \$1 million. The system will be used to process statewide nonacademic employee benefits for both active and retired members of the Ohio public school system.

Cabarrus County, N.C., has ordered a Honeywell 64/20 computer to be used initially for property tax computations and financial management applications. The system is valued at \$330,000.

Western Electric Data Center of Illinois has installed three Memorex 1380 communications processors.

HAZELTINE 1520: A BREAKTHROUGH IN PRINTER CONTROL

The Hazeltine 1520 is truly remarkable, with features found in no other terminal in its price range. A microprocessor-based editing terminal with extended system flexibility, the Hazeltine 1520 has a unique, buffered interface for controlling a slave printer with either a parallel or EIA serial interface.

Independent Operation

The Hazeltine 1520 uses two microprocessors, one dedicated to the terminal functions and one for the printer interface, allowing your CPU to interact with the terminal and printer independently. What does this mean to you? It means that an operator can be entering data through the terminal to the CPU while the printer is receiving and printing information from the CPU totally independent of the terminal function.

Printer Buffer

The Hazeltine 1520 has a separate 2K printer buffer. Data communicated from the CPU to the Hazeltine 1520 printer interface at high baud rates are buffered down to the printer's speed. This allows you to attach a low-speed and perhaps low-cost printer to a high-speed communications system.

Transparency

The Hazeltine 1520 permits data to flow through from the CPU to the printer without any change. You are not limited to formatting printed output, in accordance with the CRT display (typically limited to 80 columns).



Printing is limited only by the printer's own capabilities. The terminal is transparent between your CPU and printer.

Hard to believe that all of these unique features can be found in one low-cost terminal? Call your local sales representative today for a demonstration.



Hazeltine Puts Performance Into Economy Terminals.

Hazeltine Corporation, Computer Terminal Equipment, Greenlawn, New York 11740 (516) 549-8800 Telex 96-1435

Innovative Marketing Seen Micro Use Key

WOODLAND HILLS, Calif. — Innovative distribution techniques will be almost as important as innovative products in achieving the predicted high level of microcomputer use, according to Don M. Muller, senior vice-president for the Microsystems and Peripherals Group of Pertec Computer Corp.

"The very low-priced microcomputer, intended for a fairly narrow range of home uses, will be sought out by the public in retail stores. But the middle-range microcomputers with broad capabilities, designed for small businesses, will have to be merchandised aggressively and imaginatively if the industry is to achieve the high sales figures many observers are expecting," Muller said.

"What's needed is a showroom where the salespeople can demonstrate various pieces of equipment and show how they would help with each businessman's par-

ticular problems," he said.

Most retail microcomputer stores today are oriented toward the hobbyist and are looking for the quick sale with a lower level of after-sale support.

"We are interested in near-term success, too. We offer a line of hobbyist products through the Icom label, but we also concentrate a great deal of attention on our long-range goal of a well supported line of small business systems as solutions to the problems of the very small business," the Pertec official noted.

"Careless sales today will cause the industry grief tomorrow, and we are developing a support plan carefully tailored to assure the user gets what he needs."

"That's why we're concentrating on business applications more than home or hobbyist usage, and that's also why we're using dedicated stores to penetrate the small business market," he said.

Expansions

Sycor, Inc. has selected a 21,000 sq-ft facility in Goldsboro, N.C. The company has also occupied another 14,000 sq ft of office space in Ann Arbor, taken an option on an additional 10,800 sq ft of office space there and activated 20,000 sq ft of space in a newly constructed Ann Arbor warehouse.

Vadic Corp. has moved into a new 95,000 sq-ft plant on a 5.3-acre Moffett Industrial Park site in Sunnyvale, Calif.

Tandon Magnetics Corp. has doubled its plant size with the addition of a new facility in Chatsworth, Calif.

Wang Laboratories, Inc. will build a 126,000 sq-ft addition to its facility in Tewksbury, Mass., to be completed next summer.

Processor Technology, Inc. has moved into a new facility at 7100 Johnson Industrial Drive, Pleasanton, Calif. 94566.

Syncom, Inc. has plans to expand its present facility to 60,000 sq ft. The company is located in Orchard Park, N.Y.

Tesdata Systems Corp. has relocated its corporate headquarters and consolidated a number of satellite operations into its own 84,000 sq ft office building at the Westpark Center in McLean, Va. Initially the firm will use approximately 50,000 sq ft of the modern seven-story structure.

'Debacle' Offers Future Blueprint

(Continued from Page 69) engineering, import procurement advice, central purchase of peripherals and optimization of systems. It will also carry out research and development and play a vital role in software and systems support, software development, programming, feasibility studies, DP management and data center organization. Further down the line, the unit is to set up computer cen-

ters for the Indian government, the public sector and for industry as required.

Soviet Prototype

The organization displays many characteristics similar to those of Elektronorgtekhnika of the Soviet Union, a unit of the Ministry of Foreign Trade of that country which has the monopoly on import and export of computer hardware, software and components.

Some of the Indian concepts must have undoubtedly originated from a study of Elektronorgtekhnika, with which India has had considerable dealings.

In fact, there are already eight known Soviet computer installations in India, more than in any other country outside of Eastern Europe. Besides the Soviet BESM-6 at the Bhabha Atomic Research Center in Bombay, there are also Riad R-30 and Minsk-22 computers at the Indian Institute of Technology and another Riad R-30 at the Administrative Staff College of India.

An East German Riad R-40 is installed at India Engineers Ltd.

In 1975 the Soviet Union and East Germany supplied 20% of India's office equipment imports of \$12 million. This was the result also of the surplus rupee trade with the Soviet Bloc, but there have been reports the Soviets offered to supply the know-how to manufacture in India Riad computers, which are comparable to IBM 360 and some 370 models.

Since 1972, India also has been manufacturing its own minicomputers, of which 75 units are already installed, accounting for about 21% of all computer installations. These include the TDC-312, TDC-316 and TDC-332 models, the latter a 32-bit minicomputer whose prototype is expected to be in operation in 1978.

In addition, up to four Indian firms are trying to develop microprocessors and in 1975 an Indian microcomputer with 36 functions was announced. Its production was expected to save India

another five million rupees annually in import.

Other developing and populous countries are the most likely to undertake "Indianization" of their fledgling computer industries. This is so because many are traditionally short of hard currencies and have high unemployment while manufacture of electronics and computers is a labor-intensive industry with relatively small demand for materials input.

Brazil is already requiring local investment and local sourcing in manufacture of small computers, which keeps IBM out and forced foreign firms such as Philips, HB-CII, Fujitsu, Nixdorf and Nippon Electric to join with Brazilian interests in making the proposals.

Malaysia has announced that by 1990 foreign firms can retain only 30% in their subsidiaries. Indonesia has proposed that marketing be performed by local firms (CW, Jan. 9) and even Nigeria is demanding a share for its domestic investors in its local IBM subsidiary.

"Indianization," it seems, is the wave of the future — in the Third World at least.

**Send for
a free job
accounting
evaluator.**



Our generalized requirements checklist will put your needs in focus. It was developed from PACER's 8 years of experience with several thousand job accounting users.

Whether you are considering vendor supplied or in-house solutions, your research will not be complete until you include KOMAND in your evaluation. Not limited to just SMF, KOMAND puts you in control of the resources of your OS/VS system. KOMAND is cost conscious, flexible, and systems and operations oriented. Your KOMAND system can range from a \$5900 costing and reporting module to a total system including formal invoicing, DASD track-hour accounting, and statistical analysis.

KOMAND
BY PACE

**OS/VS Job Accounting
and Billing System**

PACE Applied Technology, Inc. Telephone (703) 369-3200
7900 Sudley Road, Manassas, VA 22110

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____
Computer _____ Operating System _____

The PACE for Today...and Tomorrow

AKD (402) 392-2606
**VOLUME DATA ENTRY
SERVICES...
TAPE OR CARDS**
"QUALITY AT A LOWER COST"
**AMERICAN
KEYDATA**
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

**EDP
Consultants**

THE SOUTHEAST
DIRECTORY OF COMPUTER
INSTALLATIONS

Show and Tell.

To learn more about computers at any level, you have to hear. Discuss. Ask questions. Share ideas. Watch things work.

Computer shows dot the map every year. But Computer Expo 78 is different. An exhibit showing you all that's new. A conference telling you about new ways to use it.

The Show.

The Exposition. Your chance to hold a one-to-one consultation with hundreds of representatives in the know from the nation's top manufacturers. You don't have to travel all over. They're coming soon to a city near you.

And the Show is free! Including exhibitor seminars and demonstrations of the latest developments in:

Data Communications Terminals • Software • Minicomputers • Data Input Equipment • Computer Output Equipment • Supplies • Magnetic Media • Modems • DP Education • Small Business Computer Systems • Flexible Disk Drives • Data Communications Interconnect Equipment • Mini-peripherals • Magnetic Tape Transports • Cassette Systems • Power Supplies • Printer Terminals • Keyboards. And more.

Ask your questions. State your needs. Discuss your plans. This low-key, non-selling atmosphere is your chance of the year to compare what's on the market, all in one place. As sophisticated or as simple a show as you need. You're the center of attention, whatever your level.

You're important enough to bring top people from all over the country to you. Find your show dates here:

ANAHEIM	March 21, 22, 23
Southern California Computer Expo	Disneyland Hotel
SAN FRANCISCO	March 28, 29, 30
Northwestern Computer Expo	San Francisco Civic Auditorium
HOUSTON	April 11, 12, 13
Southwestern Computer Expo	Astrohall
ATLANTA	April 18, 19, 20
Southeastern Computer Expo	World Congress Center
ST. LOUIS	April 25, 26, 27
Gateway Computer Expo	Gateway Convention Center
CHICAGO	May 2, 3, 4
Midwestern Computer Expo	McCormick Place
NEW YORK	May 9, 10, 11
Mid-Atlantic Computer Expo	New York Coliseum
DETROIT	May 23, 24, 25
Great Lakes Computer Expo	Cobo Hall
BOSTON	May 30, 31, June 1
New England Computer Expo	Northeast Trade Center

COMPUTER CARAVAN'S



The Tell.

The Conference. Computer Expo's Conference takes place from 9 AM to 1 PM, leaving your afternoons free for the Exposition. The Conference includes keynote speeches, case studies, presentations, panel discussions and workshops. All put together by experienced conference planners, making this the most respected conference in the country. Well-known authorities—consultants and users—will share experiences, ideas, insights and foresights with you.

These are days that will bring you facts you need now, to put to practical use now. No frills, no fluff.

Whatever your level, you'll find at least one of these days a must:

Tuesday

For you on the executive level, dealing with data processing personnel, problems, payments, plans.

The Executive Briefing.

A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing. Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday—Simultaneous Double-Conference

For you who are bringing in a first computer system for a small company, or are involved in light inhouse computer use—maybe about to trade up—or just thinking about your own system.

Small Business Systems.

A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

For you who interface with computer personnel on a day-to-day basis and need to anticipate, communicate, elicit their best work.

Managing People Problems.

A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Thursday

For you, the manager or technician whose organization is thinking of distributing its computer resources to regional offices and plants.

Distributed Data Processing.

A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Take one, two, or all three days.
Send yourself. Send your key personnel.
The Exposition is free.
The Conference is just \$55 per single day,
only \$135 for all three days.
Register now.
For the Show.
And for the Tell.

Write to
Conference Chairman
Computer Expo 78
60 Austin Street
Newton, MA 02160

Save time! To register, to get more information or for your free advance tickets to the Exposition, call TOLL FREE: 800-225-4242. (In Massachusetts, call collect: 617-964-4550.)

DG Revenues Gain 47% in Quarter

WESTBORO, Mass. — Data General Corp. posted a 47% gain in revenues and an increase in earnings for the first quarter ended Dec. 17.

Revenues reached \$75.3 million compared with \$51.1 million in the same period last year. Earnings totaled \$8.2 million or 82 cents a share compared with \$5.7 million or 58 cents a share in the same quarter a year ago.

Amounts relating to fiscal 1977 were restated to include the results of Digital Computer Controls, Inc. (DCC) on a pooling-of-interests basis.

Over the past five years, the firm's income from operations has ranged between 20.3% and 21.1% of net sales and net income has ranged from 10.9% and 11.6 % of net sales, President Ed-

son D. deCastro indicated in the firm's annual report.

DG's cost of goods sold is 47.1% of net sales, which deCastro said is among the lowest of the small computer industry, while its expenditures

facilities occupy almost 1.5 million sq ft. Another 690,000 sq ft is under construction in Massachusetts, Maine and North Carolina, deCastro indicated.

To provide capital resources, the firm raised \$60 million last September through the sale of sinking fund debentures.

DG's employment at year-end totaled 8,590. About 500 are in R&D; there are more than 420 sales engineers and 219 systems engineers devoted to the marketing effort. Field engineers totaled 857 after a 60% increase during the year, the report stated.

The firm promoted almost 1,000 employees in the assembly, inspection, technical and clerical areas.

DG has upgraded its training for manufacturing assemblers to a certification program under the supervision of the Corporate Manpower Development and Quality Assurance department, the report said. More than 1,500 field and field support people participated in formal courses during the year.

Looking at the balance sheet, the DG report stated management thinks the firm's business operations "are affected by a number of economic factors including, for example, changes in levels of spending by industry for capital equipment and availability of capital. Therefore, past results should not be considered indicative of future results."

During 1977, the firm's sales totaled \$254.7 million and earnings totaled \$28.6 million.

The firm had shipped a cumulative total of 44,500 computers by Sept. 24, 1977, an increase of 10,600 over fiscal 1976. The increase in employment totaled 2,400. The statistics for the years 1977 through 1973 were restated to include the acquisition of DCC.

The firm's total current assets were \$236.4 million while total assets, including property, plant and equipment, amounted to \$273.3 million in the year ended Sept. 24, 1977.

Financial News

Research and development are the highest, 10.2% of net sales. The firm now makes about 80% of its product, he added.

Through its expansion program, DG

Beehive Posts Mixed Year

SALT LAKE CITY, Utah — Although Beehive International's 1977 revenues set a record, earnings declined.

"Corrective action has been taken and we can see marked improvement already, but it is going to take a period of time to completely work our way out of the effect of these problems," according to President Warren Clifford.

The underlying problem of inventory cost adjustment will have a continuing effect through at least the first quarter, he added.

Revenues for 1977 rose to \$20.5 million compared with \$12.6 million in 1976, but earnings declined to \$653,277 or 62 cents a share compared with \$763,710 or 81 cents a share in the previous year.

"Recent new product introductions should reestablish the previously attained profit margins later in the fiscal year 1978," he said.

Presenting the most dynamic business Opportunity since the Big Mac.™

A National ComputerLand Retail Franchise

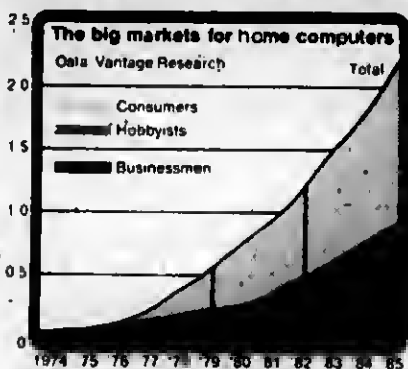
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.

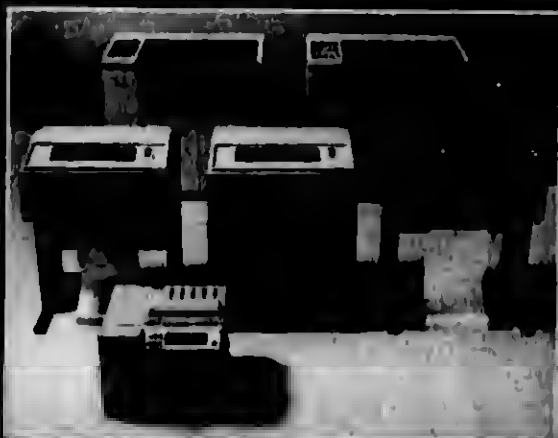


ComputerLand

Big Mac is a trademark of McDonald's Corp.

Mail to E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW
San Leandro, CA 94577 (415) 895-9363

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____



WE HAVE A LINE PRINTER FOR YOU.

If you want to save 30 to 50 % of printer costs.

BDS is the world's largest distributor of line printers. We have a line printer for you. We sell printers from the end user and systems house. We have a line printer for you. We specialize in Burroughs, DEC, and HP computers. We offer a line printer for you. We can deliver promptly. We can deliver promptly. We can deliver promptly.

BDS Computer Corporation, 1149 Chestnut Street, Menlo Park, CA 94025 (415) 326-2115

NOTICE TO BIDDERS

City of Philadelphia Water Department, Water Pollution Control Project, Southwest Water Pollution Control Plant, Additions and Modifications - Phase XI Process Computer Monitoring and Control System, Bid. No. 2814 - Division 34 - Equipment and Electrical Work No. SD-522-SW.

Sealed proposals for Additions and Modifications - Phase XI under Work Number SD-522-SW of the Southwest Water Pollution Control Plant Improvements, invited by the Procurement Commissioner, will be received in Room 1385, Municipal Services Building, on April 4, 1978 at 2:30 PM Prevaling Time, at which time and place they will be publicly opened and read aloud.

The work for which Proposals are invited includes the designing, furnishing, and installation of the Process Computer Monitoring and Control System, and all related and appurtenant work.

The Contract Documents, including Instructions to Bidders, Proposal, Federal Requirements, Contract Requirements, Specifications and Plans, may be examined in Room 1360, Municipal Services Building, Philadelphia, Pennsylvania and at the office of Greeley and Hansen, Six Penn Center Plaza, Room 310, Philadelphia, Pennsylvania. Copies of these Contract Documents may be obtained from the City only upon the deposit of a check for \$250.00 for each set. The amount of the deposit for each set will be refunded if the documents are returned in good condition within 14 days after the opening of bids.

Each Proposal must be accompanied by a certified, bank treasurer's or cashier's check on a solvent bank or trust company, drawn to the order of the City of Philadelphia, in accordance with Clause 6, Security for Execution of Contract, of the Standard Contract Requirements. This sum is a guarantee that, if the Proposal is accepted, a contract will be entered into and its performance properly secured.

No bid will be accepted unless the standard "City of Philadelphia Questionnaire and Financial Statement for Qualifying Bidders" and the Supplemental Bidder Prequalification Documentation, with all questions fully answered, have been filed with the Water Commissioner in Room 1180, Municipal Services Building, at least sixty (60) days prior to the date of opening bids.

In regard to nondiscrimination in employment, Bidders on this work will be required to comply with the President's Executive Order 11246, as amended, and the Affirmative Action Programs/General Procedures. The requirements for Bidders and Contractors under this Executive Order and the Affirmative Action Programs/General Procedures are explained in the Contract Documents. No bid will be accepted unless it includes a complete "Affirmative Action Plan" (Philadelphia Plan) for equal employment opportunity, in accordance with the Appendix to the Proposal.

Grantees on Federally-Assisted Construction Contracts will be required to comply with the Federal Requirements and Contract Provisions for Work under the Federal Water Pollution Control Act Amendments of 1972, which are included in the Contract Documents.

Any Contract or Contracts awarded under this invitation for Bids are expected to be funded in part by a grant from the United States Environmental Protection Agency. Neither the United States nor any of its departments, agencies or employees is or will be a party to this invitation for Bids or any resulting contract.

The Procurement Commissioner reserves the right to reject any or all bids or to waive any informality and to accept the bid which he deems most favorable to the interests of the City of Philadelphia, after all bids have been examined and canvassed.

OTTO R. WINTER
PROCUREMENT COMMISSIONER

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION ANNOUNCE- MENTS

Operating Systems Programmer

We have an immediate opening for an Operating Systems Programmer who is experienced in file subsystem and implementation of a general input/output manager. This individual will be responsible for the design, implementation and documentation of the standard input/output manager on the STAR 100 computer. BS/MS in Computer Science or a related discipline and a minimum of 2 years assembly language experience on large scale systems are required. For immediate consideration, send resume to K. Hardy, Dept. 40-A, 215 Moffet Park Drive, Sunnyvale, CA 94086.

CONTROL DATA CORPORATION
An Affirmative Action Employer M/F

FACULTY POSITION: MATHEMATICS AND COMPUTING SCIENCE

One position in the tenure stream at the Assistant Professor level, starting September 1, 1978; salary negotiable. Ph.D. strongly preferred; applicants should have strong background in applied mathematics and computing sciences and demonstrate continued commitment to professional development. Experience should include college teaching and/or industrial experience in a computer environment. Responsibilities include: undergraduate teaching in such areas as Data Processing, Operations Research, Modeling and Simulation, Assembly Language (OEC-10), and Numerical Analysis; assisting with the development of undergraduate computer science research projects. Eight month academic year with limited opportunity for spring and summer teaching. Deadline: March 31, 1978. Send resume to Dr. H.D. Callihan, Search Coordinator, Mathematical and Computing Sciences Department, University of Pittsburgh, at Johnstown, Johnstown, PA 15904. UPJ is an Equal Opportunity/Affirmative Action Employer.

TELECOMMUNICATIONS SOFTWARE DESIGN

CALL TOLL FREE, (800) 323-1966

In Illinois (800) 942-0491

Monday thru Friday from 8 am to 5 pm cst

A short time invested in reviewing the opportunities at GTE, could pay career dividends for years to come. The telecommunications programs underway at GTE Automatic Electric Laboratories span the various segments of the science... from long range research beyond the limits of today's technology, to prototype development and systems simulation. If you have skills in one of the areas below, spend a little time with us.

SOFTWARE DESIGN ENGINEER

Responsible for the specification, design and testing of telephone systems support software, network and control software, or maintenance and diagnostics software. Prefer a minimum of 3 years' experience in structured design, coding, testing and documentation of programs; development with large data base on multi-file computers and real-time systems, HIPO design documentation, TSO usage and software simulation techniques. Requires a BS or MS in Computer Science or Electrical Engineering and specialized study in the use of PL/1, Fortran, Assembler, Intel 8080 and PDP-11 programming languages.

DATA BASE DESIGN

This position requires a minimum of 5 years' experience in the planning development, design and implementation of data base software, including data base management systems administration. Your primary responsibilities will be the development of data base system for a large on-going project including the implementation, support and administration of systems.

TELETRAFFIC & PLANNING ENGINEER

Responsible for the analysis of teletraffic probability and queuing problems on digital and analog switching and the development of computer programs for switching systems. Perform control and route reliability studies, define and analyze problems for future systems features and their applications. Prefer a minimum of 3 years' experience in real-time control systems teletraffic problems, systems equipment quantities specification, and exposure to switching system specification. Requires a BS or MS in Electrical Engineering, Computer Science or Math and a strong statistical background and experience in PL/1 or Fortran programming and model simulation.

MINI-COMPUTER PROGRAMMERS

We have specific assignments available on project development teams responsible for the design implementation of various telecommunication processing systems utilizing minicomputers as the processing element. Responsibilities will include the development of software programs for real-time operating systems as well as unique hardware elements incorporated into the systems.

If unable to call send resume including recent salary history to:

Manager of Technical Employment
Dept. 471 A6

**GTE AUTOMATIC ELECTRIC
LABORATORIES**

400 N. Wolf Road
Northlake, IL 60164

An Equal Opportunity Employer M/F

PRODUCT MGR EDUCATION

This position involves both teaching and administration in dynamic new computer division of National CSS, headquartered in Fairfield, Connecticut.

Requires several years previous experience in developing, teaching and administering courses in a computer hardware and software related area for a mainframe or minicomputer system with sophisticated software.

Will develop programs for training, sales and technical marketing personnel in hardware concepts, competition, software products, fundamentals of finance and proposal writing, systems analysis, and industry familiarization. Will coordinate activities of others for assistance in course preparation.

Technical personnel trained through the above programs will in turn train customers and prepare for hardware installation.

Here, employees enjoy a competitive salary and fringe benefits package. For prompt consideration, please forward your resume including a copy of this ad, to:

Nancy Potanza



National CSS, Inc.

Computer Division
542 Westport Avenue
Norwalk, CT 06851

An Equal Opportunity Employer

SAN DIEGO OS/VS SYSTEMS MAINTENANCE PROGRAMMERS

Systems programmers! This is your opportunity to join a highly technical systems programming team in sunny San Diego. We are currently looking for a Professional highly skilled in the generation and maintenance of the OS/VS1 operating system. Equivalent to college graduation and 4 yrs. exp. in systems analysis and/or systems programming, including 2 yrs. recent systems programming in OS/VS env. Candidates will be ranked for employment consideration by interview which may be conducted by telephone.

CITY OF SAN DIEGO

Personnel
202 C St.
San Diego, CA 92101
(714) 238-5560

Equal Opportunity Employer

PROGRAMMERS

Become part of a dynamic, growth-oriented company in the manufactured housing industry. Headquartered in the prime outdoor activity area of Central Wisconsin, Wick Building Systems, Inc., with 14 manufacturing facilities, is the nation's sixth largest manufacturer of mobile homes and the sixth largest manufacturer of panelized homes.

To accommodate our dramatic growth record, our data processing department has need for experienced programmers with a minimum of one year programming experience to work in an IBM 370 environment with teleprocessing. We offer excellent salary and benefits as well as a participative management environment which allows for professional and personal growth.

For more information, send resume with salary history to: Programming Manager, Wick Building Systems, Inc., P.O. Box 790, Marshfield, WI 54449. All resumes submitted will be handled on a completely confidential basis.

An Equal Opportunity Employer M/F

WICK
building systems inc.

position announcements

position announcements

position announcements

position announcements

position announcements

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

Computer Programmers

Candidates should have a college degree or equivalent, and a minimum of 1 year experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and knowledge of JCL for OS/MVT is desirable.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If interested and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C
EG&G Idaho, Inc.
Box 1625, Idaho Falls, Idaho 83401
U.S. Citizenship Required
We are an equal opportunity employer M/F/H



Programmer/ Systems Analysts

Our Pride in '77... Your Challenge in '78

At Decimus Corporation, we're proud of who we are and what we do. But most of all, we're proud of our people. Because good people are what have made us what we are—foremost leaders in Data Processing services for the Financial Industry. And with this position of leadership has come growth. DYNAMIC growth. In order to keep pace, we're looking for the kind of people who can recognize the challenge and opportunity we have to offer, and who can look to themselves for the kind of pride our people have established.

Positions are available at various experience levels in:

- Communication Network Design
- Interactive Systems Development
- Systems Simulation • Distributed Processing
- EDP Audit • Check Processing (MICR)
- Teller Inquiry Control • Credit Card Processing Systems
- Deposit & Loan Systems • Database Systems

A State-of-the-Art working environment includes 370.155, 168, 195, SYS 3 (Mod 15), SYS 32, etc., and various minicomputers (General Automation, DataPoint, Four Phase, etc.), and operates under OS, MVS, DOS, IMS, CMS-VM. Software is primarily COBOL, but includes Assembler, RPG II, and PL-1.

Decimus offers excellent compensation and an outstanding benefits package, including a dental plan and reduced loan interest rates. Send your resume, including salary history/requirement, in confidence to D.B. Michaels, Decimus Corporation, Suite 320, 1700 Montgomery Street, San Francisco, CA 94133. We are an Equal Opportunity Employer taking Affirmative Action M/F/H



A BANKAMERICA
COMPANY



HOUSTON, TEXAS NEEDS YOU! ALL SKILLS ALL INDUSTRIES

The DPCenter
Data Processing Careers
4815 SW Freeway, Suite 800E
Houston, Texas 77057 • (713) 960-9102
Personnel Consultants



WHY EDP SEARCH?

Your life will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond. We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

SOFTWARE SALES

We're looking for highly motivated systems software salesmen with experience selling to the IBM OOS and OOS/VS marketplace. If you want to increase your income potential with a broad and diversified product line, call Bert Parsloe at (203) 792-5100. Universal Software, Inc. Brookfield Office Park, Brookfield, CT 06804.

GROUP MANAGER CORPORATE M.I.S. \$25-30,000

Directly responsible for specific group of user divisions. Supervise up to 12 Programmers and Analysts. Staffing and Budget duties.

IBM 370 OS/VS1 experience as a Project Leader or Senior Analyst. I.M.S. a definite advantage.

For immediate consideration, please call Ted Chaloner at (617) 426-4180. If submitting resume please include salary requirements. Client company assumes all fees.

ROGERS & SANDS

Professional Placement
100 Federal Street
Boston, Mass. 02110

FACULTY POSITION MANAGEMENT SYSTEMS

College of Business
Idaho State University
Assistant professor position, beginning August, 1978. Applicants should have an interest in teaching in several of the following areas within the computer science-info systems curriculum: MIS, Data Communication and Real-Time Systems, Systems Programming, Data Base, Simulation and Programming (Assembler, FORTRAN, COBOL). Opportunity to provide leadership in and give direction to our computer science-info systems area. The College of Business offers an AACSB accredited BBA program and also the MBA degree. The atmosphere is congenial, yet professional. Recreation activities in Southeastern Idaho are boundless on a year-round basis. A Ph.D. (or near completion) in MIS, computer science, or a related field is required. Industry and teaching experience is helpful.

Candidates should evidence an interest in research and publication activity as well as quality classroom performance. Send resume to:

Dean James M. Kelly
College of Business
Idaho State University
Pocatello, Idaho 83209
(208) 236-2135

Data Processing Professionals

Here's how we can help the job you're looking for find you.

If your looking to explore career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS and SOFTWARE SPECIALISTS for companies nationwide, at no cost to the applicant.

Here's how our service works. After we receive your resume, we (1) can make it instantaneously available, via computer, to our network of CYBERSEARCH placement offices in major cities across the country. (2) Trained placement consultants at each office can then refer your resume to companies seeking EDP professionals with your qualifications. So instead of one office and one consultant, you can have all the offices of CYBERSEARCH searching the data processing job market for you. To protect your identity, your name and present employer's name are not included in the computer file.

When interest is expressed, your personal CYBERSEARCH consultant will contact you and arrange an interview. This service is available without cost to you now, or upon hire. All fees are paid by the employer.

To put your resume into circulation fast, call or write the EDP Dept. at the CYBERSEARCH office nearest you.

CONTROL DATA CYBERSEARCH INC.
a subsidiary of
CONTROL DATA CORPORATION

CHICAGO, IL 214 North Michigan 60601 312-454-8490	LOS ANGELES, CA 8616 La Tijera Boulevard 90045 213-642-2462
DALLAS, TX 8585 Stemmons Freeway 75247 214-688-5810	MINNEAPOLIS, MN 6800 France Ave. South 55435 612-830-6650
HOUSTON, TX 2000 West Loop South 77027 713-965-5666	PHILADELPHIA, PA Two Balacynwyd Plaza 19004 215-667-2400
IRVINE, CA 17744 Sky Park Boulevard 92714 714-754-7701	SAN JOSE, CA 2025 Gateway Place 95110 408-866-3186

Computer Professionals...
these numbers may add up to be
the most important you'll ever use.

(203) 549-4240

Find out why. Call collect, person-to-person. Ask for Steve Weber. But you must have at least one year work experience. Oh, yes. Here's the phone number (in case you missed it) ... (203) 549-4240.

National Computer Associates

DALLAS DataPro Personnel Consultants 4255 E. J. Freeway Suite 162 Dallas, Texas 75234	MINNEAPOLIS/ST. PAUL Electronic Systems Personnel 801 Nicollet Mall, Suite 1716 Minneapolis, Minnesota 55402	PITTSBURGH Electronic Systems Personnel 108 Lawyers Building 428 Forbes Avenue Pittsburgh, Pennsylvania 15219
DETROIT Electronic Systems Personnel Prudential Town Center 3000 Town Center, Suite 2580 Southfield, Michigan 48075	NEW JERSEY Systems Search II 75 South Orange Avenue South Orange, N.J. 07079	SAN FRANCISCO The Computer Resources Group Agency, Inc. 303 Sacramento Street San Francisco, California 94111
FLORIDA Data Sciences Personnel, Inc. Suite 205, 15490 N.W. 7th Ave Miami, Florida 33189	NEW YORK Batal Associates, Inc. 405 Lexington Avenue New York, New York 10017	SYRACUSE CFA Associates Personnel, Inc. (Agency) 2530 James Street Syracuse, New York 13206
HARTFORD Compass, Inc. 900 Asylum Avenue Hartford, Connecticut 06105	NORTH CAROLINA TaskForce, Inc. 1046 E. Wendover Ave P.O. Box 6868 Greensboro, N. Carolina 27405	WASHINGTON, D.C. ESP Systems Corporation Suite 210 1211 Connecticut Avenue N.W. Washington, D.C. 20036
LOS ANGELES Consultation Enterprises Suite 900, 3250 Wilshire Blvd Los Angeles, California 90010	PHILADELPHIA Systems Personnel 207 Fox Lane Wilmington, Pa. 19008	

position announcements

position announcements

position announcements

position announcements

position announcements



THIS AD REALLY COST A BUNDLE BUT-WE'RE NOT LOOKING FOR SYMPATHY JUST YOUR RESPONSE !

(Bet You Never Heard An Ad Put So Bluntly Before!)

WHY DID WE DO IT?

Simple — We have a variety of interesting positions for good, competent programmers and systems analysts. Normally, we fill most of our openings with personal referrals, but this year we are expanding into several new major market areas, and we can, therefore, offer employment opportunities to a wider population.

If you're thinking about a new position at all, take a minute and read the following few paragraphs about our company. Then, for more details, call our Toll Free Number and we'll be happy to fill you in.

WE OFFER A COMPENSATION PLAN WHICH IS SURE TO PROVIDE YOU WITH COMFORTABLE SECURITY

Excellent Salaries ... Per Diem Allowance ... Paid Vacations and Holidays ... Company-paid major medical insurance ... Life Insurance for you and your family.

ALLEN SERVICES CORPORATION IS BUILT ON FOUR BASIC PRINCIPLES

- Good old-fashioned honesty and integrity is the foundation of our company. We believe that in the world today these qualities are more important than ever before.
- Solid level-headed management. ASC's financial base has grown continuously since our beginning in 1972. Financially we are rather conservative. But we hold that in the long run, good down-to-earth business decisions are better than a lot of wheeling and dealing.
- Service — To both our clients AND employees. We try to make sure that the right person is doing the right job. This keeps programmers and analysts challenged and enthusiastic; and our clients satisfied.
- Flexibility — We are in an exciting and dynamic business that requires constant evaluation. We TRY to satisfy everybody. That's a tough order to fill, and we're not perfect. But we do whatever it takes (go the extra mile so to speak) even if it means that Mr. Allen and the Board of Directors have to get personally involved.

Call our TOLL FREE NUMBER, Monday thru Saturday and ask about our numerous D.P. job openings. 1-800-543-7583.

ALLEN SERVICES CORPORATION DAYTON AIRPORT OFFICE

212 West National Road, Vandalia, Ohio 45377
In Ohio Call (Collect) (513) 890-1200
An Equal Opportunity Employer M/F

COMPUTER SYSTEMS ANALYSTS

The Andersons is a dynamic, Midwest company with sales in excess of \$600 million, a history of steady growth in the agribusiness field and a unique philosophy and concern for its responsibilities to customers, community and employees.

Our continued growth and success has created an immediate opportunity in our data processing unit. You will be responsible for the analysis of information systems, evaluating computer hardware and software and directing technical efforts required to accomplish specific data processing objectives. A Bachelors Degree, and 3-5 years experience as a Programmer Analyst/System Analyst is highly desirable. Experience in designing, implementing, and installing new computer information systems is essential.

The Andersons, located in Maumee, Ohio, a suburb of Toledo, offers an excellent compensation program, a comprehensive company-paid benefits program that includes a liberal profit sharing plan, plus growth potential. For immediate action, please direct your resume and salary requirements, in confidence, to:

The Andersons

Mr. William A. Beier
Employment and Benefits Manager
P.O. Box 119
Maumee, Ohio 43537
(419) 893-5050

PROGRAMMER REAL-TIME

PDP-11
1+ year's experience with RSX-11M at systems level.
3+ year's experience with MACRO-11 and FORTRAN.

Responsibilities include executive modifications and maintenance, device driver, writing, real time and database applications. Ability to work closely with hardware engineers.

Salary commensurate with ability and experience. Excellent fringe benefits package. Pleasant location in Philadelphia suburb.

Send resume in confidence to:
BRIDGEPORT TEXTRON
200 Precision Rd., Horsham, PA 19044
An equal opportunity employer

Positions Available Nationwide
Call Toll Free

800-426-0342

Assured Confidentiality
and Employer Retained.
Manager-Data Base Design 30-35K
5 years experience in 370 OS/
MVT/VS with previous super-
visory experience in IMS or
equivalent.
System Programmers 22-25K
370 OS/CICS and H6000 experi-
ence.
Programmers 18-22K
Experience in COBOL and BAL.
Openings on both Coasts and the
Midwest.
Project Leaders 23-26K
Data Base/Data Comm. experi-
ence.
Prog./Analysts 18-23K
Need several with EEO/ERISA
experience.

PARKER PAGE ASSOC.

P.O. Box 12308
Seattle, WA 98111
Offices in Wash. D.C.,
Chicago, Atlanta, Portland, Or.

Choose from over 100 careers!

A large securities firm is expanding its EDP staff creating immediate openings for PROGRAMMERS and PROGRAMMER/ANALYSTS.

You'll need at least one year's experience on large IBM systems operating OS, COBOL, IMS Data Base and OL/1. If you have a degree and knowledge of financial/insurance applications... so much the better. Initial salaries range from \$12-16,000.

This unusual career opportunity is located in one of the Midwest's most beautiful cities.

Join a company that offers advanced training and incentives, topped off with excellent benefits, and more!

For more information send resume, in professional confidence, including salary and relocation requirements to: Jeff Holmes



**dorsey love
& associates inc.**
P.O. Box 4486 O.S.
Springfield, MO 65804
417/883-1212

FIELD SERVICE OPPORTUNITIES

ECRM, Inc., a manufacturer of sophisticated computer equipment for the graphics industry, presently has several opportunities available for individuals with a background in field service.

FIELD SERVICE ENGINEER - VERMONT

Work and play in the heart of ski country. You will maintain our computer systems on-site at one of Vermont's leading daily newspapers. Prefer 2-5 years experience with small computers and/or peripherals. Knowledge of PDP-11 and Perdec 3000 series disc drives desirable.

MARKETING TECHNICAL SUPPORT

Excellent opportunity at our corporate headquarters at Bedford, Mass. Will perform inhouse client demonstrations on our equipment, provide technical assistance to our marketing staff, coordinate trade shows, and follow through on RPO processing. Prefer familiarity with digital and analog circuitry and 2-5 years background in field service and/or technical support.

FIELD SERVICE - THE NETHERLANDS

The individual selected for this position will be located in the Netherlands maintaining our Autokon Process Reproduction System for 6-12 months and then return to the States. Requires experience maintaining small computers and/or peripherals plus a strong analog background. Experience in the newspaper industry and knowledge of optics helpful.

Other field service opportunities are available in the following cities: Oklahoma City, Washington, O.C., Dallas, Atlanta, Los Angeles.

ECRM is a forward moving progressive company offering an excellent opportunity for growth. If you would like to be part of our team, please call Cynthia Carney at (617) 275-1760 or forward your resume to:

ECRM, INC.

205 Burlington Rd. Bedford, MA 01730
Equal Opportunity Employer

ECRM

position announcements

position announcements

position announcements

position announcements

position announcements

EDP Professionals --**Make your move!**

Make your move into NBD's atmosphere of data processing professionalism and sophisticated hardware.

TP ANALYST - Utilize your 2-3 years of experience gained in a medium/large scale teleprocessing environment. You should be familiar with IBM 3705/3704 communications controller, 3270 bisynchronous protocol, and the IBM OS/MVS System 360 or 370. Ideally, your background also includes vendor liaison.

JCL SPECIALIST - You have 3+ years of analytical/problem-solving experience. JCL/IBM utility program background a must. You'll be working in an IBM 370 environment under OS/MVS - familiarity would be a plus.

NBD offers an attractive compensation-benefits package, a stimulating work atmosphere, and opportunities for professional advancement. Send your resume and salary requirements in complete confidence to:

Professional Employment Manager

NATIONAL BANK OF DETROIT

P.O. Box 116A-C

Detroit, Michigan 48232

An Equal Opportunity Employer M/F
We Employ the Handicapped**SYSTEMS****PROGRAMMERS**

Experience in systems generation and maintenance particularly using VS1 will be helpful in securing this ground floor software position in the beautiful Pacific Northwest.

CICS/VTAM/ADABAS/WYL-BUR experience also useful. Computer due for installation in October. Salary commensurate with proficiency.

Send resume and salary requirements to:

Ken Ashcraft
Supreme Court of the
State of Washington
Office of the Administrator
Temple of Justice
Olympia, Washington 98504
Phone (206) 753-3365

**ANALYST/
PROGRAMMER**

We seek an Analyst/Programmer to work on a new development project which will use P1/1, IMS/VS, and CICS/VS. Will be involved with the design, development, and implementation of this administrative system. Must be able to translate user requirements into a structured system which is clearly documented. We will train in IMS and CICS if you have PL/1, or PL/1 and IMS if you have CICS. 2 years experience desired with IBM 360/370, OS/VS or OS/MVT, PL/1 and OS/JCL. Plus factors: CMS, VSAM. Excellent benefit package included. Send resume to:

JOAN DOIG

PERSONNEL SERVICES

Princeton UniversityPRINCETON
NEW JERSEY 08540An Equal Opportunity/
Affirmative Action Employer M/F**University of
Petroleum and Minerals
Dhahran, Saudi Arabia**

The University is seeking experienced:

- **Systems Programmers:** IBM 370 equipment; with 3-5 years experience in MVS system generation and maintenance; TSO; Performance Measuring and Monitoring.
- **Scientific Analysts:** with good working knowledge of FORTRAN; and a background in one or more of the following: Statistical Packages; Online Graphics; CAI/CMI; TSO; Documentation.
- **Analysts/Programmers:** with 3-5 years experience in business systems preferably University Business Systems; and a strong COBOL background in IBM OS/VS environment.
- **Data Processing Staff Trainer:** with 3-5 years experience in planning professional DP training programs; experience in instructing DP course in OS/VS environment.

Minimum regular contract for two years, renewable. Excellent salaries and allowances, free air-conditioned housing, free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for school-age dependent children. Local transportation allowance in cash each month. Paid vacation each year.

Apply with complete resume on academic and professional background, list of references, and with copies of degrees, including personal data such as family status (wife's maiden name, names of children, age and sex) home and office addresses, telephone numbers to:

Director-Research Institute

University of Petroleum and Minerals

P.O. Box 986

Pasadena, Calif. 91102

CLEMSON UNIVERSITY

Division of Administrative Programming Services is seeking a Manager of Systems Development for Student, Alumni, Library, and Development Information systems. This person will serve as manager of eight to ten analysts and programmers and be responsible for the design, programming, and implementation of application systems. Also, this person will serve as the primary customer interface for the areas served. Experience as a manager or project leader as well as experience with COBOL, on-line and database systems on a large scale computer is required. The University offers excellent career and learning opportunities in a state-of-the-art environment. Salary range is \$18,012 to \$25,599.

Send resume not later than January 31, 1978 to:

Clemson University
Administrative Programming Services
Revel Center
Clemson, S.C. 29631
An EOE/AA

FLORIDA**IDEAL
ENVIRONMENT
WORK & PLAY
\$1500 to \$25,000**

Programmers through Senior Technical Analysts. Degree required. STATS and On-Line Time Share. Honeywell 6000, COC, FORTRAN, COBOL.

\$2000 to \$35000

DATA BASE MGT exp. Any 370-1108-Honeywell 6000 or PDP 11. COMPILER TRANS. OB-GENS. COMM GENS.

Submit resume and salary history for immediate consideration on these career opportunity positions.

**FRANK LEONARD
PERSONNEL**

1211 No. Westshore Blvd.
Suite 100
Tampa, FL 33607
(813) 872-1853

**PROGRAMMER
ANALYST**

to work for rapidly expanding wood products manufacturer in Sandpoint, Idaho. One to three years programming experience with mini-computers in a time-shared environment is desirable. College degree in computer science, mathematics, or business preferred. Starting salary to \$16,000 commensurate with experience and education. Company offers excellent benefit package in a beautiful country setting. Submit resume and salary history in confidence to L.O. McFarland Company, Box 670, Sandpoint, Idaho 83864. An Equal Opportunity Employer

EDP**SPECIALISTS****NATIONWIDE**

Real Time Prog To 28K
Systems Prog To 32K
Systems Analyst To 24K
Field Electr Engr To 25K
Fees Assumed by Client Co.'s

ATLAS AGENCY

412 W. 6th St., L.A. CA 90014
(213) 627-9611

PROGRAMMED FOR GROWTH

... And we keep growing. We've doubled our size in the last 4 years with current sales of over \$50 million. This growth has resulted in the need for creative, results-oriented Data Processing professionals. As a vital member of our DP team, you'll be involved in such current applications as accounting, order entry, forecasting, inventory, bill of material and requirements planning as well as implementing additional manufacturing applications in one of these challenging career opportunities.

DATA PROCESSING MANAGER

Manage Data Processing function including equipment selection, systems analysis, programming and operations with an emphasis on developing improved techniques and methods. To qualify, you must possess the ability to manage and develop subordinates coupled with previous programming/systems design experience and at least 2-3 years management. You must be user oriented. Degree preferred.

SYSTEMS ANALYSTS

Ideal candidates should be senior programmers or analysts, preferably with manufacturing background including MRP and BOMP. Proven user contact and ability to meet target dates required.

PROGRAMMERS

1-2 years programming experience needed to qualify for these positions, preferably in a manufacturing environment.

In return for your abilities and experience, we offer an excellent salary, outstanding benefits and an atmosphere of professional growth and appreciation. Please send your confidential resume with salary history and requirements to: MS. REGINA SAM-PERS

LOZIER CORPORATION

P.O. Box 188, Omaha, NE. 68101

An Equal Opportunity Employer M/F

**DECISION DATA
IS ON THE MOVE!****Career Opportunities Available**

ELECTRICAL ENGINEER (DESIGN): BSEE or MSEE with 5 to 8 years design experience in closed loop servo systems. Design of sweep circuits desired. Suburban Philadelphia.

ELECTRICAL ENGINEER (PROGRAMMER): BSEE or Degree in Computer Sciences with 3 to 5 years experience in logic design or design and programming of micro-processor based systems. Suburban Philadelphia.

COMMUNICATIONS PRODUCT MANAGER: Provide technical support to marketing personnel and client base, conduct product information seminars. Experience should include 3 to 5 years in date communications hardware, including experience in both hardware and protocol. Suburban Philadelphia.

OEM SALES MANAGER: Responsible for marketing our product line to OEM customers. Requires a minimum of 5 years successful experience in EDP hardware. Suburban Philadelphia.

SYSTEM/4 SALES MANAGER: Provide marketing and sales support of the new SYSTEM/4 computer. Minimum 3 to 5 years experience in the sale of small business computers desired. Experience in IBM System/3 or equivalent product required. Suburban Philadelphia.

TEST ENGINEER: Develop high volume production oriented test methods, procedures and software diagnostics for central processor and associated peripherals. Microprocessor experience required. Suburban Philadelphia.

SYSTEM SALES ENGINEERS: Provide marketing support of SYSTEM/4, our new state-of-the-art small business computer. Requires 2 years experience in technical assistance to sales of small business computers. Knowledge of RPG II essential. Positions in Baltimore, Chicago, Los Angeles, New York, Philadelphia, and Union, N.J.

TECHNICAL MARKETING AREA REPRESENTATIVE: Responsible for sale of our new serial printer family. Experience in the marketing of serial printers essential. Positions in Boston, Chicago and Los Angeles.

SALES REPRESENTATIVES: To market small computers, data entry equipment and peripherals. Positions in Montreal, Chicago, New York, Los Angeles, Philadelphia, and Union, N.J.

FIELD ENGINEERS: Responsible for the installation, maintenance, and repair of electro-mechanical equipment. Require 2 years college, military or technical school training and 1 to 2 years experience. Positions in most metropolitan areas.

Decision Data Computer Corporation is a leader in the small business computer industry and one of the largest independent suppliers of data communications and data entry products. Join a company on the move and enjoy our excellent compensation package.

For prompt scheduling of an interview call our Manager of Professional Employment at (800) 523-5357 or, mail your resume or detailed letter to the following address:

**DECISION DATA
COMPUTER CORPORATION**100 Witmer Road
Horsham, PA 19044

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS ANALYST PROGRAMMER

Our diversified company seeks a well motivated individual to develop and coordinate new systems among division utilizing multi-computer sites, end terminals. If you have a strong academic background and some working knowledge of data base and data communications techniques (RPG II), this opportunity may be for you. Prefer on-line systems and manufacturing experience. Some opportunity to travel. For prompt confidential consideration, send your resume and salary history to:

R.A. Borbridge

**AMERICAN TRADING
& PRODUCTION
CORPORATION**

P.O. Box 238
Baltimore, MD 21203

Equal Opportunity Employer
M/F/H

FLORIDA SALES MANAGER DDP BASE TO \$30

MANAGE staff of 3 sales, 3 support in this booming market. Excellent comp. plan & benefits. Your strong sales track record in mainframe, mini or peripherals can qualify. CHARGE now-shooting for QUICK on-board date. For info, and interview contact John Cummings of our firm

FRANK LEONARD Personnel

1211 No. Westshore Blvd.
Suite 100
Tampa, FL 33607
(813) 872-1853

DIRECTOR

Total responsibility for our growing suburban Chicago data processing installation. Will manage a staff of 50. We are seeking an aggressive application oriented problem solver experienced in DP management. An IBM DOS/OS background is also highly desirable.

Excellent salary and benefits. Position offers plenty of headroom for a strong performer. Please send resume with current salary to:

CW box 1389
797 Washington St.
Newton, MA 02160

C.C.P. Programmer Systems Analyst

We are an irregular route carrier seeking an individual with System-3 programming experience. Our major emphasis is on-line applications, so individual should have three to four years of RPG-II experience with at least one year of C.C.P. Knowledge of the trucking industry helpful.

Salary commensurate with experience, education, and ability. Send resume and salary history in confidence to:

CW box 1386
797 Washington St.
Newton, MA 02160

Equal Opportunity Employer

New! 1978 Computer Salary Survey

Call for your FREE copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

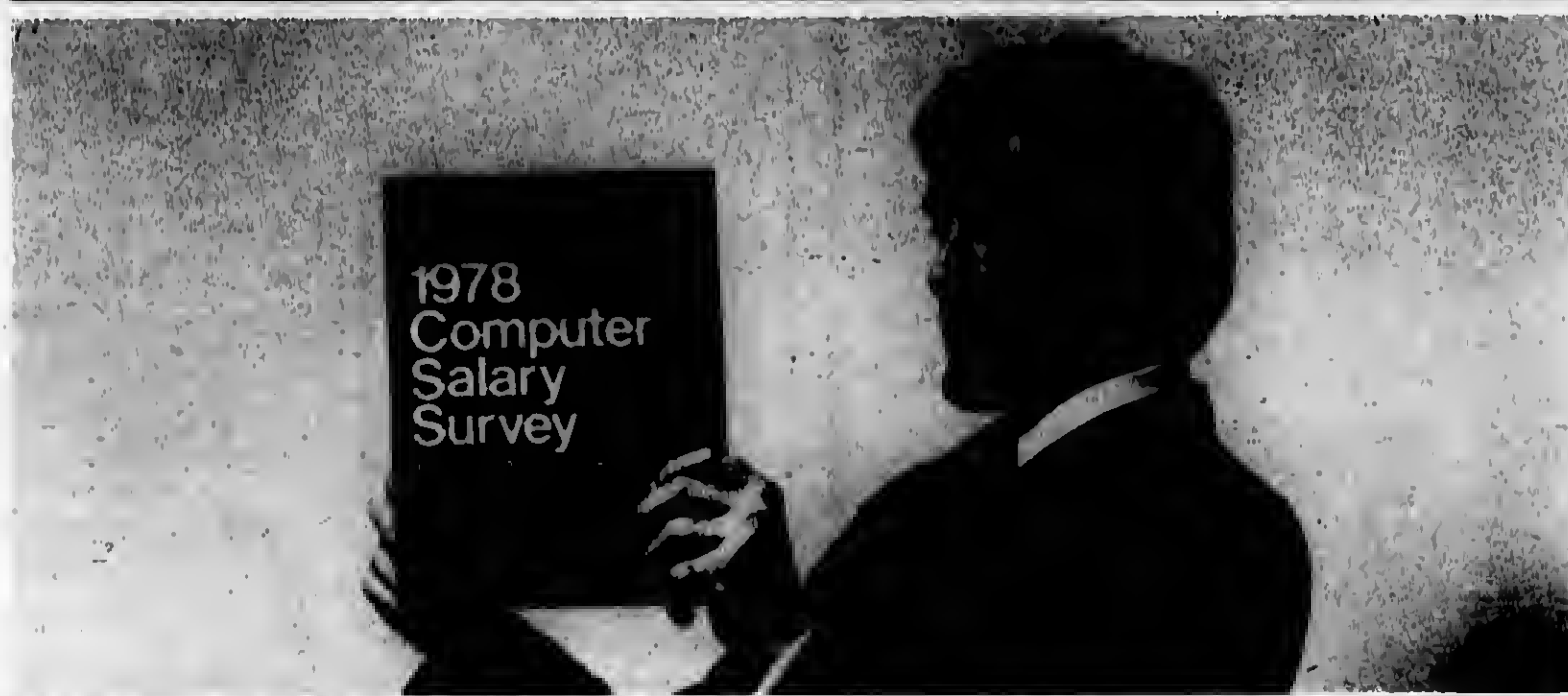
This comprehensive free report also gives you expert advice on a variety of important career topics such as:

- When you should consider a job change.
- What you need to do to break into management.
- How to make sure you're getting the proper exposure.
- Why timing is so crucial in your long range career development.
- How you can avoid stagnation.

And much more. The 1978 Computer Salary Survey has been compiled by

Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

source  edp



**For your FREE
1978 Computer
Salary Survey call
the Source Edp
office nearest you.**

East:

Boston 617/482-7613
Hartford 203/522-6590
New York City 212/736-7445
Philadelphia 215/665-1717
Stamford, CT 203/329-8411
Union, NJ 201/687-8700
Washington, D.C. 703/790-5610
Wellesley, MA 617/237-3120

Midwest:

Chicago 312/782-0857
Cleveland 216/771-2070
Detroit 313/963-0510
Kansas City 816/474-3393
Minneapolis 612/544-3600
Northfield, IL 312/446-8395
Oak Brook, IL 312/986-0422
Rolling Meadows, IL 312/392-0244
Southfield, MI 313/352-6520
St. Louis 314/862-3800
St. Paul 612/771-0544

South/Southwest:

Atlanta 404/325-8370
Dallas 214/387-1600
Denver 303/773-3700
Fort Worth 817/338-9300
Houston 713/626-8705
New Orleans 504/561-6000

West Coast:

Encino, CA 213/995-8866
Irvine, CA 714/833-1730
Los Angeles 213/386-5500
Oakland 415/444-5955
Palo Alto 415/328-7155
San Francisco 415/434-2410
Seattle 206/454-6400
Torrance, CA 213/540-7500

Canada:

Toronto 416/364-2919

If unable to call, write:

Source Edp
Department C-1
721 Enterprise Drive
Oak Brook, Illinois 60521

When writing, please be sure to use home address and indicate position title.

Royal

FOOD DISTRIBUTORS, INC.

**COBOL 370/135 DOS/VS
PROGRAMMER &
SYSTEMS PROGRAMMER**

- New Jersey convenient location
- Quarter-billion, fast-growing company
- Food industry security and stability

We're a large food distributor, a modern and dynamic company, keenly aware of the importance to our operations of a highly professional, up-to-the-minute EDP department. Work with power, without getting lost in a huge shop. You'll be visible with us, your progress will be encouraged and fully noticed.

The programmer position calls for at least 2-3 years of experience, with some knowledge of distribution systems helpful.

The Systems/Programmer position calls for an in-depth knowledge of on line applications with a knowledge of Taskmaster helpful.

Both positions offer an attractive compensation package. Please send resume with salary data in confidence to Director, Industrial Relations.

ROYAL FOOD DISTRIBUTORS, INC.

215 Blair Road, Woodbridge, N.J. 07095

An Equal Opportunity Employer M/F

**H 6000
PROJECT LDR
SYS/PROG.
\$28,000-\$32,000**

Exeter Associates

Executive Recruiters

Bruce A. Montville

P.O. Box 623,

Computer Park

Hampton, N.H. 03842

(603) 926-6712

INSURANCE SYSTEMS

Engineering consulting firm is requesting applicants for the position of programmer/analyst. Bachelors degree plus 2 yrs. exp. required; 5 yrs. exp. may be substituted. COBOL or FORTRAN a must. Data Base and Xerox CP-V exp. preferred. Salary 13-17K. Send resumes to:

Mr. R.D. Marshall
O'Brien & Gere Engr. Inc.
Box 4873
Syracuse, N.Y. 13221

Our expanding San Diego bank is developing an on-line Trust System, and has immediate opportunities for the following:

PROJECT MANAGER

Position requires 5 yrs. experience in Trust and on-line systems design with knowledge of COBOL and previous supervisory responsibilities.

SR. ANALYST PROGRAMMERS

Requires knowledge of COBOL with 4 yrs. experience in Trust and on-line programming with basic understanding of systems design concepts.

ANALYST PROGRAMMERS

Candidates must have 3 years experience in COBOL financial programming.

Ideal candidates for above positions will have had exposure to Burroughs medium systems architecture. Competitive salary and benefits. Please send resume with salary requirements to:

SAN DIEGO TRUST & SAVINGS BANK

Attn: M. Wheeler

P.O. Box 1871, San Diego, Ca. 92112

Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

COMMUNICATIONS SOFTWARE DESIGN PROJECT LEADERS DEVELOPERS

If you're seeking a challenging career in communications software, consider

**NCR's
Communication
Systems
Division**



NCR's Communication Systems Division, specializing in the development and manufacturing of data communications products and systems, is currently expanding its COMMUNICATIONS SOFTWARE group.

Get in on the ground floor of advanced communications design and participate in NCR's entry to DISTRIBUTIVE NETWORK ARCHITECTURE consisting of a series of microprocessor-based terminal systems and modes connected by communication lines.

We are looking for key individuals who have indepth software background with solid communications experience. Qualified applicants must provide definition, design, and implementation leadership; and have experience in any of the following areas:

- Microprocessor software (assembly level)
- Operating systems design
- Communications links disciplines (SDLC, bisynch, ISO, etc.)
- VTAM, NCP (for interface to SNA network)
- Front end processor software
- Network node software
- Network definition language (system generator)
- Constructors for nodes, cluster controllers, and front ends (COBOL)

All our positions are in our beautiful, sunny South Carolina location, close to the seashores and mountains. Columbia offers a lifestyle with excellent recreational facilities for tennis, golf, fishing, boating and swimming. The area also offers excellent housing opportunities, low taxes, and it is the home of the University of South Carolina and other fine educational institutions.

If you are seeking a challenging career with a leader in the industry, need a new lifestyle and have the above experience, we'd like to speak with you.

A degree in Engineering, Math or Computer Science is required. For consideration, please send your resume and salary requirements in complete confidence to:

NCR

Ken Uhlig, Dept. CS
Industrial Relations
Engineering & Manufacturing
Columbia
NCR Corporation
3325 Platt Springs Road
West Columbia, S.C. 29169

An Equal Opportunity Employer

PMI San Francisco

Informatics may have an opening for you on its permanent staff in San Francisco. Other openings exist in Portland, Oregon. Your first assignment will be as a member of a professional development team implementing a large online database application under IMS/VS. We will be using structured programming techniques and terminal-oriented programming support.

Salary range for these positions is to \$27K, with a comprehensive company-provided benefit package, including a tax sheltered savings program. We require a minimum of three years' programming experience with 6 months of IMS. Qualified candidates please submit letter or resume in confidence to: Informatics PMI, 255 California Street, San Francisco, CA 94111, Attn: B. Cahn. An Equal Opportunity Employer, M/F.



informatics inc

Member SIA Software Industry Association

OPPORTUNITY

FOR:

- (1) Project Manager
- (2) Systems Analysts
- (2) Programmers

EXPERIENCE:

Manufacturing/
Distributing/Accounting
COBOL/FORTRAN/
BASIC/RPG II
Interactive and/
or Data Base

BENEFITS:

Extraordinary
Growth Potential
Liberal Benefit Package
Equity Stock Option

Send your resume

in confidence to

Staffing Manager

Software Group

CMC ASSOCIATES INC.

755 Boylston St.

Boston, MA 02116

EDP

OPPORTUNITIES

RAMIS Interactive financial mktg

& training system \$30-37K

Sr. SYSTEMS Analyst-CICS OOS

or OS degree \$28K

APPLICATIONS Anal-CICS/

TASK MASTER \$24K

CICS New Design-OOS/OS PL-1

ADR library \$26K

PROJ LOR-financial systems-ROI

\$26K

Sr. Programmer Anal-370/158

OS/VS IMS BAL/COBOL \$26K

MBA Quantative discipline-Fortran/BASIC

\$25-30K

SOFTWARE SUPPORT-OS/VS 1

TCAM \$26K

POP/1105-Basic/fortran/ALP

\$23K

FINANCL ANAL/Syst Anal-MBA

+ BASIC/Fortran \$30-35K

FIXED INCOME/Forecasting investment banking. Fortran/BASIC

\$27-30K+

Bill Borrelli

(212) 349-3610

William Harris Assoc

150 Broadway agency NY 10038

SYSTEMS

PROGRAMMING

DATA

COMMUNICATIONS

The University of Delaware is seeking qualified candidates for a senior position in its Data Communications/Systems Software group. The person chosen will have responsibility for modification and development of innovative software on our large scale B7700 and DEC-10 computers. Candidates should be self-motivated and have a bachelor's/master's degree in computer science and/or engineering with 3-4 years effective experience in successful projects involving operating systems, language processors, or data communications programming on large scale computers. This position represents an exciting opportunity to grow in a multi-host network consisting of HP2000, DEC 11/70, B7700, DEC-10, and CYBER173 computers in a modern University Computing Center. Send resume and salary requirements to:

Robert W. Rahe, Manager
Data Communications/
Systems Software
Computing Center
University of Delaware
Newark, DE 19711
An Equal Opportunity/
Affirmative Action Employer

PROGRAMMERS

PARS

BAL

COBOL

Continued expansion of our Data Systems Management Division has created immediate openings for individuals possessing at least 2 years experience utilizing BAL or COBOL. Experienced PARS/ACP programmers are encouraged to apply. DB/DC analysis is a plus. Excellent growth opportunity and leadership potential.

Interested candidates should submit a resume including salary history to:

Department "C"
CONTINENTAL
AIRLINES

7300 World Way West
Los Angeles, CA 90009

Equal Opportunity Employer M/F

ITEL

Data Services Group,
is looking for a...

Communications Technician

- with solid field engineering-type experience in working with low-speed modems and multiplexors,
- to work with ITEL Marketing Personnel and clients in coordinating all phases of new account installations,
- to provide technical support for existing accounts — from coordination and check-out of current systems through trouble-shooting and diagnosis of operational problems,
- to work in a multi-vendor environment.

If you're the Communications Technician we're looking for, send your resume in strict confidence to:

ITEL
CORPORATION

Data Services Group
Personnel Administrator
3 Corporate Park Drive
White Plains, New York 10604

ITel Corporation is an equal opportunity/affirmative action employer — M/F/H.

PROGRAMMER ANALYST

A growing Dallas-Ft. Worth electronics company, who is a recognized world leader in the manufacture of telephone support equipment, has an outstanding opportunity available for an experienced Programmer Analyst.

The successful candidate must have 2-3 years proficient experience in COBOL, RPG, preferably ALC experience in an IBM 370/OOS/VS environment. Experience with TOTAL data base and Environ-1 on-line system will be considered a plus. If qualified you will be acting in the support of operations systems support, through-put improvement and some applications systems development in a business environment.

We offer an excellent income, comprehensive benefits program and opportunity for personal growth. If your qualifications include the above send your resume including salary in strictest confidence to:

CW Box 1388
797 Washington St.
Newton, MA 02160

an equal opportunity employer m/f

Customer Engineers and Area Specialists

Intel's fast growing Memory Systems Division, the leading independent supplier of OEM and end-user systems, has immediate openings in the Midwest.

We have several levels of opportunities for individuals with computer service background, preferably with IBM 370 equipment. Experience servicing memories is highly desirable.

Please call or send your resume to Intel Memory Systems, Attn: John Clark, 9501 West Devon, Rosemont, Illinois 60018 (312) 692-6410. An equal opportunity employer m/f.

intel
Memory Systems

position announcements

position announcements

position announcements

position announcements

position announcements

MEDICAL INFORMATION SYSTEM DEVELOPMENT PROGRAMMER/ANALYST

A Research Institute at the Indiana University Medical Center (Indianapolis) is seeking a bright and dedicated Programmer/Analyst to join in the development of a medical information system with national significance. Work involves networking, transaction processing and the development of an in-house data base system and an automated medical decision-making system. Applications extend to the clinical lab, the pharmacy, the medical record and the operation of the medicine clinics. Opportunity for strong interaction with users and responsibility for major application systems from design through implementation.

Position requires B.S. in Computer Science or equivalent technical degree and one to three years of employment as a Programmer/Analyst. Experience in the development of data management systems and/or PDP 11, RSTS, BASIC PLUS and/or RSX 11-M desirable. Experience with medical applications not needed.

Salary depends upon qualifications and experience. Please send resume (if possible, transcript) to Mrs. Joanne Leppar, 1001 West 10th St., Indianapolis, Indiana 46202.
An equal opportunity employer M/F

PROGRAMMER/ANALYST

A growing Dallas-Ft. Worth electronics company, who is a recognized world leader in the manufacture of telephone support equipment, has an outstanding opportunity available for an experienced Programmer Analyst.

The successful candidate must have 2-3 years proficient experience in COBOL, RPG, preferably ALC experience in an IBM 370/DOS/VS environment. Experience with TOTAL data base and Environ-I on-line system will be considered a plus. If qualified you will be acting in the support of operations systems through-put improvement and some applications systems development in a business environment.

We offer an excellent income, comprehensive benefits program and opportunity for personal growth. If your qualifications include the above send your resume including salary in strictest confidence to:

CW Box 1393
797 Washington St.
Newton, MA 02160

An equal opportunity employer M/F

COMPUTER PROGRAMMERS

Advance Your Career in Denver, Colorado
with United Banks Service Company

A leading computer service subsidiary for the United Banks of Colorado seeks several computer programmer/analysts to work on deposit, loan, trust, CIF, EFT, applications on on-line systems; also, Check Processing and Automated Clearing House applications. We desire 2-4 years' banking experience in PL/1 and/or Assembler on large IBM 370 systems and/or 2-4 years' experience in NEAT/3 LEVEL 1, 2 NCR Century systems.

Your salary will be commensurate with your background and qualifications. We offer excellent fringe benefits, including relocation assistance, and the appealing lifestyle of Denver and the Rocky Mountain West. Please send your resume to:

Susan B. Romero
PO Box 17006
Denver, Colorado 80217
OR CALL COLLECT
(303) 770-2400, Ext. 249

An Equal Opportunity Employer M/F.

FEDERAL PROGRAM MANAGER ADP LEASING AND RENTALS

The company seeks a managerial professional who will be responsible for planning, coordinating and directing marketing and administrative activities regarding federal government/military ADP procurement. The individual will appraise and recommend bidding on RFP's and other opportunities, conduct negotiations, and recommend longer range marketing strategies; bidding and negotiations will be done in conjunction with major hardware manufacturers. To qualify, the applicant will need 5+ years of industry experience managing the negotiation and administration of government contracts for computer hardware or services. A finance background is desirable; managerial experience and financial aptitude is necessary. Position offers executive compensation plan with bonus potential. Send detailed resume, including salary history to Anne Halsted, U.S. Leasing Corporation, 633 Battery St., San Francisco, CA 94111. No agencies please. An affirmative action employer.

US LEASING CORPORATION
A U.S. Leasing Company

SAN DIEGO SYSTEMS ANALYSTS (to \$1,793. mo.) IT'S 70° IN SAN DIEGO

Picnic at the beach, swim in the Pacific, or ski in our mountains. If you were here, you could do these things today.

The city of San Diego has immediate opportunities for motivated and committed systems analysts working in a highly advanced environment. Tell us of your education and experience and you may qualify for an opening from Trainee to Sr. Systems Analyst. The City offers stable work with no possibility of forced transfer out of San Diego area.

Applicants should have the equivalent of a Bachelors Degree and experience in the analysis, design, and programming of business applications using ANS COBOL in an environment similar to an IBM 370-158, utilizing OS/VS1, IMS/VS, DB/DC.

CITY OF SAN DIEGO

Personnel

202 C St.
San Diego, CA 92101
(714) 236-5753

Equal Opportunity Employer.

Guess Who Has A Job For You ?

WALT DISNEY WORLD has immediate openings for a Scientific Programmer, a Senior Systems Programmer, and a Programmer/Analyst.

Scientific Programmer

Walt Disney World's Scientific Programming Group is seeking a talented software professional to take an active role in the development of unique Real-Time Minicomputer Systems. Initial responsibility will be in the area of Energy Management Control Systems. Strong experience in systems development on minicomputers with emphasis on Data General NOVA or ECLIPSE is mandatory. Individual should be proficient in assembly language coding and Real-Time Multi-Tasking FORTRAN. A degree in mathematics, engineering or computer science is necessary.

Senior Systems Programmer

Candidates should have a minimum of 3 years experience in several of the following areas:

1. Univac series 90 VS/9 Operating System (or other virtual operating system) internals.
2. Telecommunications software systems.
3. Telecommunications network design.
4. Telecommunications hardware evaluation.
5. BAL
6. Minicomputers in distributed networks.
7. Performance monitoring.

Programmer/Analyst

1-5 years experience required in the design and programming of business applications. This an opportunity to become involved in a wide range of business applications, including interactive programming in an on-line virtual memory environment.

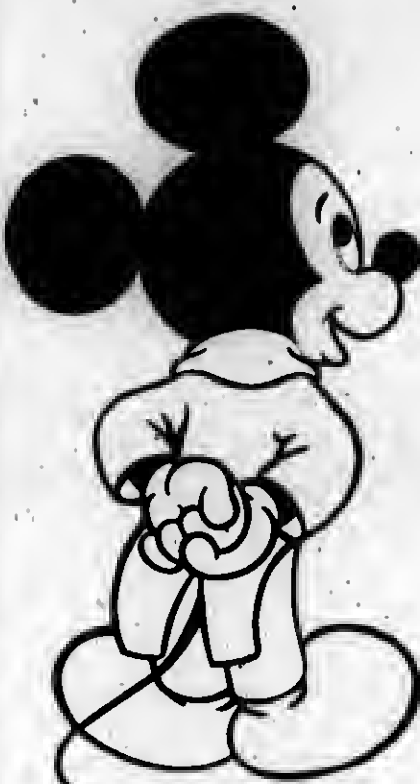
Qualified applicants should submit a complete resume with salary requirements to:

WALT DISNEY WORLD

Professional Staffing FN-9
Post Office Box 40
Lake Buena Vista, Florida 32830

Walt Disney World

AN EQUAL OPPORTUNITY EMPLOYER



© 1978 WALT DISNEY PRODUCTIONS

Burroughs Programmers & Business Systems Analysts

PROGRAMMER ... Degree in DP or equivalent with 3 years' experience in coding and documenting business applications with Burroughs hardware. Knowledge of NDL, Forte II and MCPV required.

SYSTEMS ANALYST ... Degree in DP or equivalent with minimum 5 years' experience in business programming and systems analysis using Burroughs hardware and software. Responsible for the analysis of company systems' problems and solutions. Required to make formal presentations and written reports for review purposes. Knowledge of NDL, Forte II, and MCPV required.

Please send resume and salary history, in confidence to:



Wimmer and Becker

Box 1168, Dept. CW-1
Sacramento, CA 95806

Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

JOIN WANG's GROWTH IN 1978

WANG had a great year in 1977 and we expect an even better one in 1978 (We expect sales of \$200 million). Our leadership in state-of-the-art has helped keep us in the forefront of the computer and word processing industries and this has been reflected in our growth - in sales, in staff, in opportunities. If you like a fast-paced, demanding, challenging atmosphere where your individual contributions will be recognized, you have found your place at WANG.

Systems Programmer

State-of-the-art data center is seeking a Systems Programmer to support our IBM 370/158 running under VS 2 (SVS). This position requires 1-3 years experience with OS or VS modifications or maintenance. Must be able to work with little or no supervision. Experience in any of the following areas is a plus: HASP, JES2, WYLBUR. Opportunity to get into MVS.

Programmer/Analysts

A business oriented individual with a minimum of 4 years experience in the design and development of commercial and/or government-oriented accounting (or financial) systems on OS/VS, interactive, CRT-based hardware. Experience in COBOL, RPG II, and Assembler languages is a plus.

Software Technical Writers

Experienced technical writers to participate in the documentation of a major new computer and word processing system. The successful candidates should have at least 1-3 years experience in systems software documentation or a related field. (Programmers with an interest in writing are invited to apply). Knowledge of high level programming language a must. Knowledge of an assembler level language a definite plus.

Software Systems Programmers/ Compiler Designers Research and Development

You will work in a progressive, productive professional atmosphere developing incremental interactive language compilers for BASIC, COBOL, RPG II, database, QUERY language, FORTRAN, PL/1 and W1PL (our implementation programming language). You will work with bright, interesting, competent people dedicated to high standards of excellence.

Excellent salaries and earning potential plus superior company benefits. Please send resume, including academic background and salary history and requirements to:

Stephen E. Pitt
Manager, Professional Recruiting

(or call our toll free number)

1-800-225-0654 (West Coast area)

1-800-225-0630 (East Coast area)

(when using toll free number, please specify account number 02179)

WANG

LABORATORIES, INC.

One Industrial Avenue, Lowell, MA 01851

We are an equal opportunity/affirmative action employer.

ASSOCIATE DIRECTOR FOR TECHNICAL SERVICES

International research organization has immediate vacancy for experienced manager with responsibility for policy and administration of computer programming, word processing, and graphics services. The Technical Services Department has a staff of forty and hardware including a Burroughs 86700 and an integrated mini based word processing/typesetting system. A major area of emphasis will be expansion of services to the commercial market. Salary range 30-50K. Send resume to:

Personnel Services Division
International Fertility Research Program
Research Triangle Park, N.C. 27709

IMMEDIATE OPENING

IBM 370 specialist 3135 and/or 3145

Salary \$32,000-Plus!

Other positions open for trained 370 CE
top pay and benefits.

Call Immediately

(312)843-0630

Circle Computer

920 Remington

Schaumburg, ILL 60195

SYSTEMS ANALYST

We are a progressive marine corporation seeking an energetic individual as a Systems Analyst. Must have a minimum of 3 years experience in systems analysis, IBM System 3, 3741, and communications. Degree helpful but not necessary. Salary will commensurate with experience. Excellent fringe benefits including group insurance, savings plan, and retirement plan. Send complete resume with salary history to:

Bill Clington
Gulf Mississippi Marine Corp.
225 Baronne St., Suite 600
New Orleans, Louisiana 70112

An Equal Opportunity Employer M/F

FIELD SERVICE

SYSTEMS 370/360, H-200,
XDS, Univac, CDC
All Large & Medium
CPU's
MINI's PDP, NOVA, G.A.,
HP, etc. All Mini
Systems

I/O STC, TELEX, CDC,
ITEL, CALCOMP,
etc. All Peripheral Ex-
perience

MTA

(312) 547-6682

MTA ASSOCIATES
1107 Mannheim Road \$12-30K
Westchester, Ill. 60153
Field Service Specialist
National Placement
Private Employment Agency
No Fees To Applicants

CUSTOMER ENGINEERS

We need experienced Customer Engineers in:

- Atlanta • Denver • North/South Carolina
- Boston • Houston • Phoenix
- Chicago • Kansas City • St. Louis
- Dallas • Miami/Tampa • Seattle
- Detroit • Minneapolis • Washington, D.C.
- New York

We're looking for mature, self-motivated individuals with software background and at least 5 years demonstrable experience in identifying, isolating, and repairing system malfunctions.

Our Customer Engineers have total responsibility for customer installation encompassing preventive and corrective maintenance procedures on all aspects of the entire system and associated peripherals, plus installation and testing of both upgraded and new software and hardware products.

TANDEM COMPUTERS is a young, growing company specializing in multi-processor systems which run non-stop in a wide variety of critical applications where continued operation & data integrity is of utmost importance.

If you are seeking a career opportunity and have the required background, send your resume & salary history to:

Mr. A. Lee Mitchell
Customer Engineering
TANDEM COMPUTERS INC.
19333 Vallco Parkway
Cupertino, CA 95014

TANDEM
COMPUTERS

An equal opportunity employer

EDP Systems Professionals

We are an internationally prominent "Big B" CPA firm seeking EDP systems professionals to join a national development group.

This group is responsible for the design and implementation of systems, audit and applications software used by the firm's professional staff to service a broad client base in areas such as manufacturing, hospitals, government and education.

OPERATING SYSTEMS SPECIALISTS

- Extensive hands-on experience with IBM operating systems such as DOS/VS, OS, VS1, SVS, MVS, VM/CMS.
- Hands-on working knowledge of the internals of IBM subsystems such as CICS, IMS, HASP, JES.

APPLICATIONS SYSTEMS SPECIALISTS

- ANS/COBOL - Solid background in COBOL environment with design and implementation experience.
- DATA BASE - Experience with the development of applications using data base management systems such as IMS, TOTAL, etc.
- CICS - Background in design and implementation of applications utilizing CICS.
- JCL - Solid experience writing JCL for OS/VS or DOS/VS systems.

INTERACTIVE APPLICATIONS SPECIALISTS

- Business planning/financial/accounting background.
- Ability to communicate with non-technical professional people.
- Programming experience, primarily FORTRAN.

These key positions are based in New York City and involve some travel. Compensation program is most attractive and includes full benefits. For consideration, reply in assured confidence with resume and current compensation to: CW Box 1383, 797 Washington St., Newton, Mass. 02160.

We are an equal opportunity employer, m/f

position announcements

position announcements

position announcements

position announcements

position announcements

Director of Computer Center

DEC 1170 time-share system at private liberal arts college. Supervise development of both instructional and administrative applications. Minimum qualifications are Masters degree and experience in college computing applications; salary competitive. An equal opportunity employer. Send credentials by January 20 to Ronald Kapp, Provost, Alma College, Alma, MI 48801.

SYSTEM PLANNING & CONTROL ANALYST

Major energy producing co. located in metro N.Y. area. Degree with 2+ yrs of systems design and programming IBM 370/OS in COBOL. Administrative procedures and data processing standards. Excellent communication skills required. \$26,000 FEE PAID.

ROBERT HALF PERSONNEL AGENCIES

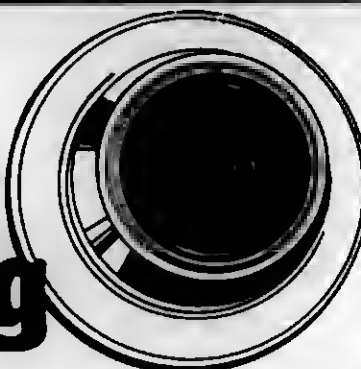
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6900

Executive Director of Computing/Data Processing

The University of Wisconsin-Stevens Point is seeking an Executive Director of Computing/Data Processing Services. Reports to the Assistant Chancellor for University Services and is responsible for instructional computing, research computing, administrative data processing, administrative systems, and public service computing functions. Salary: \$25,000. Qualifications: PhD preferred, Masters required, and successful managerial experience in computing/data processing or systems.

Apply by February 1, 1978 to Dr. David Coker, Assistant Chancellor for University Services, University of Wisconsin-Stevens Point, Stevens Point, Wis. 54481. Telephone: (715) 346-2641. Equal opportunity, affirmative action employer.

Start Something



We are an exceptionally well-capitalized new computer corporation in Nashua, New Hampshire. Our management team is comprised of experienced, successful computer industry entrepreneurs. Our computer system employs radically new architecture and several unique features that make its cost-effectiveness very attractive, and its scientific/business applications unusually wide-ranging.

We don't expect you to believe all that because we say so here. But if you're the kind of person we're looking for we expect you to give us the chance to prove it. Key positions exist for individuals with these qualifications:

Technical Writer (up to \$24,000)

You will write software (and some hardware) documentation involving novel architecture on a new, state-of-the-art computer system. As our first Technical Writer, your potential for growth will be exceptional.

Q.C. Test Engineer (up to \$24,000)

You will specify and design digital test equipment for subassembly and final test. Qualified candidates must know in-process inspection, reliability engineering, testing and Q.C. Strong managerial skills preferred.

FORTRAN Systems Programmer (up to \$22,000)

As a key member of our compiler development team you will have complete responsibility for library routines and the FORTRAN run system.

Diagnostic Programmer (up to \$24,000)

You must be familiar with computer architecture. You will be writing diagnostic on-line and off-line tests. A knowledge of both hardware and software is a decided plus.

Utility Programmers (up to \$18,000 & \$24,000)

You will be doing pioneering work in writing assembler and utility programs for a completely new computer architecture.

Programmers (up to \$20,000)

We will be employing microprocessors in several new ways to create a background computer-control network. This pioneering effort offers a tremendous challenge for professional growth and insight into state-of-the-art computer design.

Engineering Assistants (Salary Open)

You will assist design engineers in the development and testing of major computer subsystems. At least four years' related experience is necessary.

Field Service Manager (up to \$25,000)

This is a once-in-a-career opportunity to set up an entire Field Service network. You must be a highly skilled organizer, as well as technically competent. (We are interviewing now for hiring in March or April.)

This could be your once-in-a-career opportunity to get in on the beginning of something big. Start by calling our staffing consultant, Prescott Behn, at (617) 369-8505 or send your resume to him at 15 Lowell Road, Carlisle, Mass. 01741.

FUNCTIONAL AUTOMATION

An equal opportunity employer

CSC PROGRAMMER/ANALYSTS Immediate Opportunities

Computer Sciences Corporation, a recognized leader in software development, is looking for mid and senior level professionals to participate in and lead the development of large scale information systems and data bases. The systems will be operational on a H6000 WWMCCS computer with major portions of the development effort to be accomplished in a time-sharing environment.

A BS or MS in Math or Computer Science is desired but not mandatory. Applicants should have a minimum of 2 years experience in the design and development of information systems and data bases using COBOL/I-D-S. These are high visibility positions, requiring extensive customer interface and the exercise of communications skills.

The project is conveniently located near Crystal City in Arlington, Virginia with ample free parking and easy access to METRO.

For prompt consideration, send resume and salary requirements to:

Dianne F. Reason

Systems Division
**COMPUTER
SCIENCES
CORPORATION**

6565 Arlington Blvd.
Falls Church, VA 22046

Major Offices and Facilities throughout the World
Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

Rapidly growing energy resource service company, headquartered in Denver, has immediate opening for intermediate level programmer/analyst. Requires 3 years experience with COBOL. Familiarity with IBM 370/14S, OOS/VS installation helpful. Responsibilities will include applications programming, maintenance, and special projects. Advancement potential. Please send resume, including salary requirements to:

PERSONNEL MANAGER

P.O. Box 2612
Denver, Colorado 80201

Equal Opportunity Employer M/F

computer hardware



and software candidates RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

COMPUTER CAREERS INC.
Specialists-Data Processing 4720
Montgomery Lane # 503 Bethesda,
MD. 20814
(301) 654-9225

EASTERN PERSONNEL, INC.
1002 First Union Bank Bldg.
P.O. Box 1052
Wilmington, N.C. 28401
(919) 762-2624

**BRENTWOOD
PERSONNEL ASSOC.**
Computer Division
1280 Route 46
Parsippany, N.J. 07054
(201) 335-6700

ANDERSON-TAYLOR
P.O. Box 21
Exton, PA. 19341
Philadelphia area
(215) 363-1600

members of

**National
Personnel
Associates**

Specializing in DP

**UNIV. OF WISCONSIN
SUPERIOR**
Instructor or Assistant Professor to teach undergraduate business administration courses with emphasis on data processing languages and systems beginning with Fall, 1978 quarter. Position involves assignment and supervision of student activities using the PDP 11/70 system. Applicants should possess Master's degree in management information systems or business administration as minimal educational preparation. Application deadline is March 1, 1978. Send resume, references, and official copy of transcript for all coursework to Dean, College of Business and Economics, University of Wisconsin, Superior, WI 54880.
An Equal Opportunity Employer

SYCOR

Sycor is on the move...

...and staffing up its dynamic marketing teams in Boston, Washington, Philadelphia, Los Angeles, San Francisco, Chicago, St. Louis, Dallas, Houston, Kansas City and 30 additional locations.

The company's growing line of technically advanced distributed data entry and processing equipment is meeting strong market acceptance across the country. Systems Engineering and Sales have been cited as an important contributor to this rapid rise. More technically sophisticated problem solvers are needed now. Here is your opportunity to join a distinguished leader in the computer industry.

Sales Representatives

Minimum of three years experience successfully selling terminals, peripherals, or small systems that demonstrates a proven track record of sales over quota coupled with a general knowledge of DP applications, including communications is required. Responsibilities will focus on the development of territorial sales for a complete line of computer products and the support of existing customers.

Systems Engineers

COBOL or Assembler programming experience essential, communications with bi-sync and on-line background helpful. Ideal candidate will have the above experience, a BS degree, and a background in either Micro-Mini systems or programmable terminals or systems support. Any exposure to data entry applications and marketing customer support would be an asset.

We offer competitive salary and a full-paid benefit package, including retirement. Send resume and salary history or call toll-free:

1 (800) 521-3497

In Michigan dial (313) 353-5129

Corporate Employment & Staffing



SYCOR, INC.

100 Phoenix Drive
Ann Arbor, Michigan 48104

An Equal Opportunity Employer M/F

"Sycor Puts Computer
Power Where the Work Is"

SYCOR

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER/ ANALYSTS

Our corporate management is committed to the long term development of computer supported systems. With their support we are developing effective people-oriented systems in a Data Base-Data Communication environment.

We are in the early phases of installing an integrated manufacturing control system in our eight divisions; we need growth-oriented PROGRAMMERS who will be ready to assume Project Leader roles in the near future.

COBOL proficiency and experience in a manufacturing environment a plus. Attractive salary with company paid benefit package, including relocation assistance and tuition reimbursement.

To reply in confidence please send a letter or resume or call



WEHR CORPORATION

Nancy Saeger
Wehr Corporation
10201 W. Lincoln Ave.
Milwaukee, WI 53227

BASIC-FOUR SYSTEM PROGRAMMER

Northern New Jersey corporation seeks senior programmer for BASIC-FOUR Mini computer. 3 years programming and 1 year BASIC-FOUR system programming experience. Will manage and maintain programs, and supervise operators. Hours must be flexible. Salary 15-18K plus excellent company fringe benefits. Please send resume and salary requirements to:

CW Box 1390
797 Washington St.
Newton, Mass. 02160

MINI- SOFTWARE

San Francisco
Bay Area

Management & Staff positions exist in the development of software for network communications, operating systems design or generation of system level software to communications interfaces. This NYSE firm is expanding rapidly. Salaries to \$26K+.

For these & other outstanding career opportunities, please call or write, in confidence, to:

OMICRON INC.

One Ecker St.
San Francisco, CA 94105
(415) 546-7200

525 University Ave.
Palo Alto, CA 94301
(415) 328-6150

Exclusively employer retained agency

DATA BASE CONSULTANT

Professional career opportunity with a high technology consulting firm based in St. Louis. Responsibilities will include technical assistance in applications data base design and tuning, client training, etc. In addition to exciting challenges and a variety of responsibilities, you can expect an attractive compensation and benefit package.

Interested candidates may submit resume and salary history, in confidence to:

CW Box 1369
797 Washington St.
Newton, Mass. 02160

DATA PROCESSING DIRECTOR

Responsible for development, implementation and management of comprehensive data processing system for rapidly growing school district. Extensive knowledge of state-of-the-art hardware; both instructional and administrative software required. Managerial experience and programming end systems design prerequisites.

Salary: \$21,500-\$24,750
Apply: Personnel Department
Paradise Valley Schools
3012 East Greeway Road
Phoenix, Arizona 85032

SYSTEMS PROGRAMMER

Large WNY mfg. co. needs OS/VS1 SYSGEMS with min. 2 yrs. maint. exp. ASSEMBLER required. Will be important member of small team. Degree. \$18,000 (Fee Paid).

ROBERT HALF PERSONNEL AGENCIES

1310 Liberty Bank Building
Buffalo, N.Y. 14202
716-842-0801

PROGRAMMING OPPORTUNITIES

ECRM, Inc., a manufacturer of sophisticated computer equipment for the graphic arts industry presently has the following excellent opportunities available for programmers:

SENIOR PROGRAMMER

Responsibilities include software development and support on our interactive graphics systems. Prefer 3-5 years assembly language experience on PDP-11. Knowledge of DOS, RSX-11 and type setting applications desirable, but not mandatory.

DIAGNOSTIC PROGRAMMER

Will maintain and improve existing diagnostics, as well as develop diagnostics for new hardware. Two years experience with assembly level language on PDP-11 preferred. Some knowledge of digital hardware helpful.

ECRM is a progressive, forward moving company offering an excellent opportunity for growth. If you would like to be part of our team please call Cynthia Carney for more information at 275-1760 or forward your resume to:

ECRM, INC.
205 Burlington Rd., Bedford, Mass. 01730
Equal Opportunity Employer M/F



DISTRIBUTORS

Wordplex Corporation is a leader in the rapidly expanding word processing industry. We offer the broadest and most advanced range of products available—from a single station screen-based system to shared logic systems with as many as 32 word stations and massive storage.

In 1976, following a 3 year development program, the Wordplex products were first announced in Europe. Success has been outstanding with the result that Wordplex distributors now occupy prominent positions in all major European and Australian word processing markets.

We are now seeking organizations with experience in distributing computing systems in Canada and the following areas of the U.S.—

Alabama	Kentucky	North Carolina
Alaska	Louisiana	North Dakota
Albany & Buffalo, NY	Miami, Florida	Oregon
Arizona	Mississippi	South Dakota
Arkansas	Montana	Tennessee
Hawaii	Nevada	Utah
Idaho	New Hampshire	Vermont
Indianapolis, IN	New Mexico	West Virginia
		Wyoming

Contact Geoff Groom
31829 W. La Tienda Dr., Westlake Village, CA 91361
(213) 889-4455



California Opportunities for Data Processing Professionals

Our client, one of the nation's largest restaurant chains, is currently seeking highly motivated individuals to assume responsible positions as Programmers, Systems Analysts and Project Leaders in their rapidly growing EDP Department. New systems development is underway in the areas of Finance, Restaurant Operations, Marketing Analysis, Distribution and Point-of-Sale.

Qualified candidates will have a minimum of two years' business programming experience in COBOL on medium to large machines. Salaries range from \$14 to \$24K. Complete relocation expenses and excellent benefit package provided.

We are consultants to management. If you are interested in a dynamic, growing company with plenty of opportunity for individual growth and desire to live on the Southern Coast of California, please send your resume and salary history in confidence to Box CW-1387, 797 Washington St., Newton, Mass. 02160.

An Equal Opportunity Employer M/F

PROGRAMMER ANALYST

Growing client base includes many excellent career opportunities in development, consulting and package installation. Individuals with well developed technical skills, solid analytical capabilities and a "big picture" orientation will be given the opportunity to play an important role in a variety of environments.

Current openings include:
NEW ENGLAND
ALC or COBOL 15-23K
LIFE or CASUALTY
MIDDLE ATLANTIC
ALC or COBOL 18-22K
LIFE INSURANCE
MIDWEST
ALC or COBOL 18-23K
LIFE INSURANCE
SOUTHEAST
ALC or COBOL 17-26K
CREDIT, CASUALTY, PENSIONS, LIFE
SOUTHWEST
ALC, LIFE 18-25K
INSURANCE

Exceptional individuals at all levels are invited to explore these opportunities with Jack Edwards. Jack is an FLMI and deals exclusively with insurance clients.

Jack Edwards Associates
Suite 600
8150 Leeburg Pike
Vernon, Virginia 22180
(703) 891-0688
Insurance Personnel

USER SERVICES MANAGER

Responsible for supervision of a staff of 2 to 10 computer professionals in providing programming, consulting, education and support services for users of the Rand Computation Center.

Candidate is expected to have a strong background in and knowledge of the principal higher level programming languages and statistical packages and must be able to develop good working relationships with a large number of users. BA/BS required, preferably in Computer Science.

SYSTEMS PROGRAMMER

Position available for experienced IBM systems programmer with internal knowledge of MVT, SVS or MVS. Knowledge of utilities, job management and supervisor services required. Knowledge of VSPC and VSAM desirable. BA degree and good organizational and documentation skills required.

Send resume establishing qualifications, full employment, earning history and salary requirements to Kenneth R. Logan.

THE RAND CORPORATION

1700 Main St.
Santa Monica, CA 90406
An Affirmative Action Employer.

position announcements

position announcements

position announcements

position announcements

position announcements

SALES & MARKETING

Our client, a nationally known leader in software package RJE sales has commissioned us to find numerous sales, marketing and account executive personnel to fill expanded needs across the country. They seek experienced (Jr. or Sr.) personnel familiar with these products. Experience with manufacturing accounts a plus. All costs are paid by our employer. Company has excellent benefit package and incentive program. Here is a sample of current needs:

Sr. Marketing Consultant\$30-45K+
Lead Marketing Representative\$30-35K+
Sales Reps (SR.)\$24-30K+
Sales Reps (JR.)\$20-24K+

CALL TOLL FREE 24 HRS./DAY
1-800-821-2270 EXT. 605

(In. Mo. 1-800-892-7655)

Bill Denny, V.P.

Jim King and Associates

438 Gulf Life Tower/Jacksonville, Florida 32207
(904) 398-7371

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM II, Assembler and COBOL. Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:

W.M. Jones



**Harper-Grace
Hospitals**

Human Resources Department
3990 John R.
Detroit, MI 48201
(313) 494-8082

An Equal Opportunity Employer M/F

data processing

PROGRAMMERS

Key Positions with Our Winning Computer Consulting Team in Springfield, IL., Indianapolis and Chicago.

If you're skilled in COBOL, ALC and/or PL-1 and have at least a 2 year success record of accomplishment with large scale IBM systems under IMS... we have the programming and system challenges to match your expertise. These positions require high productivity.

As a member of our professional staff, you'll be rewarded with an excellent salary and benefits. For details call Don Breitfelder collect, from 10AM to 5PM at (312) 786-0220.

INDECON, INC.

300 South Wacker Drive
Chicago, IL 60606
since 1966

An Equal Opportunity Employer M/F

**Computer Engineering
PROFESSIONALS****THE CHOICE CAREERS**

See Them At

**The Applied Technology Division of
Computer Sciences Corporation**

The Computer Sciences Corporation team of over 9,000 professionals will testify to the truth of our challenging assignments, excellent income offers, and growth careers.

CSC Applied Technology Division provides a full range of information systems technology programs to government agencies and private industry and offers you every opportunity to develop your professional skills and to meet both personal and professional challenges on one of our support projects.

SELECT YOUR IDEAL LOCATION...☐ **MOUNTAIN VIEW, CALIFORNIA**

Applications Engineers with Fortran programming experience to provide programming/analysis for helicopter and aircraft simulation for the NASA AMES program.

☐ **NASA KENNEDY SPACE CENTER, FLORIDA**

Programmer/Analysts with H6000 COBOL, Fortran, GMAP or GCOS experience.

☐ **SAN DIEGO, CALIFORNIA**

Programmer/Analysts with Fortran or systems experience on NOVA or HP minicomputers to work at our Naval Ocean Systems Center.

☐ **JACKSONVILLE, FLORIDA**

Programmer/Analysts with U1100 COBOL experience for the Navy's Data Processing Service Center (DPSC) program.

☐ **SEABROOK, MARYLAND**

Programmer/Analysts with IBM 360/370 experience in COBOL, Fortran, JCL, ALC, PL1, or TSO. Systems Programmers using DBMS, OS, VS1, VS2, MVS, and MVT to work on our NASA Goddard Space Flight Center program.

☐ **BAY ST. LOUIS, MISSISSIPPI**

Electronics Engineers with experience in analog circuit design, instrumentation, digital logic design, computer interface design, or microprocessors for the National Space Technology Laboratory (NSTL) program.

☐ **RIDGECREST, CALIFORNIA**

Programmer/Analysts with U1108 COBOL EXEC B experience for our Naval Weapons Center program.

Along with choice locations, CSC offers you competitive salaries and a fully paid company benefits package.

For immediate consideration, please send resume with salary history to:

Gus Siekierka
Director, Industrial Relations

**COMPUTER
SCIENCES
CORPORATION**

Applied Technology Division
6565 Arlington Boulevard
Falls Church, Virginia 22046

Major Offices and Facilities throughout the World
Equal Opportunity Employer M/F

**APL SYSTEM
PROGRAMMER**

Scientific Time Sharing Corporation, world leader in APL time sharing services, is seeking applicants for the position of APL System Programmer. This position requires an individual able to help develop and maintain our proprietary APL system software. Applicants should have a working knowledge of APL system internals or wide experience with equivalent large software systems such as HASP or VM. STSC offers a competitive salary, excellent health benefits, a challenging and exhilarating work environment, access to our AMDAHL 470 computer, and the opportunity to join innovative professionals in the development and use of APL.

Please send letter and resume to:

John W. Myrna
Scientific Time
Sharing Corp.
7316 Wisconsin Ave.
Bethesda, MD 20014

**PROGRAMMERS
AND
ANALYSTS**

If you are a programmer, programmer analyst or systems analyst and would like the most individualized job search offered in the data processing field today, either on a local or national level, send your resume in confidence to either location:

CINCINNATI

SEARCH FEE: \$150

SEARCH FEE: \$150

SEARCH FEE: \$150

CINCINNATI (800) 420-208

DALLAS

SEARCH FEE: \$150

SEARCH FEE: \$150

SEARCH FEE: \$150

DALLAS (800) 420-208

position announcements

position announcements

position announcements

position announcements

position announcements

We are a major health products corporation located in Southern California, with immediate openings on our professional staff. Our South Bay Long Beach data center has two 370/145's under DOS/VS and CICS/VS. We also have a distributed processing network with multiple System/7's, 3740's, and System/3's, with expansion to System/34's planned in the near future. We offer growth potential and excellent benefits. The following openings are available:

SYSTEMS PROGRAMMER

Successful candidate must have a minimum of 2 years recent experience as a Systems Programmer in a DOS or a DOS/VS environment. VS/1 experience preferred. This is an excellent opportunity for an individual willing to learn DOS/VS and CICS/VS. Salary commensurate with experience.

**SR. PROGRAMMER ANALYSTS
PROGRAMMER ANALYSTS**

Senior Analyst requires a minimum of 5 years experience and Programmer Analyst requires 3 years experience in inventory control, physical distribution, and/or sales reporting, including systems design, project planning and control, user interface, specification writing, and COBOL programming. Must have good communication skills and be able to provide direction to others on a project basis. Knowledge of HIPO and structured programming a plus. Degree preferred.

For immediate consideration, send resume with salary history, in confidence to:

Bergen Brunswig Corporation

D. Dohner
Employee Relations
P.O. Box 1973
Long Beach, CA 90802
Equal Opportunity Employer M/F

**Challenging Career
and Beautiful Lifestyle for
Programmers and Systems Analysts**

Tall mountain peaks, lush pine forests, and sparkling streams provide a setting of natural beauty for Dominion Bankshares Corporation, a dynamic multi-bank holding company in Virginia. With 123 state-wide offices, Dominion has a record of performance few can match. Our earnings and dividends have increased EVERY YEAR since we incorporated.

And performance is what we look for in people. We are seeking career candidates who want to excel and who can take advantage of an environment that encourages individual achievement.

Successful applicants will work in a twin 370/158 OS/VS1 environment located at our corporate headquarters in the scenic Roanoke Valley. COBOL and CICS programmers will be involved with such applications as Demand Deposit Accounting (DDA) and Central Information-File (CIF). Analysts will work with DDA and CIF, and one analyst position will be reserved for someone with Mortgage Loan applications experience.

If an outstanding company and a great place to live is the combination you've been after, call Barry O'Donnell, Assistant Personnel Officer. (703) 362-7681. Or send a resume including current salary to Corporate Personnel Unit, Dominion Bankshares Corporation, P. O. Box 13327, Roanoke, Va. 24040. All replies will be held in confidence.

Dominion Bankshares Corporation

An Equal Opportunity Employer, M/F

MINI/MICRO**Software-Firmware-Hardware**

NATIONAL OPENINGS in the rapidly growing minicomputer and microprocessor fields, including design of computers and peripheral hardware and software, and all forms of applications. Fortune 500 and growing regional firms in 35 states. All searches COMPLETELY CONFIDENTIAL. Company clients pay all fees, interview, relocation, etc. Sample openings include:

Real Time/Interactive Sys \$18-29K
Firmware Engineering \$16-24K
RSX-11M Experience \$18-30K
INTEL/Motorola Micro Coding \$18-26K
Diagnostics \$18-30K
Simulation Programming \$15-25K

CALL TOLL FREE 24 HRS./DAY
1-800-821-2270 EXT. 605

(In Mo. 1-800-892-7655)
Ralph Stevenson, V.P.

Jim King and Associates

438 Gulf Life Tower Jacksonville Florida 32207
(904) 398 7371

D P MGR

Mid-New Hampshire

Growing \$40M Company seeking Mgr. of 370/125 with multi-plant data comm. network. Must have systems and management experience. Must be able to interface with senior mgt. Mfg. experience and degree required. Send resume with salary history to:

CW Box 1385
797 Washington St.
Newton, MA 02160
Equal Opportunity Employer

EXECUTIVE RESOURCES

SERVING THE NATION FROM DAYTON

Since 1968

40 S. Main St., Suite 615
Dayton, Ohio 45402

24 Software Programmers \$15-23,000
2 Digital Design Engineers \$23-30,000

100% Employer Paid Fees. Send your resume in confidence.

**INTERESTED IN
A GOOD JOB?
WE HAVE A PLACE
FOR YOU**

Growing South Louisiana Co.

Has Openings For:

- Cobol Programmer
- Senior Programmer/Analyst
- Senior Analyst

Experience with IBM System 370 Model 135, DOS/VS with 256K real storage or larger system is desirable.

IF A CHALLENGE APPEALS TO YOU, SEND COMPLETE RESUME TO PERSONNEL MANAGER, P.O. Box 2607, MORGAN CITY, LA. 70380. We are an equal opportunity employer, M/F

**RESEARCH
PROGRAMMER**

Provide statistical and technical support for a variety of research projects. Experience with program support for DEC system-10 and IBM 360 preferred. Atmosphere busy, informal and dedicated to client services. Excellent fringe benefits. Application deadline 1-31-78. Send resume to: Personnel Service Office, Ball State University, Muncie, Indiana 47306. An Equal Opportunity/Affirmative Action Employer.

**MARKETING REPS. SALES ENGINEER
EMULATOR SYSTEMS MINI-COMPUTERS
\$50,000+ \$35-\$40,000**

A rapidly growing company in the computer industry is building an unparalleled, national sales staff to market emulator systems. Qualified candidates will have a degree in Computer Science, knowledge of dynamically alterable control logic and excellent understanding of business. Company offers above average base salary (\$25K) plus commissions in the \$25-30K range, full benefits, stock options and high management potential. Interested applicants should call our nearest office and ask for Job #10-2L.

Due to expansion, a major manufacturer of mini-computers is seeking a person with 3 plus years experience as a Sales Engineer, selling to the Process Control industry. The qualified candidate will have a degree, be a strong sales professional and/or previous sales manager. Company offers car, plus all expenses, full benefit package and will expose you to one of the best and most secure working conditions in the industry. For more information regarding this position, call our nearest office and ask for Job 10-3JS.

...OTHER POSITIONS NOW OPEN...

Sales-Ter. Equip.	\$30-35K	S/T-EDP Software	\$25-28K
M/R-Telemetry Syst.	\$25-35K	S/E-Time Sharing	\$24-28K
S/E-Microfish Print	\$26-28K	Salas-Computers	\$18-25K
S/E-CRT Word Process.	\$35-40K	S/E-Mag Machines	\$20-23K
M/R-Time Sharing	\$20-24K	S/E-Comp. Ctrls.	\$20-25K
		Market Research	\$25-35K



SALESworld, inc.

Atlanta-2965 Flowers Rds, Atlanta, Ga 30341 (404) 458-8981
Baltimore-300 E. Joppa, Towson, Md 21204 (301) 296-5600
Boston-460 Totten Pond Rd, Waltham, Ma 02154 (617) 890-1500
Chicago-9801 W. Higgins Rd, Rosemont, Il 60018 (312) 692-9000
Cleveland-20950 Centar Ridge Rd, Clevel, Oh 44116 (216) 333-9440
Dallas-1111 W Mockingbird, Dallas, Tx 75247 (214) 638-5081
DC-7926 Jones Branch Dr, McLean, Va 22101 (703) 821-1850
DT-30100 Telegraph Rd, Birmingham, Mi 48010 (313) 647-7400
Houston-9800 N.W. Freeway, Ho, Tx 77092 (713) 681-8485
LA-10680 Wilshire Blvd, LA, Ca 90024 (213) 475-6601
Phil-1150 1st Ave, King Of Prussia, Pa 19406 (215) 337-0170
Toronto-145 King St W, Tr, Ontario M5H 1J8 (416) 364-5500

CADILLAC EDP OPPORTUNITIES

ALL FEE PAID NATIONWIDE COVERAGE
CONFIDENTIAL

CADILLAC offers you assistance in finding a position that meets your objectives... NATIONWIDE or in your present locality. For 45 years CADILLAC has been helping professional people find new positions that offer greater growth more responsibility, new experience, relocation, higher salary, etc... we'll make every effort to do the same for you. Just send your resume, or a note outlining your experience... no cost or obligation to you.

Sys Prog (Tech Support)	\$20-30	Prog (Applications)	\$14-20
Sr. Anal/Proj Mgrs	\$22-30	Prog (MINI, PDP, etc)	\$16-23
System Anal	\$20-25	EDP Auditors	\$18-22
Prog/Anal	\$16-22	Managers IBM Sys/3	\$16-23



Mark Fuller
CADILLAC ASSOCIATES, INC.

32 W. Randolph St., Chicago, IL 60601

(312) 346-9400

**PROGRAMMER/ANALYST
PROPERTY MANAGEMENT**

VEDA INC., a national engineering and consulting firm, is seeking an individual with the following qualifications to join in the development of a new D.P. division.

WANTED:

- Innovative analyst/programmer
- Capable of assuming project responsibility
- Comfortable interacting with customers
- Preferably experienced in property management

TO:

- Develop computer software systems immediately
- Train and supervise technical support personnel as req'd. to support national marketing effort

Be there for this ground floor opportunity and advance with the growth of the company. We have the experience and environment necessary for talented people to succeed. For inquiry call: (703) 979-2700 or send resume to:

VEDA INCORPORATED
1755 Jefferson Davis Highway
Suite 708, Arlington, VA 22202
ATTN: J. Redman, O.P. Services Mgr.
An Equal Opportunity Employer M/F

**Computer Systems
Engineer**

Develop new products and software including operating systems, language processors and application packages for building automation, energy management and process monitoring/control. Position requires a strong background in real time programming, primarily FORTRAN. Mini or micro computer experience an asset.

Send resume stating qualifications to:

Robertshaw Controls Co.

Attn: A.J. Falco, Personnel Manager
P.O. Box 27606
Richmond, Virginia 23261
An equal opportunity employer, M/F

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMING MANAGER HONEYWELL 66/10 HOSPITAL

Large teaching hospital in heart of Penna. Dutch Country has growth opportunity for person on the way up the D.P. ladder. Successful candidate will have appropriate academic credentials and be highly motivated in developing new software packages. Will function as number two in department. Honeywell 66/10 hardware and COBOL experience hold high priority in selection process. Attractive starting salary with excellent benefits. Apply in confidence to: W.B. Harris, Director of Employee Relations, Lancaster General Hospital, 555 North Duke Street, Lancaster, PA 17604. (717) 299-5511

Sales Incentives

Man of the Year

Your personal track record indicates outstanding sales achievement and the ability to deal in large volume sales with corporate executives. Your current earnings are between \$30-\$75,000 and you've developed a flair for creative solutions to marketing problems. Now you're seeking new challenges, more responsibilities and greater financial rewards.

We offer all this and more! As designers and marketers of merchandise and travel incentive programs (such as President's Club and Leader's Council) for the biggest names among the Fortune 500 companies, we need highly motivated sales/marketing executives to join our dynamic marketing team.

Find out about this exciting and unusual opportunity by sending a letter or resume to:

John Jack

Business Incentives, Inc.

P.O. Box 1610
Minneapolis, MN 55440

An Equal Opportunity Employer

REAL-TIME PROGRAMMERS

NCR's Terminal Systems Division in Millsboro, Delaware is a high volume manufacturing facility concerned with the design and production of POS terminals. We are currently experiencing substantial increases in Engineering activity and as a result have immediate needs for programmers interested in growth opportunities.

Desired Experience

-Systems

- I/O Drivers
- Diagnostics
- Operating Systems

-Applications

- Vocationally oriented to the Retail Market
- Peripheral development to include scanners, communications, data collection, etc.

Basic Qualifications

- 1-3 years experience in Assembly language with mini or microcomputers
- 8080 experience a plus
- BS in CS, EE or Math



In addition to excellent career opportunities with NCR, our Millsboro location is right in the heart of the Delmarva Peninsula, better known as the "land of Pleasant Living." We're just minutes from marine recreational areas, wildlife preserves and the nation's finest beaches.

Please send resume with salary requirements:

Ron Tuill, Dept. C-116
Terminal Systems Division
NCR Corporation
P.O. Box 607
Millsboro, DE 19966

NCR



SUNNY SOUTH

DATA PROCESSING CAREER Opportunities

Programmer Analyst	Atlanta	\$14,000 - \$16,000
Programmers (Several)	South Carolina	\$13,000 - \$16,000
E.D.P. Auditor (Several)	Atlanta	\$15,000 - \$17,000
Operations Manager	Georgia	\$18,000 - \$21,000
Programmer Analyst (CICS)	Atlanta	\$17,000 - \$18,500
Programmer (Systems III)	Atlanta	\$16,000
Data Center Manager (Operations)	South Carolina	\$25,000
Systems Analyst (Insurance)	South Carolina	\$22,000
Consultant (Insurance)	Atlanta	\$30,000
Systems Programmer (Mini)	Atlanta	\$20,000
IMS Internals Specialists	(Several)	\$35,000
Scientific Programmer	Florida	\$22,000
Systems Programmer (MVS)	Atlanta	\$22,000
Systems Analysts	Florida	\$19,000
Systems Analysts	North Carolina	\$20,000
Programmer Analysts (Several)	Alabama	\$18,000
Sales Reps. (Many)	Atlanta	Salary + Comm.
Sr. Systems Analysts	Georgia	\$22,000
Sr. Systems Analysts	North Carolina	\$23,000
Programmers (Many, All Levels)	North Carolina	\$19,000
CPCS Applications	Atlanta	\$17,500 + O.T.

100's Of Other Positions Throughout The Southeast

Send Resume or Call (404) 659-4141

FOX AND ASSOCIATES, INC.
EDP Recruiters

2104 CAIN TOWER/229 PEACHTREE STREET N.E./ATLANTA, GEORGIA 30303

PROGRAMMER- ANALYST

IBM SYSTEM-3/12, requires an individual with proven programming expertise in RPG II, as well as analysis experience. Prior operations supervisory experience as well as some knowledge of SPOOLING, DUAL PROGRAMMING, and CCP is a plus.

Qualified applicant will assist Director in design and programming of new applications as well as assume partial responsibility for job scheduling and computer operations.

Please send resume in confidence stating employment history and salary, work experience and salary requirements to:

Mr. M.H. Gross, Director of Data Processing, Gottesman and Company, Inc., 100 Park Avenue, New York, N.Y. 10017. An Equal Opportunity Employer.

VIRGINIA PDP II

Systems Programmer and (4) Applications Programmers needed by this progressive Virginia company. Beautiful location, excellent opportunity to get in on ground floor of a new installation environment. PDP-II, DIBOL, BASIC, DS 2780 Protocol, DECNET, TP, RSTS.

Call or send resume to
Data Processing Department
PERSONNEL PLACEMENT
537-O Huffman Mill Rd.
Burlington, NC 27215
(919) 584-5591

SOFTWARE SPECIALIST

(Attractive Southern Location)

We have a new position that will offer the right candidate a variety of responsibility exposure. The person we select will have:

- 3-5 years software experience
- BDMP or DBDMP
- T/P Monitor, CICS, CCP, TO-TAL
- Manufacturing environment

If you believe you qualify, send your resume to:
F.A. Harrison
TPI Corporation
P.O. Box T-CRS
Johnson City, TN 37601
E.E.O. M/F

PROGRAMMER

Medical/Research

We are currently seeking a qualified individual to join our staff as a Medical/Research Programmer. This represents an excellent opportunity to sharpen your Data Processing skills in a small, research-oriented department within our hospital.

The successful candidate will possess an AAS degree (BS preferred) or equivalent work experience, have a good knowledge of BASIC or FORTRAN, and have a background in statistics, math and/or general programming. We will also consider a recent graduate.

Duties will include light program writing, medical records maintenance (computerized), research programming support and possibly some systems work.

We offer an excellent salary and benefits package that includes free health and life insurance and paid vacation and holidays. Please submit your resume, including salary history and current requirements, to:

CW Box 1384
797 Westington St.
Newton, Mass. 02160
An Equal Opportunity Employer M/F

COLOR VIDEO SENIOR DESIGN ENGINEERS

Requirements:
EXPERIENCE
DEDICATION

VAS Corp.

2525 Maricopa
Torrance, Ca. 90503

Salary open, send
resume or call

Attn.: R. Zegers de Byl
Phone: (213) 320-8334

position announcements

position announcements

position announcements

position announcements

position announcements

MANAGER OF IBM SOFTWARE SYSTEMS

The J. Preston Levis Regional Computer Center is seeking an experienced systems programmer who is ready for significant management responsibilities. JPLRCC operates one of the largest computer facilities in northwest Ohio, and serves many agencies and institutions in the area with a wide variety of applications. We are located in suburban Perrysburg, near Toledo and convenient to several major metropolitan areas. This position reports to the Director of Systems and Development, and is considered senior management.

The successful applicant will have expertise in the generation and maintenance of VS or OS and either HASP or JES2, and will have demonstrated leadership abilities. In addition to the management duties normally associated with such a position, this individual will play a key role in the evaluation and selection of a new and major IBM-compatible computer. Familiarity with the latest hardware and software is therefore highly desirable.

The salary for this position is negotiable and dependent on qualifications, but will be competitive. A full fringe benefit package applies, including 4 weeks of vacation annually and educational benefits. If you feel that you fill the qualifications for this position, and if you would like to play a significant role in a dynamic center housed in an attractive suburban environment with excellent coworkers, we would like to hear from you. Send resumes and salary histories to:

Personnel Officer

JPLRCC

25875 Dixie Hwy.

Perrysburg, Ohio 43551

An Equal Opportunity/Affirmative Action Employer

PROGRAMMERS PADRE ISLAND SOUTHWEST

Our Las Vegas promotion worked so well we are going one step better... Computer Logic will pay for one week in a beachfront condominium and a fishing excursion to Mexico for any programmer for whom we obtain employment up to June 30, 1978. For the top DP professionals, we have numerous openings.

- Data base Prog/Anals. To 24K. IMS/CICS design & programming.
- ALC Programmers/OS. To 22K.
- OS/DOS COBOL. To 20K.
- PL-1/Mark IV. To 19K.
- Mini computer Programmers.

These are "Sun Belt" permanent positions; employer paid relocation and fees.

If you want to step up to "STATE OF THE ART" data base systems or advance your career in 1978, call for an appointment and come in and relate your skills, salary and personal needs to local or national situations. We specialize in "CAREER PLACEMENT OF D.P. PROFESSIONALS".

JERRY BEATTY, 214-243-5051

COMPUTER LOGIC, INC.

Personnel Consultants

2655 Villa Creek Dr., No. 287, Dallas, TX 75234

Our parent company, PPS, Inc., has permanent long-term consulting positions available for OS, COBOL and/or data base professionals, analysts and programmer/analysts. If you've ever wondered what consulting is all about, please contact us!

REWARDING OPPORTUNITY WITH A LEADING DATA BASE/ DATA COMMUNICATIONS VENDOR

Insyte Datacom is expanding again! Growing domestic and foreign markets for DATACOM DBMS & TP software require immediate investment in innovative DP professionals for systems engineering, customer support, sales and programming. Must have 3 to 5 years experience on IBM 360/370 series DOS and/or OS. Insyte Datacom is ideally located in dynamic Dallas, where you and your family can enjoy a secure future and full utilization of your professional skills. Insyte Datacom, a wholly owned subsidiary of Insyte Corporation, a public company, offers excellent advancement opportunities and company benefits. Please send resume today to Orrin Stevens for immediate consideration.

insyte datacom

214/526-4280

3707 Rawlins St Dallas TX 75219

Boston Chicago Denver San Francisco Mexico City Frankfurt W Germany Sydney Australia

FLORIDA

Why freeze when you can be in warm sunny Fla-We have orders We need Applicants!
P/A 370/OOS/VS CICS to 16K
SYS/PROG 370 OOS or OS to 20K
SCIENTIFIC any equip to 18K
P/A large Buir to 18K
Scientific-Graphics to 19K
PROG COBOL or BAL to 16K
P/A NCR Bnkg to 17K

ROBERT HALF
PERSONNEL SERVICES

311 N. Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

FEDERAL EXPRESS
Americas
Airline
for Packages

**DATA
PROCESSING**

We are now accepting resumes for **SYSTEMS ANALYSTS** and **PROGRAMMER ANALYSTS** to work on various applications in our Systems and Programming Department. We prefer experience in large on-line systems. All applicants must be proficient in COBOL.

If you desire to work in a challenging, innovative department that anticipates extensive growth potential, please contact us directly. All resumes will be kept in strict confidence.

Kay Coop
Personnel Specialist (CW)

Federal Express Corp.

AMF Box 30167

Memphis, TN. 38130

(901) 369-3245

Equal Opportunity Employer M/F

**SYSTEMS
PROGRAMMER**

Connecticut based service organization urgently needs people with Amdahl 470 or IBM 370/168 MVS, BAL. Experience with MVS Internals, dump analysis, design and implementation of system software. \$23,000 plus. Fee Paid.

ROMAC & ASSOCIATES

342 North Main Street

West Hartford, CT 06117

(203) 232-4811

**COMPUTER
SYSTEMS
ENGINEER**

Requires applicable college degree plus 2 years experience. VS1 and VM experience most desirable. Send resumes to Commonwealth of Virginia, 201 8th Street Office Building, Richmond, VA 23219, Attn: Bobbie Hughes. Eoe

EDP**SOUTHEAST**

Prog: OS, Cobol \$18K
Sr. Prog: CICS \$20K
Software: DOS \$22K
Software: OS \$24K
Sys Anat: Mfg. \$25K

Several positions open in the above categories with leading Southeastern companies. Mail confidential resume or call Joe Sawyer, the EOP Personnel Specialist, (803) 233-2546.

EXCEL**PERSONNEL**

1421 Laurens Road

Suite 200A

Greenville, SC 29607

**SENIOR FORECAST
ANALYSTS**

Here is an exceptional opportunity for an experienced professional to join the fastest growing minicomputer company in the business. Data General. In the last nine years our sales have gone from \$1 million to over \$254 million. And we're going to keep on growing. Presently we are seeking candidates for our **CORPORATE MANUFACTURING** planning department with computer industry exposure and specialized knowledge of CPU and peripheral products. Your responsibilities will include evaluation of market demand, marketing strategies, and business forecasts for impact on production plans. You will be required to recommend appropriate production strategies to optimize delivery capability within specific risk limitations and develop and implement tools and techniques in support of the above tasks. Requirements include 4 years experience in market and/or manufacturing forecasting and planning functions. A technical degree is required; an MBA preferred.

If interested in the above position, please send your resume, including salary history, to Barry S. Davis, Data General Corp., 15 Turnpike Road, Westboro, MA 01581 or call him at 1 (800) 225-7347, ext. 4511; in Massachusetts call collect (617) 366-8911, ext. 4511.

Data General

An equal opportunity employer M/F

**Honeywell 6000
Programmers**

We are assisting one of our suburban Boston area clients in locating qualified Honeywell 6000 programmers. This is an opportunity for you to learn first hand about an unusual opportunity without becoming directly involved with a potential employer. Clip and mail the enclosed coupon. I'll contact you at your convenience and answer any questions you may have about this or other opportunities.

Name _____ Date _____
Address _____
Phone _____
Best Time to Call _____
Honeywell 6000 experience _____ years
Other Data Processing Experience _____

Timothy D. Crowe, Jr.
Personnel Consultant
Box 6
Chelmsford, Mass. 01824

An equal opportunity employer, M/F.

position announcements

position announcements

position announcements

position announcements

position announcements



COMPUTING AND COMMUNICATIONS CAREERS IN ATLANTA

Digital Communications Associates, Inc. is an Atlanta-based manufacturer of computer communications networks. Our networks interconnect clusters of asynchronous terminals with one or more host computers. Our networks are the most advanced in our market, offering statistical multiplexing, end-to-end error control, port contention, circuit switching and centralized network management in one integrated package. Our fast growth has created the following new positions for talented persons with a commitment to quality work and a record of successful accomplishments.

Manager of Customer Support

Responsible, mature individual to lead a team of customer support personnel. Responsibilities will include internal acceptance and installation of networks as well as fault isolation and repair. Applicant must have progressively responsible experience in support or operation of digital communication networks; familiarity with minicomputers is desired. Applicant must possess good interpersonal skills and be capable of communicating well with all levels of customer personnel, both in person and on the telephone. Bachelor's degree or equivalent experience is required.

Customer Support Engineer

Experienced service engineer to install, diagnose, and repair networks which utilize state-of-the-art hardware and software. Assembly language experience with minicomputers (PDP-8) and microprocessors (Z-80) is desired; experience with communications equipment (e.g. multiplexers and modems) is required. A degree in a relevant field is preferred. Applicant will travel about one week per month.

Programmer/Analyst

Highly capable person to develop, document, test, and support in a team environment both software tools and data manipulation systems for engineering, sales, and manufacturing departments. Applicant must possess knowledge of commonly used software-tool structures, must be capable of working in assembly language, and must be committed to using recent advances in program development methodology. Applicant must have substantial experience in constructing data manipulation and processing systems for technology-based corporations. Experience on the DECsystem-10 is desired. Bachelor's degree or equivalent experience is required.

Senior Software Engineer

Mature, capable person to conceptualize, develop, document, test, and support in a team environment operational and diagnostic software and firmware for network and front-end processors. Applicant must be a problem solver, designer, implementer, and communicator, well-grounded in software system theory and practice, and familiar with psychological, managerial, and economic issues involved in the construction and maintenance of software systems. Applicant must have some knowledge of digital hardware. Advanced degree (M.S. or Ph.D.) or equivalent experience is required.

DCA is a small, high-technology but people-oriented team of professionals working at the state-of-the-art in manufacturing commercially viable private computer, communication networks. We maintain an informal, technically challenging, professional work environment in a heavily wooded research park situated in an Atlanta suburb. We offer competitive salaries, liberal fringe benefits, and excellent opportunities for career growth and advancement. If you are interested in one of these positions, please reply by letter of application and resume to our Personnel Director at P.O. Box 73, Norcross, Georgia 30092. DCA is an equal opportunity employer; we invite people to work with us based on their talents and capabilities, not on the color or shape of their skin.

DATA PROCESSING CAREERS

IN SCENIC NEW HAMPSHIRE

Unparalleled growth and internal expansion has created numerous career opportunities at all levels for experienced data processing professionals.

Immediate openings now exist for the following positions:

- Project Leaders
- Systems Analysts
- Programmer/Analysts
- Programmers

We are the data processing center for American International Group, one of the world's largest and most prestigious insurance organizations currently doing business in 130 countries.

We are a progressive installation utilizing an IBM 370/158 with VM, CMS, CICS, OS/VS1 software. Major on-line data based systems are under development.

If you would enjoy working in a highly professional environment located near nationally famous ski resorts and the lakes region of New Hampshire, please send your resume, including salary history and requirements in strict confidence to:

Personnel Director
American International Group
Data Center, Inc.
1750 Elm St., Manchester, NH 03107

A Member Company of
American International Companies
An Equal Opportunity Employer, M/F

PROGRAMMERS/ SYSTEMS ANALYSTS

Openings currently exist at all levels for individuals possessing a background in the following areas:

- Microprocessors
- Minicomputers
- Operating Systems
- Distributed Processing Networks
- Systems Simulation/SIMSCRIPT or GPSS
- Systems Constructors & Generators
- 8080 Assembly
- Assembly & COBOL Languages

We welcome responses from recent graduates with a BS in Computer Science as well as experienced personnel.

To investigate these opportunities, please send your resume and salary requirements to:

J.E. Chorazewitz
Engineering & Manufacturing - Dayton
Employment, CW-116
NCR Corporation
Dayton, Ohio 45479



An Equal Opportunity Employer

TOLL FREE

800/633-6644

In Alabama Call Collect

205/328-2931

24 Hr. Telephone Service

SUNBELT SERVICE

EOP AVOIT/	25K
MFG	
EOP CON-	24K
SULTANT	
BANK EOP	23K
ANALYST	
SYS ANALYST/	22K
MFG	
PROJ LOR,	22K
NCR	
PROG MGR/	22K
INS/370	
SYSTEMS PROG	22K
PROJ LOR/	20K
MFG/370	
OPERATIONS	20K
MGR/370	
S/+ SPECIAL	20K
IST/MFG	
NCR, BANK,	20K
P/A, UNIVAC,	20K
LIFE INS, 370,	20K
MFG PROG/	19K
ANALYST	
EOP MGR,	
HONEYWELL	18K
COBOL PROG,	18K
P/A, HONEYWELL	18K
COBOL PROG,	18K
BURROUGHS PROG	18K
P/A, HONEYWELL	18K
EDP STAFF	17K
AUDITOR	
ANALYST/370/	17K
MFG	
POP PROG,	16K
P/A, BANK 370	16K
SYSTEM/3, P/A,	15K
MFG	

Representative listing of current southern opportunities. Additional positions available in south and nationwide. All fees paid. Call Ole Olson or mail resume for fast, confidential service.

GENERAL PERSONNEL CORPORATION
Brown Marx Bldg
Birmingham, Ala. 35203

Programmer

SENIOR PROGRAMMER

Minimum 3 years COBOL plus on-line and data base programming experience utilizing large scale IBM 370 type hardware. Knowledge of OS-JCL and utilities a must. Our on-line environment consists of 3270 compatible terminals with INTERCOMM as our teleprocessing monitor and TOTAL as our DBMS.

If you feel you qualify for the above position, please send resume including salary history in confidence to:

C.E. TYLER

Industrial
Products

8200 Tyler Blvd.
Mentor, Ohio 44060
Equal Opportunity Employer M/F

STUDENT SCHEDULING SPECIALIST Denver, Colorado Area

Jefferson County School District has an immediate opening for a user liaison specialist with a college degree, preferably in education or computer sciences, and four years experience in system analysis, programming, data processing user liaison, or student scheduling. Oesie specific experience with the EPIC: SOCRATES scheduling system in an IBM 370 QOS CICS data base environment. Salary is in the 20-25,000 range with an excellent benefits package including four weeks vacation. Please send resume in confidence to:

James E. Engel
Computer Services Department
13300 W. Ellsworth Ave.
Golden, Colorado 80401
An Equal Opportunity Employer

PROGRAMMING PROFESSIONALS

your background and abilities in programming and design are needed by our major clients throughout the U.S.A.

Immediate openings exist for accomplished professionals in both programming and systems design. Applications include the implementation of an integrated insurance processing system as well as financial and business systems e.g. IBM 370/168's under MVS.

SENIOR PROGRAMMERS/ ANALYSTS

You should have two to five years of programming experience on large-scale IBM 360/370 systems with emphasis on insurance or general financial application and IBM COBOL experience. Data base experience is desirable for some positions as is knowledge of IMS-2, PL/I, OS, JCL, and/or assembler language.

SYSTEMS DESIGNERS

A minimum of four years of EDP experience is required including programming and systems design for large-scale equipment. Also required is a knowledge of financial and accounting applications and a knowledge of COBOL.

Interested individuals are invited to forward resume stating current salary in confidence to:

BRITT AND COMPANY, INC.

AFFIRMATIVE ACTION SPECIALISTS
One Bala Cynwyd Plaza
Suite 315-17
Bala Cynwyd, PA 19004
(215) 667-0958
All Positions Fee Paid

position announcements

position announcements

position announcements

position announcements

position announcements

systems software

Mergenthaler Linotype is a world leader in the innovative development of computerized photocomposition and phototypesetting systems. These systems utilize mini-computers, micro-processors, mass memory devices, video display terminals and a wide range of phototypesetters.

Our continued growth has created openings in the following disciplines:

LEAD TEST ANALYST (EDP Auditor)—B.S. in Computer Science. Minimum 6 years' experience in large systems and minicomputers. Knowledge of acceptance testing. Typesetting background preferred.

SOFTWARE ENGINEERS—B.S. in Computer Science with 2-4 years' experience in programming in Assembly language and at least 1 year programming minicomputer software operating systems.

LEAD SOFTWARE WRITER—Minimum of 2-4 years' technical writing for computer systems. Knowledge of programming documentation, format specification and software development coordination.

DIAGNOSTIC PROGRAMMER—Minimum 2 years' experience in digital and analog troubleshooting and 1 year's diagnostic or Real Time Assembly language programming.

If you have expertise in phototypesetting, photocomposition, or computerized word processing systems, we would like to talk with you. We offer an excellent compensation package which includes extensive company-paid benefits and in-house Master's level educational program.



Please indicate your area of interest and send your resume with salary history/requirement to:

Edward S. Schneldermen,
Manager, Industrial Relations

Mergenthaler Linotype Company
Mergenthaler Drive
Plainview, New York 11803

equal opportunity employer M/F

COMPUTER PROFESSIONALS

A recent Management decision to design and implement a centralized corporate Data-Base has created the need for highly motivated and competent professionals who will participate in the development, installation and maintenance of all corporate systems.

PROGRAMMERS, ANALYSTS

Responsibilities will include development of various corporate applications in an IMS Data-Base environment. Candidates should be experienced with OS/JCL, COBOL and highly disciplined in their programming techniques. Education and training will be provided to individuals without an IMS background.

SYSTEMS PROGRAMMERS

Responsibilities will include implementation, maintenance and performance analysis of IMS/VS DB/DC systems. Candidates should have a minimum of three years working experience in the maintenance of IMS/VS system with sound working knowledge of 5VS internals.

TRAINING CO-ORDINATOR

Responsibilities will include the development of effective training programs, conducting classroom instruction and analysis of program effectiveness. Candidate should have a degree, preferably in Math or Computer Sciences, with 3-5 years programming experience and have effective communications skills.

Individuals whose background match the above requirements and who are looking for advancement should send a resume detailing work history, education, training and salary requirement to:

Personnel Department
M. LOWENSTEIN & SONS, INC.
Information Services Division
P.O. Drawer 10232
Rock Hill, S.C. 29730

WE'RE #1

Of 180 recruiting firms* competing throughout the U.S. we were #1 in EOP placements (& we produce more than #2, #3, & #4 COMBINED!) Our clients are nationwide, many on an exclusive basis, and represent a full spectrum of industries, size & needs. IF YOU ARE EVEN THINKING of a change, you can't afford not to contact us. All fees, costs, and temporary living expenses are paid by the companies.

Sr. Sys. Prog (S) MVS/OS Internals	\$22-28K
Sys Prog (S) OS/VS/MVS/SVS	\$20-26K
Mini Tech Analyst DEC/COBOL/R&D	\$25-30K
Proj Leaders IMS/VS COBOL/PL-1	\$20-26K
Sys Analyst IMS/VS COBOL/PL-1	\$20-24K
Prog Anals OS/DOS	\$14-20K

*National Personnel Associates - Offices Throughout the U.S.

Bill Denny, V.P.

CALL TOLL FREE 24 HRS./DAY
1-800-821-2270 EXT. 605

(In. Mo. 1-800-892-7655)

Jim King and Associates

438 Gulf Life Tower/Jacksonville, Florida 32207
(904) 398-7371

Programmer/Analyst

**OPPORTUNITY KNOCKS
with the right position
just once
in a lifetime**

JOHNS HOPKINS is where the right person could soar in their career and where the environment is filled with challenge, excitement, colorful surroundings and OPPORTUNITY.

Our highly respected Information Systems Department has been used as a model by organizations throughout the country. The successful candidate will have related college training and progressive experience in the following areas:

- Three to four years programming COBOL, of which one to two years was using the MSA General Ledger, Cost Allocation and Budget Systems. IBM 370 OS.
- Four years programming in COBOL and ALC for IBM 370 OS. CICS helpful.

We offer much in the way of compensation and benefits, including FREE BLUE CROSS/BLUE SHIELD/MAJOR MEDICAL, three weeks vacation, annual raises, etc.

If you'd like more information or a chance to see for yourself the advantages of working at JOHNS HOPKINS, give us a call or send a resume describing your experiences.

THE JOHNS HOPKINS MEDICAL INSTITUTIONS

Office of Professional Recruitment
624 N. Broadway
Baltimore, Maryland 21205
(301) 955-5589
An Equal Opportunity Employer M/F

SENIOR SYSTEMS PROGRAMMER

Educational network serving 15 colleges and universities. 360/MVT. 370/SVS with HASP 4.0 shared pool. MILTEN/WYLBUR. Maintain and enhance O.S., plan and implement hardware and software upgrades. MVT and/or SVS systems programming experience, assembler and higher level language proficiency required. College degree preferred. PL/I, HASP, shared pool, MILTEN/WYLBUR experience a plus. Salary commensurate with experience. Send comprehensive resume no later than January 31, 1978 to J. William Strider, WNET, 837 Chestnut Ridge Road, Morgantown, WV 26505. An Equal Opportunity Employer M/F.

FLORIDA OPPORTUNITIES

Analysts/Programmers

Seeking promotion and greater personal potential in an ideal environment for you and your family — SUNSHINE year around. \$18,000 To \$35,000 Client Companies Pay All Fees Plus Interview & Relocation Costs Degree and two or more yrs. experience. CRITICAL needs in these areas: DBM, CICS, Systems Internals, Time Share, Communications.

Please submit resume and present salary and we will respond promptly.

FRANK LEONARD Personnel
1211 No. Westshore Blvd.
Suite 100
Tampa, FL 33607
(813) 872-1853

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives; salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals



INTERGLOBAL is...

a subsidiary of a NYSE listed company, with an EDP service bureau placing Consultants throughout the United States and foreign countries.

To take advantage of our nearby and worldwide EDP opportunities, please submit your resume for inclusion in our worldwide computerized retrieval system, to our corporate headquarters in New York City.

Ralph Young
**INTERGLOBAL
TECHNICAL SERVICES, INC.**
56 W. 35 St. NY, NY 10001
(212) 695-7773
Equal Opportunity Employer M/F

SOFTWARE ENGINEERS

Boeing Computer Services currently has openings in Wichita, Kansas, for persons with skills in design, development, integration and test of software on special purpose simulation computers and/or end item computers for real-time aircraft, aerospace and special purpose systems. This includes the engineering design and integration of the computer software system with simulator, airborne and/or special purpose hardware.

Applicants must possess:

- College degree in Engineering (preferably EE) or Computer Science with Engineering emphasis
- 3-5 years experience
- Proficiency in FORTRAN

In addition to excellent salary and benefits, our Wichita location offers the advantage of a modern progressive city with plenty to do and lots of fresh air and sunshine.

Please send resumes to: C.C. Forsythe or call (316) 687-3308.

BCS

BOEING COMPUTER SERVICES COMPANY

A Division of The Boeing Company

3801 South Oliver, Wichita, Kansas 67210
An Equal Opportunity Employer

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

**IBM
3033**
AVAILABLE
Dec. '78
(914) 238-9631
**DELIVERY POSITIONS
AVAILABLE**
IBM 370
138 & 148
January February March
Most Have 3203 Printers
Call Dick Murray at
RENAISSANCE
MARKETING INC.
(516) 271-2389
FOR SALE
**CALCOMP GRAPHIC
SYSTEM**
925 CONTROLLER
1036 PLOTTER
CCC LEASING CORP.
946 Main St.
Hackensack, N.J. 07601
(201) 343-3760
**IMMEDIATE
DELIVERY**
DEC LSI-11
KD 11-F
\$755
Mini Computer
Suppliers, Inc.
25 CHATHAM ROAD
SUMMIT, N.J. 07901
(201) 277-6150
Telex 13-6476
**PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS**
**Bob Russell
Jack Emery
Dave Hopburn
Paul Baillie**
SYSTEMS MARKETING, INC.
700 E. Thomas Road
Phoenix, Arizona 85012
(602) 264-5600 Telex 667134
SMA
CA
**FOR SALE
DISC DRIVES**
2 DEC RK06 14MB
Drives and
controller for PDP-11
6 mos. old.
CONTACT
EARL M. GOLDMAN
(415) 682-3144.
Want to Buy
3158 Memory
U35 - U36
3158 - J
compuduct
**6115 28th St., S.E.
Grand Rapids, MI 49506
(616) 948-0281**
WANTED
**RANDOLPH NEEDS:
3340-A2 DISK
3420-3, 4 & 8
MODEL TAPE DRIVES
CALL: MIKE SEEKINGS
TOLL FREE
800-243-5308**
RANDOLPH COMPUTER COMPANY
Division of Firstbank Financial Corporation
A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
537 Steamboat Rd., Greenwich, CT 06830 • (203) 661-4200
WANT TO BUY
IBM 3271-2
IBM 3272-2
FOR SALE

024	084	419	552	*2402
026	085	514	557	*2403
029	088	519	602	*2405
056	089	521	604	*2406
077	402	523	824	7330
082	403	526	826	
083	407	548	867	

(Potter)*
**Call Warner Rivera
at (212) 557-3712**

GENESIS ONE
COMPUTER CORPORATION
an MAI company

300 East 44th St., New York, NY 10017
IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.
026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.
029	\$1800	\$55/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.
046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.
056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.
059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.
077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.			

THOMAS COMPUTER CORPORATION
**600 N. McClurg Court - Suite 4202
Chicago, Illinois 60611
(312) 944-1401**
**115 Harbor Island Rd.
Newport Beach, CA 92660
(714) 675-2810**
370/125's
**For Sale* Lease* Purchase
*Purchase Leaseback**
**Specialists in 125 Systems
3410's and 3411's Also Available**

CORPORATE COMPUTERS, INC.
(203) 661-1500
115 Mason St., Greenwich, CT 06830
**Member
CDA**
**We are
buying,
selling,
& leasing!**
Buying: 3830, 3420
Selling: 360/65, 360/40
Leasing: 370/155, 360/65
Please contact:
Linda Vaughn / (415) 955-0220
Tommy Talbot / (415) 955-0238
**TEL
CORPORATION**
FOR LEASE
SHORT OR LONG TERM
2065-I-HO
2860-003
2870-001
3X2365-002
1052-007
AVAILABLE LATE JANUARY
SHORT OR LONG TERM LEASE
FOR ALL YOUR 360/370 COMPUTER REQUIREMENTS CALL:
ALBERT BERMAN GEORGE SPRINGSTEEN
(215) 885-4990
GRANITE
COMPUTER LEASING CORP.

BENSON EAST
YORK ROAD AND TOWNSHIP LINE
JENKINTOWN, PA. 19046
MEMBER COMPUTER LESSORS ASSOCIATION
**Distribution
Management
Systems, Inc.**
DMS 330
**ON LINE ORDER ENTRY
INVENTORY MANAGEMENT
ACCOUNTING SYSTEM**
**for
Large Scale Wholesalers
Light Manufacturers**
**Data Base System Permits total
access by name, part number, gen-
eric group, family, relational, city,
phone. 40 terminal DMS system is
demonstrable, affordable - the
most revolutionary cash flow
machine available anywhere at
any price.**
■ Omaha, Nebraska 68124
■ (402) 391-8210
**DEC
BROKER IN NEW
&
USED DEC COMPUTER
SYSTEMS
& COMPONENTS**
C.D. SMITH
**730 N. Post Oak Rd.
301**
**Houston, TX 77024
(713) 686-9405**
**BUY-SELL
TRADE**
For Computer
Call Action Write
CAC
**404/458-4425 P.O. Box 80572
Atlanta, Ga. 30366**

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

FOR SALE

DEC PDP 11/40
SYSTEM INCLUDING
RSTS/E SOFTWARE

- (4) RK05 Disk Drives and Controller
(11) RK05-Type Disk Packs
(2) TU10 9TR/800BPI Magtape Drives and Controller
256 KB Parity Core
Console Teletype/with interface
Diva DD-30 Disk System with controller (Diva emulates and programs same as 2-RP03 Drives)
Entire system under constant maintenance contract. Available early April, 1978 (upgrading to 11/70 system).
Will separate, but greater savings on entire system.
Call or write with your offer. Specifics on request.

Bob Marcus
BLOCK AND COMPANY, INC.
1111 S. Wheeling Road
Wheeling, IL 60090
(312) 537-7200

MINICOMPUTERS & SYSTEMS

Don't waste company time or money. Check with us before you buy or sell.

New DEC Equipment
Immediate Delivery

RK11-RK05 Disk Systems - \$8500
PDP 11/04s and 11/34s - 20% off list
DZ 11
DEC Station 78

New DG Equipment
Immediate Delivery

DG 10 Mbyte Disk Systems from \$7500
DASHERS - 15% to 25% off list
Nova 3/12 or 3D - 20% off list
Immediate delivery for MOS!

Inventory Clearance
call us for free brochure

MINICOMPUTER EXCHANGE

(408) 733-4400
TWX 910-339-9272



BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

WERE YOU A WINNER IN THE IBM LOTTERY?

IF NOT, CIS is having a supplementary drawing for winning alternatives to the 3031, 3032, and 3033. We can deliver the following IBM 370 equipment to meet your needs:

Jan. 78 155-DAT available
165-DAT available
158-New, ITC qualifying
168-New, ITC qualifying

Mar 78 158
158-New, ITC qualifying
168-New, ITC qualifying

Feb 78 158
158-New, ITC qualifying
165-DAT available
168-New, ITC qualifying

Apr 78 155-DAT available
158-New, ITC qualifying
168-New, ITC qualifying

Several 370 systems available beyond April, 1978.

If you hold a winner in the IBM lottery, we will buy your currently installed IBM equipment from you.

Call Us!



CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900

FOR SALE OR LEASE

(2) 3330-11

1-4 Years
Available 2/15/78

(2) 1403/2821

600 or 1100 LPM-UCS
Available 2/1-4/1/78

2501-B1/B2

Available 2/1 4/1/78

(3) 3420-3 Wanted

SYSCOMP

2150 Crestview Drive
Excelsior, MN 55331
(612) 474-8873

FOR SALE BY USER

CC-70 FRONT END

COMPUTER

COMMUNICATOR CONTROL SYSTEM

3 PDP-8's with 8K
1 PDP-1 with 8K
10 Rixon DS-2401S Modems
3 Digitronix Paper Tape
Punch Converters w/Ampex
Magnetic Tape Drive Readers
13 Magnetic Tape Racks

Midwest Stock Exchange
120 S. Le Salle St.
Chicago, IL 80601
Fred Siegman 312-368-2266

BUY - SELL - LEASE - BROKERAGE -

Buy, sell, lease, sub-lease, or be your agent in placement of your pre-owned IBM 360/370/System 3, or other units.

COMPUTER INTERNATIONAL LTD
BEACH COMPUTER CORP.
CWC's Leasing Division
COMPUTER WHOLESALE CORP.
(504) 581-7741

Suite 507/508 First National
Bank of Columbia, Inc.
New Orleans, LA 70112
Wholesale Computer Dealers - All

DEC HARDWARE
PDP 11 PDP 8
Processors Peripherals
Memories
VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

**BUYING SELLING Leasing**

370/ 135
138
145
148
155
158
165
168

214/630-6700

Pioneer Computer Marketing
1165 Empire Central Place Dallas, Texas 75247

IBM 370/3033 AN IMMEDIATE SOLUTION

Need more processing power now: CSA can provide you with a 370/158, 165 or 168 now on a short or long term lease to bridge the gap to a 303X system which CSA can commit to you now.

If you are already renting a 370/158, 165 or 168 from IBM on a monthly basis, you can save money by installing one from CSA under a short-term lease.

The following models are available on lease terms of one to five years with additional upgrade provisions:

Model	S/N	Available	January 1978
370/168	60030	Available	January 1978
370/165	60103	Available	April 1978
370/158-MP	23868	Available	January 1978
370/158-MP	23599	Available	February 1978
370/158	23769	Available	March 1978

Computer Systems of America, Inc.

141 Milk Street, Boston, MA 02109
Call our toll-free line: (800) 225-2036
or (617) 482-4671

SALE ALL IBM Unit Record Equipment 129 & 029's
East Coast
(717) 564-8870
West Coast
(415) 332-6265
Unit Record Leasing Company
110 Hivista Road
Sausalito, Calif.

LEASE

call... **the Matchmakers** **1-800-654-9179**
TOLL FREE!
COMPUTER SALES INTERNATIONAL, INC.

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

For Sale Or Lease System 3/15

Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.

Also complete inventory tapes — disks.
Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

IBM EQUIPMENT FOR SALE OR LEASE

2501/B2 Card Reader
2520/B2 Card Punch
2821/5 w/PFR
3330/3333 Model 1 & 11 Disks
3420/3 & 5 Tapes

3505/3525 Reader & Punch
3803/1 w/7 & 9 TR RPO
3830/2 (w/Madrids)
370/125 HO w/IPA & Byte MPX

WANT TO BUY

3270 Display Equipment
3340/A2 & B2 w/Fixed Head & RPS
3420 Tape Drives — All Models
3780 RJE Terminal
3830/2 Disk Controller
370/145 Processor

Call

**FORSYTHE
McARTHUR**

(312) 943-3770

Dealer &
Lessor In IBM
Computers

FORSYTHE/McARTHUR ASSOCIATES, INC.
919 North Michigan Ave. Chicago IL 60611

Member, Computer Dealers Association

WANTED TO BUY IBM 370/155

with or without DAT
Contact: Harry Blair
(713) 524-8249

IBM PROCESSORS & PERIPHERALS

PROCESSORS PERIPHERALS

SELLING: 3145H-Now 3420-6 w/6425
3155J02-Jan. Avail. January
3165-2-Now

LEASING: 3165-4 MEG All 3420
7 Channels Tape Drives
3033-August

BUYING: 3158 3420-4, 8
3168 3333-1, 3330-11

The Logical Choice
COMDISCO

9701 W. Higgins Rd. Rosemont, Ill. 60018

(312) 698-3000

San Francisco
415 944-1111

Fort Worth
817 534-1774

Atlanta
404 256-5956

Minneapolis
612 854-8107

New York

261 566-9666

Paris, France

374-1130

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115
370/125

ECONOCOM

ECONOCOM
1255 LYNNFIELD ROAD
P. O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER, COMPUTER DEALERS ASSOCIATION

**COMPUTERWORLD
CLASSIFIEDS
WORK!**

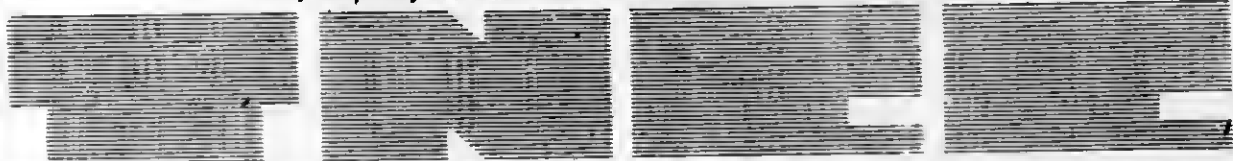
WAITING FOR A 3031 AND
NEED AN INTERIM CPU?

TRY OUR

**3155 WITH DAT
AND AMS PSU**

ONE YEAR LEASE COST LESS
THAN IBM'S RATE ON A 3148
AT TWICE THE CPU POWER

2, 3, 4, & 5 YEAR LEASES AVAILABLE



THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle — (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman — (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Huntington Station, New York 11746

Mini-Computers

BUY-SELL-TRADE-LEASE

FOR SALE D.E.C. CPU'S

11/04-DC \$ 3,800.00
11/40-BK \$ 9,500.00
PDP-8E 8K \$ 3,800.00
11T34BA New & Used \$28,000.00

D.E.C. DISCS

RP04AA \$20,000.00
RP04 & Controller \$28,000.00
RP03 \$11,000.00
RK05J \$ 3,500.00
RK11D & 2nd RK05J \$ 8,900.00

D.E.C. CRT'S

VT05 \$ 1,100.00
VT50HA \$ 1,000.00

Hundreds of Miscellaneous Modules & Cables Available

CALL FOR OTHER COMPONENTS IN STOCK

DATALEASE

700 North Valley Street, Anaheim, CA 92801
(714) 533-3920 TELEX 692439

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Sale or Lease
370/135 FE0
3330/3340 IFA
 Available March 78
360/30 Model F
64K System
Lo Speed I/O

FOR LEASE
3033 8 Meg Syst.
Fall 78 Delivery

Call George Gilman
 (212) 673-9300



383 Lafayette St.
 New York, N.Y. 10003

FOR SALE
DEC 11 V03

DEC 11 V03
 OR ASSUME MY LEASE
 \$258/mo. 8 mos. old
 INCLUDES

1-tt V03 w/Dual Floppies
 1-VT52
 1-24 K Intel Memory
 2-DLV11's, Cables
 1-LA38

RT-11, System
 Documentation
 Basic Fortran
 Application Software:
 G/L, A/P, A/R, P/R

CALL (205) 821-8230

WANTED
FOR LEASE
or Purchase
360/65
Model 1 or IH
3 Channel
with 7074
Emulation

Reply to CW Box 1392
 797 Washington St.
 Newton, MA 02160

CMI BUY LINES

BUY-SELL-LEASE-TRADE

3031/3032/3033

(Lease Only)

John Mills
 (313) 642-8000

3420 3803

3333 3830

3330 3340

Darryl Hastings
 (313) 642-8000

360

30/40/50/65

Gary Smith
 (313) 642-8000

370/165 370/168

Bob Van Hellemont
 (313) 642-8000

370/158

Ron Baker
 (313) 642-8000

370/155

Gary Smith
 (313) 642-8000

370
148/145/138/135

Pam Hoban
 (313) 642-8000

1403 2821

2501 1442

1443

If you rent any of these and
 are returning them to IBM call
 me. I'll show you how to
 make money using your rental
 credits. We buy and sell all of
 these units.

Kathy Housley
 (313) 642-8000

370/115/125

Bob Southwell
 (313) 642-8000

3270 CRT's

Printers/Controllers
 Jim Carleton
 (313) 642-8000

129-029-059-026

System/3

Model 15
 Jerry Roberts
 (313) 642-8000

3742

3741

5496

Jerry Sharon
 (313) 642-8000

360/20

1130

Jim Carleton
 (313) 642-8000

CMI
CORPORATION

The IBM Specialists

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000



BUY-SELL-TRADE IBM EQUIPMENT

IBM 370 Memory-Buy & Sell For Sale Now

370/135 Memory: IBM FE to GF (96K to 192K)
 370/135 Memory: INTEL 96K to 320K
 370/135 Memory: AMS 192K to 320K
 370/135 Memory: AMS 240K to 384K
 370/135 Memory: AMS 256K to 384K
 370/135 Memory: INTEL - any 256K increment
 370/135 Memory: AMS - any 512K increment
 370/145 Memory: INTEL - any 256K increment
 370/145 Memory: AMS - any 512K increment
 370/158 Memory: INTEL 1 Megabyte - For lease

CALL DICK BAKER (305) 561-5207

dataware

Intracoastal Building
 3000 NE 30th Place, Suite 309
 Fort Lauderdale, Florida 33306
 Telephone (305) 561-5207



For Sale

Norand Electronic Ordering
 NT50 Scanners. Excellent
 Condition. Reasonable Price.

Contact

Mr. Donald Vernon
 Associates Grocers
 of Colorado, Inc.
 5151 Bannock St.
 Denver, CO 80217
 (303) 534-1155

1976 G.A. DM 130/2
 with 64KB Core, 2 CRTs
 with 1920 character dis-
 play, a 165 CPS printer
 and a 10 MB Disk Drive -
 \$23,000.00.

Inquiries:

Mike Oakes
 3100 Richmond
 Suite 400
 Houston, TX 77098
 (713) 524-1871

COMPUTER FLOORS



BUYING
 SELLING
 INSTALLING
 All Kinds of Computer
 Floors for Efficient Service

Nord Computer
 Floor Corp.

3 Warehouse Lane
 Elmsford, NY 10523
 (914) 592-2450-2451
 (203) 248-7942

PDP-11

Available for immediate delivery:

DS357
 11/34 64K, 2-RK06, LA180
 1-VT52 CTS300
 11T34-AA
 11/34 64K, LA36, 2-RK05s,
 RSX11-M
 11/03-KA

PDP11/03 16K with
 Power Supply
 MM11-DP 16K Core
 PR11 High Speed
 Paper Tape Reader
 DU11-DA Synch. Interface
 KD11-P LSI 11 Board
 Minicomputer Sales Corp.
 14 W. 40th St.
 New York, N.Y. 10018
 (212) 221-7270

JAN GEDDES
 sale of the week

DIABLO Disk drives & systems

Diablo 31 2.5 Mb removable cartridge disk
 drive, 1562 data transfer rate \$1,950
 Diablo 33F 2.5 Mb fixed door disk drive,
 1562 data transfer rate 1,250
 Diablo 31 & 33F 2,900
 Diablo 31 with System Industries 3010
 Controller for PDP11, power supply &
 cable 3,495
 Diablo 31 & 33F with System Industries
 3010 controller for PDP11, power supply
 & cable 4,495
 Diablo 31 with Decision 3170 Controller for
 Data General, power supply &
 cable 3,900
 Diablo 31 & 33F with Decision 3170
 Controller for Data General, power supply
 & cable 4,900

ONE-DAY SHIPMENT A.O.
 WHILE SUPPLIES LAST
 90 day warranty
 Call to Reserve

NEWMAN COMPUTER EXCHANGE

(313) 994-3200

TI'S MODEL 745 PORTABLE



• Purchase
 and Lease Plans
 • Nationwide
 Factory Service

Tele-Data
 DATA COMMUNICATIONS EQUIPMENT

TELE-DATA INC.

7800 Red Road, South Miami, Florida 33143
 Telephone (305) 665-1611. Telex 515506 TWX 810-848-8021

TELETYPE MODEL 43 KSR



Call Toll Free
 800-327-3570
 Contact
 Ray Kreger

**PREVIOUSLY OWNED
EQUIPMENT & SYSTEMS**

N.C.R. & BURROUGHS

N.C.R. 31, 32 & 151 & 152 Teller Units
 735/735 & 745 Mag. Tape Enc. & Line Printers
 N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
 BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S
 Also B-700 Thru B-4700 Systems w/w/o Peripherals
 WE ARE AUTHORIZED N.C.R. DEALERS OF
 210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS
BUYING OR SELLING-CALL US FIRST.

KEY-EXPORT CORP.

256 LIVINGSTON ST. (P.O. BOX 129) NORTHVALE, N.J. 07647
 TELE N.J. 12011 767 3444 N.Y.C. (212) 736 7736
 TELEX 120109 - CABLE KEYEXPORT NORTHVALE NJ

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

IBM RENTAL CREDITS

We will pay for your rental credits on FTP, ETP, and MAC machines. Call us before sending your machines back to IBM.

IPB Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

FOR LEASE**145 IO**

available immediately on long or short term lease

FOR SALE**165K II**

DATed, up to 4 megabyte For Sale or Lease

155J

available now with or without new DAT

145I2

available now with ISC

3420-3, 5&7

available now with controllers

158 ISC

available now

I/O Sets

all combinations avail. for sale or lease

360/501

Priced to move now

PURCHASE/LEASEBACK

370/125 Systems Save rent starting today

Call for a quote

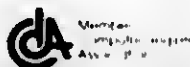
WANT TO BUY

370/168, 165, 158, 155's

IBM Tape Systems

and Disk Systems

All 370 Memories

**BUY-SELL-SWAP****PDP 11's & NOVA's**

Systems and Peripherals at very attractive prices

New and Used

ICS

Computer Equipment Sales

408-735 7360

PAUL PEREZ

408 735 7361

**digital****Factory Refurbished Equipment**

All quality tested and warranted by the people who made them.

- Complete systems
- Processors
- Peripherals
- Accessories
- Complete Documentation

Digital Equipment Corporation
Traditional Products
125 Northeastern Boulevard
Nashua, New Hampshire 03060

☐ Please send your complete product listing.

☐ Please call, I'm specifically interested in: _____

Name _____

Address _____

City _____

State _____

ZIP _____

Phone _____

CWT168

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340's

IBM UNIT RECORD EQUIPMENT

026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557.

029-059-129

Call us for all your needs; we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. Contact ACS for proposal.

ACS 7126 Mullins
Houston TX 77081
(713) 666-2122
TWX 910-881-1526

EQUIPMENT CORP.



INDEPENDENT

**WE BUY - SELL -
INSTALL & REPAIR**
AT REASONABLE PRICES

**HONEYWELL USED
SERIES 200 EQUIPMENT**
COMPUTER SYSTEMS
PARTS - PERIPHERALS

Now In stock

2040-64K M7-32K M9
120-1250 - TAPE DRIVES
READERS, PRINTERS, PUNCHES
3200-131K Avail. 5/78

CALL NOW

Wilson Grabill (513) 874-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati, Ohio 45246

WANTED

**BURROUGHS 'L' Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299**

Boynton Business Systems
87 Route 208
Wallkill, N.Y. 12584
914-895-2007

Short or Long Term Leases From RANDOLPH

370/138
370/148
370/135
370/145

...and all other 370's from 115's ... to 168's. CPU's or full systems. Up to 8-year lease available.

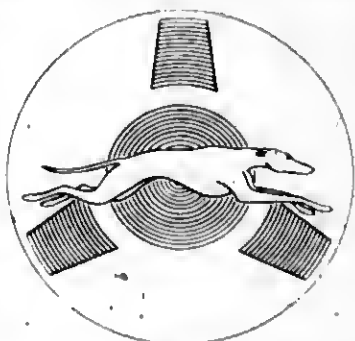
CALL THE 370 HOTLINE

800-243-5307**WANTED:**

3420 Tapes: MOD 3's, 5's, 7's
135/145 Subleases or purchase

800-243-5308

Randolph Computer Company
537 Steamboat Rd., Greenwich, CT 06830
(203) 661-4200

**GO GREYHOUND**

When you plan to
Buy or Sell your
Computer Equipment

For complete information
call the Greyhound Representative in your area.

FOR SALE

3145-HO
360/65J

WANT TO BUY

3340-A2 & 3340-B2
3135 w/4655, 6981, 6982,
7855, 7881

U.S.

Home Office
New York
Chicago
Dallas
San Francisco

T.A. Takash 602-248-6037
Dick Ventole 914-949-1515
Pete Ahern 312-298-3910
M.W. "Bill" Tucker 214-233-1818
Henry Paulson 415-283-8980

INTERNATIONAL

Canada
U.K./Europe
Mexico
Austro-Asia
Europe

Don Maunder 416-366-1513
Joe Gold 022-61-27-54
Andres Contreras 905-543-6850
John Hellmark 214-233-1818
Don Haworth 214-233-1818

NON IBM

Dallas

John Hellmark 214-233-1818

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

370/165 For Sale or Lease

- Will Configure to your needs
- Immediately Available
- DAT Available
- Short-term or interim lease available to 30XX System

Call or Write
George Forsythe

ALANTHUS CORPORATION

111 High Ridge Road
Stamford, Connecticut 06905
203 348 4820

FOR SALE IBM Sys 3

6415-021 Ser. # 40979
3277-001 Ser. # 30840
6421-001 Ser. # 12512
1403-N1
3340-A2
3411 optional

Avail Feb. 15-78

• Will be furnished
at closing of contract



DATA AUTOMATION COMPANY, INC.
8488 CASH ROAD DALLAS, TEXAS 75247
SAC 214 627-8870

SALE OR LEASE

1130-2D CPU
1133 Model 1
1403 Model 2
1442 Model 7



METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg.
1111 W. Mockingbird Lane
Dallas, Texas 75247 TWX 910-861-4171
(214) 634-2750

For Sale XEROX DISK SYSTEM MODEL 7275

Controller
W/86 MB Disks

Call
Telefile
(714) 557-6660
Ask for
Mrs. Weddle

Wanted for Purchase or Lease Spring, 1978

370/158
Memory Only
2 Megabytes above Model K
Call Collect
DPF INC.
141 Central Park Ave. South
Hartsdale, N.Y. 10530
Attn: Norman Usher
(914) 428-5000

WANTED

029-129
3741-3742

We Buy
Rental Credit Machines
Continue to Rent at A
Discount From IBM Prices.
Call Stewart Krakover

Data Rentals/Sales
(213) 559-3822

BASIC FOUR MODEL 500

2 Disc Drives 4.2 megabyte each,
Total of 8.4 40K of User Mem-
ory. Medium speed Matrix Print-
er.

Will sell as package or separate.
Approximately 29 additional Disk
Packs available. Will sell or swap
for Model 600 plus cash.

Call Bruce Sears
(312) 276-8000

For Sale

(2) 3803-1
(10) 3420-5
360/30 F
128K 2030 Memory



compuduct

6115 28th St., S.E.
Grand Rapids, MI 49506
(616) 849-0281

Wanted To Buy

**3672-Memorex storage
control unit**
3673-Memorex disc controller
3670-Memorex disc module
3675-Memorex disc module

Contact:

Harry Blair 713-524-1401

12 Month Lease

On Your Owned or Leased

370/158-168

(Term & Rate based on acquisition cost)



COMPUTER CAPITAL CORP.

1351 Washington Boulevard
Stamford, Connecticut 06902
Tel 203 357 9663

dataserv

buy • sell • lease • trade

FOR LEASE - SHORT OR LONG TERM

Equipment Serial Number

158/KJ CPU	23769
145/J12	10777
145/GFD	10969
136/J	20021
135/GF	61460
135/I	61154
125H2 (Canada)	10567

Other Models Available

IBM MEMORY

Various Modules of 158, 145
and 135 Memory Available

FOR LEASE OR SALE

3611/1	13046	2870/1	71036
3411/1, 3221, 7360	40026	2860/2, 1862, 7850	60456
3340/A2	21895	2621/2, 3615 (2)	22907, 12031
3330/1	11026	2365/2	41285
3211/1	11280	1403/N1 (2)	43162, 91652
3210/1	20540	1442/7	71755
3210/2	10623	1131/2B	12574

CDC 3300 System 77
Bunker Ramo 22285 Comm Ctl. Unit
(3) 31001002; 31001015; 31001030

WANTED TO BUY OR TRADE
An IBM 370 CPU or Peripherals
Call Marv Berger (800) 225-2036

**Computer Systems
of America, Inc.**

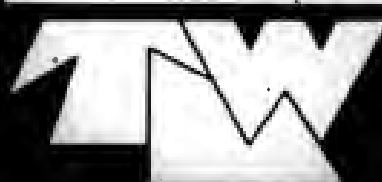
Computer Systems of America
141 Milk St., Boston, MA 02109
(617) 482-4670

BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK!

FOR SALE
3505-B1 and 3525 P3
3135-GF -- Fully Loaded
3155-J with Dat Box

WANT TO BUY

370/145 IBM Mem. I2-J2
370/135 IBM Mem. GF-H
3-1403 N 1
1442 N 1
3420-5 Single Density



**COMPUTER
INDUSTRIES
INC.**

3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO 312 298-5650
WASHINGTON 703 525 3074
LOS ANGELES 213 370 4844

For Sale or Lease

Any 115/125 configuration.

Sending 115/125
Back to IBM

Call us! We'll show
you how to make money
using your rental credits.

370
115 and 125
Steve Lachny
800-328-2406

For Sale or Lease

135 - 145 - 155
CPUs — Peripherals —
Memory

AVAIL. IN JAN.
370/138 MEMORY
I-J
3344-B2

370
135 through 168
Dave Miller
616-637-8481

For Sale or Lease

3211/3811 3340/A2,B2
3272/3277 3410/3411
3330/3333 3420/3803

**STOP! Before you send
any of the above machines
back to IBM call us. We'll
show you how to make
money.**

370
Peripherals
800-328-2406

For Sale or Lease

360/30 - 40 - 50 - 65s
CPU — Peripherals —
Memory

1419 Single or Dual Address

We'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory

360
CPUs and Peripherals
Neal Johnson
800-328-2406

For Sale or Lease

5406 - 5410 - 5412 - 5415
CPUs — Peripherals —
Memory

We'll Buy
Your 5406/5410
5415 — Rental credit
machines
Peripherals — Memory

Sys/3
CPUs and Peripherals
800-328-2406

**Call Toll Free 800-328-2406
or 612-544-0335**

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
P.O. Box 9488, Minneapolis MN 55440

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Rent-Sell-Buy Immediate Delivery

- Texas Instruments 733-745-810
- DEC Writer II-III
- Teletype Model 43
- IBM Punch Card Equipment

Call Collect: Stewart Krakover or Barry Thompson

Data Rentals/Sales Inc.

8611 Hayden Pl., (213) 559-3822 Culver City, CA 90230

WANTED FOR PURCHASE OR LEASE

EARLY 1978

(3) 158 MEMORY ONLY
2 Megabytes above MODEL K

NORM USHER

DPF INC.

141 CENTRAL PARK AVE SO

HARTSDALE NY 10530

(914) 428-5000

dpf

For Immediate Lease or Sale
138's, 148's,
3203-4's
3033 (11/78)
(Lease Only)



**BARRETT
CAPITAL
& LEASING
CORPORATION**

14 Redwood Road
Whita Plains, N.Y. 10605
(914) 761-0070

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
AND PERIPHERALS
WE BUY • SELL • LEASE • TRADE

transdata



P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

AUCTION

Jan. 27, 1978, 2 p.m. p.st. 1205
Prospect St., Ste. 435, La Jolla,
CA.

Computer System, formerly used
as Taxicab dispatch, incl. 2 Data
General Nova 2/10 32K Memory,
w/eccessories, 2 SAI 8-Chan. I/O
boards, 4 PERTEC Mod. D3331
Disk Drives, 2 PERTEC Disk For-
mattar Controllers, 1 Centronix
Mod. 101AL Line Printer, 1 Tele-
type Mod. 33ASR, Teletyp., 14
Hazelitina 2000C Video Display
Stations w/Keybds., 2 IT Mod.
601 Gerge Terminals, 1 Tele-
dynamics Modem for phone line
& Coupler, 1 SAI 100S Switch
Module & Control Panel, 1 SAI
200S Keybd. Serializer & misc.
equip.

For further info.
Contact: W. Williams
Science Applications, Inc.
1200 Prospect St.
Box 2351
La Jolla, CA 92038
(714) 459-0211

SOFTWARE WANTED

SUPERREPORTER!

Our fast, inexpensive, easy to use,
COBOL package can provide near-
ly unlimited reports. Users design
their reports based on selection
criteria, content and sequence!
Send today for information.

ANALYSISISTENCE

P.O. Box 11115
Newington, CT.
06111

ACCOUNTS PAYABLE SYSTEM

Many design features including:
• Auto. discount calculation
• Cost center reporting
• G/L interface tape
• Check reconciliation
• Written in COBOL
• Single data base
• Complete documentation
• 3 year warranty
• Batch mini or main frame
Low purchase price or rent.
Write or call for more information

LEGLER SYSTEMS COMPANY

23 Charles Hill Road
Orinda, CA 94563
(Est. 1972) (415) 254-1264

PRINTING FIRMS

Software for Computer Esti-
mating, Production Planning and
Order Entry. Installation and
training assistance available. RPG
II, Fortran IV.

Green Systems, Inc.

Box 25402
Charlotte, NC 28212
(704) 568-0976

Sale or Lease 2) 370/145-12

Serial # 10515 end 11192

Available 2/1/78

Combination 3145 infarum to 3031 lease

Plans also available:

Contact Jim Jamieson

(804) 643-9123

CCA

Commonwealth Computer Advisors, Inc.
707 East Main St. Suite 1650
Richmond, Virginia 23219
(804) 643-4200

ORDER POSITION AVAILABLE

IBM 370/138

AVAILABLE MARCH 1978

ITC ELIGIBLE

For Futher Information Contact

WESLEY ASSOCIATES

(201) 488-3400 Ext. 47

FOR SALE OR LEASE

MACHINE/MODEL	DESCRIPTION	AVAIL.
3138	1 (New) Del. Pos.	2/17/78
1403	2	2/1/78
2501	B2	1/15/78
3410	3 w/DD Tape Drive	2/1/78
64-128K	360/30 Indep	Now
	Memory	
2030	64K Loaded CPU	Now

CALL KENNSCO 612-533-5800



FOR SALE

by owner

370/135

256K, 2 channels
with 3046 and 3215
available

February 1978

CW Box 1382

797 Washington St.
Newton, MA. 02160

BUY-SELL-LEASE

026- \$ 850	085- \$ 750
029- 1850	514- 800
082- 650	552- 750
083- 1800	557- 2500

Mohawk-6401-6403

NCR-736

Shredders

Busters & Decollators

Call Stan Patc, Natalie Rayes



DP SERVICE Inc.

Phone (312) 774-2556 5505 N.
Menard Avenue, Chicago, Illinois
60630.

FOR SALE OR LEASE

Immediately Available

IBM 3330/001's

IBM 3330/011's

IBM 3333/011's

with features #8150

Contact: Harry Blair 713-524-8249

WE BUY AND SELL AND INSTALL

NEW AND USED COMPUTER ROOM FLOORING

Raised Floor Installation, Inc.
19 Sebago St.
Clifton, N.J. 07013
Tele. (201) 778-2444 in New Jersey
(212) 594-4039 in New York
(415) 546-9466 in Calif.

FOR LEASE

3032 (4 MEG)

JUNE 78

CONTACT:

BOB RUSSELL

SYSTEMS MARKETING, INC.
200 E. Thomas Road
Phoenix, AZ 85012
(602) 264-5600 TLX 667-334

SALE

or short or long-term

LEASE

IBM 3271s, 3272s, 3277s

write or call

METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg
1111 W. Mockingbird Lane
Dallas, Texas 75247 TWX 910-861-4171
(214) 634-2750

BUY • SELL

TELETYPE

MODELS

43 • 33 • 32

NATIONAL
TELETYPEWRITER CORP.
207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444

efm computer
leasing, inc.

3000 marcus avenue
lake success, ny 11040
(516) 486-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65

360/50 370/135

BUY-SELL-TRADE IBM EQUIPMENT

360/65 or 65 MP CORE
1.5 Megabytes For Sale

Independent memory in single cabinet. Great savings
on floor space, power, air conditioning and mainte-
nance. 5th port available. Priced right. Internem.

CALL DICK BAKER (305) 561-5207

dataware
incorporated

Intracoastal Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207



software for sale

software for sale

software for sale

software for sale

software for sale

PAYROLL PERSONNEL SUPER/PAY ONLY \$960 ANS COBOL 60+ USERS

Users on IBM, Burroughs, Univac and minis such as NCR, DG, & Four Phase

Easy to Use 30 Day Trial
Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

ACCOUNTING SOFTWARE FOR DEC RSTS/E CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Successful installations in manufacturing, distribution, service bureau uses. Completely on-line, interactive systems. If you are installing or have installed a RSTS/E or CTS-500 system, contact us first for cost-effective solutions in: ACCOUNTS PAYABLE, GENERAL LEDGER, FINANCIAL REPORTING

The design specifications for these packages were developed by accountants for use by accountants. All packages provide excellent audit-trail, extensive user prompting, fast data entry, full file-maintenance and inquiry capabilities, modular design and construction. These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

For more information, contact us at:

(219) 936-2183
p.o. Box 160
Plymouth, in 46563
Olv. of Young Deer Co.

Plycom services

TSO 3

The only
TSO for VS1

Redesigned to eliminate TCAM and the staggering overhead of user swapping

ISP

(Intersystem Spool)
Processor

System-to-System
Communication for VS1

(Write or phone for details)

TSO
Software Corp.

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

DIGITAL PDP-11 DATASYSTEMS

Applications
Software

- Accounts Receivable
- Accounts Payable
- General Ledger
- Payroll/Personnel
- Order Processing
- Inventory Control
- Word Processing

Timesharing

Dataservices

- Dual PDP-11/70's
- National Network
- Applications Software
- RSTS/E System Utilities
- Distributed Data systems
- Software Development
- Consulting Services

ims

Interactive Management Systems, Inc.
375 Concord Avenue
Belmont, Mass. 02178 (617) 489-3550

SAVE

RPG/RPG II TO COBOL TRANSLATOR

This package accepts all types of RPG and produces ANS COBOL while approaching 100% error free conversion. The resulting COBOL program is modular in design and easy to read and maintain. Several client service options are available: Perpetual Lease, Conversion only, Clean Compile and full implementation including production JCL, test and installation. Over 100 satisfied customers.

For Prompt Reply Write or Call Us Today

Park Ridge, Illinois 60068, Suite 315
1480 Renaissance Dr., (312) 299-5005

DASD

RPG II SYSTEMS

- *A/R-OPEN ITEM OR B/F
- *ACCOUNTS PAYABLE
- *GENERAL LEDGER
- *PAYROLL AND LABDR DIST.
- *INVENTORY
- *CREDIT UNION MAILING, ETC

Extensive Documentation Provided

Bancroft Computer Systems
P.D. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our translators, write or call today.



Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

RSTS/E

Communications

The HASPBOX(tm) is a communications front-end processor for DEC RSTS/E

- 360/370 communications via HASP protocol
- Block compression (increasing line throughput up to 35%)
- Supports line speeds up to 19.2 KB
- Automatic input queuing facility
- Allows remote RSTS printers and card readers
- Supports RSTS to RSTS systems communication

Contact:
Software Results Corporation
455 West Seventh Ave.
Columbus, Ohio 43201
(614) 421-2094

General Data Systems

- Systems Design
- Software Development
- De-Bugging
- Model-Analysis

For Applications Within the Following:

- Medical Systems
- Town & Government Systems
- Business & Financial Systems

Call
GDS (617) 545-1872
11 Sedgewick Drive
Scituate, MA 02060

PROC/ANALYSIS

Is an O/S system utility that provides cross-reference information on JOB STEPS, PROGRAMS EXECUTED, DATA SETS, & SYSCUT FORMS within a particular PROCLIB, a combination of PROCES and a specific number of PROCES or all PROCES having identical GENERIC NAMES.

A perfect tool to enforce standards in naming conventions, identify use of certain FORMS, syntax check PROCES and provide information on where PROGRAMS and DATA SETS are used, PROC/ANALYSIS is available from CHICAGO DATA SYSTEMS, INC. on a 30-day free trial.

Full price of \$2500 includes SOURCE CODE SAMPLE JCL COMPLETE DOCUMENTATION including SAMPLE REPORTS, and a ONE YEAR WARRANTY. INTERESTED? Call or write: JOHN A. AMBLER, President, CHICAGO DATA SYSTEMS, INC., P.O. Box 7644, CHICAGO IL 60680. Phone (312) 751-5474.

TIME & SERVICES

Datacenter
370/158

3 meg VS2
Specializing in
Remote Job Entry
and Batch

Excellent Technical Support
Very Attractive Rates

Contact: Stu Keriensky
(212) 564-3030
Datamor
132 W. 31st St.
New York, N.Y. 10001

WE ARE

**BROKERS OF
COMPUTER
TIME**

New York & New Jersey Only
Computer Reserves, Inc.
(212) 577-1840
(201) 676-1881

NATIONAL DATA SYSTEMS, INC.

RSX-11M
Systems Design
Consulting/Programming
APPLICATIONS:

- On-line
- Teleprocessing
- Point of Sale
- Business
- Scientific
- Real Time

TurnKey Systems Installed
Call Roy S. Nicolosi
(201) 843-5300

COMPUTER TIME

- ALL SHIFTS AVAILABLE
- DOS/VS AND GRASP ENVIRONMENT
- COMPLETE DATA PROCESSING SERVICES PROVIDED
- REASONABLE RATES

370/145-256K

PERIPHERAL DEVICES INCLUDE:

- (1) 2314 DISK DRIVES
- (1) 200/400 KS DUAL DENSITY 8 TRACK TAPE DRIVES
- (2) 1402 IN/1100 LPM PRINTERS
- (1) 1442 CARD PUNCH
- (1) 2501 CARD READER
- (1) 2671 PAPER TAPE READER
- (1) 3215 CONSOLE PRINTER

CONTACT JIM GREEN OR LARRY YOUNG
MASS. TEL (617) 583-0800

TEXT DATA BASE BUILDING

Fantastic Rates!

Fantastic Service!

ComCom inputs fifty million characters per week with a maximum error rate of one in 20,000 characters—double-keyed and electronically proofread.

Rates begin at \$1.25/M characters.

Specialty—converting, updating and CRT typesetting existing data bases.

Interested? Contact

Mr. David Zellner
ComCom, Inc.
834 N. 12th St.-Box 2
Allentown, Pa. 18102
215-437-8656

I.B.M. 360-40

All Shifts 128K, 4-2401
MOD-2, 9-2314, 1403-N1,
2540, 1401 Compatibility.
From \$35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036

Contact:

Al Palmo (212) 974-4966
Charles Leigey (212) 974-4967

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Data Craft, Data General, CDC, DEC, EMM, Febri Tek, Honeywell, GAI, HP, Interdata, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Verien, XDS.

Any Manufacturer's Memory

THREE DELTA CORP.

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

CHICAGO
370 - 145
DOS/VS - GRASP
TIME/SERVICE
Computyme of
Chicago
(Loop)
(312) 922-6624

COMPUTER TIME

RJE - Stendalone - Batch
FULLY CONFIGURED
370/158 & 15511
360/30

- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

RJE SERVICES 370/165-2

Systems Engineering
Computer Co.

announces the availability of:
CHICAGO DATA CENTER
With Nationwide Network

Contact: Robert Chomko
(312) 298-0997

SEC

SYSTEMS ENGINEERING COMPUTER CO.

2500 East Devon Ave.
Des Plaines, IL 60018

We're really proud of our add-on memory for your PDP®-11/70. Here's why.

First, we'll ship it when you need it. No waiting. We invented semiconductor memory, manufacture our own components and deliver more bits of memory every year than any other company.

No one has more experience in MOS memory technology than our design team. They've designed our in-1670 for PDP-11/70 to deliver optimum reliability, with the features you need. Error Correction Coding and Error Logging, for example, mean that single bit errors are corrected automatically, and logged to simplify preventive maintenance.

We designed our in-1670 for easy expansion, too. It gives you up to two megabytes in a single frame. As your needs grow, you can expand easily by adding memory cards in convenient 128K byte increments.

We're proud of our worldwide service organization, too. It's the support you'd expect from the independent

that delivers more memory systems than anyone.

Finally, there are economic advantages. Choosing Intel can give you clear-cut cost savings. And the added peace of mind you get when you go with a leader. That's true of all our memory systems, for PDP-11 and LSI-11 computers, and 370 computers, too.

Why wait? Pick up the phone and call your local Intel sales office. Or, for more information, call us at 408/734-8102 or use the coupon below.

intel® delivers.

Intel Memory Systems

1302 N. Mathilda Avenue, Sunnyvale, CA 94086

CW11678

Send me more information on memory for my

PDP-11/_____, LSI-11_____, Other_____

Call Me_____/_____

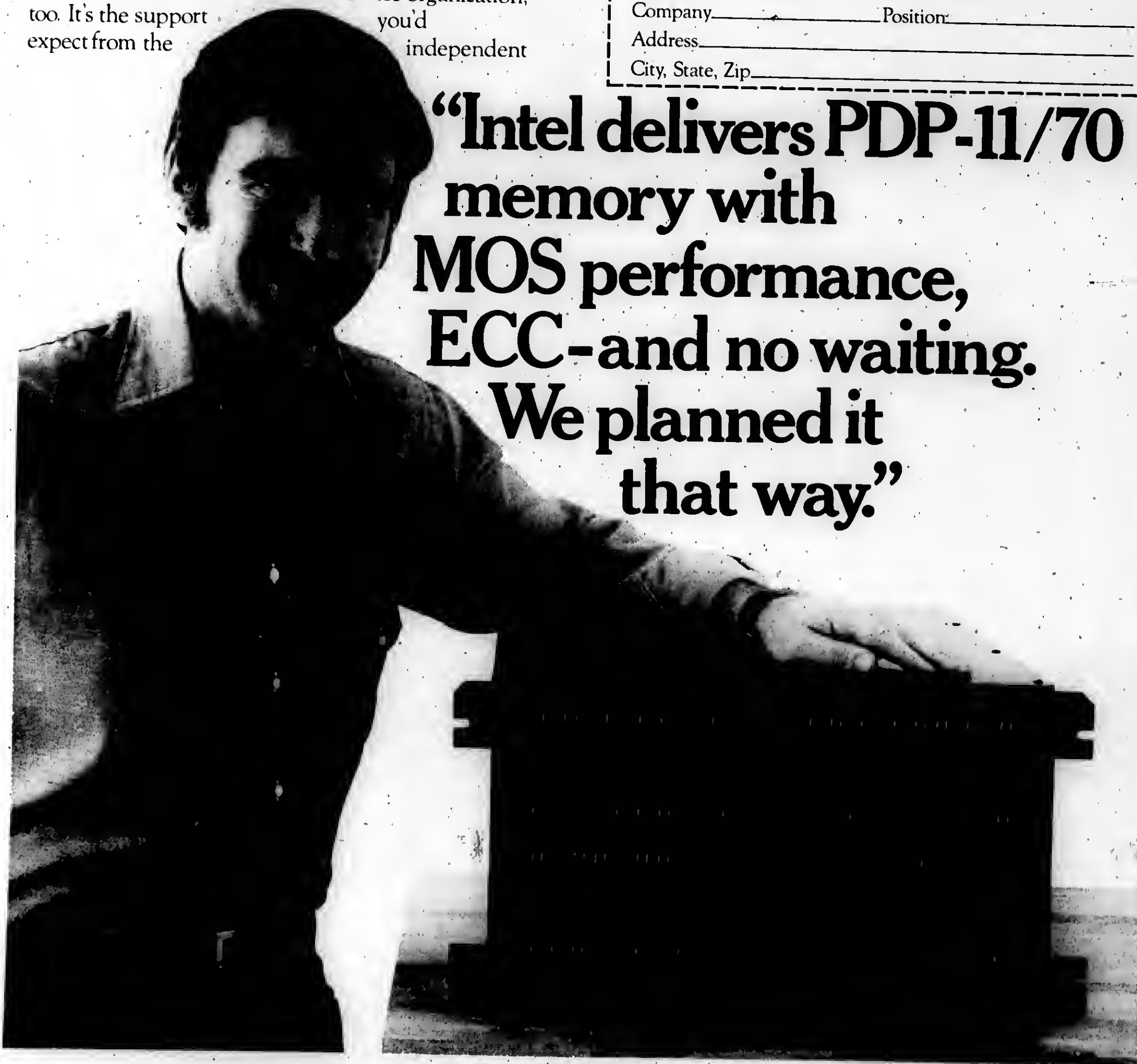
Name_____

Company_____ Position_____

Address_____

City, State, Zip_____

**“Intel delivers PDP-11/70
memory with
MOS performance,
ECC-and no waiting.
We planned it
that way.”**



Memorex Puts Fine Comb to Jury Selection

By E. Drake Lundell Jr.
CW Staff

SAN FRANCISCO — The jury impaneled here last week to hear the Memorex Corp. vs. IBM antitrust case was one of the best-researched ever with both sides using outside consultants — and even computers — in the jury selection process.

The eight-woman, four-man jury — selected last Monday even in the midst of rumors about settlement negotiations between the two firms — is a mixed bag, ac-

cording to one observer.

However, Memorex, which did far more research into the potential jurors, is happy with the jury. It believes the jury is a conscientious group that will be able to follow the case closely despite its complexities, according to Beth Benora from the National Jury Project, which was hired by Memorex for its jury screening work.

The project took a statistical sample of 825 potential jurors and conducted interviews with them to determine their attitudes

toward big business in general and IBM and Memorex in particular.

The information was compiled and sorted by a computer system, Benora said, adding that it "probably" wasn't an IBM system.

From that information, project personnel try to draw a profile of the type of juror that would be most favorable to the client, in this case Memorex.

However, this was difficult in this case, Benora said, because people's attitudes toward
(Continued on Page 8)

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

Vol. XII, No. 4

January 23, 1978

75¢ a copy; \$18/year

Amdahl Revamps Prices

SUNNYVALE, Calif. — Amdahl Corp. chopped 9% off the price of its 470V/6-II and brought out a new minimum-configuration 470V/5 with 12 channels that costs 9% less than the previous eight-channel model. Lease terms are now five years.

The firm announced lease plans for the 470V/7; a 6M-byte unit costs \$86,225/mo. Maintenance prices were not changed, nor was the 470V/7 purchase price.

With 6M bytes of memory, a typical 470V/6-II previously priced at \$3.5 million now costs \$3.2 million and leases for \$75,950/mo.

The latest minimum-configuration 470V/5 with 4M bytes of memory and the now standard 12 I/O channels carries a \$2.4 million price tag compared with the previous cost of \$2.65 million for an eight-channel version; it leases for \$58,575/mo. An IBM 3032 with 12 channels is priced at \$2.5 million.

All 470V/5s shipped from this date will have the new 12-channel configuration, Amdahl said.

Users Award Xerox, Amdahl Top Grades in Annual Survey

By E. Drake Lundell
CW Staff

DELRAN, N.J. — Computer equipment from Xerox Corp. and Amdahl Corp. ranked first and second respectively in overall user satisfaction in this year's Datapro Research Corp. computer users survey.

The results are noteworthy, since Xerox Corp. no longer even makes or supports its systems, and Amdahl Corp. is a relative newcomer to the business.

In the survey, which attracted 1,790 responses representing user experience with 2,253 mainframes, from a variety of manufacturers, Digital Equipment Corp. was the only other mainframer to receive better than average ratings from its systems users.

In overall satisfaction, Control Data Corp., IBM, NCR Corp. and Univac equipment received average replies, while gear from Burroughs Corp. and Honeywell Information Systems, Inc. was rated below average by the users.

The survey, which was mailed to 20,000 Datapro subscribers, asked each computer user to rate the performance of its equipment — and the firm behind it — in 12 different categories.

The users assigned ratings of excellent (4), good (3), fair (2) or poor (1) to each of these categories and Datapro then calculated a weighted average for each.

In overall satisfaction, the 16 Xerox users gave the firm a 3.5 score, while the seven Amdahl users responding rated that firm 3.4 and the 27 DEC users rated DEC 3.3.

CDC, with 23 responses, got a 3.1 rating, as did IBM with 1,291 users, NCR with 70 users and Univac with 78 users responding.

Burroughs, which was rated by 146 users, got a 3.0 rating and HIS was at the bottom of the list with a 2.9 rating from its 130 users.

Two Ite Corp. users also replied to the survey, but their responses were not ranked with those for the other companies since Datapro requires a minimum of six replies for such rankings.

However, Datapro noted that the two
(Continued on Page 4)

SSA Files Opened to Fraud Probes

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Legislation that bolsters the Department of Health, Education and Welfare's (HEW) crackdown on welfare cheaters through computer cross-checks is on the books.

Michigan has uncovered 6,000 possible welfare cheaters by cross-checking the employee records of four companies — including the Big Three auto makers — against the state relief roster. Story on Page 7.

agencies to help them determine an individual's eligibility for aid or services.

The new law also commands the secretary to establish safeguards to ensure that wage data for individuals isn't used for purposes other than reducing fraud and determining benefit amounts.

Congressional concern centers on the number of questions this section of the

law raises — in particular, its relationship to the Privacy Act of 1974.

For the past several months, HEW's Inspector General has used computer technology to purge the nation's welfare rolls of those federal employees who were illegally receiving funds from the Aid to Families With Dependent Children (AFDC) program [CW, Nov. 21].

(Continued on Page 6)

PL/I Joins Ranks of DG Mini Languages

By Don Leavitt
CW Staff

BERKELEY, Calif. — Data General Corp. has announced a PL/I language facility for its Eclipse minicomputers and a user at the University of California's campus here, where it has been in place for nearly nine months, gave it high marks across a range of applications.

DG claimed the software, scheduled for general release in late March, will be the first PL/I available from any major minicomputer vendor. While

that appears to be true, IBM — a latecomer on the mini scene — won't be far behind; it has announced PL/I for the Series/1 and said it will be ready in April.

The language has, until now, been used on large mainframes for computational operations and business-oriented DP as well as for systems programming since it provides the primary capabilities of Fortran, Cobol and Algol while at least encouraging a structured approach to programming.

In the Quantitative Anthropology

Laboratory at the university here, Prof. William H. Geoghegan said PL/I on an Eclipse C/330 "has been involved in everything from systems programming to document processing, report generation, preprocessing of graphics data and statistical applications that involve heavy number-crunching."

One of the systems programming chores handled for the lab by DG's PL/I was setting up the means of transferring large volumes of data between the Eclipse and a Nova 2/10

(Continued on Page 8)



EDITORIAL

Editor E. Drake Lundell Jr.
Deputy Editor Ronald A. Frank
Managing Editor Nancy French
Associate Editor Donald Leavitt
Associate Editor Esither Surden
Associate Editor Molly Upton
Assistant Editor Frank Vaughan
Washington Bureau Edith Holmes
Staff Writers Catherine Arnsi
Jeffrey Beeler
Timothy J. Scannell
Brad Schultz

Chief Copy Editor Cheryl M. Gelb
Copy Editors Barbara T. VanScoyoc
Susan Gerrard

Photography Editor Ann Dooley
Editorial Assistant Denise Petski
Editorial Cartoonist Jim Orion

Bureaus:
London Roger Frampton
Munich Hans-Jurgen Ballnath
Asia Hidetsuna Sasaki

Contributors:
Education J. Daniel Couger
Legal Roy N. Freed
Taylor Reports Alan Taylor
Human Connection Jack Stone

SALES
Vice President/
Marketing Roy Einreinhofer

Advertising
Administrator Terry Williams
Display Advertising Mary Anne Furlong
Classified Advertising Donna Whalen

Recruitment
Advertising Kathy Steinberg

Sales Promotion
Director Jack Edmonston
Market Research Kathryn V. Dinneen

CIRCULATION
Vice-President/
Circulation Margaret Phelan
Circulation Manager Barbara Jeannetti
Customer Service Rep Peggy Kelly
Assistant Maureen Burke

PRODUCTION
Manager Lee Vidmer
Supervisor Henry Fling
Assistant Manager Peter Holm
Typesetting Supervisor Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352. Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 Munchen 40, Tristramstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S.—\$18 a year; Canada and PUAS—\$28 a year; Europe and Middle East—\$50 a year; all other foreign—\$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/
Publisher Patrick J. McGovern
President W. Walter Boyd
VP-Marketing Roy Einreinhofer
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Holding Company Act Cited

Bank Sued for Alleged DP Tie-In

By Don Leavitt
CW Staff

CHICAGO — Statistical Tabulating Corp. (Stat-Tab), a Chicago-based DP service organization, has brought suit in federal district court here charging Northern Trust Co. with a violation of the Bank Holding Company Act.

Filed in late December, the suit seeks \$50,000 in damages, subject to trebling, based on an allegedly illegal tie-in requirement involving the sale of

cashier's checks and payroll processing. Stat-Tab charged that Northern, a bank holding company, refused to sell cashier's checks to customers for payroll purposes unless the customer's payroll was processed through the bank.

Northern had until last Thursday to respond to the complaint formally. Earlier in the week, however, a spokeswoman asserted that the bank's actions have been "proper and not in

violation of the prohibitions against tie-ins contained in the Bank Holding Company Act" as amended by Congress.

Payroll processing for Northern and its customers is done by the Midwestern subsidiary of Automatic Data Processing, Inc. (ADP) under terms of an agreement signed in late 1976. Northern receives a percentage of the revenues generated by this agreement, Stat-Tab claimed.

The Northern-ADP agreement itself is one of the subjects of another federal suit, filed 15 months ago, in which Stat-Tab charged ADP with attempting to obtain a monopoly in Chicago and other metropolitan areas.

Reminiscent of Late '60s

Stat-Tab's suit against Northern was reminiscent of actions in the late 1960s when a number of banks were challenged by independent service bureaus for offering DP services not directly related to their primary financial services.

The Bank Holding Company Act permitted creation of holding companies to provide management and services, including DP, for groups of banks. Since the holding company was not legally a bank it could offer DP services beyond those that were bank-related, according to the statute.

In 1970, Congress amended the Bank Holding Company Act so that a "one-bank" holding company was deemed legal, and such a holding company could offer DP services provided they met tests for need and didn't involve tie-in between DP and other service offerings.

Stat-Tab's antitrust suit against ADP — still pending and unlikely to reach trial this year, in the view of one observer — is "without merit," Richard Patterson, ADP's vice-president for finance, said last week, echoing comments carried earlier in the company's annual report.

High Court Refuses IBM; Greyhound to Get Retrial

WASHINGTON, D.C. — The antitrust case filed by Greyhound Computer Corp. against IBM will have another trial, despite IBM's objections to the U.S. Supreme Court on that ruling.

The high court recently denied IBM's motion to review the U.S. Ninth Circuit Court of Appeals' order for a new trial.

There is a procedure by which IBM

may petition the Supreme Court for a rehearing. However, an IBM spokesman said the firm has made no decision on whether to follow that route.

"We recognize that petitions to the Supreme Court are rarely granted, especially when a matter has not been fully adjudicated in all the lower courts," he said.

The original Greyhound antitrust trial was dismissed with a directed verdict in 1972, and the Ninth Circuit took five years to order a new trial, which it did in August 1977. IBM subsequently took the ruling to the Supreme Court [CW, Dec. 12].

In addition to the Greyhound antitrust case, IBM has several other trial engagements simmering. The California Computer Products, Inc. case was also dismissed with a directed verdict and is being appealed [CW, Sept. 5]. The Memorex Corp. case started last week and meantime, the case of U.S. vs. IBM trudges onward in Foley Square, New York.

IBM had argued in its brief to the Supreme Court that letting stand the Ninth Circuit's order would "intimidate vigorous competition on the merits," burden lower federal courts and harm defendants.

SCDP Sets Election

MEMPHIS, Tenn. — The Society of Certified Data Processors (SCDP) is conducting elections for its top officers and board of directors, and unless someone mounts a staggering write-in campaign, the following slate will be elected: G. Gary Casper, president; Thomas W. Briggs II, vice-president; Errol S. Pringle, secretary; and Frank Sellgren, treasurer.

Each is running unopposed for a two-year term.

Seven candidates are competing for six two-year terms on the board of directors. They are Lee Gruenfeld, Tom Kurihara, William P. LaPlant, Santiago Levy, Walter Seyffert, Elmer Swartzmeyer and Pat Watt.

Results will be announced by Feb. 1.

On the Inside This Week

NEWS

User 'Fires' Computer, Says Steff Works Faster . . . 5
HEW Widens Search for Student Loan Dodgers . . . 6
Search for Welfare Cheats Hits Private Sector . . . 7
French Reach Accord on DP and Freedom Act . . . 12
Program Error Writes Off SSNs for Tax Office . . . 14
Planners Warned Office Automation Not Easy . . . 16
Library Retrieval System Taps 80 Data Bases . . . 17

EDITORIAL

Editorial: Think, Mainframers . . . 20
Human Connection: Crooks Mix Skills, Craftiness . . . 21
Taylor Report: Confusion in Chase Marketing . . . 21

SOFTWARE & SERVICES

Package Helps Designer Visualize Ideas . . . 23
'Sara' Enhanced for Honeywell, IBM Sites . . . 24
Creativity Seen Vital, Even in Maintenance . . . 25
Data Dictionary Useful in Systems Analysis . . . 26
Text Work Runs on DP System . . . 28

COMMUNICATIONS

Nets Seen Key to Terminals' Success . . . 31
Courlar Enhances Family of Terminal Systems . . . 32
RJE Systems Undergoing Fast Evolution at GE . . . 33
Gandalf Adds Two Versions of PACX System . . . 38

SYSTEMS & PERIPHERALS

Dialogue With Users Key to OCR Switch . . . 39
Air Cooling Poses Problem For OCR Center . . . 41
OCR Paper Strictures Becoming More Flexible . . . 42
Users Briefed on OCR Paper Qualities . . . 44
On-Line Unit Handles Building Permit Boom . . . 45
Bank's File System Assesses Loan Risks . . . 46

MINIWORLD

Working Together, Counties Cut Costs . . . 51
Conference to Cover Trends . . . 52
Software Seen Problem for Small Businesses . . . 53
Firm 'Burns Up' Paperwork With Large Mini . . . 54
Small Systems Check Out at Inns' Front Desks . . . 55
Pertec Builds Systems on MITS/Altair Micro . . . 56

MICROCOMPUTING

Second User's Search Ends Differently . . . 57
Micropolis Systems Include S-100 Floppies . . . 58

COMPUTER INDUSTRY

Price/Performance Game Rules Change . . . 61
Input Sees '82 Service Revenues at \$14 Billion . . . 62
Kennedy to Keynote February CCIA Caucus . . . 63
Commerce Has Survey to Aid Marketing Abroad . . . 64
Mainframers to Gross \$15 Billion in '78: Probst . . . 65

For a quick look at ADR's newest on-line software products, read this:

The VS OnLine LIBRARIAN® Extended (VOLLIE™): ADR's latest on-line system, VOLLIE incorporates all the facilities of earlier systems and takes a quantum leap forward by providing many new and enhanced features, including: Online Library. Library interfaces. Utilities. Command procedures. Logging facility. Extended command language. Syntax checkers.

ROSCOE®: ADR's on-line program development system has been extended to include:

RTS, for problem solving in a time-sharing mode. COBOL/ADE, an interactive system for COBOL debugging. MINIBASIC, an implementation of the BASIC problem-solving language.

LOOK® has been extended with: New MVS extensions. TSO measurement facilities. Long-term measurement capabilities.

OnLine ETC™: ADR's Extended Text Compositor now operates interactively with new editorial features and a host of screen handling functions.

MetaCOBOL®: ADR's multi-purpose COBOL preprocessor has on-line ROSCOE facilities along with new structured programming and other facilities.

Automated System Charter™ has new ROSCOE prompting facilities to increase ease of use.



For a longer look, clip this:

Send information on:

- ☐ VS OnLine LIBRARIAN Extended. (VOLLIE)
☐ ROSCOE.

- ☐ LOOK.
☐ OnLine ETC.
☐ Corporate Presentation.

- ☐ MetaCOBOL.
☐ Automated System Charter.

Name/Title

Company

Address

City/State/Zip

Telephone

Computer Configuration



APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS™

Route 206 Center, Princeton, N.J. 08540, Phone: 609-924-9100

Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.

ADR software products: In use at over 8000 installations worldwide. U.S. offices in Atlanta (404) 252-9130, Boston (617) 245-9540, Chicago (312) 694-2244, Cleveland (216) 826-0190, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (609) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 281-2011. International offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.



Xerox, Amdahl Praised by Users

(Continued from Page 1)

responses represented 20% of the Ite base at the time of the survey and added that the firm, if ranked, would have placed first in three out of the 12 categories and tied for first place in three others.

But while the overall satisfaction categories give a quick snapshot of what users think of their equipment, there are a great many differences in the other 11 categories rated by users and an individual look at the equipment from each manufacturer quickly pinpoints their strengths and weaknesses.

For example, Burroughs won the software laurels with first place in compilers and assemblers and a tie for first place (with Xerox) in operating systems. In addition, the operating systems for DEC and Univac were also rated above average.

It is also interesting to note that the Xerox scores were pulled down considerably by the categories of maintenance and technical support, which are now handled by HIS since Xerox has left the mainframe business.

Here is a rundown by manufacturer in order of their finish in the overall survey. The rankings are based on the weighted average user ratings and there are many ties within the rankings. A full chart showing the user ratings by manufacturer and model is shown at the left.

In addition to overall satisfaction, Xerox was in the No. 1 position only in the area of operating systems and was tied for that place by Burroughs.

However, it was No. 2 in compilers and assemblers and tied for second place in ease of operation and reliability of mainframe. It also tied for third place in the "ease of programming" category.

Xerox tied for fourth place in reliability of peripherals, but its ranking fell off in the areas of responsiveness of maintenance and effectiveness of maintenance, where it was in a tie for sixth place.

It also tied for sixth place on technical support and applications programming and was in fifth place in regard to ease of conversion.

Amdahl Takes Two No. 1s

Amdahl's strengths were in the areas of ease of conversion, where it ranked No. 1, and in responsiveness of maintenance service, where it was also No. 1. In addition, the firm tied for top ranking in the categories of technical support and applications programs.

It captured second place in the area of effectiveness of maintenance service and tied for the No. 2 spot in the area of reliability of mainframe and reliability of peripherals.

The firm tied for the No. 4 rank on ease of operation, but tied for fifth place in the operating systems and the compilers and assemblers categories. It ranked No. 6 in ease of programming.

DEC placed well — No. 1 — in the ease of programming category and No. 2 in the ease of conversion and operating systems areas. Furthermore, it tied for second place in reliability of peripherals, but slipped to a sixth-place tie in the applications programs category and ranked fifth in the technical support area.

CDC ranked sixth in both the ease of operation and reliability of mainframe areas but tied for third place in the reliability of peripherals and responsiveness of maintenance service areas.

In the ease of programming category, CDC tied for sixth and in the ease of conversion category it was in the eight slot.

IBM ranked No. 1 in reliability of peripherals and came out No. 2 in technical support. It stood in third place in mainframe reliability and effectiveness of maintenance and tied for third in responsiveness of maintenance service and applications programming.

IBM tied for fourth in the categories of ease of (Continued on Page 5)

Manufacturer and Model	No. of User Replies	No. of Computers Represented	Weighted Average User Ratings											
			Ease of Operation	Reliability of Mainframe	Reliability of Peripherals	Responsiveness of Maintenance Service	Effectiveness of Maintenance Service	Technical Support	Operating Systems	Compilers and Assemblers	Applications Programs	Ease of Programming	Ease of Conversion	Overall Satisfaction
Amdahl 470V/6	7	7	3.3	3.6	3.0	3.8	3.4	3.0	3.0	3.0	3.0	2.8	3.7	3.4
Burroughs B 1700 Series	30	34	3.8	3.0	2.4	2.8	2.3	2.2	3.8	3.4	2.9	3.5	3.2	3.0
Burroughs B 2700 Series	21	22	3.8	3.2	2.4	2.7	2.6	2.1	3.9	3.5	2.4	3.5	3.2	3.2
Burroughs B 3500 Series	15	18	3.4	3.7	2.3	2.7	2.5	2.2	3.7	3.3	2.4	3.5	3.3	3.1
Burroughs B 3700 Series	19	22	3.7	3.2	2.4	2.6	2.1	2.2	3.7	3.7	2.6	3.6	2.9	2.9
Burroughs B 4700 Series	31	44	3.8	3.3	2.2	2.7	2.4	2.0	3.7	3.4	2.4	3.5	2.9	3.0
Burroughs B 5700 Series	3	4	4.0	2.3	2.3	2.3	1.7	1.3	4.0	3.3	2.7	3.3	2.7	2.7
Burroughs B 6700 Series	21	28	3.6	3.0	2.5	2.8	2.5	2.8	3.8	3.4	2.5	3.5	3.2	3.1
Burroughs B 7700 Series	2	2	4.0	3.5	2.5	3.0	3.0	3.0	4.0	4.0	3.5	4.0	4.0	4.0
Burroughs, others	4	4	3.5	3.8	2.5	3.3	3.3	2.5	3.7	3.5	1.0	3.3	3.0	3.0
BURROUGHS TOTALS	148	178	3.7	3.2	2.4	2.7	2.4	2.2	3.7	3.5	2.5	3.5	3.1	3.0
Control Data Cyber 70 & 170	5	6	3.8	3.2	2.8	3.8	3.3	2.6	2.8	3.2	3.0	3.2	3.0	3.8
Control Data 3000 Series	6	7	2.7	2.7	2.7	3.3	2.8	2.5	2.6	2.7	2.2	2.5	2.3	2.8
Control Data 6000 Series	10	11	3.0	3.0	2.7	3.0	3.0	2.7	3.1	3.2	2.8	2.8	2.7	3.1
Control Data 7600 Series	2	2	2.6	3.0	2.0	3.0	3.0	2.5	2.5	3.5	3.0	3.0	3.0	3.0
CONTROL DATA TOTALS	23	26	3.0	3.0	2.7	3.3	3.0	2.8	2.9	3.1	2.6	2.8	2.7	3.1
Digital Equip. DECsystem-10	22	23	3.6	3.3	2.9	3.1	3.1	2.4	3.5	3.2	2.4	3.8	3.4	3.3
Digital Equip. DECsystem-20	5	5	3.6	4.0	3.2	3.0	3.2	2.6	3.8	2.8	2.0	3.8	3.6	3.6
DIGITAL EQUIP. TOTALS	27	28	3.6	3.4	3.0	3.1	3.1	2.5	3.5	3.1	2.4	3.7	3.4	3.3
Honeywell Model 58	3	3	3.3	3.3	2.7	3.0	2.7	2.0	2.0	2.0	2.0	3.3	3.0	2.3
Honeywell Level 62	7	7	3.4	3.7	3.4	3.9	3.6	2.9	2.9	3.1	3.3	3.3	2.6	3.4
Honeywell Level 64	10	11	3.3	3.1	2.4	2.7	2.4	2.2	3.0	2.9	1.8	2.9	2.8	2.6
Honeywell Level 66	24	28	3.5	3.6	3.0	3.1	2.8	2.6	3.5	3.2	2.6	3.2	2.7	3.3
Honeywell Series 2000	29	30	3.1	3.1	3.0	2.8	2.7	2.3	2.9	2.9	2.5	3.0	2.8	2.9
Honeywell Series 6000	20	46	3.4	3.2	2.7	3.0	2.9	2.7	3.7	3.4	2.8	3.3	3.0	3.1
Honeywell Series 200	28	42	2.8	2.7	2.4	2.8	2.6	2.1	2.6	2.6	2.2	2.9	2.5	2.8
Honeywell Series 600	2	4	2.5	2.5	2.5	2.5	2.0	2.0	3.0	3.0	2.5	2.5	2.0	2.0
Honeywell G-400 Series	3	4	2.7	3.3	2.3	2.0	2.3	1.7	3.3	3.3	2.3	4.0	2.3	3.0
Honeywell, others	4	4	3.3	3.5	2.8	3.3	3.0	1.8	2.8	2.8	2.3	2.8	2.3	3.0
HONEYWELL TOTALS	130	179	3.2	3.2	2.7	2.9	2.7	2.4	3.0	3.0	2.9	3.1	2.7	2.9
IBM 360/20	5	5	3.2	3.4	3.2	3.4	3.4	3.0	3.4	3.4	2.8	3.2	3.2	3.4
IBM 360/30	59	64	3.1	3.4	3.1	3.3	3.1	2.7	3.0	3.1	2.9	3.1	2.9	3.1
IBM 360/40	60	65	3.2	3.4	3.0	3.1	2.9	2.8	3.0	3.0	2.7	2.9	2.8	3.1
IBM 360/44	3	3	2.7	3.0	3.0	3.3	2.7	2.5	3.0	3.0	2.0	3.0	2.0	3.5
IBM 360/50	53	55	3.1	2.8	2.9	3.0	2.9	2.6	2.9	3.0	2.6	2.9	2.8	2.8
IBM 360/65	46	51	3.3	3.2	2.8	3.2	2.9	2.9	3.3	3.2	2.6	3.0	2.9	3.1
IBM 360/67	5	8	3.0	2.6	3.5	3.4	3.6	2.8	2.8	2.8	1.5	3.0	2.5	3.0
IBM 360/75	2	2	2.5	3.5	2.0	4.0	3.5	2.0	3.0	3.5	3.5	3.0	2.5	3.0
IBM System/360, others	9	11	3.6	3.4	3.3	2.9	2.5	2.8	3.0	3.1	2.8	3.3	2.9	3.3
IBM System/360 Totals	242	262	3.2	3.2	3.0	3.2	3.0	2.7	3.0	3.1	2.7	3.0	2.8	3.0
IBM 370/115	36	37	3.4	3.7	3.4	3.4	3.2	2.8	2.8	3.0	2.7	3.4	2.7	3.1
IBM 370/125	51	55	3.2	3.7	3.5	3.3	3.3	3.0	2.9	3.1	2.9	3.0	3.0	3.2
IBM 370/135	118	259	3.2	3.7	3.3	3.3	3.2	3.0	2.9	3.1	2.8	3.0	2.8	3.1
IBM 370/138	59	61	3.2	3.7	3.2	3.2	3.1	3.0	2.9	3.1	2.8	3.0	3.0	3.1
IBM 370/145	181	199	3.3	3.5	3.2	3.3	3.2	3.0	2.9	3.1	2.7	2.9	2.8	3.1
IBM 370/148	49	49	3.2	3.6	3.3	3.4	3.3	3.1	2.9	3.1	2.7	3.0	2.9	3.1
IBM 370/155	56	72	3.3	3.5	3.1	3.3	3.2	2.8	2.9	3.1	2.7	2.9	2.7	3.1
IBM 370/158	224	266	3.3	3.6	3.3	3.4	3.2	3.0	3.1	3.1	2.8	3.0	2.8	3.2
IBM 370/165	15	20	3.3	3.4	2.9	3.1	3.1	2.9	2.9	3.3	2.9	3.2	3.0	3.1
IBM 370/168	67	103	3.2	3.3	3.2	3.4	3.1	3.1	3.0	3.2	2.8	3.0	2.8	3.1
IBM System/370, unspecified	8	9	3.3	3.8	3.4	3.8	3.4	3.4	2.6	2.8	3.1	3.1	2.6	3.4
IBM System/370 Totals	864	1130	3.3	3.6	3.3	3.3	3.2	3.0	3.0	3.1	2.8	3.0	2.8	3.1
IBM System/3 Model 6	5	5	3.6	3.8	3.6	3.6	3.8	3.4	3.2	3.4	3.3	3.4	3.5	3.4
IBM System/3 Model 8	10	11	3.3	3.8	3.6	3.2	3.2	2.9	3.3	3.2	2.7	3.2	2.8	3.5
IBM System/3 Model 10	31	32	3.4	3.7	3.4	3.5	3.4	2.9	3.4	3.4	2.7	3.4	2.9	3.3
IBM System/3 Model 12	21	22	3.7	4.0	3.5	3.4	3.5	3.0	3.2	3.2	3.0	3.5	3.5	3.4
IBM System/3 Model 15	43	45	3.4	3.7	3.4	3.4	3.4	3.0	3.1	3.2	2.8	3.3	3.1	3.2
IBM System/3, unspecified	9	10	3.4	3.7	3.4	3.2	3.0	2.7	3.2	3.1	2.4	3.4	2.8	3.1
IBM System/3 Totals	119	125	3.5	3.8	3.4	3.4	3.4	3.0	3.2	3.2	2.8	3.4	3.1	3.3
IBM System/32	36	93	3.6	3.8	3.6	3.6	3.5	3.1	3.3	3.2	2.7	3.3	3.1	3.3
IBM 1130	14	15	3.1	3.7	3.0	3.4	2.9	2.3	2.5	2.5	2.4	2.8	2.4	3.0
IBM 1401	8	8	2.9	2.9	2.3	2.9	2.4	2.7	3.0	3.7	4.0	2.3	1.6	2.6
IBM 1800	8	14	2.9	3.8	2.9	3.0	3.3	2.8	3.4	3.1	3.2	2.9	2.3	3.3
IBM TOTALS	1291	1647	3.3	3.5	3.2	3.3	3.2	2.9	3.0	3.1	2.8	3.0	2.8	3.1
Itel AS/4 end AS/5	2	2	4.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.0	3.0	—	3.5
NCR Century 50 & 100	7	8	3.1	2.4	2.6	3.4	2.7	2.1	2.9	2.6	2.5	2.9	2.7	2.7
NCR Century 101	19	24	3.4	3.8	2.8	3.3	2.9	2.2	3.2	3.1	2.9	3.3	3.3	3.2
NCR Century 151	6	8	3.2	3.2	2.7	3.2	2.7	2.7	3.0	3.0	2.4	3.0	3.2	3.0
NCR Century 200	8	8	2.7	3.2	2.5	3.0	3.0	1.3	2.3	2.5	1.8	3.2	3.0	2.8
NCR Century 201	13	14	3.3	3.8	3.1	3.4	2.6	2.2	3.5	3.3	3.4	3.4	3.4	3.2
NCR Century 251	6	7	3.3	3.5	3.0	3.8	3.3	2.7	3.0	3.0	2.3	3.0	3.0	2.8
NCR Century 300	5	8	3.3	3.0	2.4	2.8	2.6	2.2	2.8	2.6	3.0	2.8	2.2	2.8
NCR Century Totals	30	35	3.2	3.4	2.8	3.3	2.8	2.1	3.0	3.0	2.8	3.2	3.0	3.0
NCR 8500 Series	8	8	3.4	3.6	3.3	3.6	—	3.1	3.1	3.1	3.1	3.5	3.6	3.2
NCR TOTALS	70	75	3.3	3.4	2.8	3.3	2.9	2.3	3.1	3.0	2.8	3.2	3.2	3.1
Univac Series 70	19	26	3.2	3.4	2.8	3.2	3.2	2.7	3.3	3.2	2.7	3.1	2.8	3.1
Univac 9200	3	3	3.3	3.3	2.6	2.3	2.3	—	2.5	—	—	3.5	—	3.0
Univac 9300	4	4	3.3	3.5	2.8	3.5	3.5	3.3	3.0	2.5	3.0	3.3	3.0	3.3
Univac 9400 & 9480	9	9	3.1	3.1	2.9	3.2	2.7	2.3	3.1	3.0	2.1	3.0	2.9	2.8
Univac 9000 Series Totals	18	16	3.2	3.3	2.8	3.1	2.8	2.8	3.1	2.8	2.2	3.1	2.9	2.9
Univac 90/30	16	18	3.3	3.3	2.9	3.3	3.1	2.7	3.5	3.4	3.0	3.3	3.1	3.3
Univac 90/60, 90/70, 90/80	8	8	3.4	3.4	3.1	3.4	3.4	2.7	3.4	3.6	3.3	3.4	3.3	3.3
Univac Series 90 Totals	23	24	3.3	3.3	3.0	3.3	3.2	2.7	3.5	3.4	3.1	3.3	3.2	3.3
Univac 1100/10	1	1	3.0	3.0	3.0	4.0	3.0	—	3.0	3.0	2.0	3.0	3.0	3.0
Univac 1100/42	2	2	3.2	3.2	3.2	4.0	3.0	2.5	3.0	3.0	4.0	2.0	2.0	3.0
Univac 1106	6	8	3.7	3.2	3.5	3.0	2.8							

User 'Fires' Computer, Says Staff Works Faster

By Ann Dooley
CW Staff

CINCINNATI — Health Maintenance Plan, a group health organization here, canceled a computer's appointment permanently when it learned its employees could do the work five times faster than an automated appointments service.

The company bought the service from Meditech, Inc. in 1974 after deciding it needed a more efficient recordkeeping method, according to administrator Paul Beckman. It hoped automating its manual system would free its staff for other duties.

Instead, patients wanting to make an appointment were kept waiting as long as five minutes, and Health Main-

tenance had to add an extra staff member to deal with the waiting patients.

"We tried not to even mention it was a computer at fault because we felt it would turn some people off," Beckman said. "Mostly we just apologized a lot."

The problems with the system came to light recently when Health Maintenance published a review of its current, manual appointment-keeping system in its newsletter.

Almost everything was wrong with the DP system, Beckman said. "There were problems with both the hardware and the software, as well as the phone lines linking us to the computer" at Meditech in Riverdale, Md., he added.

The service was bought with the intention of expanding to a full medical

records system. Health Maintenance, a prepaid health plan, started out with the appointments system to handle its 19,000 members; after struggling with the system for nearly a year, however, it decided to scrap it, Beckman said.

When the system was in operation at Health Maintenance, a staff member would key in on a CRT the patient's name, the requested doctor and the amount of time needed for the appointment. Meditech's computer would verify if the person was a group-health member and then indicate an available time.

After the appointment was made, the system would record the patient's name, home telephone number, doctor and appointment time and date.

But the system never ran as smoothly

as it should have, Beckman claimed. Meditech used Digital Equipment Corp.'s PDP-15s past their capacity, he said.

In addition, response time depended on how many other customers were using the system at the same time, he contended.

The software itself was not designed to be too speedy, according to Beckman. The program was prewritten and didn't fit the organization's needs or way of operating exactly, he said.

The automated system took anywhere from three to five minutes to complete an appointment, but it only takes 30 seconds to a minute with the manual method, he said.

Attempts to reach Meditech were unsuccessful.

Users Applaud Xerox, Amdahl

(Continued from Page 4)

operation and compilers and assemblers, and it got a fifth-place tie for operating systems and ease of programming. The firm was rated seventh in ease of conversion.

NCR's best rating came in ease of conversion, where it was rated third and it also tied for third place in responsiveness of maintenance service, applications programming and ease of programming.

It is in the fourth spot for operating systems and tied for fourth in ease of operation, reliability of mainframes and reliability of peripherals categories. It dropped to a sixth place tie in effectiveness of maintenance service and was in seventh place on technical support.

Average Scorer

Univac scored about average in most categories, getting the No. 3 place for reliability of peripherals, technical support, operating systems and compilers and assemblers and tying for third in applications programs and ease of programming.

It took fourth place on responsiveness of maintenance service and tied for fourth in ease of operation and effectiveness of maintenance service.

Univac wound up in a fifth-place tie in the category of mainframe reliability and was in sixth place in the area of ease of operation.

Burroughs topped the chart in compilers and assemblers, tied for No. 1 in operating systems and tied for No. 2 in ease of operation.

However, this showing was offset by its ranking in maintenance, where it was No. 7 in responsiveness and No. 8 in effectiveness. Furthermore, it was No. 8 in technical support.

HIS, low man on the totem pole, received its highest grades for applications programs, where it ranked No. 2, and in reliability of peripherals, where it tied for third. In ease of programming, it was No. 4.

However, it did not fare as well in other areas such as ease of operation (fifth), reliability of mainframe (tied for fifth), responsiveness of maintenance service (tied for sixth), effectiveness of maintenance (seventh), technical support (a sixth-place tie) and in operating systems and compilers and assemblers, in both of which it tied for fifth.

When you install the
DYNAM
software team
it's like adding more
tape and disk drives!

YES - DYNAM/D AND DYNAM/T OPTIMIZE
THE USE OF PHYSICAL DEVICES RESULTING IN
THE OUTPUT OF ADDITIONAL DRIVES... BUT
AT A FRACTION OF THE COST!

DYNAM/D is the Computer Associates software system that provides automatic Disk Space and Catalog Management for IBM 360/370 users operating under both DOS and DOS/VS systems.

DYNAM/T is the Computer Associates automatic Tape Library Management software system that provides control of all tape files.

THE DYNAM TEAM MAXIMIZES
THE USE OF YOUR PHYSICAL
RESOURCES - AND PROVIDES
TOTAL FILE SECURITY.

DYNAM/D slashes disk space needs. It automatically allocates space for both permanent and temporary disk files on an "as needed" basis. It automatically releases unused disk space.

Other features include:

- Device independence.
- Automatic volume recognition with generic volume recognition.
- The Catalog Management facility allows the user to control

the physical attributes of disk files.

And - there is much more. Ask for the FREE General Information Kit!

With DYNAM/T, DP Managers now have available an advanced Tape Library Control system with complete file security and greatly simplified operational procedures.

MAIL THE COUPON OR
CALL COLLECT TODAY! **(212) 355-3333**

YES! Rush the FREE General Information Kits checked below. Also send details of no-obligation 15-day FREE trial.

☐ THE DYNAM TEAM ☐ CA-SORT

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone No. () _____

Computer Model _____ System _____

CALL COLLECT (212) 355-3333 655 MADISON AVE. NEW YORK, NY 10021

COMPUTER ASSOCIATES

U.S. Offices: California, Connecticut, District of Columbia, Georgia, Illinois, Missouri, New York, Ohio, Texas
Worldwide Offices: Argentina, Australia, Austria, Belgium, Brazil, Denmark, France, Germany, Holland, Italy, Japan, Switzerland, United Kingdom

- DYNAM/T makes certain the correct tape reel and version of the file is mounted - the only tape management system with multi-file, multi-volume recognition.

- Provides automatic volume recognition and early device release.

- It provides retention date control with a unique period-ending date facility.

Those are just a few of the unique DYNAM/T features. Send for the FREE General Information Kit for more details.

THE DYNAM TEAM IS FROM
THE CREATORS OF AWARD
WINNING CA-SORT, THE NO. 1
SORT SOFTWARE SYSTEM.

CA-SORT has earned an enviable position on the Datapro Honor Roll for three consecutive years. It was rated highest by users of sort software under OS, OS/VS, DOS, DOS/VS operating systems. More than 2300 users world-wide make CA-SORT the Number One choice of DP Managers.

\$416 Million Outstanding HEW Widens Search for Student Loan Dodgers

By Nancy French
CW Staff

WASHINGTON, D.C. — The Department of Health, Education and Welfare (HEW) has launched a drive to collect \$416.7 million in unpaid student loans by matching computerized payroll records of federal employees with those of delinquent students.

The government-wide project is an outgrowth of a trial matching of delinquent student records, maintained on magnetic tape by HEW, against the agency's own payroll files. The names of 316 HEW employees matched those of students who have defaulted on their loans, according to an agency spokesman.

Records are being matched by name, address, birthdate and Social Security number (SSN), according to Robert Wilson of the Inspector General's Office.

No Privacy Act Violation

The use of Civil Service Commission files in this manner is not a violation of the Privacy Act of 1974, according to Charles Ruff, also of the Inspector General's Office, who said the question was thoroughly researched before the project was undertaken.

As Ruff explained, the Inspector General has jurisdiction over all cases of fraud associated with HEW programs — of which the Federal Insured Student Loan Program is one — and has the authority to obtain files from any agency, such as the Civil Service Commission, that might be needed in investigations.

The matching projects are being run under an agreement between the Civil Service Commission and HEW that calls for the "strictest" regard for privacy and security procedures on the part of the HEW audit personnel who will be handling the information.

The student matches will be run in the next week or so on HEW's IBM 370/168 — the same system the agency

used to match federal employee records against those of individuals receiving Aid to Families with Dependent Children, (AFDC) [CW, Nov. 21].

Touches 2.8 Million People

The records of some 2.8 million federal civilian workers will be checked before the project is completed, Ruff said.

Under the Federal Insured Student Loan Program, a leg of the Guaranteed Student Loan Program, students obtain loans through banks and other lending institutions. They have up to 10 years to repay the debt after

graduating or leaving school.

Most repay, a spokeswoman said, but when a student defaults, the lender is reimbursed by the federal government and the government takes over responsibility for collecting the debt.

HEW Secretary Joseph A. Califano has named Leo I. Kornfeld director of the Student Finance Assistance Program within HEW's Office of Education, and it is through this office the collection program will be handled.

A former vice-president of Automatic Data Processing Corp., Kornfeld is expected to institute collection techniques used in private industry in the student loan default program. This

includes such measures as skip tracing and collection agencies, an HEW spokesman said.

After obtaining the raw computer matches, program administrators will send letters to each defaulter at his "federal" — business — address. The letters will instruct the defaulter to contact the nearest HEW regional office, and a payroll deduction plan will be offered to those who desire such a repayment arrangement.

"If that doesn't elicit a response, we'll probably contact them through personnel channels," the spokesman said, adding, "information will be extremely restricted" for the sake of privacy.

Law Gives Go-Ahead for File Matching

(Continued from Page 1)

With the passage of the Social Security Amendments Act, Califano announced that state welfare agencies will expand their efforts against cheating by matching welfare rolls and Social Security payroll records.

"A key element in the controversy that is brewing will be the safeguards the HEW secretary draws up and when they will go into effect," one congressional source said.

"None of the information contained in the SSA files has ever been used for this kind of thing before. The regulations restricting the use of this data are major issues," he added.

There is an additional problem with Section 411, "access to wage information," in the new law, other sources stated. Social Security has wage data as a result of the tax system, they noted.

Nowhere does the new law clarify what restrictions accompany data moving from the Internal Revenue Service (IRS) to the SSA, the sources said. The Tax Reform Act of 1976 contains "a much more elaborate" system for protecting this information than the Social Security law's direction

that the HEW secretary "establish such safeguards as are necessary," they added.

The act governing the IRS specifically calls for periodic audits by the General Accounting Office (GAO) of the protections given this data, the sources stated.

Effective in '79

Effective Oct. 1, 1979, state and local welfare agencies will have to use wage information from the SSA to determine AFDC eligibility and benefit levels, according to the new law.

Other than the section's opening clause, which states that "notwithstanding any other provision of the law," the HEW secretary will make this data available to the state and local agencies, there is no reference to the Privacy Act or the Tax Reform Act, another source said.

The new law could be used by HEW as a means of bypassing the Privacy Act when it comes to record-matching schemes to reduce fraud and abuse, he suggested.

When he announced "Project Match," Califano received criticism on

privacy grounds from Rep. Richardson Preyer (D-N.C.), chairman of the House Government Information and Individual Rights Subcommittee, and David F. Linowes, former chairman of the Privacy Protection Study Commission.

Under the Privacy Act, an agency must notify those individuals whose files they wish to use for other than "routine uses" — or those purposes for which the information was originally collected. Routine uses need only be published annually in the *Federal Register*.

Perhaps in reaction to criticisms that its anti-fraud campaign runs the risk of violating individual privacy rights, HEW published in the Jan. 6 *Federal Register* a new "routine use" for its Inspector General's system of records.

To facilitate Project Match, HEW stated in the register that records from the Inspector General's system "may be disclosed as a routine use to a federal, state or local agency maintaining pertinent records, if necessary to obtain a record relevant to a department decision concerning the hiring or retention of an employee, the issuance of a security clearance, the letting of a contract or the issuance of a license, grant or other benefit."

The new routine use for the Inspector General's records system will go into effect Feb. 5. Unless public comments persuade HEW to follow another course of action.

Security Precautions

HEW spelled out the security precautions it takes to ensure the privacy of the information it has collected from other agencies.

As soon as the data has been collected, all original source computer tapes are promptly returned to the source or destroyed, the article in the *Federal Register* stated.

The records collected by this process will be carefully validated to confirm that each individual identified is or has been in fact employed by the federal agency and at the same time is or was illegally in receipt of AFDC payments, HEW said in the routine use notice.

Anyone interested in sending comments to HEW about its new routine use should write to Acting Director, Fair Information Practices Staff, Department of Health, Education and Welfare, 200 Independence Ave., S.W., Washington, D.C. 20201.

The DELTA 4050 Display Terminal with proven Burroughs, Honeywell & Univac emulation



Performance proven around the world



USE THE DELTA 4050 FOR EXISTING AND NEW APPLICATIONS

When you need an emulating terminal, consider the DELTA 4050 — the terminal that offers true emulation for your existing software. Most so-called "emulating" terminals provide nothing more than communications capability. That limitation will work for some new applications, but what of current jobs? That's where the DELTA 4050 outshines them all: it gets right down to business without modifications. Think of the time you'll save, and the problems you'll avoid.

While you're at it, think about the operating features you'd like to have in your display terminal system. You'll find them in the DELTA 4050 which offers more features and advantages, is more economical and is easier to use than the computer manufacturers' or other companies' emulating terminals. Compare the DELTA 4050 with the others; we think you'll be quite pleased at what you see. Call us now for full details.



Delta
Data Systems
Corporation
DELTA DATA SYSTEMS
Corporation
Woodhaven Industrial Park
Cornwells Heights, PA 19020
Phone: (215) 639-9400
U.K. Subsidiary:
DELTA DATA SYSTEMS LTD.
Welwyn Garden 33833

Search for Welfare Cheats Hits Private Sector

By Jeffrey Beeler
CW Staff

LANSING, Mich. — A state government search of four nearby companies' payrolls has netted 6,000 possible cases of welfare fraud in what officials here are terming the biggest computer cross-checking operating of its sort ever undertaken in Michigan.

The search of Chrysler, General Motors, Ford Motor Co. and Detroit Edison Co. employee records represents the latest effort in a year-old campaign to catch welfare cheaters by computer-checking the Social Security numbers (SSN) and other identifiers of individuals on state relief.

The investigation has attracted attention for at least three reasons:

- It signals the spread of the state's welfare fraud search from the public to the private sector. All previous investigations of welfare cheating in Michigan have focused only on government employees.

- It marks a growing interest at both state and federal government levels in the use of computers for welfare fraud detection.

- It threatens to further intensify the national debate over the possible privacy risks posed by computer checks of SSNs.

Since Dec. 10, 1976, the Inspector General's Office of the Michigan Social Services Department (SSD) has conducted eight computer searches for possible welfare violators, a spokeswoman here said. Besides the records of the four private organizations, investigators have examined state income tax returns, the state government payroll and the employee records of U.S. Post Office and Internal Revenue Service employees in Detroit.

They have also cross-checked welfare records in Ohio and Illinois and investigated the Michigan Employment Security Commission's unemployment compensation files in Kent County, which includes Grand Rapids.

Cheaters Uncovered

Before the most recent series of cross-checks, the computer dragnet had yielded 4,391 investigations, 80% of which have already been finished, the spokeswoman said. Of the approximately 3,600 completed investigations, slightly more than 1,200 showed evidence of welfare fraud, with the remaining 2,397 suspects apparently innocent of any wrongdoing.

Warrants have been issued to most of the suspects from the earlier fraud investigations, and some of the cases have already been decided in court.

The computer checks have also prompted SSD officials here to shut off 372 public assistance grants and reduce 219 others, the spokeswoman added.

How many suspects from the latest series of cross-checks will prove guilty of welfare cheating will remain unknown until members of the Inspector General's Office complete their current investigation.

The state's procedure for hunting welfare cheats differed slightly in each of eight investigations. In most of the checks involving government agencies, investigators compared the payroll records of the target employer against a list of Michigan residents on state relief. They then listed as suspect any persons the computer cross-check

found on both sets of data.

In many but not all instances, the identifiers used in the computer matching were SSNs. Other identifiers included names, addresses and dates of birth, the spokeswoman explained. The matching of relief recipients and employees for most of the searches was performed on computer systems in one or another agency of the state government.

With the private companies, however, state investigators took a somewhat different approach in their checks. They transferred the SSNs of all state welfare recipients onto magnetic tape and set copies of the recorded data to each of the cooperating companies, which used their own computer systems to check for matches be-

	State Income Tax Records	State Payroll	Post Office Employment Records, Detroit	Illinois Aid to Depen- dent Child- ren Records	Ohio Aid To Depen- dent Child- ren Records	Employment Security Commission Records, Kent County	IRS Em- ployment Records, Detroit
Grants Closed	225	33	50	15	17	1	31
Grants Reduced	207	8	4	0	0	0	0
Cases of Fraud	845	113	131	15	17	27	55

To identify welfare cheaters, the state of Michigan cross-checked its relief rolls against seven sets of government records. The results of that cross-check and the disposition of the cases appear above.

tween the state's tapes and their own employee records.

Although the latest computer cross-check will probably uncover some instances of welfare fraud, the procedure

the state used to accomplish that feat profoundly troubles some officials, including Jeff Ostahowski, an aide to U.S. Rep. Dale Kildee (D-Mich.). Os-

(Continued on Page 8)

How do you know if your system is really doing the job?

We'll tell you. With PLAN IV and PLAN IV:MVS, program products for system management from Capex Corporation.

If you're operating an IBM OS, OS/VS, or MVS system, PLAN IV and PLAN IV:MVS will let you know where you've been, where you stand now, where you're going next. You'll get the information vital for making informed decisions quickly. In clearly understandable form. With as much depth and detail (or as little) as you demand.

Information For Decision Making

PLAN IV and PLAN IV:MVS provide the information needed for all levels of decision making. Whether you're concerned about turnaround and response time, balancing system resources and load, tuning system performance, scheduling, IPS tuning, or capacity planning, PLAN IV and PLAN IV:MVS provide the information you need. You get immediate access to key information, presented in a concise, highly readable

format, without smothering in extraneous detail. Yet when you need comprehensive information to support detailed analysis or problem solving, that too is available.

Proven Techniques

PLAN IV and PLAN IV:MVS apply proven management techniques to DP Management by Exception. Nobody likes to wade through stacks of reports. PLAN IV and PLAN IV:MVS pinpoint what you need to know first, what you need to know most. They automatically spotlight bottlenecks and significant changes. You identify problem areas quickly, get to work on them immediately. Information in Perspective. You can make immediate comparisons between shifts, with last month, last year, see where you're doing better... or doing worse.

Efficient, Effective, Proven

Both PLAN IV and PLAN IV:MVS utilize data from facilities already built into your system (SMF, RMF or MF/1)



capex
CORPORATION

to efficiently gather information about overall system operation. They bring information about past and present performance into focus, providing the perspective you need to manage your system now and plan intelligently for the future.

With PLAN IV and PLAN IV:MVS, you know where you stand. No wonder these tools are already in use at more than 150 sites throughout the world.

To arrange a demonstration contact us today.

Capex Corporation
2613 N. 3rd St. Phoenix, AZ 85004
Phone 602-264-7241 TWX 910-951-1594

Offices nationwide: Atlanta, Boston, Chicago, Dallas, Los Angeles, New York, Phoenix, Washington, D.C.
In Europe: contact CGS Products/London, Paris, Dusseldorf, Brussels, Rijswijk ZH

Capex Corporation Info Dept BT
2613 N. 3rd St., Phoenix, AZ 85004

☐ Please send me more information on PLAN IV and PLAN IV:MVS.
☐ Please contact me to arrange a demonstration.

Name

Title

Company

Address

City

State Zip

Phone

Model

System ☐ MFT ☐ MVT ☐ VS1
☐ SVS ☐ MVS

DG's PL/I Extends Language Choices for Eclipse

(Continued from Page 1)

through the Multiprocessor Communications Adapter. Using PL/I instead of Assembly language "reduced development time considerably, but still gave us programs that met our execution speed requirements," Geoghegan said.

The lab's document processor program performed margin adjustments and justification, automatic paging and line spacing. PL/I's "extensive string-handling capabilities and procedural organization made the programming much easier than it would have been in Basic or one of the Fortrans" available under DG's Advanced Operating System (AOS), the professor continued.

To test the number-crunching capabilities of the language package, Geoghegan converted production runs on economic data from Algol to PL/I. The conversion was easy, he said, and Algol applications which took about 15 minutes on the Eclipse before took only about five minutes in the new environment, "even with moderate competition from other users."

PL/I was originally developed by IBM in the early days of the 360 and stayed very nearly a proprietary language for some time.

Eventually many of the other mainframers implemented versions for their equipment, however, and in 1976 a specification of the language was approved by the American National Standards Institute (Ansi).

DG's PL/I is described as a "streamlined and slightly extended" subset of Ansi's 1976 specifications. In this packaging, the designers omitted high overhead items such as aggregate arithmetic, a spokesman said, but included such niceties as console I/O and the DO case statement out of Algol.

Three Optimization Levels

Running in interactive or batch mode on Eclipse S/130s, S/230s or C/330s under AOS, the compiler is said to

support interactive program development, English language diagnostics, three levels of optimization during compilation, shared runtime code and access to all operating system functions.

The optimization is a separate optional pass over intermediate output from an early stage of the compilation. It allows the user to choose the degree and type of tuning desired, if any, with each compilation, DG said.

The system can, for example, optimize on expressions and branches and this can help both space and speed, the spokesman said. At another level, the system will also clear out du-

plications of computations which can, he estimated, save 25% of the space used by some programs.

The third level of optimization, in which invariant computations are moved outside of loops, reportedly enhances the speed of the user's program. If all three levels are invoked at once, compilation time would typically be extended 10% to 15%, according to the spokesman.

The term "shared runtime code" as used by DG means the same as the more common phrase "reentrant code": a single copy of a program residing in memory can be accessed concurrently by multiple users.

With the 192K-byte memory required for AOS, an installation can support four to six or eight time-sharing users, especially if they are all working with the same reentrant program. The maximum Eclipse configuration — 512K bytes — could support 30 general users or perhaps 60 if the system is dedicated to a function, the spokesman said.

A user's first license for the AOS PL/I package — compiler and runtime libraries — will cost \$4,000. That fee includes installation support, training credit and one year of DG's Software Subscription service, DG said from Rt. 9, Westboro, Mass. 01581.

Fine-Toothed Comb Used in Jury Search

(Continued from Page 1)

business are "very complex" and therefore the project was unable to come up with a typical juror that might be favorable to Memorex.

'Most Difficult Case'

Benora, who has worked on jury selection for such well-known cases as the Attica prison trials and the Joan Little case, said in fact that this was "the most difficult" case she had worked on because people's attitudes and feelings toward business are so complex.

For example, the project found that in general, the people of the San Francisco Bay area were 54.4% pro-Big Business and 41.7% anti-Big Business. IBM, however, was viewed favorably by 69.9% of the people and unfavorably by 28.7%.

On the other hand, the survey found that the majority of the people at least "somewhat agreed" with the statement that the public interest would be served if very large companies were broken up into smaller companies (57.4%), and over 70% felt that very large corporations "do everything possible to eliminate competition."

The data was not only used to try to

develop a profile of a favorable juror but also served to acquaint the Memorex lawyers with prevailing opinions in the area and to help them plan their trial strategy.

While it was difficult to draw a profile of a favorable juror, Benora said the data did give them some pointers to the type of person they wanted. She admitted, however, that the selection process last week often came down to a "gut" feel for the person in spite of all the research.

Long Trial Expected

For one thing, Benora said the judge was very lenient in letting people excuse themselves from serving on the jury, because the trial is expected to last for up to 10 months.

Because of this, of the 160 people originally called, a pool of only 28 was left to choose from, with the rest excusing themselves because of the long duration of the case, she said.

Furthermore, the judge did not ask

the prospective jurors for much detailed information when he examined them, she said, giving her little to go on in deciding whether the juror would be favorable or unfavorable.

For its part, IBM had an outfit called the Federal Jury Service here prepare a special report on the backgrounds of all 900 people in the jury pool.

Normally, this service sells a book for \$150 to lawyers with public record information on the people in the pool, but IBM had the service update its records for jurors added to the pool after the last book had been published.

For \$675 extra, IBM received such information as voter registration, employment history, assessor's records on property ownership and assessed valuation and records of past jury duty for each of the 900 candidates.

After legal wrangling over access to such information, the service also provided its data to Memorex, which split the fee for the additional work with IBM.

Michigan Extends Matching

(Continued from Page 7)

Ostahowski argues that the state, which originally had total responsibility for the welfare fraud investigation, should have performed the cross-checking itself rather than delegate the job to a nongovernment organization.

"I don't believe a government agency should deliver what is in essence public information to a private concern," he asserted. "When that happens, the welfare recipients and employees involved are relegated to second-class citizens."

If computer crosschecking of the sort performed in Michigan and elsewhere is left unchecked, Ostahowski warned, the practice could "spread like wildfire" in just a few years. One possible outgrowth of such a development, he speculated, would be a gigantic computer system in which the Federal Bureau of Investigation or some other federal agency could store the serial number of every manufactured good costing more than a set amount.

Surveillance Possibility

Theoretically, such a data base "could be used to help authorities recover stolen goods," he explained. In practice, however, the same system could be subverted "to maintain a complete inventory of the personal property owned by every person in the country."

Ostahowski does not question the desirability of catching welfare cheats, and he admitted the use of private companies to help detect possible violators of relief laws might not constitute as serious a problem as he fears. But he urged authorities to "take a second look" at the concept of computer cross-checking, which he cautioned could have "astronomical implications" for civil liberties and personal privacy.

"In the end, I suspect the question of whether people's rights are being violated by these investigations will have to be decided by the courts," he predicted.

Federal Mandate

The state Inspector General's Office cites two federal regulations as the legal basis for its use of SSNs in cross-checking welfare records by computer, the spokeswoman here noted.

Regulation 20CFR205.50 empowers the states to use or disclose information about relief recipients when investigating possible welfare abuses.

Federal Regulation 250.11, meanwhile, mandates the states to create procedures for detecting and reporting to police suspected cases of welfare fraud. Failure to establish these procedures could result in a cutoff of federal subsidies to state social services programs.



DOS TO OS

COBOL
CONVERTER

JCL
CONVERTER

DOCUMENTATION
GENERATOR



\$10 PER COBOL PROGRAM

- I. FOCUS CONVERTS DOS COBOL SOURCE CODING TO OS
- II. FOCUS CONVERTS DOS JCL TO OS JCL
- III. FOCUS PRODUCES OPERATIONS DOCUMENTATION

EXPERIENCED, PROVEN, TESTED AND IMPLEMENTED

FULL SUPPORT ON SITE INSTALLATION AND BRIEFING SESSIONS

ELIMINATE COST OVER RUNS

ADDED EXPENSE OF MAINTAINING TWO OPERATING SYSTEMS

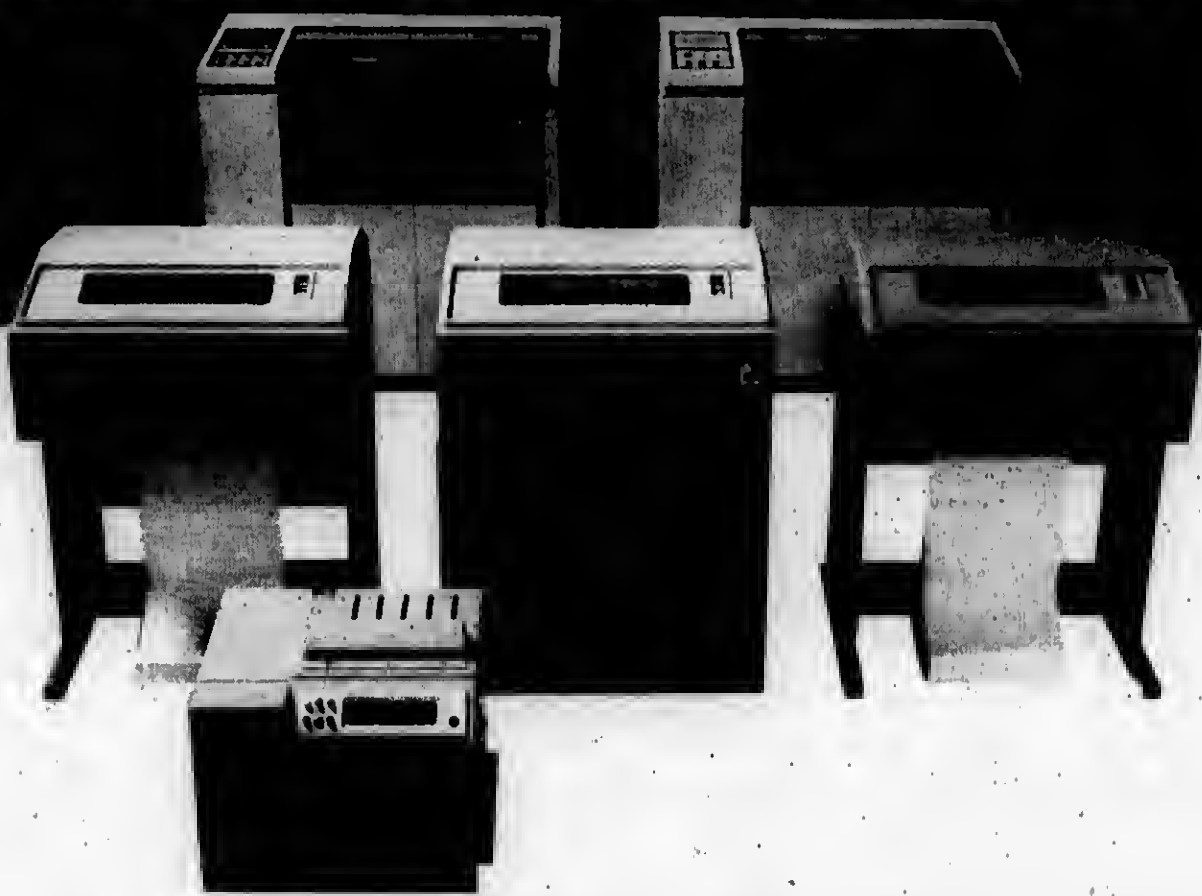
EXPENSIVE OUTSIDE SERVICES



24 MANOR HOUSE ROAD, NEWTON CENTRE, MA 02159

(617) 964-1894

HAVE WE GOT A LINE PRINTER FOR YOU.



**If you've got
a DEC, DG or
HP system.**

BDS sells Dataproducts printers far below the prices charged by the "mainframer" for the very same printer sold under their name. We interface to the mainframes of the big three and numerous others. Each of our printers comes complete with appropriate controller and cable; ready to plug in and start printing.

BDS carries a large inventory of new, not reconditioned, Dataproducts printer models. In fact, we are the world's largest supplier to the end user. Printers, and only printers, are our business. We deliver promptly and we provide service in more than 50 U.S. cities, coast to coast.

So if you want to buy one printer or, if you're a systems house, a "dozen" printers; contact BDS for attractive unit prices or quantity prices covering the complete line of Dataproducts printers.

Featured in the Dataproducts list of line printers sold under the BDS name.

- ☐ The 2200 Series—gives significantly low operating cost at 300, 600, and 900 LPM.
- ☐ The 2550 Charaband—sets a new standard in horizontal font printers at 1200-1500 LPM.
- ☐ The 2470 Heavy Duty Drum—offers real price performance advantage at 1500-1800 LPM.

If you're interested in saving 30 to 50% of printer costs fill out and mail the coupon.

**Yes, I want to save
30 to 50 % of printer costs.**

The computer system I use _____

My line printer requirements are _____

Name _____

Title _____

Company _____

Street _____

City _____ Zip _____

State _____

Telephone _____

BDS Computer Corporation, 1149 Chestnut St.
Menlo Park, CA 94025, (415) 326-2115

EDS

**BDS Computer Corporation, 1149 Chestnut Street
Menlo Park, CA 94025, (415) 326-2115**



FS 990/4



Authorized Distributors

ALABAMA

(205) 837-8700 Hall-Mark Electronics—P.O. Box 1133, Huntsville, AL 35801

ARIZONA

(602) 243-4101 Kieruff Electronics—4134 Eastwood Street, Phoenix, AZ 85040
(602) 958-6161 Marshall Industries—835 West 22nd Street, Tempe, AZ 85281
(602) 272-7144 R.V. Weatherford Co.—3311 West Earll, Phoenix, AZ 85017

CALIFORNIA

(714) 979-3000 Cramer/Los Angeles—17201 Daimler Street, Irvine, CA 92705
(714) 585-1881 Cramer/San Diego—6913 Complex Dr., Suite E, San Diego, CA 92123
(408) 739-3011 Cramer/San Francisco—720 Palomar Avenue, Sunnyvale, CA 94086
(213) 884-4560 JACO Electronics (West)—21201 Oxnard Street, Woodland Hills, CA 91364
(213) 885-5511 Kieruff Electronics—2585 Commerce Way, Los Angeles, CA 90040
(415) 958-9292 Kieruff Electronics—3969 East Bayshore Road, Palo Alto, CA 94303
(714) 278-2112 Kieruff Electronics—8797 Balboa Avenue, San Diego, CA 92123
(213) 999-5001 Marshall Industries—8015 Deering Avenue, Canoga Park, CA 91404
(714) 686-0141 Marshall Industries—9874 Telesar Avenue, El Monte, CA 91731
(714) 556-6400 Marshall Industries—17975 Sky Park Blvd., Irvine, CA 92707
(714) 278-6350 Marshall Industries—8057 Raytheon Road, San Diego, CA 92111
(408) 732-1100 Marshall Industries—788 Palomar Avenue, Sunnyvale, CA 94086
(805) 964-6823 RPS—350 South Kellogg Avenue, Goleta, CA 93017
(213) 748-1271 RPS—1501 South Hill Street, Los Angeles, CA 90015
(714) 292-5811 RPS—7587 Convoy Court, San Diego, CA 92111
(408) 732-5555 TI Supply Company—778 Palomar Avenue, Sunnyvale, CA 94086
(213) 973-2571 TI Supply Company—831 South Douglas Street, El Segundo, CA 90245
(213) 320-0880 Time Electronics—19210 Van Ness Avenue, Torrance, CA 90504
(415) 965-8000 Time Electronics—2629 Terminal Blvd., Mountain View, CA 94043
(714) 633-9633 R.V. Weatherford Co.—1550 Babbitt Avenue, Anaheim, CA 92805
(213) 849-3451 R.V. Weatherford Co.—8921 San Fernando Road, Glendale, CA 91201
(714) 823-1261 R.V. Weatherford Co.—1095 East Third Street, Pomona, CA 91766
(714) 278-7400 R.V. Weatherford Co.—7872 Raytheon Road, San Diego, CA 92111

COLORADO

(303) 758-2100 Cramer/Denver—5465 East Evans Place, Denver, CO 80222
(303) 371-6500 Kieruff Electronics—10890 East 47th Avenue, Denver, CO 80239
(303) 761-5432 R.V. Weatherford Co.—3905 South Mariposa Street, Englewood, CO 80110

CONNECTICUT

(203) 248-3801 Arrow Electronics—295 Treadwell Street, Hamden, CT 06514
(203) 239-5641 Cramer/Conn.—35 Dodge Avenue, North Haven, CT 06473
(203) 795-0714 Milgray Electronics—378 Boston Post Road, Orange, CT 06477

FLORIDA

(305) 776-7790 Arrow Electronics—1001 N.W. 62nd Street, Suite 402, Ft. Lauderdale, FL 33300
(305) 923-8181 Cramer/Hollywood—4035 North 29th Avenue, Hollywood, FL 33020
(305) 894-1511 Cramer/Orlando—345 North Graham Ave., P.O. Box 20214, Orlando, FL 32814
(813) 443-4514 Diplomat/Southland Inc.—2120 Calumet, Clearwater, FL 33515
(305) 971-9280 Hall-Mark Electronics—1302 West McNab Road, Ft. Lauderdale, FL 33310
(305) 855-4020 Hall-Mark Electronics—7233 Lake Ellenor Drive, Orlando, FL 32809
(305) 647-5747 Milgray Electronics—1850 Lee Road #104, Winter Park, FL 32789

GEORGIA

(404) 448-9050 Cramer/Atlanta—6456 Warren Drive, Norcross, GA 30071

ILLINOIS

(312) 583-8230 Cramer/Chicago—1911 South Busse Road, Mt. Prospect, IL 60056
(312) 638-4411 Newark Electronics—500 North Puleaski Road, Chicago, IL 60624
(312) 640-2964 TI Supply Company—515 West Algonquin Road, Arlington Heights, IL 60005

INDIANA

(317) 634-8202 Graham Electronics—133 South Pennsylvania Street, Indianapolis, IN 46204

IOWA

(319) 365-7551 Deeco Incorporated—2500 16th Avenue SW, Cedar Rapids, IA 52406

MARYLAND

(202) 737-1700 Arrow Electronics—4801 Benson Avenue, Baltimore, MD 21227
(301) 948-0110 Cramer/Washington—16021 Industrial Drive, Gaithersburg, MD 20760
(301) 459-2222 Milgray/Washington—9730 N. George Palmer Hwy., Lanham, MD 20801
(301) 461-2200 Technico Incorporated—9130 Red Branch Road, Columbia, MD 21209

MASSACHUSETTS

(617) 933-8130 Arrow Electronics—96D Commerce Way, Woburn, MA 01801
(617) 969-7700 Cramer/Newton—85 Wells Avenue, Newton, MA 02159
(617) 667-8331 Kieruff Electronics—13 Fortune Avenue, Billerica, MA 01821
(617) 890-0510 TI Supply Company—504 Totten Pond Road, Waltham, MA 02154

FS 990/4.

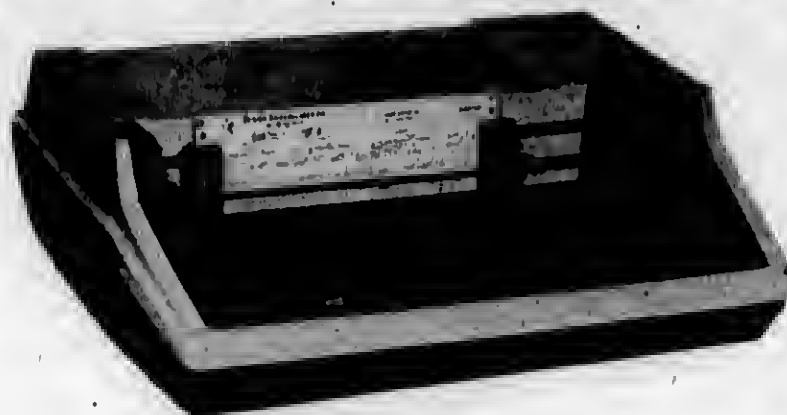
The microcomputer system you've wanted—at a price you've been waiting for.

TEXAS INSTRUMENTS.

Now you can have the high performance of the 990/4 microcomputer with the low-cost flexibility of a floppy disk, in an integrated, powerful FS 990/4 floppy-based system. It's all available at your local TI distributor.

A complete system.

The FS 990/4 is a cost-effective microcomputer package that starts for well under \$11,000.* It combines all the features and components you need to develop and execute a wide range of application programs... a 990/4 microcomputer equipped with 48K bytes of RAM, a floppy-disk ROM loader, CPU self-test feature and a full-function programmer panel. Plus a Model 911 video display terminal with detachable keyboard and added single-function keys, and a dual floppy-disk drive. All packaged in an attractive, contemporary single-bay desk. And for a surprisingly small additional investment you can



Optional low-cost TI Model 810 Printer.

add the convenience of TI's new Model 810 Multicopy Printer.

Even the software is off-the-shelf.

The FS 990/4 comes complete with an easy-to-use interactive development and maintenance software. Included is TX990, a real-time multitasking operating system with powerful floppy-disk file maintenance capabilities. You even get one full year of our software update subscription service.

Optional FORTRAN IV, too.

To simplify software development further, add TI's optional higher

level FORTRAN IV language. This comprehensive version of FORTRAN includes ISA extensions, making the FS 990/4 a performance standout among systems in this price range.

Get started now.

Delivery of the FS 990/4 microcomputer system is fast. In fact, many TI distributors offer it off-the-shelf.

- System hardware
- System software license
- User and programmer manuals
- Hardware installation

All available from your local TI distributor at one low price. Contact him today!

For information on the entire 990 Computer Family, including the FS 990/4 system, contact your nearest TI sales office or write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001. Or call Computer Marketing at (512) 258-7305.



*U.S. Domestic only
Copyright ©1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS
INCORPORATED

MICHIGAN

(313) 967-0600 Newark Electronics—20700 Hubbell Avenue, Detroit, MI 48237
(616) 241-6681 Newark Electronics—Box 1826, Grand Rapids, MI 49501

MINNESOTA

(612) 888-5522 Arrow Electronics—9700 Newton Avenue South, Bloomington, MN 55431
(612) 835-7811 Cramer/Minnesota—7275 Bush Lake Road, Edina, MN 55435

MISSOURI

(816) 221-2400 LCOMP-Kansas City, Inc.—2211 Riverfront Drive, Kansas City, MO 64120
(314) 291-6200 LCOMP-St. Louis, Inc.—2550 Harley Drive, Maryland Heights, MO 63043

NEW JERSEY

(809) 235-1900 Arrow Electronics—Pleasant Valley Avenue, Moorestown, NJ 08057
(201) 797-5800 Arrow Electronics—285 Midland Avenue, Saddlebrook, NJ 07662
(809) 424-5993 Cramer/Pennsylvania—12 Springdale Road, Cherry Hill, NJ 08034
(201) 935-5800 Cramer/New Jersey—1 Cardinal Drive, Little Falls, NJ 07424
(809) 964-8580 General Radio Supply Co.—600 Penn Street at Bridge Plaza, Camden, NJ 08102
(201) 935-2120 Kieruff Electronics—5 Industrial Drive, Rutherford, NJ 07070
(809) 424-1300 Milgray/Delaware Valley—1185 Markess Road, Cherry Hill, NJ 08034
(201) 382-6400 TI Supply Company—301 Central Avenue, Clark, NJ 07066

NEW MEXICO

(505) 243-4566 Cramer/New Mexico—2460 Alamo S.E., Albuquerque, NM 87106

NEW YORK

(516) 894-6900 Arrow Electronics—900 Broad Hollow Road, Farmingdale, NY 11735
(914) 898-7530 Arrow Electronics—Old Route 9, Fishkill, NY 12524
(516) 231-5800 Cramer/Long Island—29 Oser Avenue, Hauppauge, NY 11787
(716) 275-0300 Cramer/Rochester—3000 South Winton Road, Rochester, NY 14623
(315) 437-6671 Cramer/Syracuse—6716 Joy Road, East Syracuse, NY 13057
(516) 548-6000 Milgray Electronics—191 Hanse Avenue, Freeport, NY 11520
(716) 454-7800 Rochester Radio Supply Co.—140 West Main Street, Rochester, NY 14603
(516) 273-5500 JACO Electronics (East)—145 Oser Avenue, Hauppauge, NY 11787
(607) 754-1570 Wilehira Electronics—10 Hooper Road, Endwell, NY 13760

NORTH CAROLINA

(919) 725-6711 Cramer/Winston-Salem—938 Burke Street, Winston-Salem, NC 27102
(919) 832-4465 Halt-Merk Electronics—3000 Industrial Drive, Raleigh, NC 27609

OHIO

(216) 464-2000 Arrow Electronics—23500 Mercantile Road, Cleveland, OH 44122
(513) 253-9176 Arrow Electronics—3100 Plainfield Road, Kettering, OH 45432
(216) 248-8400 Cramer/Cleveland—5835 Harper Road, Cleveland, OH 44139
(513) 226-1133 ESCO Electronics—221 Crane Street, Dayton, OH 45403

OKLAHOMA

(918) 582-6272 TI Supply Company—P.O. Box Drawer "T", 12151 E. Skelly Drive, Tulsa, OK 74128

OREGON

(503) 292-3534 Almac/Strom Electronics—4475 SW Scholls Ferry Rd., P.O. Box 25444, Portland, OR 97225

TEXAS

(713) 652-4700 Harrison Equipment Co.—1616 McGowen, Houston, TX 77004
(713) 776-6511 TI Supply Company—8600 Commerce Park, Houston, TX
(214) 238-6830 TI Supply Company—6000 Denton Drive, Dallas, TX 75235
(713) 688-7406 R.V. Weatherford—3500 West T.C. Jester Blvd., Houston, TX 77016

UTAH

(801) 486-3371 Standard Supply Co.—3424 South Main, P.O. 151250, Salt Lake City, UT 84115

WASHINGTON

(206) 763-2300 Almac/Strom Electronics—5811 Sixth Avenue South, Seattle, WA 98108
(206) 575-0907 Cramer/Seattle—1059 Andover Park East, Tukwila, WA 98188
(206) 575-4420 Kieruff Electronics—1005 Andover Park East, Seattle, WA 98188

WISCONSIN

(414) 764-6600 Arrow Electronics—434 West Rawson Avenue, Oak Creek, WI 53154

Commission Makeup Resolved

French Reach Accord on DP and Freedom Act

Special to CW
PARIS — In an adjournment eve compromise, both houses of the French parliament approved the Data Processing and Freedom Act [CW, Dec. 12], sending it to President Giscard d'Estaing, whose signature is assured. The national assembly voted a re-

vised text on Dec. 16 and the remaining differences with the senate were ironed out to allow final action on Dec. 22.

As in most compromises, neither the government, Socialists nor the business community got all they were seeking, but each got something.

A little-debated change in the final measure defines personal information as applying to physical persons only, whereas the original version included legal or corporate persons as well. If businesses had access to records pertaining to them held by other businesses, it was felt that

proprietary data might be compromised and the government could monitor private enterprises more closely.

The principal dispute was the size and composition of the National Commission on Data Processing and Freedom, which will be established under the law. The government wanted a 12-member body, essentially composed of present or former judicial officials who, in France, are part of the executive department. The Socialists sought a more independent commission to be nominated by parliament according to the special qualifications of individuals. The senate generally accepted this view.

As a compromise, the government will have its judicial appointments, but the commission will number 17 members and include two deputies in the assembly, two senators and two members qualified in data processing.

The law applies principally to automated records, and most of the provisions of the initial legislation stand although the procedure for organizations to declare their systems of personal records has been somewhat simplified. "Nonautomated data banks," according to the law, or simply manual files, may be brought under its provisions according to the following

conditions:

- When the information is obtained by fraudulent means.
- When people are not informed of the mandatory or voluntary nature of the collection procedure and other rights of individuals.

- When the organization maintaining personal information fails to have sufficient security protections.

- When organizations register information on the political, religious or trade union membership of individuals.

Specifically excluded from the definition of manual files are personal address books.

Data Obsolescence

Purging old or obsolescent personal information is another key feature of the French law, which takes its lead here from the Germans, who incorporated this idea in their federal data protection law last year. However, instead of placing a maximum age on active files as the Germans did, the French will require all private organizations to specify how long the data will be kept in their declaration requesting permission to maintain personal data system.

Lest anyone take this stipulation lightly, the penalties for violating the law are fines ranging from \$400 to \$400,000 and imprisonment from six months to five years.

EEC Arm Seeking Privacy Views

By G. Russel Pipe

Special to CW

BRUSSELS — A subcommittee of the European Parliament is seeking public views on how best to protect individual citizens in member countries from abuses that result from computerized recordkeeping and data banks in both the public and private sectors.

The parliament's subcommittee on data processing and the rights of the individual will hear expert testimony on Feb. 6 as part of its role in recommending uniform action that could be taken by the nine countries that make up the European Economic Community (EEC).

The role of the parliament in this issue is to recommend action to the European Commission, which itself has formed a working group to consider the need for an international agreement or convention that would harmonize or make reciprocal the various national laws. The working group of the commission is approaching the issue from a legal and technical position, whereas the parliamentary unit is seeking broader public and political assessment of legislative solutions.

Experts Being Questioned

A questionnaire has been circulated to a number of experts in Europe as well as the U.S.

The information requested is designed to:

- Determine the principal differences in the approach to legislation on data protection in the European Community, Sweden and the U.S.

- Identify particular difficulties the various forms of legislation may cause industry and individuals.

- Find out if the absence of international legal provisions has already caused difficulties in the application of national privacy legislation.

- Distinguish the scope of "the public sector," seek comments on differences in approach which may be accorded the private sector and learn whether legislation may distort competition.

- Obtain opinions on whether the general principles of fair personal information practice are acceptable and necessary, particularly if adopted at an international level.

- Learn whether the transmission of personal data across national frontiers involves any particular risks.

As for transborder data flows, the questionnaire results may shed new light on whether a binding EEC directive is "urgently required," or whether a directive might obstruct the conclusion of a convention with countries of the Council of Europe and the Organization for Economic Cooperation and Development (OECD).

It might also help determine whether an official body is needed to monitor data protection in the community and what additional costs to data processors would result.

Debates in the parliament since 1974 show wide support for international action in adopting minimum standards for data protection, reducing "unfair competition" in relation to cross border data flows and establishing monitoring systems in those areas where national provisions are not fully effective.

Some also believe that if no unifying action is taken, data havens could be created within or outside the community hampering the Common Market through distortions of competition or obstacles to trade.

PROFESSIONALS WANTED

Our rapid success in implementing Data Terminal Management Programs at Fortune 500 companies necessitates additional personnel in our Boston, New York/New Jersey, Philadelphia and Washington offices.

Eighty percent of our business is generated from our existing customer base and we need Area Managers, Account Managers, Sales Persons and Electronic Technicians. Qualified Computer Professionals are invited to join in our success — We double revenues every other year, and earn 10%+ profits. Contact Eric S. Taylor, Personnel Manager.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300
AN EQUAL OPPORTUNITY EMPLOYER M/F

FOR LEASE ONLY

3033

DELIVERY SEPTEMBER 22, 1978

3031

DELIVERY SEPTEMBER 22, 1978

370/148

2 or 3 YEAR LEASE AVAILABLE

CALL RAY HOMA



COMPUTER EXCHANGE/
NORTH AMERICAN CORPORATION

302 Technology Park • Norcross, GA 30092 • (404) 449-4400

Viewdata Conferences

Birmingham, February 14
Zurich, March 2

Two public conferences on Viewdata and its implications for business.

Viewdata is a service created by the British Post Office. It links the ordinary telephone in the office or home to a TV receiver, to provide a revolutionary new medium for selling services and providing information to the public. The information is sent by computer over the telephone line and displayed on the TV screen.

Already the Deutsche Bundespost has bought the rights to use Viewdata (Bildschirmtext). Viewdata may become a European — or world — standard for public information services.

No business can afford to ignore Viewdata, probably the most important development in public communications since TV itself.

The conferences will be addressed by the Post Office top management team responsible for Viewdata, by information providers and by suppliers of Viewdata receivers. The speakers will use Viewdata to illustrate their talks.

Details from: Butler Cox & Partners Ltd
The International Press Centre
76 Shoe Lane, London EC4

England

Telephone 01-353 1138

Telex 885838



Butler Cox & Partners Limited

Get Smart.

ADDS *Regent* · Smart for the price of Dumb.



Time was, if a man bought a Dumb terminal, he was considered pretty smart. Times change.

ADDS Regent family of Smart terminals is making Dumb look dumb.

For under \$1000* our Regent 100 has features no smart man can resist.

You get cursor controls for operational simplicity and extensive remote commands that make it easy to control the Regent from the computer. Optional function keys customize Regent to your specific application.

You get a Status Line that provides current information on the terminal's operating status. And, you get visual highlights such as blinking, zero intensity, half intensity, underline and reverse video.

You also get self diagnostics.

In other words, you get Smart. Or Smarter: Our Regent 200 has everything our 100 has plus buffered transmission, auxiliary port and editing options.

You can't get a whole lot more.

Get Smart. Get ADDS.

Quality, Reliability and Integrity. It all adds up to ADDS.

*In moderate OEM quantity.

ADDS Applied Digital
Data Systems Inc.
100 Marcus Blvd., Hauppauge,
New York 11787 516-231-5400
Dept. 250

Name _____

Firm _____ Title _____

Address _____

City _____ State _____

Phone _____

But Solution on the Way

Program Error Writes Off SSNs for Tax Office

By Molly Upton
CW Staff

CHICAGO — Although Social Security numbers (SSN) may be a curse to many people, they are a blessing to taxation departments.

And the Pennsylvania Personal Income Tax Bureau, faced with processing 5.2 million returns whose address labels do not contain the taxpayers' SSNs, may be about to discover just how much of a

boon the preprinted numbers are.

Normally, tax return forms are mailed with a return address label that contains the taxpayer's SSN. The taxpayer affixes the label to his return and the state tax department then enters the number as one of the first steps in processing the return.

In Pennsylvania, however, R.R. Donnelley & Sons Co. prepared a program to prompt

its IBM 370/145 to generate printed labels from a tape sent by the state taxation department. However, the program neglected to require printing of the first line of data, which contained the SSN.

The process of manually going through 5.2 million forms and ferreting out the SSN from attached forms, such as W-2s, is time-consuming at best.

But what a programming error hath wrought, another

program can set right. At least, that's what Donnelley has indicated to the Personal Income Tax bureau.

Using a match code program requiring entry of 21 keystrokes as opposed to 11 on the SSN, 99% accuracy can be obtained in retrieving the correct SSN, according to a Donnelley spokesman.

Donnelley has, in fact, performed a run and isolated the approximately 50,000 cases in which duplications occur in

the match code procedure, he said.

The firm will give the state a list of these persons, and other identifying information on them so the state can differentiate between the duplicates.

If duplicates still remain after running the match code program, the bureau expects it will manually retrieve the SSN from various forms attached to the return, according to David J. Davies, director of the Personal Income Tax Bureau.

The Bureau plans to run two sorts on tax receipts: those with an SSN entered by the taxpayer and those without an SSN, he added.

The bureau anticipates needing some ancillary manual help and relatively few additional keypunch people, Davies said. He plans to run overtime in order to keep up with the bureau's past processing rates.

Donnelley has admitted the error and not only devised the match code program, but also agreed to pay the expenses necessitated by the error, Davies said.

NAME and ADDRESS CAPTURE TYPE/SCAN

025 Per Name

DATA-MIDWEST (A Division of DATA SYSTEMS INC.)
3050 Metro Drive, Minneapolis, Minn. 55420 612-854-1800

Short or Long Term Leases From

RANDOLPH

370

370

370

370

...and all other 370's from 135 to 168's. CPU's or full systems. Up to 8-year lease available.

CALL THE 370 HOTLINE

800-243-5331

WANTED:

3420 Tapes: MOD 3's, 5's, 7's
135/145 Subleases or purchases

800-243-5331

Randolph Computer Company
537 Stearns Rd., Greenville, SC
(303) 891-3001

Computer May Be Midwife At Contraceptive's Creation

By Ann Dooley
CW Staff

CHICAGO — Researchers are "impregnating" a computer with fertility facts and folklore in hopes of giving birth to a new kind of contraceptive.

Data from scientific journals and folklore from all over the world are being studied by scientists at the University of Illinois Medical Center here to find new fertility regulating agents in plants.

Scientists believe primitive people limited population growth by using plant extracts; even today, at least 25% of all prescriptions contain principles extracted from plants, according to Dr. Norman Farnsworth, head of the university's Department of Pharmacognosy and Pharmacology.

Plants Ranked

Using an IBM 370/168, the researchers enter information on more than 5,000 plants that have been determined useful for the project. The characteristics of each plant are weighted in importance and the computer is programmed to deliver a ranked order for the plants according to their likelihood for regulating fertility.

"Folklore information is never-ending," Farnsworth said, and is especially difficult to analyze because it is often vague or ambiguous.

The information is periodically reanalyzed and updated, he said. Those plants that rate highest usually are mentioned in folklore as well as used in studies on animals or by humans, Farnsworth added.

Weighting System

Some of the factors included in the weighting system are adverse side effects in humans or animals, whether the plant is poisonous, its scientific name, the part of the plant used and the length of time used. Several hundred variables were entered into the sys-

tem, according to Farnsworth. Extensive crosschecking for accuracy and duplication occurs before and after the data is entered into the computer, he noted.

Once researchers have analyzed the computerized plant list, they will select a limited number of plants for further study.

The researcher's goal is to discover an alternative to current contraceptives, such as a safe morning-after pill, male contraceptive or a contraceptive to be used before intercourse or after missing one menstrual period.

Since a new kind of contraceptive is the object of the search, the computer has been programmed to exclude any plant that would act similarly to the present birth control pill.

The project, which was conceived by the World Health Organization, is also funding centers in London, Brazil, Hong Kong, South Korea and Ceylon where the selected plants will be tested.

Calendar

Feb. 27-March 1, Cherry Hill, N.J. — Data Entry Management and Supervision Seminar, sponsored by Management Information Corp. Contact: Management Information Corp., 140 Barclay Center, Cherry Hill, N.J. 08034.

Feb. 27-March 1, Philadelphia — 1978 Business and Personal Computer Sale & Exposition. Contact: George Pachter, Produx 2000, Roosevelt Blvd., Mascher St., Philadelphia, Pa. 19120.

Feb. 27-March 2, San Francisco — Compcon 78, Computer Technology: Status, Limits, Alternatives. Contact: Institute of Electrical and Electronics Engineers, P.O. Box 639, Silver Spring, Md. 20901.

Call for Papers

CONVENTION INFORMATIQUE 78, Palais des Congrès, Porte Maillot, Sept. 18-22, 1978.

The theme of the convention is "The Integration of Data Processing into Organizations and Companies." Questions will include "What are the problems of the integration of data processing into organizations and companies?" and "What parameters can be taken into account in the designing of information systems which will be used in different phases of future project?" Paper topics include new technologies, user groups, tools, techniques and services.

Four copies of an abstract of at least 500 words, in English or French, should be sent by Feb. 15 to Convention Informatique, Secretariat, 8, Place de Valois, 75001 Paris, France.

THIRD INTERNATIONAL SYMPOSIUM ON ULTRASONIC IMAGING AND TISSUE CHARACTERIZATION, National Bureau of Standards, Gaithersburg, Md., June 5-7, 1978.

Focus will be on the state of the art, new directions of technology and research opportunities in the noninvasive characterization of the ultrasonic properties of tissue. Topics include techniques for measurement of ultrasonic parameters, computerized tomography, signal processing and pattern recognition, microscopy and standards and calibration methods.

An 800-word abstract should be sent by March 1 to Dr. Marvin Linzer, Materials Building, Room A329, National Bureau of Standards, Washington, D.C. 20234.

1978 INTERNATIONAL CONFERENCE ON PARALLEL PROCESSING, Ballaig, Mich., Aug. 22-25, 1978.

Papers are requested describing recent advances in all aspects of parallel/distributed processing. Topics include processor-memory interconnections, reliability and diagnostics, performance measurements, languages and application studies.

Both regular and short papers will be accepted. For a regular paper, submit a 100-word abstract and a 1,000-word summary (submission of the full text in lieu of the summary is encouraged); for the short paper, submit four copies of a 100-word abstract and a 300- to 500-word summary. Send before March 15 to Prof. G.J. Lipovski, Department of Electrical Engineering, University of Texas, Austin, Texas 78712.

FIRST INTERNATIONAL SYMPOSIUM ON ULTRASONIC MATERIALS CHARACTERIZATION, National Bureau of Standards, Gaithersburg, Md., June 7-9, 1978.

This will be the first meeting devoted exclusively to fundamental measurement methods that offer potential for the practical assessment of material performance. Topics include ultrasonic methods for determination and verification of material properties by measurements such as velocity, attenuation, absorption and scattering; and new ultrasonic instrumentation, transducer developments and approaches to standards for calibration. Theoretical and experimental papers are requested.

A 300-word summary should be sent by March 15 to Harold Berger, Materials Building, Room A363, National Bureau of Standards, Washington, D.C. 20234.

IBM USERS:

GIVE YOUR NETWORK SIMULTANEOUS

PIX-II is the industry's only virtual data link. Virtual means PIX-II performs all of the functions of an SDLC network, but with none of the actual hardware and software required by IBM.

By removing the complexities between your host CPU's byte multiplexer channel and the remote devices it communicates with, PIX-II makes those devices appear to the CPU to be in local mode. And PIX-II works with every model in the IBM System/360, System/370 and the new 3031/32/33 family.

That's why you can perform functions with PIX-II that you could never obtain with other equipment. What functions? Take a look.
☐ *First*, you can set up an SDLC-based communications network virtually overnight (some users have done it in four hours) without BTAM, TCAM, or VTAM. Without NCP front-end software—you don't need a front-end. And with very minor planning or resource commitment, just attach a small PIX-II local controller to your CPU byte MPX channel, and a PIX-II remote controller at each remote site. The result: a total data network that operates at up to 56KB on telephone, microwave or satellite links. ☐ *Second*, you can populate any remote site with any array of peripheral or terminal

3270s, MAG TAPE, PRINTERS, AND HASP OR JES WORK STATIONS UNDER SDLC WITHOUT VTAM OR NCP.

Magnetic tape drives. Console controllers, like I052s, HASP, JES1, JES2 or JES3 work stations. Each at speeds ranging from slow to fast. All operating simultaneously on the same high-speed virtual data link. Without remote teleprocessing software. ☐ *Fourth*, you can use PIX-II regardless of the IBM processor model or software system you use. It works flawlessly under

Tell me more about PIX-II. My immediate network requirement is:

☐ To consolidate _____ data centers currently using _____ hardware and software.

☐ To build quickly a 3277-type network of _____ devices linked to a _____ host CPU.

☐ To run remote peripherals in a clustered environment that includes _____ devices.

☐ To implement an error-free, low-cost satellite link between my _____ CPU and _____ devices.

☐ To create a CPU-to-CPU link without ACF right now.

☐ Other: _____

Name: _____

Title: _____

Company: _____

Street: _____

City: _____ State: _____ ZIP: _____

Telephone: _____

The Secret of PIX-II Is What It Can Do

PIX-II simplifies every data network by eliminating network complexity between the CPU's byte MPX channel and its remote devices. Thus, every device operates in a local mode. This flexibility lets PIX-II perform all of the following functions:

- Eliminate 270X or 370X front-end hardware
- Eliminate Remote VTAM and NCP software totally
- Eliminate Remote TCAM and BTAM in bisynch networks
- Convert 3270 systems to full local mode operation (interrupt driven)
- Duplicate I052, 3215, 3210 console functions
- Replace 3780 functions with full-duplex SDLC
- Implement SDLC without VTAM/NCP
- Duplicate HASP work station without RTAM
- Duplicate JES work stations without RTAM
- Implement CPU-to-CPU link without ACF
- Eliminates remote site software needed with teleprocessing systems such as IMS, CICS, TSO, SWIFT, ENVIRON/I, WESTI, ROSCOE and others
- Operates under all IBM operating systems
- Operates under all IBM spooling systems
- Operates under most non-IBM OS/spoolers
- Implement remote tape drives as local systems tapes
- Implement various device types all operating full-duplex simultaneously

devices—up to 25 per remote PIX-II controller—and send and receive simultaneously to all devices over full-duplex lines. Without polling. Without interruption for ACKs and NACKs. As if every device were attached directly to the MPX channel. ☐ *Third*, when we say an array of devices, we mean just that. 3272, 3274, 3276, 3277 and 3278 data entry controllers and devices. Card readers/punches. Printers.

DOS, DOS/VS, OS/MFT, OS/MVT, OS/VSI, VS/2(SVS), VS/2(MVS) or other IBM-compatible operating systems. It also operates under all IBM spooling systems—POWER, HASP, JES and non-IBM spoolers. ☐ *Fifth*, you can save enormous sums of money in your data communications network in five ways. *One*: by eliminating front-end and remote site hardware (PIX-II local and remote controllers are almost always less than the hardware they replace). *Two*: by eliminating all NCP and device control software development (which can run into hundreds of thousands of dollars in staff resources over long periods of time). *Three*: by direct hardware cost reductions; PIX-II is so powerful you can consolidate many small data centers into one manageable remote batch network. *Four*: by reducing line charges by 50% or more; PIX-II's full-duplex, data compression and SDLC capabilities allow high-speed two-way data paths that are much more efficient than those you now use. And *Five*: by minimizing future redesigns as new data links are needed; PIX-II lets you grow when and where you want, with the devices you want, within a single expandable virtual data link family.

Nearly 200 IBM users have already discovered PIX. Shouldn't you? Find out more. Send us the attached coupon, or call your nearest Paradyne sales office. PIX-II lets you do it right now.

PIX-II LETS YOU DO IT RIGHT NOW.

paradyne

Paradyne Corporation, 8550 Ulmerton Road,
Largo, Florida 33541 (813) 536-4771

Sales Offices: Atlanta (404) 588-0875 • Boston (617) 965-4850 • Chicago (312) 692-5950 • Cincinnati (513) 793-2853 • Cleveland (216) 656-2629 • Dallas (214) 661-0242 • Detroit (313) 559-5360 • Hartford (203) 563-8105 • Houston (713) 977-7102 • Los Angeles (213) 437-0613 • New York (201) 461-3700 • Philadelphia (609) 662-3049 • Pittsburgh (412) 343-9133 • San Francisco (415) 574-0902 • St. Louis (314) 739-2322 • Tallahassee, Fla. (904) 877-3896 • Washington, D.C. (703) 548-4453.

But Could Save Billions Planners Warned Office Automation Not Easy

ORLANDO, Fla. — Automated office systems will boost business productivity and cut costs only if their installation is preceded by careful planning and evaluation, according to Harvey Poppel, a senior vice-president of Booz, Allen & Hamilton in New York City.

Although he predicted that automation will trim much of

the \$600 billion that business spends annually for office operations, Poppel noted that knowledge of how offices work and how they should be changed remains limited.

"We must expand our knowledge of office operations and condition our organizations to the changes which inevitably occur" in electronic office systems, he

said in a keynote address at a recent International Communications Association meeting here.

Speaking at a seminar on "Telecommunications and the Office of the Future," Poppel presented a methodology for planning systems. It begins with systems selection, which stresses the identification of users and of the sources and

flow of information through the organization.

The next planning cell, systems architecture, addresses a number of critical issues: How important is retention of information? What provisions should be made for confidentiality? How will the planners implement new systems without disrupting existing ones? How will new types of infor-

mation be indexed and processed?

"People using these machines need contact with other people — they need to talk to each other and they need to be managed," Poppel said. He underscored the importance of selecting the right systems to fit the styles of individual users and of preparing these users for less face-to-face communications and more indirect communications from workstations.

In reviewing planning issues, Poppel noted problems in financing and implementation of technical systems. "Who is going to pay the staggering development costs? Hundreds of users, each with his own ax to grind, or the 'corporate' group?"

Biggest Hurdle

But "the behavioral element is the hurdle we think most likely to trip you," Poppel said. "A negative user reaction may be triggered by poor systems design. Most people will respond favorably to an electronic office environment if it is flexible and adaptable to their own style of work — that's the challenge in systems planning."

Predicting impending breakthroughs in word and image processing, communications processing and office data processing technology, Poppel added, "The real potential for electronic office automation is the evolution and acceptance of electronic mail, intra- and interorganizational networks, smart PBXs, video conferencing, business-home networks and common data bases."

The critical factor in building electronic offices is the evolution of simplified packages of electronic systems and the marriage of these components into interactive workstations, Poppel said.

He cited three emerging applications for such systems: generalized event-driven interactive workstations, specialized interactively driven stations and highly specialized procedure-driven stations used by support staff for the major portion of their work functions.

How to love DEC without marrying the whole family.

The PDP-11 is a real beauty. The CPU, that is. It's too bad we can't say the same for the peripheral members of the family. Especially the line printer. To us, it costs way too much, and it's hung-up on outdated technology.

That's why we're introducing the MRX/300, 600 and 1000 LPM printers. For the

And unlike other independent printer companies, we offer 30-day delivery, nationwide service and spare parts availability, plus a national average service response time of less than two hours. In addition, a nationwide sales network insures direct company contact and

support. It's this kind of service that has made us the #1 on-line peripheral company in the demanding IBM System/3 marketplace. (And we're going to do the same in the mini market.)

A better machine in the bargain.

You'll find that our chain-train design will eliminate the wavy lines normally associated with mini-computer printers. We're also fully buffered so that the CPU can perform other processing tasks between printer line settings. Sensing devices indicate complete paper status, and halt the machine if paper-out or paper-runaway conditions exist. As many as six clear copies

can be made. Plug compatible, our printers require no changes to system software or user programs.

For full details, just call our toll-free number: (800) 854-3111. In California (714) 549-9961. Or write to: Memorex, Business Systems Division, 3015 Daimler Street, Santa Ana, California 92705.

MEMOREX



first time, DEC users can have a printer that utilizes the latest chain technology, and yet costs 25% less. (Rent, lease or buy it.)

DC, Interdata and HP without the in-laws.

Again, great CPU's, so-so printers. And again, we can upgrade you while saving you a pile of money in the process.



FOR RENT OR SALE

- 33, 43 Teletypes
- TI 745
- DECwriters LA36

IMMEDIATE DELIVERY

DATA COMMUNICATION EQUIPMENT BROKERS, INC.

4915 Farnlee
Royal Oak, Mich. 48073
(313) 549-3400

Library Retrieval System Taps 80 Data Bases

By Tim Scannell

CW Staff

CORVALLIS, Ore. — A person who knows what he's looking for can access the resources of more than 80 data bases with help from an operator and a computer terminal here at the University of Oregon's library.

The Library Information Retrieval Service can, for a fee, access files containing bibliographical information on a variety of topics in the sciences, business, economics and world politics, according to a library spokesman. These files are maintained by six information organizations, including the New York Times Information Bank.

A person desiring to research a subject would come to the library and describe the area he would like searched to one of the terminal operators. "We do all of the searching ourselves; a patron can't come in and use our terminals," Kris Brooks said. Brooks is coordinator of the system and one of two persons who operate it at the request of users.

"When a person comes in with a topic, we try to determine what it is he really wants and if a computer search is really appropriate," she said. "I had a patron come in and request some information on the planning field, but unfortunately it's a very nebulous area; there is not really any kind of control over the literature. I told him that I really didn't think I could do anything for him."

On the other hand, many people who have used the service have found it worthwhile. "We did one project that retrieved over 1,000 references and will result in a major research project and about three dissertations," Brooks recalled.

Average Cost \$18

Costs for using the system vary from 32 cents for a short research project to as much as \$1,500 for large ones, the spokesman said. Approximately 1,800 persons have utilized the service with searches averaging about \$18.

The informational data banks are accessed through 300- and 1,200 bit/sec terminals. The library is billed according to the time spent communicating with a particular computer.

Brooks said two problems have been encountered in managing such a system: finding a document once it has been listed and explaining the computer's limitations to the users.

The first problem involves customers who complain about the length of time it takes to locate referenced material. "My job right now is to identify if something has or has not been written and, unfortunately for patrons, it is not actually to locate the original docu-

ments," Brooks said.

"That is a very frustrating process at times. We find now that we can, in a very few minutes, locate all of these marvelous references and it may take people three or four months to get the original documents," she added.

Document delivery hasn't been developed yet because so much time has been spent in discovering "what can be done with the searching procedure itself," Brooks said.

But, she noted, "it's not going to do people a whole lot of good if they learn this 'absolutely fantastic thing exists' and then find out that they can't get the information."

The library service, in cooperation with the U.S. Department of Labor, is currently experimenting with a solu-

tion to this problem in one research area by trying to set up its own data base. Using Control Data Corp. equipment, the library is attempting to create a reference file, including documentation, on the employment training field.

The second problem is trying to convince people that the terminal is only a machine, not an electronic wizard. "People look at the 1,200 bit/sec terminal and think it's really a 'magic machine.' Things are printed out so quickly and everybody's fascinated by it and somehow feel ... it has to have the answer to their questions," she said.

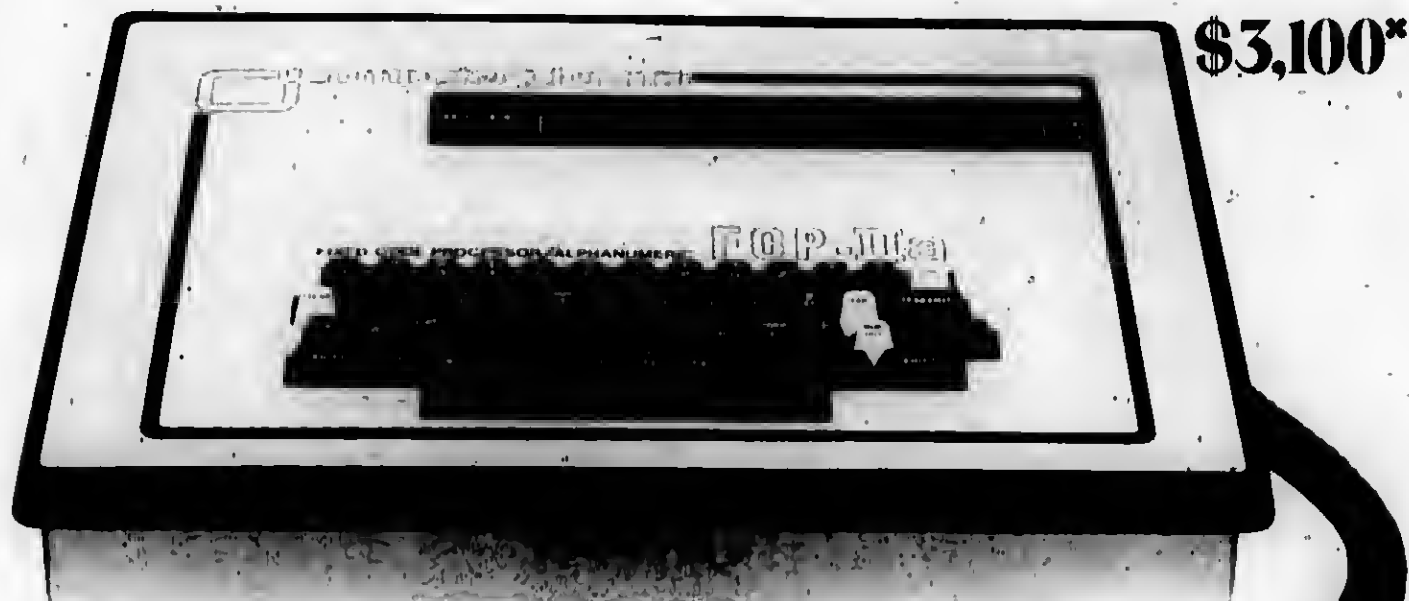
The Library Information Retrieval Service isn't unique; there are quite a few computerized libraries set up

around the country. The motives of other similar organizations, however, may involve more than just supplying information to interested users, Brooks said.

"I begin to wonder about the kind of services being provided and whether they really know how to ask the proper questions of their patrons and get the appropriate answers," she explained. "It doesn't take very much to start a business ... All you have to do is sign an open contract and promise to pay your bills ... buy your terminal ... and you're in business."

Some private concerns going into business, she contended, look at it just as a profitable venture. "We are not here to make money, so our primary concern is our patrons," she said.

Our lightpen comes attached to an alphanumeric unit with full LED display.



How many code readers can make that claim?

Just ours.
It's part of a remarkable bar code data entry terminal system. The FCP-IIa. It's a plug-in system that eliminates errors, cuts pre-processing costs and saves valuable operator time in both plant and office data entry applications. The FCP-IIa is interactive! The operator receives both audio and visual scan confirmation immediately as well as visual computer feedback. Send/receive message length can be up to 32 characters. And, codes? The FCP-IIa handles "2 of 5", Interleaved "2 of 5", "3 of 9" (including variable length codes), Codabar and UPC. The FCP-IIa. It's what's behind the pen that counts.

(*Quantity of one, OEM and volume discounts available.)

- ☐ I'm interested in more information on the FCP-IIa
☐ I'm interested in OEM possibilities

NAME _____

COMPANY _____

ADDRESS _____

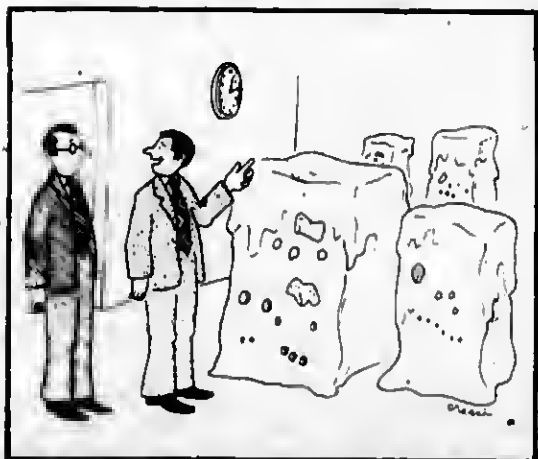
STATE _____

ZIP _____



computer identics

31 DARTMOUTH STREET, WESTWOOD, MASSACHUSETTS 02090, TELEPHONE: (617) 329-1980



'And This Is Our Software Department.'

Discover

the one organized (and inexpensive) way to keep up with what's new in computer techniques and management—

The Library of Computer and Information Sciences

and start with a whale of a value:

Take any 3 books for only \$3.95

(values to \$60.00)

if you will join now for a trial period and take three more books—
—at handsome discount prices—
within the next 12 months

82560. TECHNIQUES OF PROGRAM STRUCTURE AND DESIGN. Edward Yourdon. Over 300 illustrative problems, 90 valuable references, and four demonstration projects. **\$17.50**

54450. THE IBM 5100 PORTABLE COMPUTER: A Comprehensive Guide for Users and Programmers. Harry Katzau, Jr. Includes BASIC and APL programs for payroll/inventory control applications. **\$19.95**

58810. THE LOGICAL CONSTRUCTION OF PROGRAMS. Jean Dominique Warnier. Specific techniques and information for structured programming. **\$14.95**

70110. PRINCIPLES OF DATA-BASE MANAGEMENT. James Martin. Detailed introduction to the concepts, principles, and applications of data base technology. Covers data structures, security, file storage, real-time vs. non-real time, more. **\$19.95**

40005. COMPUTER PERFORMANCE MEASUREMENT AND EVALUATION METHODS: Analysis and Applications. Liza Svoboda. Detailed look at how to measure hardware and software performance. Covers system modeling techniques, measurement tools, performance controls for operating hardware and software. **\$15.95**

81910. SYSTEMS AND PROGRAMMING STANDARDS. Susan Woodbridge. An essential guide to establishing workable standards in any computer installation. Covers project initiation, investigation standard setting, procedures for data and problem analysis, more. **\$12.50**

32485. ALGORITHMS + DATA STRUCTURES = PROGRAMS. Niklaus Wirth. A detailed explication of the logical steps necessary to program development and specification, employing minimum mathematics. A classic work on structured programming with practical examples. **\$19.00**

80630. STRUCTURED COMPUTER ORGANIZATION. Andrew S. Tanenbaum. A non-mathematical approach to computer organization and assembly language programming that provides a practical look at computer architecture concepts from the microprogramming level to the operating system. **\$18.50**

84385. TOP-DOWN STRUCTURED PROGRAMMING TECHNIQUES. Clement McGowan and John R. Kelly. Practical solutions in actual code serve to introduce this revolutionary concept. **\$14.95**

62620. MICROCOMPUTER HANDBOOK. Charles J. Sippl. Detailed reference to the technology and applications of microprocessors. Covers software to the effect of micro technology on main-frame users. **\$19.95**

41670-2. DATA BASE DESIGN. Gjo Wiederhold. Excellent sourcebook for the methods, principles, and concepts relevant to the design of data base software. Useful to those without data base experience. Counts as 2 of your 3 books. **\$21.50**

49355. FUNDAMENTALS OF DATA STRUCTURE. Ellis Horowitz and Sartaj Sahni. A practical handbook outlining the principles of data structure design and manipulation. Includes in-depth coverage of file organizations, indexing techniques, internal and external sorting and tree structures. With detailed illustrations. **\$17.95**

37580. CHESS AND COMPUTERS. David Levy. An excellent and practical handbook, with illustrative games, that shows how to apply computer skills to chess problems. Softbound **\$7.95**

(Publishers' Prices shown)

FREE FOR JOINING NOW.

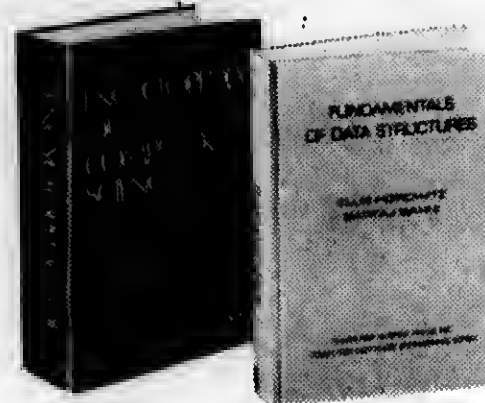


THE 1978 BUSINESS WEEK DESK DIARY AND EXECUTIVE TRAVEL PLANNER.

An \$18.00 Value

59920. MANAGEMENT: Tasks, Responsibilities, Practices. Peter F. Drucker. A brilliant task-focused handbook of the skills, techniques and tools a good executive needs to stay effective in modern management. **\$17.50**

55415. INFORMATION AND DATA IN SYSTEMS. Borje Langefors and Kjell Samuelson. Covers basic retrieval functions, processing techniques, design methodology, more. **\$14.95**



88000. WRITTEN COMMUNICATION FOR DATA PROCESSING. Randi Sigmund Smith. Guidelines to help prevent the leading cause of data processing, catastrophes—ambiguous specifications. **\$12.95**

53795-2. HOW TO MANAGE STRUCTURED PROGRAMMING. Edward Yourdon. Based on the author's highly popular seminar series, this offers a detailed step-by-step presentation of just what programmer productivity techniques (PPT) can do for the DP manager. Counts as 2 of your 3 books. **\$21.50**

78350. SIMULATION WITH GPSS AND GPSS V. P. A. Bubillier, B. C. Kahan, and A. R. Probst. Provides a detailed approach to the effective planning and execution of simulation experiments and projects. With concrete examples. **\$18.50**

42303. A DISCIPLINE OF PROGRAMMING. Edsger W. Dijkstra. A world-renowned computer scientist forges some impressive new programming tools to solve problems that range from the everyday to the complex. **\$17.50**

70720. PROGRAM BEHAVIOR: Models and Measurements. Jeffrey R. Spira. The first detailed handbook to directly address the problems of program behavior, modeling, and operating systems theory and measurement. **\$15.95**

34425. ARTIFICIAL INTELLIGENCE. Patrick Henry Winston. An excellent introduction to the fundamentals and latest developments in the field. **\$14.95**

MEMBERSHIP BENEFITS • In addition to getting three books for only \$3.95 when you join, you keep saving substantially on the books you buy. • If you continue membership past the trial period, you will be eligible for our Bonus Book Plan, with savings of at least 70% off publishers' prices. • At 3-4 week intervals (15 times per year) you will receive the Book Club News, describing the coming Main Selection and Alternate Selections, together with a dated reply card. In addition, up to 4 times a year, you may receive offers of special selections, always at substantial discounts. • If you want the Main Selection, or the special selection, do nothing and it will be sent to you automatically. • If you prefer another selection, or no book at all, simply indicate your choice on the card, and return it by the date specified. • You will have at least 10 days to decide. If because of late mail delivery of the News, you should receive a book you do not want, we guarantee return postage.

52900. HIGH LEVEL COBOL PROGRAMMING. Gerald M. Weinberg, Stephen E. Wright, Richard Kauffman and Martin A. Goetz. An advanced guide to proper and efficient COBOL usage. Introduces "sheltered programming" concepts, stresses modular design and maintainability of code. **\$17.95**

44900-3. ENCYCLOPEDIA OF COMPUTER SCIENCE. Edited by Anthony Ralston and Chester L. Meek. Accurate information on hardware, software, systems, theory, economic, social, and professional issues. Counts as 3 of your 3 books. **\$60.00**

80530. STATISTICAL METHODS FOR DIGITAL COMPUTERS. Edited by Kurt Enstein, Anthony Ralston, and Herbert S. Wilf. How to implement specific statistical techniques on the computer. With flowcharts and sample Fortran code for techniques from stepwise regression to covariance. **\$19.95**

58805. LOGICAL DESIGN OF DIGITAL SYSTEMS. Arthur D. Friedman. Basic reference to the components of the digital system: gate level logical design, combinational circuits, sequential circuits, register transfer languages, more. **\$16.95**

79165. SOFTWARE METRICS. Tom Gilb. Provides many practical techniques for estimating program reliability and efficiency. Details the experiences of leaders in the field like TRW-Systems and Lockheed. **\$15.95**



The Library of Computer and Information Sciences

7-A1E

Riverside, New Jersey 08075

Please accept my application for membership and send me the three volumes indicated, billing me only \$3.95. I agree to purchase at least three additional Selections or Alternates during the first 12 months I am a member, under the club plan described in this ad. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three books. A shipping and handling charge is added to all shipments.

3 books for \$3.95

Indicate by number the books you want.

Plus my free gift: The 1978 Business Week Diary and Travel Planner (37140).

A few expensive books (noted in book descriptions) count as 2 or 3 choices.

Name

Address

City

State Zip

(Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)

Software Written In-House Hospital Credits System for Saving \$1 Million

By Brad Schultz
CW Staff

CLEVELAND — "It does everything but kiss us good night and tuck us in" and saved about \$1 million over the past year.

So said a spokesman for University Hospital here in describing a computer system that performs 32 separate operational functions, for the institution. The system assists meal preparation, admissions, schedules surgery, evaluates laboratory results, aids property control and does accounting and many other tasks for the 981-bed facility, the spokesman said.

High Utilization

"We are high in computer utilization, yet our costs are not correspondingly high; in fact, they are at a lower level," he said, comparing University Hospital to the national average.

Using 1976 figures, the hospital ranks higher than 90% of the nation's hospitals in computer usage, but its operating cost adjusted for outpatient activity is at the national median for large teaching hospitals, the spokesman noted.

DP Expo Slated At Month's End In Washington

WASHINGTON, D.C. — A DP exposition featuring a demonstration of new products, applications and services by more than 150 firms will take place at the Sheraton-Park Hotel here Jan. 31-Feb. 2.

Federal DP Expo '78, a three-day conference, will include 40 exhibitor-sponsored application workshops and nine professional seminar sessions. Among the topics to be discussed will be personal computing, computer graphics, microcomputers' impact on electronics funds transfer and the law vs. the computer.

Admission to the exposition, workshops and seminars is free. Additional information and a copy of the program can be obtained from Ted Evans, Federal DP Expo '78, 11501 Huff Court, Kensington, Md. 20795.

Ginsburg Named To Jones Chair

LOS ANGELES — Dr. Seymour Ginsburg, a pioneer in theoretical computer science, has been appointed the first Fletcher Jones professor of computer science at the University of Southern California School of Engineering.

Ginsburg is a professor of computer science at the university. His early work in the areas of switching theory, automata theory and context-free computer language were basic contributions to computer science.

The Fletcher Jones Chair, named in honor of the late founder and chairman of the board of Computer Sciences Corp., was recently created by a grant of \$1 million from The Jones Foundation.

The meal preparation program — planning menus and printing recipes — alone saved the hospital about \$1 million over the past five years, he said. The system helps organize 6,000 meals per day and holds a data base of more than 1,000 recipes.

The admissions processing segment of the system "contains admitting and socioeconomic data on more than 170,000 patients admitted here at University Hospital since 1970," he said.

The surgery scheduling program handles 75 to 100 procedures daily, and another program was used to evaluate results of 2.1 million laboratory tests last year, according to the

spokesman.

The hospital saves about \$222,000 annually through computerization of accounts payable and patient census taking, he added.

The key to the system's success is its in-house-developed specialty software, Director of Information Systems Palani Palaniappan indicated. Palaniappan's staff has developed all the application programs featured in the system, writing them in Cobol.

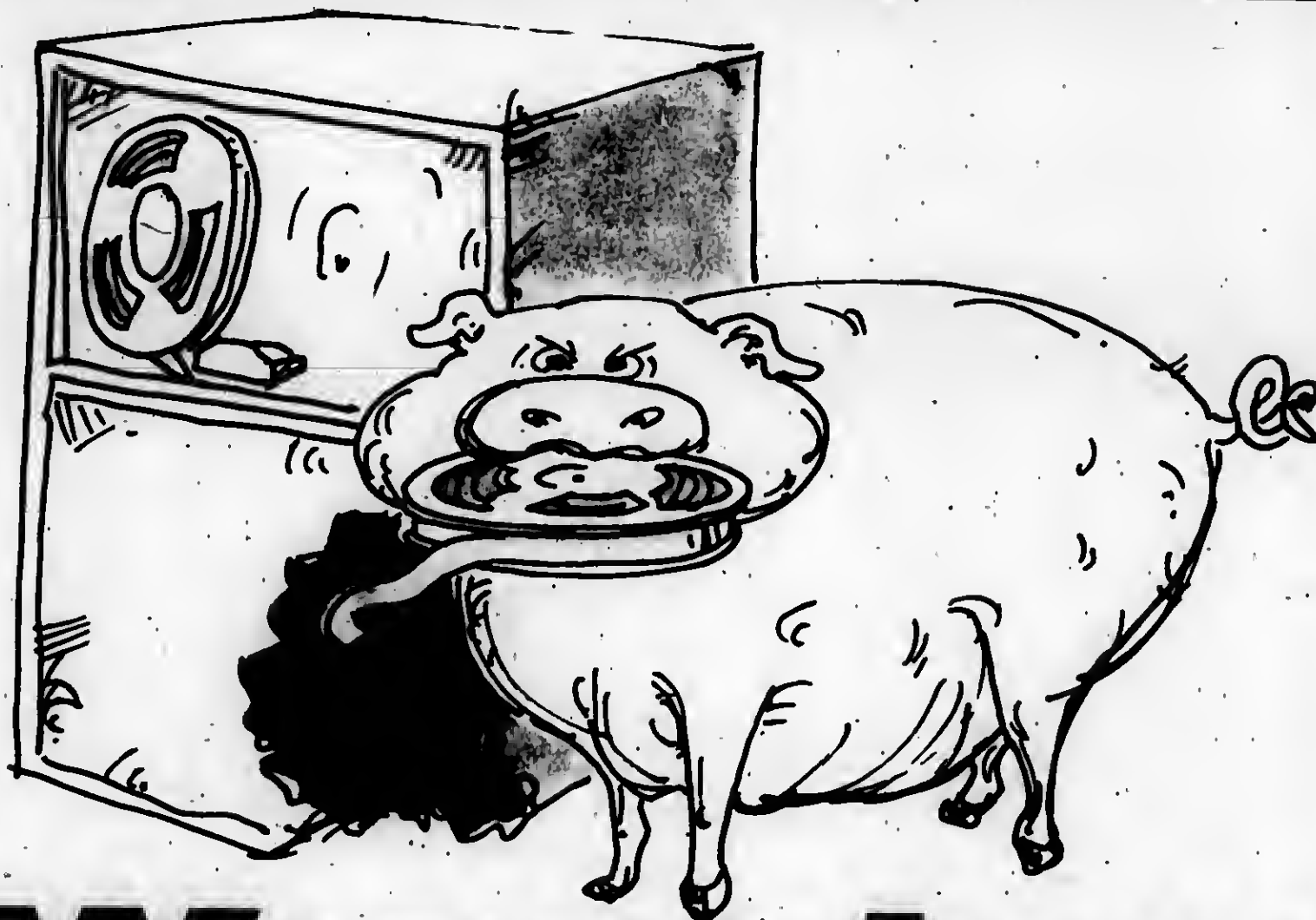
The system is based on an IBM 370/158 CPU and supports the programs with IBM's Customer Information Control System (CICS). The hospital saves about \$250,000 annually by leasing its hardware from a third party

rather than from the manufacturer, Palaniappan said.

Intel Corp. is the third party, receiving monthly lease payments of \$28,000 to \$30,000; the manufacturer would charge \$55,000 to \$60,000, he added.

"IBM does not lease on a long-term basis; the maximum lease it offers is four years ... Intel gives you a longer lease and the benefit of lower lease payments," Palaniappan said.

Palaniappan acknowledged that the system yields a normal crop of bugs and malfunctions, but seemed pleased with its overall impact. "We have gotten to the point where it is difficult to conceive of how we would operate without the thing working," he said.



Wanna buy a hog?

Or the DBMS with **No. 1 throughput** on the market!

Their DBMS can eat you up alive. Waste your resources, CPUs, and slash the performance value of your million-dollar mainframe. A smart buying decision now can save millions in additional staff and hardware upgrades over the next few years. You should buy **DATAKOM/DB**. We're easiest-to-use in design, implementation and maintenance of applications systems. Best on-line performance for inquiry and/or update transactions under **DATAKOM/DC** (our superior telecommunications monitor), CICS or

other monitors. ☐ Unequaled sequential processing capabilities. ☐ Minimum use of 360/370 hardware resources including CPU cycles, memory, I/O events and DASD space. ☐ Exceptionally readable and useable documentation. ☐ Continual, innovative, cost-effective enhancements. Call or write today. Let **DATAKOM** prove we're the most efficient, cost effective and easiest-to-use DBMS on the market... compared to any 'Big Bad Byte Eater' you can name!

I want you to prove **DATAKOM/DB** superiority on 360/370 systems.

Name _____ Title _____
Firm _____ Phone _____
Address _____
City _____ State _____ Zip _____

DATAKOM DB and DC. Great by themselves... Even better together.

insyte datacom
corporation

214/526-4280
3707 Rawlins St. Dallas, TX 75219
Boston/Chicago/New York/Denver/San Francisco/Mexico City
Frankfurt, W. Germany, Sydney, Australia

Member SIA Software Industry Association

Editorial

Think, Mainframers...

The new Datapro Research Corp. listing of how users rate the mainframe vendors (see Page 1) should give those manufacturers pause.

Just think: The vendor with the highest overall satisfaction among its users was Xerox Corp., which has been out of the business for over a year. And in second place was Amdahl Corp., which has been marketing systems for less than two full years.

The only other firm to receive better than average ratings from its users was Digital Equipment Corp., which is far better known in the minicomputer area than for its medium to large mainframes.

Control Data Corp., IBM, NCR Corp., and Univac all ended up with average ratings, while Burroughs Corp. and Honeywell Information Systems, Inc. were below

the average in overall satisfaction ratings.

The good news from all this is that no vendor — with the exception of HIS — was rated as less than "good" by its users, since the average scores were just above that level of satisfaction.

The bad news, of course, is that users apparently do not rank the traditional mainframes high on their satisfaction lists.

Clearly, there is room for improvement on the part of all vendors in the business. The Datapro breakdown shows specific areas in which users rate their vendors highest and where those vendors experience problems. We hope manufacturers will now attempt to improve in those areas of weakness.

... And Think Again

And while users were rating the traditional mainframe vendors a little more — or a little less — than average, a whole revolution in prices has taken place in the computer industry over the past year.

The industry has become more competitive — which means lower prices for users and a wider selection at those prices.

IBM traditionally had been the higher priced alternative and has still managed to pile up 65% share of the computer marketplace, thanks at least in part to an excellent marketing team and after-the-sale support.

But after the price cutting of 1977, IBM is now clearly in the middle

or lower end of the marketplace on a price and performance basis.

These two facts may spell trouble for the other traditional mainframe vendors in the future. From the Datapro survey it seems clear that their users are no more — and in the case of HIS and Burroughs less — satisfied than IBM customers. And now the IBM alternative does not cost any more.

Therefore, the other vendors in the business need to start offering their users either better service than in the past, or they may be overwhelmed by the IBM marketing juggernaut.

It is time for all the vendors in the business to rethink their strategies.

Data Past

Five Years Ago Jan. 24, 1973

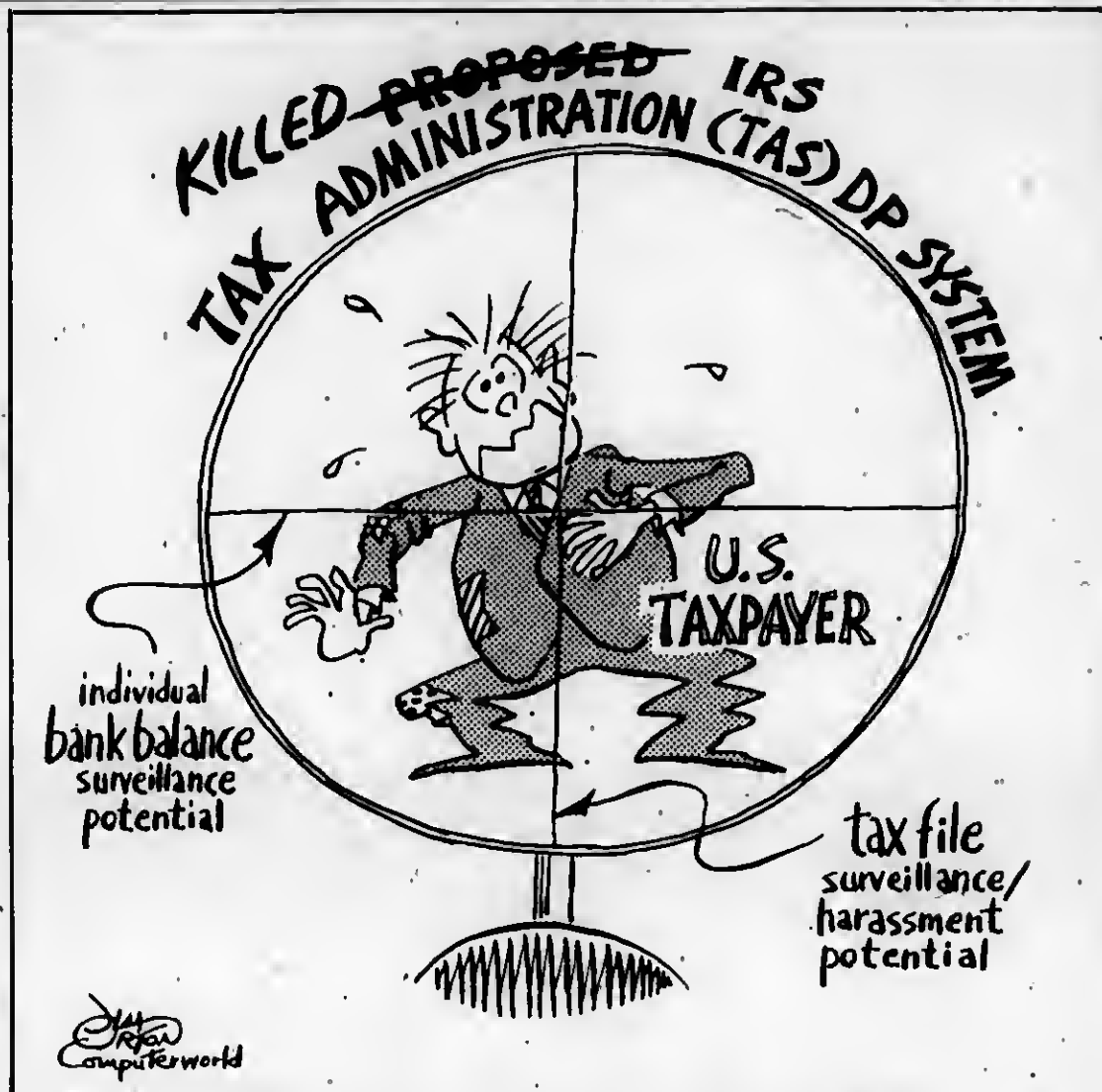
MINNEAPOLIS — One of the oldest of the antitrust suits against IBM ended here when Control Data Corp. accepted an out-of-court settlement and in effect handed the broader issues raised by the case to the Justice Department for resolution. In total, CDC may have received as much as \$146 million in either direct cash outlays or in promises of future business from IBM. In turn, CDC had to put up \$16 million in cash to buy the Service Bureau Corp., an IBM subsidiary.

WELLESLEY, Mass. — Honeywell Information Systems, Inc. introduced the Multiplexed Information and Computing Service system (Multics) as a commercial product this week. Multics included security features and the user could write his own operating system commands.

Eight Years Ago Jan. 28, 1970

GAITHERSBURG, Md. — An official of the National Bureau of Standards (NBS) called for the establishment of a "giant membership society" modeled after the British group and, similarly, called the American Computing Society. Dr. H.R.J. Grosch, director of the NBS computer center here, said the American Federation of Information Processing Societies should be consolidated with all outlying societies to form a more powerful and affluent organization.

BOSTON — A franchised computer school, the Institute of Computer Technology (ICT), quietly closed up shop on Jan. 16 — so quietly that its students weren't aware of the school's demise until they received notice in the following day's mail that "financial difficulties" had forced the closing.



"There's Good News — and Good News!"

Letters to the Editor

The Coast May Not Be Clear

There was a very dangerous omission in "Air Force Picks Halon With Workers in Mind" [CW, Dec. 26-Jan. 2]. The article failed to stress that an electrical fire involving coaxial cabling, which is very common in computer rooms, can be deadly to workers. Never mind the Halon system, polyvinyl chloride (PVC) fumes from coaxial cable combustion are lethal.

Those who read the article could be misled if they believe they can immediately return to an area where PVC fumes have been released by a fire. I quote: "... personnel can reenter the area where a fire has occurred and resume operations immediately." (This refers, of course, to the effects of Halon but doesn't mention the PVC danger.)

Halon or no Halon, only fire officials can instruct personnel when it is safe to return to the site of a fire.

Tony Fernandez

N. Bergen, N.J.

IBM Activities in India

"IBM Exit From India Not Surprising" [CW, Jan. 9] was wrong on two points. The first was the implication that IBM may have paid bribes in India and the second was that we withheld new technology in order to generate profits from older equipment.

IBM's policy regarding bribes, payoffs or any other form of questionable payments is quite clear: We just don't do it. Numerous audits of our operations in India, conducted both by us and our outside accounting firm, have never revealed any use of IBM funds for such purposes.

As for withholding technology,

you should know that we have made many attempts in India over the years to market our current products incorporating the latest technology. Almost without exception, customers were unable to obtain government permission to install our System/360 and System/370 machines. At no time did we "refuse to import newer computers."

Furthermore, our proposals to the Indian government included an offer to manufacture current technology products at our Bombay plant. The government did not accept this proposal.

Ralph A. Pfeiffer Jr.
Chairman

IBM World Trade Americas/
Far East Corp.
N. Tarrytown, N.Y.

UN, ACM Can't Be Compared

I would like to point out to letter-writer H.R. Sides that comparing the United Nations to the Association for Computing Machinery (ACM) [CW, Jan. 9] was itself illogical and nonsensical.

The UN exists to discuss and iron out political and ideological differences between the nations of the world, while the ACM is an organization of professional men and women interested in advancing the knowledge of computing machinery. In response to the Soviet Union's refusal to allow some citizens to participate in ACM conferences, the ACM acted in a very logical manner by banning the Soviet Union from participation.

It is common for people to be deprived of their rights in the Soviet Union. The ACM should be very proud of its humanistic stand and should be congratulated by both its DP professionals and laymen.

Russell A. Hersch

Chevy Chase, Md.

DP Crooks Couple Basic Skills, Craftiness

By Jack Stone
Special to CW

Although the typical computer thief generally uses only a basic set of DP skills and knowledge, researchers are thoroughly impressed with the craftiness and diversity of his misdeeds.

In a two-part series on computer crime in *The New Yorker* (Aug. 22, 29), Thomas Whiteside wrote a compelling account of computer crime, with particularly chilling commentary on mischief perpetrated by devious DP employees. (The series is a mandatory reading assignment for all DP managers and supervisors.) Much of the material in this column was extracted from the series.

Why are computer crimes committed, usually by seemingly loyal and honest employees? One reason is that the opportunities for these illegal acts are legion. People who, under nearly all other conditions, would be law-abiding citizens are easily enticed.

Further, these opportunities are indirectly supported by the fact that so many users (including chief executives, auditors and security officers) neglect giving proper attention to the DP operation.

Perhaps it's the impersonality of the computer which develops feelings of intimidation or maybe it's the machine mystique, but the net

result is that most unknowledgeable users take computer-generated listings as fact. They seem to have a deep, abiding faith in these artifacts, a trust they would rarely place in the humanoid worker.

Computer crime also provides what seems to be a neat and tidy intellectual and ethical environment for the DP evildoer. It provides a wonderful technical challenge; the loss is difficult to detect; and it's not like really sticking one's hand in the till (although the net take can be vastly larger).

Then there is employee vengeance aimed directly at management for feelings of being overworked, underpaid or unfairly treated. One overworked operator, an employee of a trucking firm, took home and destroyed some billing data — \$2 million worth; he had not been given enough time to enter it. An irate insurance company tape operator, after being fired for misbehavior, erased, misfiled or mislabeled vital tapes — including their masters — just before her departure. It cost about \$10 million to re-create the data sets.

Unhappy programmers trying to get even with the boss turn to more sophisticated ventures. A programmer in France who was fired reset volume labels to expire two years after his departure; his scheme was successful.

Other programmers, whiling away the time until dismissal, are known to have reprogrammed financial applications to receive a handsome severance settlement or substantial retirement pay.

Free computer time and data set access are other targets of wayward employees:

- Three operators working for a

The Human Connection

major book publisher ganged together to steal the company's customer list and sold nearly three million names. The list itself was worth \$1 million.

- A computer operator employed at a state driver's registration bureau spirited away the name and address file after being bribed by commercial direct mail interests.

- A police officer was indicted by a federal grand jury for reprogramming an FBI information system to obtain data for outside merchandising.

Even ex-employees get into the act; in one case an ex-employee of a commercial service bureau was charged with grand theft for allegedly using terminal passwords to

steal machine time for his new employer.

Finally, without really intending to induce nightmares, I want to relate the curious case of the terminal-based embezzler who lifted nearly \$1.5 million from his banking employer during his four-year career.

In Whiteside's words, "However much management may have come to rely on these super-efficient DP systems, the systems inevitably contain certain imperfections, and it is the knowledge of these imperfections which can bring a gleam of temptation to the eye of a supposedly trustworthy bank employee — especially one who happens to feel that he has been treated unfairly by management ...

"Through a computer terminal he was authorized to use, he modified bank records so that customers who conducted transactions thought they had money in their accounts which they didn't have (and he pocketed the difference) ...

"For all his ability to conceal his computer-terminal fraud ... he had had no training at all in computer science ... and no special knowledge of the internal circuitry or of programming the computer."

Stone takes a look at some common misconceptions about computer crime next week.

Confusion Cited in Chase Service Marketing

About a month ago, I discussed the checking account overdraft protection system known as the "English overdraft" method, which is used by Chase Manhattan Bank [CW, Dec. 19]. With this system, Chase lends an overdrawn customer the exact amount of money he needs for the time he needs it.

In contrast, most banks set up a special installment loan account and, in multiples of \$50 or \$100, sell the overdrawn customer the maximum possible loan; the loan is repaid over a fairly long period.

From the customer's point of view, the English method seems to be the better one because it results in smaller interest charges.

However, Chase's service is not selling well, and I asked readers, "How do you think you would market this real overdraft protection in competition with the installment loan selling gambit sold under the cover of overdraft protection?"

The answers I received showed an unusual depth of knowledge. They came from people who used the Chase system 14 years ago, people who had not used the system but had seen other computer advantages lost in the marketplace and people who were just interested.

Despite the difference in back-

grounds, there seemed to be a consensus: Chase had not really marketed the system at all because it had allowed it to be confused with the standard installment loan system.

Marketing Confusion

According to readers' letters, there are three areas where this confusion is apparent: in the name of the system, in the discontinuation of the old system and in the use of old system methods on statements.

The system is called an "overdraft protection system." This does not distinguish it from other systems with the same name, even though it is described as being a better one. An adjective such as "exact" ("exact overdraft system") would make that distinction and point to the system's advantages.

Even better would be a totally different name, perhaps "Computer-Accurate Protection System," "Minimum-Loan Protection System" or "Minimum-Interest-Days System." These would also make the system's advantages readily apparent.

Mere replacement of an old service with a more efficient one doesn't mean instant marketability because it does not underline the differences between the two.

In this case, there is no reason why Chase should not have continued to sell installment loans triggered by overdrafts; had it done so, customers would have been forced to make a choice — and to note the benefits of the new system.

Chase's final error seems to be the use of old system methods on statements (note the sample, which Chase made up for me). The problem is that a separate transaction is entered every time the amount of overdraft changes. This makes the whole thing seem confusing, when it is actually very simple.

Another way to simplify the statement would be to print out the accurate balance, even if it is in overdraft, and use the term "Average

Daily Overdraft" instead of "Average Daily Balance" at the bottom.

All of this applies to many areas in Computerdom. Our methods will not be bought by the public unless they are offered as alternatives and unless their advantages are underlined.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

The Taylor Report By Alan Taylor CDP

One-Statement Banking

JOHN JONES

SAMPLE

Branch Telephone Number

Checking Account Number

CHASE

Checking Account Summary

Previous Balance	As Of	Current Balance	Overdraft	Overdraft	Overdraft	Overdraft	Overdraft	Overdraft
200.00	2/29	787.81	1	1.07	2	925.00	3/31	336.12

Checking Account/Cash Reserve Transactions

Checks and Debits			Checks and Debits			Deposits and Cash Reserve Transactions			Deposits and Cash Reserve Transactions		
Date	Time	Amount	Date	Time	Amount	Date	Time	Amount	Date	Time	Amount
121	3/2	122.51									
						CASH RESERVE LOAN	3/2	77.49			
122	3/4	250.00							3/4	172.51	172.51RI
124	3/8	116.12				CASH RESERVE LOAN	3/8	288.63RI			
						3/8	116.12		3/15	211.37	
125	3/20	75.00				** DEPOSIT/CASH					
						RESERVE PAYMENT	3/20	136.37			
126	3/24	22.50				3/15	500.00	3/24	87.81RI		
						(288.63)					
127	3/24	90.53							3/30	337.19	
						CASH RESERVE LOAN					
128	3/24	111.15							3/31	336.12	
						3/24	87.81				
	3/31	1.07PC				** DEPOSIT/CASH					
						RESERVE PAYMENT					

RI = CASH RESERVE LOAN BALANCE

PC = FINANCE CHARGE

3/30 425.00
(67.81)

Cash Reserve Summary

Previous Balance	Total Cash Reserve Credits	Total Cash Reserve Debits	Average Daily Balance	FINANCE CHARGE	New Balance
As of 2/29					As of 3/31
0	376.44	376.44	107.91	1.07	0

Annual Percentage Rate 12%

Daily Periodic Rate .0129

The Finance Charge on Cash Reserve

Loans (continued) is calculated on the

date of payment.

See Statement - Credit - Cash Reserve Loan

Cash Reserve Payments should be made on or before

the 15th day of each month and on the last day of

the month if the 15th day falls on a Saturday or

Sunday.

To obtain credit on your account for all the cash reserve loan credit on Statement, you must make a cash reserve loan payment of \$1.00 or more on the 15th day of each month or on the last day of the month if the 15th day falls on a Saturday or Sunday.

Some other reasons for obtaining the cash reserve loan credit on the Statement is the Cash Reserve Loan Statement. See the Statement for more information.

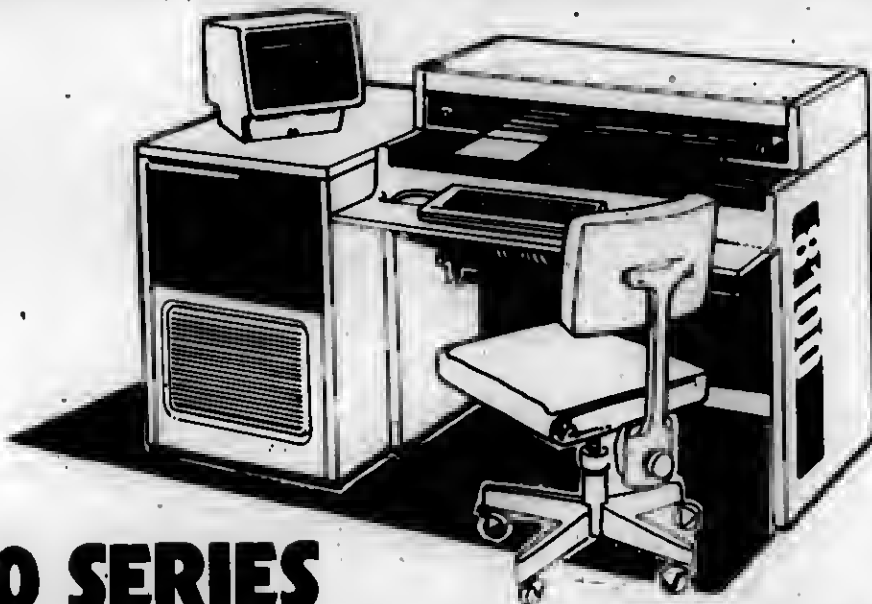
The finance charge on the cash reserve loan is 12% per year, compounded monthly.

Please see your statement and accompanying documents for important information.

Sample of Chase Statement

COMPUTER DEVELOPERS

**WE ARE ONE OF THE KEY LEADERS TODAY,
HELP US BECOME THE "LEADER" TOMORROW...**



NCR 8100 SERIES

NCR Corporation has just developed a powerful family of computer products that offers smaller businesses hardware and solution-oriented application software at a readily affordable cost. The 8100 System is just a part of the advancement and involvement of NCR in solving mankind's problems for today and tomorrow.

Our current involvement at the Data Processing Division of NCR in Wichita in the 8100 series requires experienced and knowledgeable personnel to work on future and similar development.

These positions offer excellent income commensurate with your experience, a liberal benefits program and unusual and challenging opportunities for both professional advancement and personal growth with NCR Data Processing Division.

ARCHITECTURE DESIGNER

We need you to define and design processors and their interface for operating systems. Such a challenge requires a thorough knowledge of various design approaches. It also requires the ability to effectively interface with peers and management. Minimum qualifications are a CS degree and 5 years design experience in compilers and work utilities.

UTILITY DEVELOPERS

You are needed to develop utility programs in high level or assembly languages. Example programs are SORT/MERGE, Media Copies and Media/Memory Printouts, Dynamic File Inquiry, etc. You must have a CS or Scientific degree and a knowledge of assembly level programming and utility design.

COMPILER DESIGNERS/ANALYSTS

Would you like to lead or serve on one of our teams in Compiler Design from definition through programming and systems test? Do you know high level programming languages, assembly level languages, and PASCAL based languages? If your answer is "yes" and you have a BS degree or better with 3 to 5 years experience, we are interested in you.

SENIOR SYSTEMS ENGINEER

You will be responsible for the development of small business systems architecture. Special applications will be in the area of distributive processing and communications. EE or CS degree plus a minimum of 8 years experience needed.

DESIGN ENGINEERS

We challenge you to be responsible for logic and firmware design for micro processor based EDP systems. Specific experience with Peripheral Controllers desired with an EE and a minimum of 3 years experience.

SOFTWARE DEVELOPMENT DESIGNERS

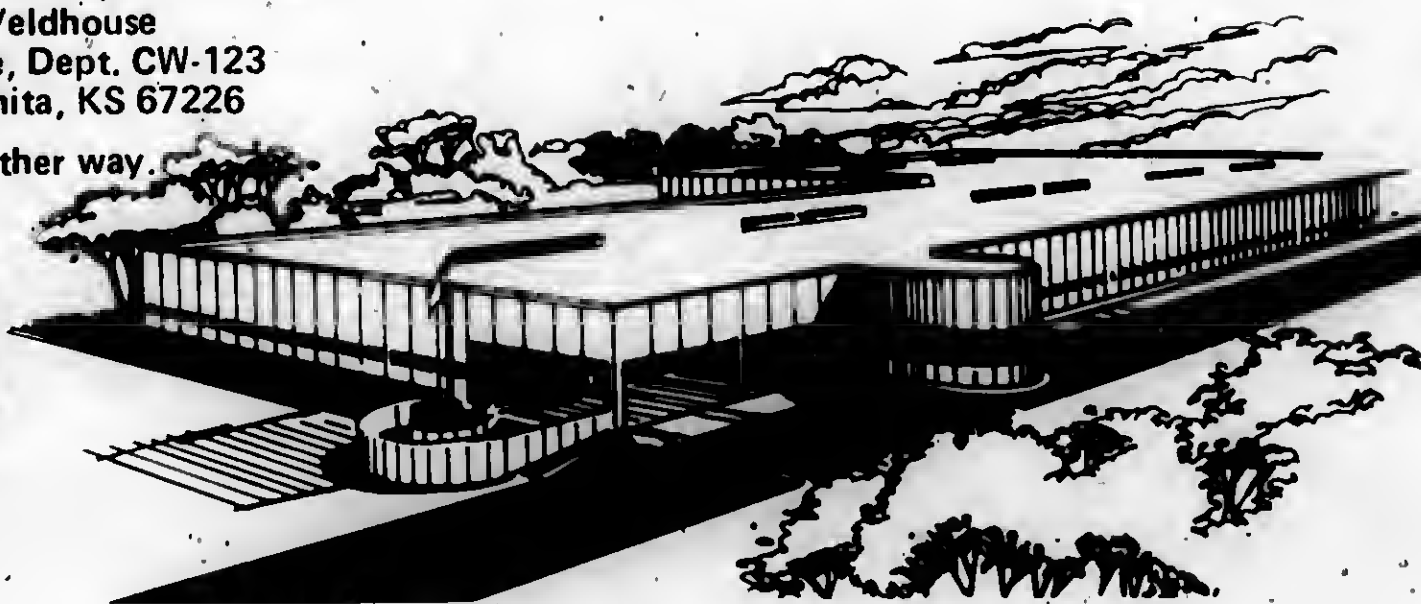
You'll be responsible for operating system software design and implementation. Micro processor assembly language experience desired. Your assignments will be in Logical I/O, Physical I/O (including communications), systems internals and generation. CS plus 3 years experience required.

Please call (316) 687-5551 or send your resume to:
Mr. Dee Walker or Mr. Rick Veldhouse
Professional Placement Office, Dept. CW-123
3718 North Rock Road, Wichita, KS 67226

You'll get complete details either way.

NCR
Data Processing Division

An Equal Opportunity Employer



Package Helps Designer Visualize Ideas

By Brad Schultz
CW Staff

ELMSFORD, N.Y. — Shaded pictures of three-dimensional objects, created from mathematical descriptions of the objects, can be shown on a CRT screen — and then twisted and turned so the objects can be viewed from new perspectives — with a software system called Synthavision.

Synthavision lets users generate a 3-D mathematical model, slice through it at any point from any angle and produce line drawings of any cross section needed, according to Mathematical Applications Group, Inc. (Magi) vice-president Leon Malin.

Magi developed the process primarily for such design-and-production applications as engineering analysis and numerical control, building it from a set of proprietary Fortran programs.

The initial step in using Synthavision is always modeling the part to be depicted or analyzed — a technique based on the notion that most solid structures, no matter how complex, can be broken down into simpler shapes, Malin said.

He noted that nearly any 3-D object can be formed of such geometric "primitives" as spheres, cones and boxes; and that the process currently uses 11 primitives, with more being contemplated.

Quick Results

Malin indicated that Synthavision differs from conventional computer-aided design systems in being able to quickly and economically produce 3-D shapes — "we've produced results in three or four minutes." It excels in producing any view desired — either as a line or shaded drawing, or as numerical data, he added.

Synthavision can create a geometric model for engineering analysis applications that determines volume, weight, center of gravity and other physical properties and provides data for

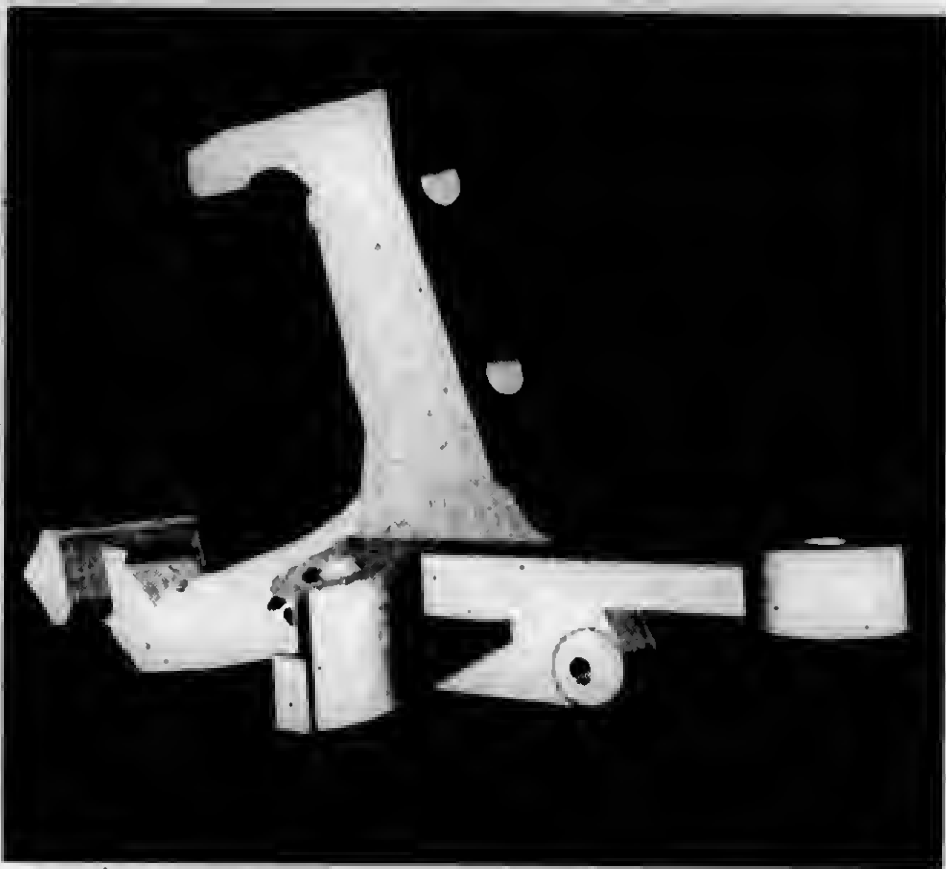
stress-analysis codes, Malin said.

For numerical control applications, the process can provide 3-D input typically used in program checkout before engagement of the cutting tool, he said.

Synthavision can facilitate manufacturing operations by offering views of new, nonexistent components before they have left the drawing board, Malin noted, adding that in this way costly preproduction errors can be minimized.

Synthavision can be used on almost any CPU that has 220K bytes of available memory, a CRT output device and support for Fortran.

The package costs about \$150,000, depending on options, Malin added from Magi headquarters at 3 Westchester Plaza, Elmsford, N.Y. 10523.



VCI Enhances OS Scheduling

By Don Leavitt
CW Staff

CHERRY HILL, N.J. — Installations working under IBM's OS or OS/VS can schedule workloads dynamically with help from a trio of products now available from Value Computing, Inc. (VCI), a vendor spokesman claimed.

The software support can start with either VCI's System III scheduler for a single CPU or the Data Center Scheduling System. To either base the user must add the Stars on-line job-tracking system [CW, Sept. 10] and the just-announced Apollo JCL submission subsystem, he said.

System III is a CPU or machine scheduler that balances resource demands, time constraints and resource availability to generate the best job mix for a shift or a day in advance. The Data Center scheduler extends that concept to produce schedules for the CPUs and all other work centers within the center, he explained.

Stars — more formally, the Status Tracking and Revision System — allows an installation's operators to follow the progress of jobs through their systems and to make changes, as the need arises, for work that is already underway.

Apollo is an on-line JCL and control card submission subsystem that uses as its inputs the schedules developed by the scheduling systems or revisions to those schedules entered by the operations staff. Apollo retrieves the appropriate JCL from the user's procedure library and submits it in schedule sequence to the operating system.

System Adjuncts

Both Stars and Apollo were designed from the start as adjuncts to the batch-oriented scheduling systems. They were never seriously envisioned as stand-alone products, the spokesman said, noting that therefore, the coding in each was specific to its task

without generalization.

The benefits specific to Apollo include a sense of assurance that all production JCL is under control of a single system that can be constantly audited and improved without adding people, the spokesman said. The subsystem also provides an audit trail of all JCL changes made and supports better restart procedures, he added.

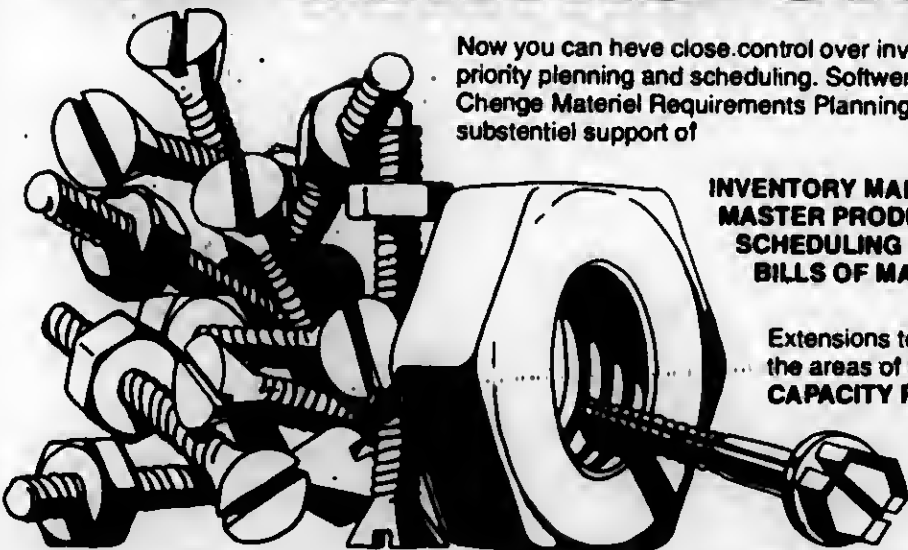
One of Apollo's strong points, according to VCI, is the software's lack of dependence on any part of IBM's operating system or any of the Selectable Units into which IBM is now subsetting the operating system.

The complete scheduling system costs \$16,000 (for System III) or \$24,000 (for the Data Center version); plus \$6,000-\$10,000 for Stars; and \$10,000 for Apollo.

All the software is available now, VCI said from 300 VCI Building, W. Marlton Pike, Cherry Hill, N.J. 08002.

SOFTWARE & SERVICES

PUT THE RIGHT PARTS IN THE RIGHT PLACE WITH OUR MANUFACTURING PLANNING AND CONTROL SYSTEM.



Now you can have close control over inventory levels and costs through manufacturing priority planning and scheduling. Software International's practical and user-proven Net Change Material Requirements Planning computer software package provides substantial support of

INVENTORY MANAGEMENT
MASTER PRODUCTION SCHEDULING
BILLS OF MATERIAL

ENGINEERING CHANGES
WORK-IN-PROCESS CONTROL
OPEN PURCHASING AND MANUFACTURING ORDERS

Extensions to this system give you additional performance in the areas of **SHOP FLOOR CONTROL**, **ADVANCED COST**, **CAPACITY PLANNING** and **ADVANCED PURCHASING**.

In the complete, yet modular, Manufacturing Requirements Planning system, you get the control and performance you want — when you need it. Call or write. Today.

Please help me get our manufacturing system together. Send me more information about:

Manufacturing Systems

- ☐ Master Production Scheduling
- ☐ Material Requirements Planning
- ☐ Capacity Planning
- ☐ Shop Floor Control

Name _____

Title _____

Company _____

Address _____

City _____

Financial Accounting Systems

- ☐ General Ledger and Financial Reporting System
- ☐ Accounts Payable
- ☐ Accounts Receivable

Comprehensive Report Generator

☐ FILETAG

State _____

Zip _____

Phone _____

Computer _____

CWC2377

SOFTWARE INTERNATIONAL

Elm Square, Andover, Mass. 01810 (617) 475-5040

Toronto • Atlanta • New York • Washington, O.C. • Philadelphia
Chicago • San Diego • Houston • Columbus, OH • San Francisco

'Sara' Versions Enhanced For Honeywell, IBM Sites

FALLS CHURCH, Va. — Improved management controls are said to highlight enhanced System Analysis and Resource Accounting (Sara) packages now available from Boeing Computer Services, Inc. (BCS) for IBM 360/370 or Honeywell 600, 6000 and Series 60 installations.

A management reporting system has been added to Sara-H for the Honeywell sites. This system operates on a data base created by Sara and provides tabular and graphic history of 46 major system variables, a spokesman said.

The year-to-date reports provide the user with a means of projecting future system requirements through trend analysis, he added.

The management reporting facility already part of the IBM-oriented Sara

III (for OS and OS/VS) and Sara IV (for OS/MVS) has been enhanced to include historical data from the system's shift report. With this extension, "profiles" of the shifts can be plotted for periods ranging from a month to 100 days.

A shift analysis feature is also available for the Sara III and Sara IV systems. System activity can be reported by user-defined shift and activity for up to four mutually exclusive shifts per day (any 24-hour period) can be summarized and compared, the spokesman noted.

A separate report page is generated for batch, Time-Sharing Option (TSO) and device activity. For management, a total summary page is also provided, BCS said.

Both of the IBM versions include re-

Zippy Tax Calculations

WAKEFIELD, Mass. — A Sales or Use Tax Calculation package (Sutax) is available from A.V. Products, Inc. to support invoicing operations by determining sales and use liabilities for all states, counties and cities in the U.S., according to a spokesman.

The package is not dependent on complex coding schemes, he said; it uses postal Zip Codes as the keys to the appropriate taxes, rates and extensions. Since all business addresses are supposed to include Zip Codes, there shouldn't be any file changes required to use Sutax.

A system by-product is a detailed

audit file, which greatly aids tax auditors in their verification of tax payments, the spokesman said.

The package itself is written in Cobol; it is not dependent on any particular operating system and requires only 3K of memory. The only limitation on where it can be used is that it requires a direct-access storage facility, he added.

Sutax leases for \$96/mo, which includes a monthly update service under which users are notified of all rate changes and taxes which became effective during the month.

A.V. Products, Inc. is at 113 New Salem St., Wakefield, Mass. 01880.

Proposals...a guide to Winning

A unique step-by-step guide to proposal preparation is providing the winning edge to computer/EDP marketers in their proposal efforts. *How to Create a Winning Proposal*, an innovative "how to," is so effective it is rapidly becoming the standard text for use in government, commercial and OEM proposal projects. It is currently in use by 74% of the nation's major computer/EDP equipment manufacturers, and 62% of the database management and service organizations.

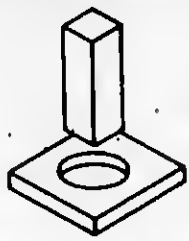
The book covers the entire proposal process, giving detailed instructions on contents, structure and methods of preparation for both solicited and unsolicited proposals. Technical, cost and management section checklists are included to ensure the proposal team of covering all the important bases. Excellent guidelines are provided on how to analyze and respond to RFP's, RFQ's and IFB's.

Government requirements are covered in an overview of the US procurement network, how it works, and how the proposing firm can increase its "win probability" in competing for contracts. Other topics covered include:

- How to develop an effective "win strategy," mobilize the proposal team, and control the input of the various team members.
- How to organize the proposal contents—what goes where in the management, cost and technical section.
- How to develop task descriptions, manpower estimates, and a work breakdown analysis.

Copies are available pre-paid from Mercury Communications Corp., 730-CW Mission, Santa Cruz, CA 95060. \$65 includes 3-5 day deliv. inside USA. In Calif. + \$3.90 tax. For outside USA, \$76 (Int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

IAI Knows Square Pegs Don't Fit Round Holes



IAI doesn't expect you to fit your requirements into a standardized software package. Beginning with one of our base systems, we'll customize the product you want and help you learn to use it.

EDUCATION - COLLEGES AND UNIVERSITIES

Financial Accounting, Billing/Receivables, Accounts Payable, Student Loans, Student Records, Admissions, Alumni Finance/Development, Continuing Education, Degree Audit, Exam Scheduling, Payroll/Personnel, Position Control, Labor Distribution.

MEDICINE - SOFTWARE AND FACILITIES MANAGEMENT FOR HOSPITALS

Admissions/Discharges/Transfers, Accounts Payable, Accounting, In/Out Patient Billing/Receivables, Payroll/Personnel, Position Control, Inventory, and Purchase Orders, Pharmacy, Laboratory.

BANKING

Student Loans, Mortgage and Loan Processing.

GOVERNMENT

Financial Accounting, Accounts Payable.

BUSINESS

Payroll/Personnel, Accounts Payable, Billing/Receivables, Accounting, Sales Analysis, Inventory - Perpetual and Physical.

Find Out Why IAI Has More Than 200 Satisfied Customers.

CALL OR WRITE:

James F. Lyon
Information Associates, Inc.
97 Humboldt Street
Rochester, New York 14609
(716) 288-6900

Richard E. Bagby
IAI Data Services Corporation
11722 Sorrento Valley Rd., Suite J
San Diego, California 92121
(714) 481-1204



Information Associates, Inc.

Written in RPG-II

'PBA' System Aids Schools

ATLANTA — Designed to help government and school administrators improve financial control and reporting, the Public Budgeting and Accounting (PBA) package announced by IBM's General Systems Division runs on an IBM System 34.

The programs within the package support budget preparation and tracking, revenue and expenditure accounting, purchase order encumbering and accounts payable and general ledger. They provide both CRT screen displays and hard-copy reports, he noted.

The system generates audit trails from the source entry of transactions to period-end closing to help reduce repetitive entries and increase the accuracy of the whole process, he said.

Once transactions have been summarized to the proper fund balance

sheet accounts, a trial balance is run for checking prior to producing final period-end statements.

As an option, purchase orders may be entered on-line for encumbrance accounting. This allows tracking of money spent and funds planned to be spent, the spokesman said. For payment of purchases, other programs write checks and produce check registers, he added.

Since users will be provided the RPG-II source code, PBA apparently can be used on any CPU that supports that language.

The package is expected to be available for general distribution in November, for a monthly license fee of \$155.

General Ledger Uses Series/1

N. HOLLYWOOD, Calif. — An on-line general ledger system developed by Applied Computer Services, Inc. for the IBM Series/1 minicomputer is said to be suitable for accountants and service bureaus with multiple businesses as clients.

The system works interactively with teletypewriter terminals under IBM's Realtime Program System and requires 12K memory, a spokesman said.

System features include simultaneous remote or local multiuser access of disk-stored files, file protection and error checking. Audit trailing; account balance display; and trial balance, balance sheet and profit/loss report generation are among the user-oriented features.

The system costs \$4,000 with quantity discounts available from 12200 Sylan St., N. Hollywood, Calif. 91606.

4C Extends CMS-2 With Formatting

LOMITA, Calif. — A general-purpose FORMAT capability similar to that of Fortran IV is now available to users of the Department of Defense high-level language, CMS-2, through a compiler from Command, Control and Communications Corp. (4C).

The CMS-2Z compiler for Data General Corp. and Rolm Corp. CPUs is said to be compatible with CMS-2 but to include the formatting feature as a set of runtime procedures.

A set of procedures for performing file control functions using Data General RDOS is also available, 4C said.

The CMS-2Z compiler is written in CMS-2 for transferability to other machines that have a standard CMS-2 compiler. The compiler costs \$50,000 or \$500/mo, the company said from 1823 W. Lomita Blvd., Lomita, Calif. 90717.

COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

Please enter my subscription
(all rates in US \$)

☐ I'm already a subscriber,
but I'd like you to
change my

address

title

industry

other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

RATES. United States — \$18

All Other Foreign – \$65

Canada and PUAS – \$28

(MC Only) List four digits above your name)

If charge we must have
cardholder's signature:

Expiration
Date: _____

First Initial	Middle Initial	Surname										
Your Title												
Company Name												
Mail To:												
City	State		Zip Code									

Address shown is:

Business

☐ Home☐ Check here if you do not

wish to receive

promotional mail.

☐ Check here if you're

interested in receiving

information on:



THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Detach here, fold, and place in post-paid envelope attached through binding.

Creativity Seen Vital Factor, Even in Maintenance Work

By Robert R. Jones
Special to CW

There has been a lot said and written about the functions of effective organizations when designing and implementing a system. The approaches, pitfalls, rewards, successes and failures have all had some attention paid to them.

Notice that I did not say all have been identified; if every possible pitfall could be identified, the role and functions of a design group could well be eliminated.

There have been many courses offered and conferences held with the goal of refining the art of systems analysis in general. More specific attention has been paid to designing and implementing systems or applications.

Analyst and programming skills have been sharpened as a result of all this effort. The product of all this concern is an efficient, well-planned, successfully running, neatly documented,

Concepts and Techniques

user satisfied easily maintainable system. But, invariably, the best of plans often miss the target.

Maintenance Group

At any rate, changes or fixes of some sort are going to be required in almost every system delivered. This is no surprise and is also a very crucial part of the system. The responsibility of making the necessary changes is often referred to as "maintenance."

In many shops, the maintenance group is responsible not only for correcting errors, but also for adding enhancements. It is often difficult to get good people to want to work in a maintenance group. This may be because the thought prevails that there is a lack of creativity which may be exercised on the part of the programmer/analyst working in the maintenance group.

The fact that the programmer/analyst has to "straighten out somebody else's mess" is the cry most often heard coming from the maintenance group.

The good systems analyst or programmer has an especially difficult task in finding a meaningful relationship between his creative talents and his role in a maintenance group. When attempting to solve problems in a system, he feels all creative talents he has acquired are put aside, and he sees himself functioning strictly as a program investigator.

It is uncommon for him to view this role of investigator as requiring creative talents. In actual fact, however, if he would take the time to evaluate what in fact his steps and his approaches were, he would often times find in solving a particular problem that most of what he considers creative

(Continued on Page 30)

'Optx' Improves CDC 6600 Runs

BEDFORD, Mass. — A series of programs that are said to greatly reduce the core requirements of programs executed on a Control Data Corp. 6600 mainframe, Optx is now available on the eastern section of CDC's Cybernet remote computing service network, according to the developer, Brendan J. Welch.

Optx analyzes the operation of the user's program at the binary-coded loader level and determines the tree structure of the subroutines within the program so they can be brought into memory as needed, rather than in an unsegmented monolithic entity, Welch said.

The reduction in core requirement is usually offset by a small increase in running time, he admitted, but the amount of trade-off between core and time is selectable by the user.

While Optx is primarily intended to reduce costs to the user, some may find it useful because it allows programs previously too large to fit within memory to be broken into effective overlays and used without reworking their logic.

In a remote computing environment, the optimizing of a program may permit it to be used in a better job classification for faster turnaround. In an in-house setting, it may help control costs by making more effective use of memory, Welch added.

Although he has used Optx's capabilities almost exclusively with large Fortran programs, the developer believes that, since the optimizer works at the binary loader level, there is nothing that would limit it to that language.

Welch noted that the cost of using Optx is at this point negotiable since some installations may have continuous use for it while others will want to use it "once or twice a year."

A free trial can be arranged by contacting Welch through P.O. Box 253, Bedford, Mass. 01730.

Pansophic Users Share Routines

OAK BROOK, Ill. — Pansophic Systems, Inc. has released Volume III of its Systems Exchange catalog. Volume III is a compilation of exits and subroutines involving Pansophic products, interfaces with other software and procedures for using Pansophic products in various applications, a spokeswoman said.

The vendor acts as a clearinghouse to gather information for the exchange, assemble the actual source coding and documentation for the routines, catalog them and offer them free to its worldwide client base.

Volume III of the System Exchange includes 70 specific applications "representing hundreds of man-years of programming effort," the spokeswoman said.

The exchange is open to any Pansophic product user currently on maintenance or to anyone who has made a contribution to the Exchange, she said, adding that the catalog is updated semiannually. New routines are inserted as they are checked out and older ones are updated as the software with which they work is changed.

More information is available from Pansophic at 709 Enterprise Drive, Oak Brook, Ill. 60521.

the terminal connection

We can match your terminal needs with our off-the-shelf price and delivery. A wide selection of terminals like DEC LA-36 with all options in stock, LS-120, LA-180 and VT-52, Datacassettes, all new Teletype 43 KSR, TI-745, and acoustic couplers.

For your free quote, call us TOLL FREE:
800/323-2135

*management response corporation
660 busse highway park ridge, illinois 60068 (312) 698-3377

Are Your DASD's Drowning ... in a Sea of Data?



DMS/OS the Wave of the Future in Data Management

DMS/OS has recently become the most widely accepted data management system available. For controlling the every day problems associated with DASD maintenance... it is the wave of the future.

Here's why DMS/OS is now the number one data management system: it addresses major user problems; reduces DASD and CPU operating costs; user proven in supporting all DASD devices and operating systems; supported by DASD experts; well documented; easy to load, use and maintain.

The BASIC SYSTEM includes:

1. Management Reports
2. Archival/Retrieval
3. Data Set Retention Control
4. Migration of Sequential GDG's from Disk to Tape
5. Automatic Selective back-up/restore

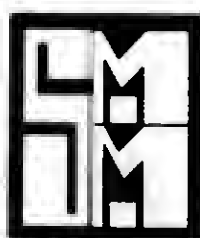
6. PDS Management/Compression
7. Data Set History File
8. RACF Support
9. System Tasking
10. Self Diagnostics

SELECTABLE UNITS

1. VSAM Support
 2. TSO Command Processor
 3. DASD Space Billing
 4. Mass Storage Support* (Real to Virtual Migration)
 5. Volume configurator
- DMS/OS supports all IBM 360/370's under MFT, MVT, VS1, VS2, MVS and VM.

Let DMS/OS save your DASD's from drowning in a sea of data. DMS/OS is available for a free 30-day on-site evaluation. Call or write today for a free brochure, functional overview or for your on-site evaluation. DMS/OS... the wave of the future in data management.

*MSS user group information available



SOFTWARE MODULE MARKETING

THE SUPERMARKET OF SOFTWARE

Crocker Bank Building/Penthouse 1007 7th Street Sacramento, CA 95814 (916) 441-7234 Telex SAMSAC 377-314 IN EUROPE: California Module Marketing, Ltd. c/o Country Farmations, Ltd. 27 Kelsa Place, London W. 8

Not Just for Data Base Work Data Dictionary Useful in Systems Analysis

By Chris Gane
Special to CW

Recently the data dictionary concept has been recognized as an excellent tool for storing and controlling the flood of details that often threatens to drown us as systems analysts.

Another way of controlling this flood is by using a logical data flow diagram which, as the name implies, shows the flows of data in a system, the logical places where data is held (manual or computer files) and the logical processes (clerical or automated) that operate on the data.

This diagramming technique (described in some detail in "Data Flow Diagrams Ease Planning of Any System" [CW, Oct. 3]) enables the user to draw a clear picture of a system, eliminating most of the confusing detail found in flowcharts while preserving the important features of the system and showing how the parts fit together to meet the user's needs.

Of course, the detail still exists and cannot be ignored. Suppose, for instance, we show on a data flow diagram a flow called "Orders" coming from "Customers" and going to a process called "Enter Or-

ders." Anyone looking at this diagram could justifiably ask, "What exactly do you mean by 'Orders'?"

In answering this question, we must be careful not to get bogged down in great and unnecessary physical detail, especially where we have a number of different types of orders, each only slightly different from the next.

No doubt the time will come in development where we should specify this physical detail, but first we must get a map of the forest before starting to count the leaves on the trees.

Top-Down Answers

What we want to do is describe the orders at a logical level, identifying each of the data structures and data elements that make up an order, and we want to have a place to store and retrieve the physical details of each component data element once they have been defined.

Most likely we will find an order consists of some identification, the customer's name and address, and the details of at least one item. So we can give a first-level "top-down" answer to the question,

```
ORDER
ORDER-IDENTIFICATION
ORDER-DATE
CUSTOMER-ORDER-NUMBER      usually present
CUSTOMER-DETAILS
ORGANIZATION-NAME
PERSON-AUTHORIZING-ORDER  optional
FIRST-NAME
LAST-NAME
CUSTOMER-PHONE
AREA-CODE
EXCHANGE
NUMBER
EXTENSION                  optional
```

and so on.

Figure 1.

"What do you mean by orders?" by showing just this breakdown into three data structures:

```
ORDER
ORDER-IDENTIFICATION
CUSTOMER-DETAILS
ITEM-DETAIL
```

We can expand these further, with notes on their contents, until we get down to the level of individual data elements, as in Figure 1.

We note this data structure

for an order tells us nothing about form layout, field size, whether the field is held in packed decimal, editing characteristics, etc. While it omits this physical detail, it is precise enough for the analyst and the user to review for errors and omissions.

For example, the user might say, "If the customer doesn't give an order number, we will insert an order identification of our own," and the analyst

can incorporate this fact.

If we were to define each data element making up each data structure, describe each data store and each data flow and store all this information in a place where it could easily be retrieved, we would have a data dictionary for the system. A word dictionary carries the definitions and explanations of words in a language, arranged for easy access; a data dictionary carries the definitions and explanations of data (and sometimes logic) used in a system or organization.

The use of a data dictionary has often been at a very physical level, holding the detailed physical definitions of data elements, record layouts and so on. This is well and good, and there are many benefits to be had from this physical data dictionary in system implementation and maintenance.

From our description of the analyst's needs, however, it should be clear the data dictionary also has a central role to play at the logical level in analysis.

Let us review what the analyst needs in a data dictionary:

1. *Data element definitions:* name; description; aliases (other names by which the same data element is also known); allowable ranges of values; meanings of different values for a code.

As the analysis proceeds and the physical makeup of the system becomes clearer, the length of each data element and its physical encoding will be added.

2. *Data structure definitions:* name; description; component data elements; information on volume (where the data structure has an independent existence).

3. *Data flow definitions:* source (external entity or process or data store from which the flow starts); destination; description; data structures that flow down the data flow; volume information (where not carried at the data structure level).

4. *Process definitions:* name; description; inputs; outputs; logic details.

5. *External entities:* name; associated data flows; descriptions.

External entities may be other systems (e.g., payroll/personnel), or departments (e.g., accounts) or logical classes of people or things (e.g., customers, temperature sensors).

6. *Glossary items.* It is very useful to be able to store and retrieve "user jargon" terms that mean nothing to the analyst. Finance people may use the

(Continued on Page 28)

Have you considered HELL, Michigan

We haven't either but we do have excellent opportunities in many other parts of the country.

Cutler-Williams, Inc., a nationally-known consulting firm providing services to major corporations across the country, offers the opportunity for growth and challenge. Our corporate office is located in Dallas, Texas, with regional offices located in...

* Atlanta, Georgia * Chicago, Illinois * Cleveland, Ohio
* Dallas, Texas * Dayton, Ohio * Detroit, Michigan * Houston, Texas
* Los Angeles, California * Miami, Florida * San Francisco, Calif.
* Washington, D.C.

We are interested in talking to outstanding individuals with a minimum of 2 years experience whose background includes 1 or more of the following:

IBM - ALC, COBOL, PL/1, IMS, CICS, TSO, TOTAL, Mark IV,
PARS, both DOS & OS experience
Burroughs B6700 & B4700 - COBOL, CANDE, WFL, DMS11
Univac 1108 & 1110 - Exec 8
Honeywell 6000 - GCOS, COBOL
Minicomputer Applications

We offer: stimulating assignments, promotion from within, professional education, above average compensation, and fully paid benefits (including dependents).

For further information, call or send resume, in complete confidence. All replies will be answered.

Ms. Kris Vollmer, TOLL FREE 1-800-527-4907
(inside Texas, call COLLECT: 214-243-3421)

CUTLER-WILLIAMS, INC.

2655 Villa Creek Dr., Suite 205, Dallas, TX 75234
We are an Equal Opportunity Employer M/F

We Always do a Professional Job





IDMS is
the only
Database System
on the Datapro
Honor Roll for the
second consecutive
year

"IDMS has the best vendor support"*

***say users in Datapro study**

In the fifth annual Datapro Research survey of software users, Cullinane's IDMS, the only DBMS on the Datapro Honor Roll for the second consecutive year, was again rated #1 in Vendor Support.

Many of our users are literally running their businesses with IDMS. So when they want Vendor Support, they want it now, and often on site.

To us, Vendor Support isn't just having competent people answer the phone when you call. It's going the extra mile to be on-site, as soon as possible, if need be. And that includes

weekends, holidays, Superbowl Sunday.

We do this with a dedicated team of computer trouble-shooting experts, headed by Ron McKinney. Most times the problem is not with IDMS. But like all our specialists, Ron and his group care. Care that your whole computer system works properly.

For the complete story — including technical literature on IDMS and a schedule of seminars for your area — send this coupon, or phone us at (617) 237-6600.

Think twice. You'll choose the database system with satisfied users.

Name

Title

Co.

Address

City State Zip

Tel. ()

My computer is



Cullinane Corporation

Wellesley Office Park, 20 William St., Wellesley, Mass. 02181 (617) 237-6600

Text Work Runs on DP System

SEATTLE — Costing \$2,500, the Document and Text Assembler (Data 2500) package is said to provide users of Wang 2200 small business systems with text-editing facilities comparable to those commonly found only in dedicated word-processing systems.

Marketed by The Office Manager (TOM) and associated dealers throughout the country, Data 2500 enables anything from one-page letters to 500-page specifications and manuals to be typed, edited and printed out, according to a spokesman.

Data 2500 offers simultane-

ous input and output, keyboard buffering, format memory and automatic text and page adjustments. Unlimited insertions and deletions and automatic headings and footings are also supported by the package, according to TOM.

Data 2500 is document- rather than page-oriented. Although text can be accessed, editing and printed by pages, the document is treated as one continuous file of any number of lines of text, the spokesman said.

Data 2500 is a CRT screen-oriented text-editing system. All processing is carried out

on the screen as a function is performed. Screen prompts guide the operator through all steps, he added.

Text is saved on disk as it appears on the screen; corrections are resaved in place of the original text. Word wrap-around eliminates the need for carriage returns after each line and keyboard buffering is said to protect against lost text if the keyboard operator is extremely fast.

When working on documents, the top three lines of the screen are used by the system to communicate with the operator. These lines tell what document is being worked on, what operation is being performed, the current page and line within the document and the current margins and tab settings.

Data 2500 requires a 16K Wang 2200T or a 32K 2200VP processor and a dual floppy or hard disk drive. Simultaneous printing is not recommended on a dual floppy system because of the disk access time.

Data 2500 will not operate on a PCS II with minidiskettes, TOM noted from 550 Industry Way, P.O. Box 88067, Seattle, Wash. 98188.

Analysts Use Dictionaries

(Continued from Page 26) abbreviation "NPV"; engineers may talk about "shear."

Every user is prepared to explain his special vocabulary to one analyst once but, unless this knowledge can be quickly shared among the people on the team, the users may get impatient when asked to define "accrual" for the seventh time. The data dictionary is a natural place for this.

The contents of the data dictionary may be stored on index cards (about 200 entries seem to be the maximum number practical), keyed into the computer via a text-editing system or maintained on-line via specialized software, of which a number of commercial versions are available.

Whichever approach is taken, the analysts on a project can save time by defining each item once, using the data dictionary as a central store of definitions and, later, where the information is held in machine-readable form, supplying programmers with data definitions direct from the data dictionary, without the labor of coding and reentering those definitions.

Readers with experience or questions on the use of data dictionaries as a tool for analysis are invited to write Chris Gane at Improved Systems Technologies, 888 Seventh Ave., New York, N.Y. 10019.

Seminars Set for Spring

KENSINGTON, Md. — A seminar series on various data processing topics will be offered this spring in the Washington, D.C., area.

The topics include data base management, interactive systems, technical data for decision-making, document storage/retrieval, information resources management and micrographics/computer system design, according to the sponsoring organization, Science Information Association.

Some of the seminars are based on graduate courses at American University and George Washington University, while others will be presented for the first time because of developing demand.

Registration for each seminar costs \$295 for each participant and \$250 for second and subsequent participants from the same organization. Enrollment will be limited to 10 persons.

Seminar schedules and applications are available from the association at 3514 Plyers Mill Road, Kensington, Md. 20795.

WHEN YOU'VE GOT IT... FLAUNT IT!



JASPER JOB ACCOUNTING

FEATURING:

- WIZARD REPORT GENERATOR
- FREE CICS BILLING CAPABILITY
- RJE ACCOUNTING

DATAChron CORPORATION 174 FIFTH AVE.
NEW YORK, N.Y. 10010 (212) 675-5333

NAME _____ CO. _____
TITLE _____ TEL. _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
COMPUTER MODEL _____ OP. SYSTEM _____

FOR LEASE - SHORT OR LONG TERM

Equipment	Serial Number
158/KJ CPU	23769
145/J12	10777
145/GFD	10969
138/J	20021
135/GF	61460
135/I	61154
125H2 (Canada)	10567

Other Models Available
IBM MEMORY

Various Modules of 158, 145
and 135 Memory Available

FOR LEASE OR SALE

3811/1	13046	2870/1	71036
3411/1, 3221, 7360	40028	2860/2, 1862, 7850	60455
3340/A2	21855	2821/2, 3615 (2)	22907, 12031
3330/t	11028	2365/2	41295
3211/1	11280	1403/N1 (2)	43182, 91652
3210/t	20540	1442/7	71755
3210/2	10623	1131/2B	12574

CDC 3300 System 77
Bunker Ramo 22285 Comm Ctl. Unit
(3) 31001002; 31001015; 31001030

WANTED TO BUY OR TRADE
An IBM 370 CPU or Peripherals
Call Marv Berger (800) 225-2036

Computer Systems of America, Inc.

Computer Systems of America
141 Mink St., Boston, MA 02109
(617) 482-4670

From the "bottom line" people . . .

Truly decentralized data entry just became practical, economical



. . . and available!

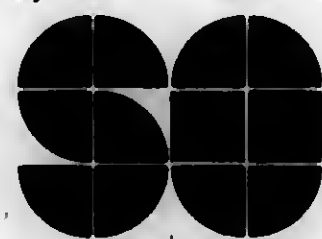
Now, without specialized training, regular office personnel can quickly capture data on pages or documents virtually at the source . . . at any workstation, in any office.

Two new Scan-Optics OCR systems, the 506 and 515 (8 models in all) give you performance ranging from 30 documents or 3 pages per minute up to 60 documents or 7½ pages per minute. All operate off-line. All handle a variety of OCR fonts and handprint. Designed for use in decentralized installations, each contains a mini-computer, scanner, CRT display/keyboard and data storage.

Optional features include communications capability, line printers and more.

For complete information, call or mail this coupon.

Name _____
Title _____ Phone _____
Company _____
Address _____
City _____ State _____ Zip _____



SCAN-OPTICS, INC.
22 Presige Park
East Hartford, Ct 06108
203/289-6001



**The reason Epoch 4 has been so successful
in Finland is because it deserved to.**

Quality. It stands out all over the world.

Finland has one of the highest standards of living in the world. It's a country noted for engineering ingenuity and technological excellence.

A computer product that can make it big in Finland can make

it anywhere in the world.

Finland today is one of Graham's best markets for Epoch 4 computer tape. Its record of performance, through billions of passes, has made believers out of data processing

people all over the free world. And millions of reels of Epoch 4 are now in use.

Epoch 4 is the patented one. The one that's never been duplicated. Never equaled.



GRAHAM MAGNETICS *Proven around the world.*

Graham, Texas 76046



XCS Supports Manufacturers

LOS ANGELES — A production control system that reportedly provides shop floor control, capacity requirements planning and input/output control for manufacturers is available through Xerox Computer Services (XCS).

Shop floor control helps the foreman schedule jobs so work centers meet overall production schedules, capacity requirements planning quantifies personnel and machinery requirements for the manufacture of individual products and input/output control measures how well production plans are met, XCS explained.

The production control system offers four scheduling options. These

are forward scheduling, which starts with a work order and projects timing for all steps up to a due date; backward scheduling, which starts with a due date and projects timing backward to establish a start date for each operation; mid-scheduling, which allows forward and backward scheduling from a known bottleneck; and manual scheduling, which allows the user to manually enter job start and end dates.

XCS provides on-line, interactive computer services to manufacturers, distributors, utilities and government organizations in more than 100 cities. The service is headquartered at 701 S. Aviation Blvd., Los Angeles, Calif. 90245.

Creativity Vital Factor, Even in Maintenance Work

(Continued from Page 25)

talent had been involved and utilized.

The other things the maintenance group is often called upon to produce is add-ons or enhancements. These are often considered insignificant to many analysts and programmers because they are usually relatively small, compared with the system as a whole, and they are usually supportive in nature to the functions already operating.

If an examination of what processes are required when implementing the add-on, it would again be realized that a great deal of creativity and often ingenuity is required. For example, when an enhancement is being added, the individual who is designing the changes

required must first become extremely knowledgeable in the system as it presently exists. This is to enable him to be aware of precautions he must consider such as interfacing with other subsystems and data base integrity.

He will probably be dealing with different programming styles, assuming that more than one individual designed and wrote the original system. This is not to be taken lightly; if one is to understand a given program, he should be able to examine the code and understand why that particular approach was taken.

To do this one must put oneself in the position of the author of the given task or program and adopt his style as much as possible while reviewing his work, which may be impacted by any changes made.

After a thorough knowledge is obtained on the existing situation, only then can an add-on be designed. During the design phase of the add-on, a constant vigil must be kept on the impact the addition may have on storage and timing of the system.

Data base utilization, efficiency and sizing are items that must be given the same consideration as when the original system was designed. The impact the new function may have on existing functions must also be considered. Does this new function duplicate any part of existing coding? If so, is the duplication required? Does the new function overlap or eliminate the need for coding elsewhere in the system, or does the similar coding serve another function for entirely different reasons?

Care must be exercised to ensure that destructive interference in the way of coding is not inadvertently implemented. If all of these items are given the attention needed and the user requirement is met satisfactorily, the design should be implemented efficiently.

After coding is complete, vigorous testing is required. Not only is the new function tested to determine that the goals of its intended purpose are met, but the entire system must undergo complete testing to verify that the new function does not adversely impact any other function in the system.

With this phase complete and all necessary documentation changes made and user training complete, the system is ready to run.

If all of the foregoing items were attended to with the detail necessary to accomplish a satisfactory system enhancement, an efficient, well-planned, successful running, neatly documented, user satisfied, easily maintainable system would be the result. This also describes the goal of the system as originally delivered and indicates the need for originality, creativity and ingenuity that went into the original system are also required processes for system enhancement.

It should, therefore, be clear that at least as much talent and creativity as is required in an original system development group is also required in the maintenance group. This will no longer be the case when the group that developed the original system is flawless and develops the ability to anticipate all future user requirement changes.

Want a faster, cleaner, user-oriented financial application system? ACCOUNTING IV...right off the shelf and right on the money.

A lot of off-the-shelf accounting systems can make you wish that's where you'd left them... on the shelf.

But not ACCOUNTING IV... Unlike other financial application packages, ACCOUNTING IV is as flexible and comprehensive as a custom-built system costing five times as much. And it's easy-to-use — requires none of the special programming that ties up valuable DP time and makes most packaged systems unduly slow in getting information back to the requesting party.

There are four members of the ACCOUNTING IV family — each providing smooth integration with existing programs, each written totally in ANS Cobol, and each boasting a wealth of unique features that makes it easy to install and easy to adapt to the user's needs.

ACCOUNTS RECEIVABLE, for example. A fully integrated module providing tight monetary controls, a wide range of billing options, and complete automation of every receivables function. Over 25 management reports available to suit the user's requirements. Everything from detail aged A/R to sales analysis by product.

Or ACCOUNTS PAYABLE. An extremely flexible system offering more than 50 statistical and informational re-

ports, from check reconciliation to inventory analysis. The Purchase Order module performs the three way match-up of purchase orders, receivers and invoices.

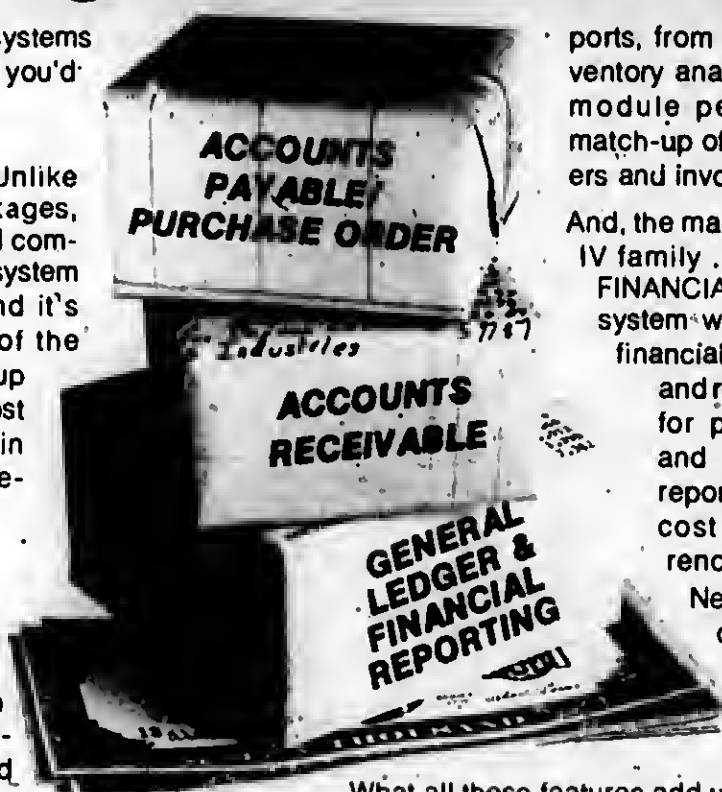
And, the mainstay of the ACCOUNTING IV family... GENERAL LEDGER & FINANCIAL REPORTING. A powerful system with a broad data base for financial and statistical collection and reporting. Offers capabilities for profit-planning, budgeting and forecasting, responsibility reporting, transaction analysis, cost allocation, multiple-currency accounting, and more.

New enhancements include on-line data entry and inquiry as well as interfaces to TOTAL, IDMS, DL/1 and IMS data bases.

What all these features add up to is an entirely new level of control over business operations. A strong claim? Yes, but one that over 250 companies have already seen us make good on.

So contact Informatics today and let us show you how in as little as four weeks you can be up and running with an accounting system that's right off the shelf and right on the money.

ACCOUNTING IV is sold and supported by Informatics Inc., the world's largest independent software vendor.



Informatics Inc. Software Products

World's Leading Independent Supplier of Software Products

Member SIA Software Industry Association

Informatics Inc., Software Products
21050 Vanowen St., Canoga Park, Calif. 91304 (213) 887-9121

Please send literature on:

- ☐ General Ledger & Financial Reporting.
☐ Standard Product Cost.
☐ Accounts Payable. ☐ Accounts Receivable.
☐ I would like to attend a free ACCOUNTING IV seminar.
Please send dates and tell me when the next seminar will be in my city.

Name _____

Position _____

Dept. _____ Computer _____

Firm _____

Address _____ Tel. _____

City _____ State/Province _____ Zip _____

Nets Seen Key to Terminals' Success

By Ronald A. Frank
CW Staff

NEW YORK — Data communications networks hold the key to successful implementation of terminal systems, according to Dan A. Barnes, vice-president of marketing for TRW Retail Systems.

Originally, TRW configured specialized turnkey point-of-sale (POS) terminal systems for specific customers but this is changing so that today's POS-terminals can fit a variety of retail applications, Barnes said in a recent interview.

There is now a trend to incorporating addi-



Dan Barnes demonstrates POS features.

CW Photo by R. Frank

tional functions in terminals that operate on existing private-line nets run by the larger retailing chains, Barnes said.

Among these newer applications that are being overlaid onto existing terminal systems, Barnes listed data entry, administrative messages and bank deposit information — all of which can be transmitted to corporate DP centers from remote retail sites. The data can be transmitted by individual terminals or it can be batched in larger stores and then transmitted after it has been compiled from a number of terminals, Barnes said.

As an example of additional terminal uses, Barnes described the prototype system developed by TRW that would add timekeeping functions to an existing POS terminal site. By integrating the timekeeping operation with an existing network, a user can get more efficiency out of his DP center and also obtain increased utilization of existing network facilities, he said.

The manual time cards now being fed to data entry depend on having the information translated into CPU-compatible form.

But if employees use timekeeping terminals, entering data with magnetic stripe ID cards, the data-entry interim step would be eliminated. And such a system could also be used to keep track of employee productivity information, Barnes added.

Rather than viewing POS display terminals as simple CRTs, TRW calls them "retail windows" that can provide management with administrative reports of sales and associated data, keep track of inventory and selling trends and provide bank deposit data at the close of business each day.

As an example of nonsales transactions, Barnes said a TRW 2001 terminal could be used after store hours to transmit price changes to a specific department from a central site. This information would then automatically be printed for salespersons when the terminal was activated at the start of the next business day.

With software and programming designed to fit specific retailing needs, basic terminals can be expanded with a variety of applications, some of which still remain to be implemented, Barnes said.

Sycor Adds Entry-Level System

ANN ARBOR, Mich. — Sycor, Inc. has introduced the Sycor 405 distributed data entry and processing system for users desiring an entry-level terminal system with the capacity to expand upward.

The 405 can be linked with other 405s or with the firm's 445 processors through-

Sycor's recently introduced Sycorlink local-mode networking facility. Users can increase their total processing capability, the number of keyboards in a network and the amount on-line disk storage by adding 405s and/or 445s to the on-site Sycorlink network, the firm said.

The terminal system can communicate with most IBM mainframes and can emulate IBM 2770, 2780, 3770, 3780 and 3774 terminals, a spokesman said. The system can also emulate teletypewriters, and an IBM 3270 emulator is planned for the fourth quarter of 1978.

The 405 provides up to 64K bytes of main memory, 2M bytes of flexible disk storage, two 2,000-char. CRT terminals, a magnetic tape drive and one bidirectional matrix or line printer.

Although the 405 is an entry-level system, its ability to process two different jobs simultaneously gives it the capability of larger system, the company said, adding that a 405 user doing program-controlled data entry can at the same time be printing a payroll report or transmitting inventory transactions to another system.

The 405 CRT incorporates a glare-resistant

(Continued on Page 36)

Eastern Blending Two Systems To Consolidate Communications

By Molly Upton
CW Staff

MIAMI — Eastern Airlines is in the process of blending its two separate IBM- and Univac-based communications systems into one, which it calls Unipars, according to J. Thomas O'Connor, director of technical programs for Eastern's System One operations.

The plan will enable the firm to reduce the number of private-line networks from two to one and eliminate one type of terminal at each of its reservations sites, he indicated.

The Eastern DP operations at Charlotte, N.C., will be phased out after the consolida-

tion process, and its functions will be transferred to the center here, he said.

Currently, Eastern uses three Univac 494s at Charlotte to control the airline's administrative message switching as well as handle various applications.

From Miami, two 370/195s, a 370/168 and 370/145 handle a modification of IBM's passenger airline reservation system (Pars) operating under a modified Airline Control Program (ACP) dubbed Shared Multiple Applications Real-Time System (Smart).

Under Unipars, modified Raytheon PTS terminals will enable operators to select

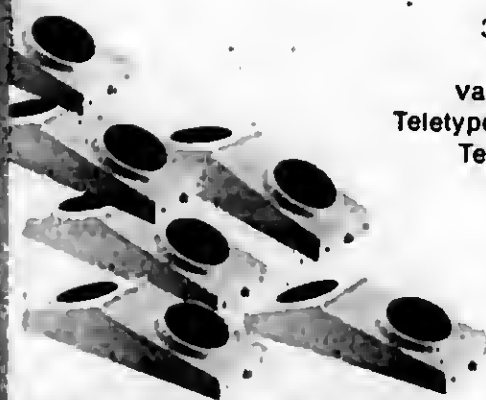
(Continued on Page 34)

CLIP AND RETURN FOR FAST RESPONSE

for a variety of terminals

☐ Series 150A

300 baud, 31 models
Available for a
variety of terminals —
Teletype, Digital Equipment
Texas Instruments . . .



\$147

with tape interface

☐ 302C2-13

Data rate to 300 baud
Magnetic tape interface
Operates with audio recorder
Provides block and record markers



\$425

with universal interface

☐ Series 302A,B

300 baud, 19 models
Simultaneous EIA/20ma
interfaces
Hardwire options
Optional interfaces



\$245

☐ 300 - 1200 baud modem ☐ 2400 - 9600 baud modem ☐ Limited distance modem

Check models of interest and return to us for additional information

COMDATA

8115 Monticello
Shelton, CT 06076
New York
212-777-3800

Name _____

Company _____

Street _____

City _____

State _____

Zip _____

acoustic
couplers

With Local, Remote ATCs

Courier Enhances Family of Terminal Systems

TEMPE, Ariz. — Courier Terminal Systems, Inc. has announced enhancements to its family of IBM-compatible terminal systems. The new models provide advanced communication capabilities and features for improving operator productivity, the company said.

The systems include Advanced Terminal Controllers (ATC) for use with IBM 360/370 CPUs. The ATCs come in local models for use at the computer site as well as remote models for use with data communication facilities. The remote ATC comes in a mini version for use with up to eight displays and/or printers. A larger version of the remote, as well as the local ATC, can

be used with up to 32 displays and/or pictures. The remote ATC communicates in binary synchronous (BSC) or Systems Network Architecture (SNA)/Synchronous Data Link Control (SDLC) protocols compatible with the IBM 3274 Model 1C control unit, the company said.

The local ATC operates in both SNA or an IBM 3272 environment. The SNA environment corresponds to an IBM 3274 Model 1A, while the IBM 3272 environment corresponds to an IBM 3274 Model 1B.

ATC Improvements

Improvements related to the ATC are also incorporated in the Courier 270

display terminals. A display model, when attached to the ATC, offers increased capacities of 2,560 and 3,440 characters on its CRT display screen. Capacities of 480, 960 and 1,920 characters are also available. A status line for relaying error information and terminal system status is located at the bottom of the display screen.

The Courier 270 display system is compatible with similarly configured systems in the IBM 3270 line. A Courier 270 system using an ATC attached locally to an IBM 360/370, with 10 displays and two medium-speed serial printers, may be purchased for approximately \$45,000, or leased for a 36-month term for \$1,150 per month,

the firm said.

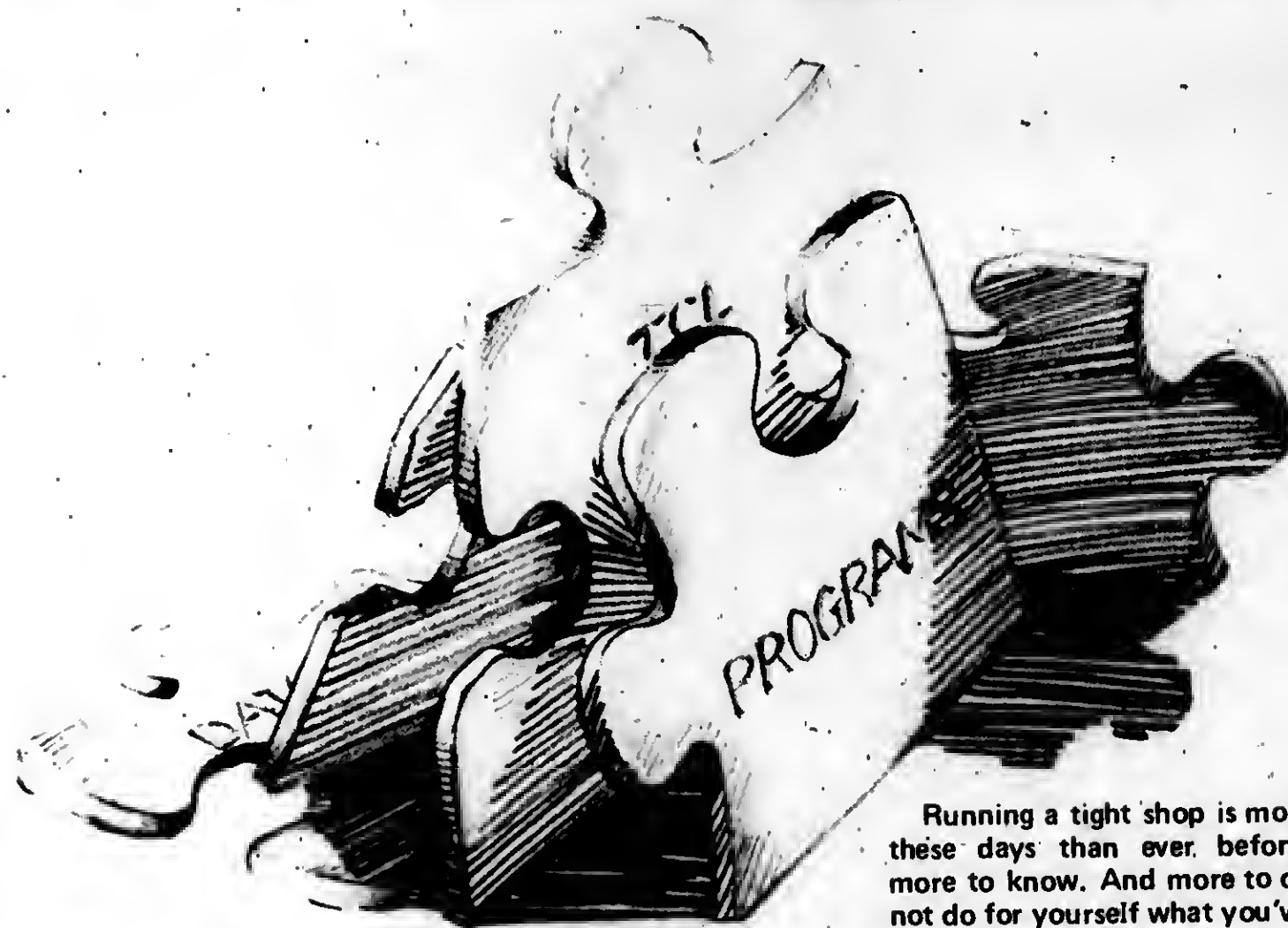
A comparable IBM 3274 costs almost \$61,000 if purchased, \$1,700 per month if rented or \$1,450 per month on IBM's 24-month lease. The Courier system would save the user almost \$16,000 if purchased, or \$10,000 in the first three years if leased, Courier said.

A Courier 270 system using a small remote ATC, communicating over phone lines to an IBM CPU with seven display terminals and one printer, sells for approximately \$24,000 or \$650 per month on lease, the firm said.

A comparable IBM 3276 system costs over \$33,000 if purchased, \$900 per month if rented or \$750 per month if leased, it added, noting that in this case, the Courier savings is approximately 25% if the equipment is purchased or 15% on a three-year lease.

Courier is at 1515 W. 14th St., Tempe, Ariz. 85038.

Get It All Together...



Running a tight shop is more difficult these days than ever before. There's more to know. And more to do. So why not do for yourself what you've done for your users?

With JOBDQC, you build a data base of everything you need to know about running your jobs. And then let JOBDQC go to work:

- Controlling Costs
- Monitoring File Relationships
- Generating Complete Job Requirements
- Cross Referencing All Job Related Information
- Providing Operating Statistics
- Giving You A Better Audit Trail Than You Ever Thought Was Possible.

JOBDQC: When you want an easier way to do a tougher job.



Gulf Computer Sciences Inc.
1775 St. James Place
Houston, TX 77027
Tele. 713-627-9320

Racal-Milgo Beefs Up 24 LSI

MIAMI — Racal-Milgo (ICC) has unveiled improved versions of its 24 LSI modems, operating at 2,400 bit/sec.

The 24 LSI Mark II now provides a standard range of pushbutton test features. Included are internal error test, receive test, analog loopback and digital loopback testing capability. Nine LED indicators provide indication of key EIA interface signals and modem status.

Dial-up models of the 24 LSI Mark II are registered with the Federal Communications Commission so that users can connect directly to switched telephone networks through standardized data jacks, without special access devices, the company said.

The private-line version of the modem costs \$1,092 or \$50/mo. on a 30-month lease. The dial-up version costs \$1,275 or \$57/mo. on a 30-month lease. Prices are for 10 units from Racal-Milgo, Inc. at 8600 N.W. 41st St., Miami, Fla. 33166.

Telenet Expands 1,200 Bit/Sec Service

WASHINGTON, D.C. — Telenet Communications Corp. has announced an expansion of 1,200 bit/sec service and support for the recently introduced Bell 212 full-duplex modem.

Network subscribers will now be able to choose either the Bell 212 or Vadic VA 3400 full-duplex modem for private dial access in 81 U.S. cities, according to a spokesman.

The 1,200 bit/sec public dial-in service using the Bell modem will be introduced in early 1978 in Chicago, Los Angeles, New York, San Francisco and Washington, subject to state approval of tariffs for the new Bell equipment.

Communications costs for a terminal operating at 300 bit/sec average \$3 an hour on Telenet. In comparison, communications for a terminal operating at 1,200 bit/sec average just \$4.40 an hour with three to four times the throughput, the spokesman said.

Telenet is at 1050 17th St. N.W., Washington, D.C. 20036.

RJE Systems Undergoing Fast Evolution at GE

By C.R. Stewart Jr.
Special to CW

The Aerospace Controls and Electrical Systems Department of General Electric Co. in Binghamton, N.Y., has been using remote terminal processing in its business environment for a number of years — since as early as 1972.

Reflecting on the past gives some insight into how the department progressed and the changes that occurred in remote and other processing. The department was established in 1949 as the Aerospace and Ordnance Section. It then became the Avionics Business Section of the Light Military Electronics Department between 1953 and 1955, Avionics Controls Department in 1967, Aerospace Instruments and Controls Systems Department in 1971 and, finally, the Aerospace Controls and Electrical Systems Department in 1974.

DP started around 1955 using tab equipment such as IBM 604 calculators, 407 tabulators, 521 summary punches, 083/084 sorters, 077 collators and 519 reproducer/summary punches. Our first electronic computer, the Univac 1004, came in 1961; this system reached its maximum capacity and in 1964 was replaced by the GE 304B. The 304B served our business information needs through 1967 when its processing capacity was exceeded and it was replaced by the GE 415.

In 1968, the GE 415 was upgraded to a GE 435 to utilize the additional memory available. In the same year, the printing volumes were such that a GE 115 was brought in to relieve some of the print load from the GE 435.

The main purpose here was to provide telecommunications capabilities for remote scientific processing, as well as paper tape to magnetic tape conversion for the factory data collection systems.

In 1972, DP centralization became a reality with regional centers to handle remote DP that was previously handled by the local sites.

The purpose of centralization was mainly to take advantage of the major advances in technology and large processing capabilities of the third-generation machines, spreading the cost over many departments, and subsequently reducing the overall cost per department for the computing equipment.

In the case of our regional center, a switch was made from a GE 635 to a Honeywell Information Systems, Inc. Level 66/60. But where did this leave the department that was not designated a regional center? In order to determine this position, let's investigate the immediate impact DP centralization had on the nonregional center site.

In order to convert information management systems to the regional center, there had to be some means of getting the data to the center and back. This meant using the GE 115 terminal DP system equipped with 2,000 bit/sec dial-up telecommunications facilities that had been used for low-volume scientific work.

Although processing volumes were very low at the advent of conversions by the latter part of 1973, the GE 115 remote job-entry (RJE) terminal system was overwhelmed and it could not begin to meet the total remote processing

needs of the department. It was obvious the GE 115 terminal would have to be replaced, since it had been upgraded to its limit; dedicated 9,600 bit/sec lines and latest remote-batch software still could not satisfy the department's processing needs.

The GE 435 was not being fully utilized because conversion to the regional center had taken most of its processing load.

In 1974 we invested the money, a nominal amount, to convert the GE 435 local batch-processing system into an RJE terminal. The results were good. The terminal met our immediate needs and provided the flexibility needed to handle expanding future needs.

Business information systems were

developed via the terminal at the regional center and we experienced no terminal capacity overflows. But something else happened — the system software was becoming very sophisticated RJE terminal software. Software that at one time only transmitted and received data could now do concurrent printing, card punching and file transmission. As a matter of fact, the GE 435 terminal had achieved a degree of functionality rivaling hardware and software developed by vendors whose main objective was to market RJE terminal equipment.

Today, demands have tripled with regard to the functionality needed in an RJE terminal. The GE 435 is approaching the limits of its capacity and suffering from old age. The replace-

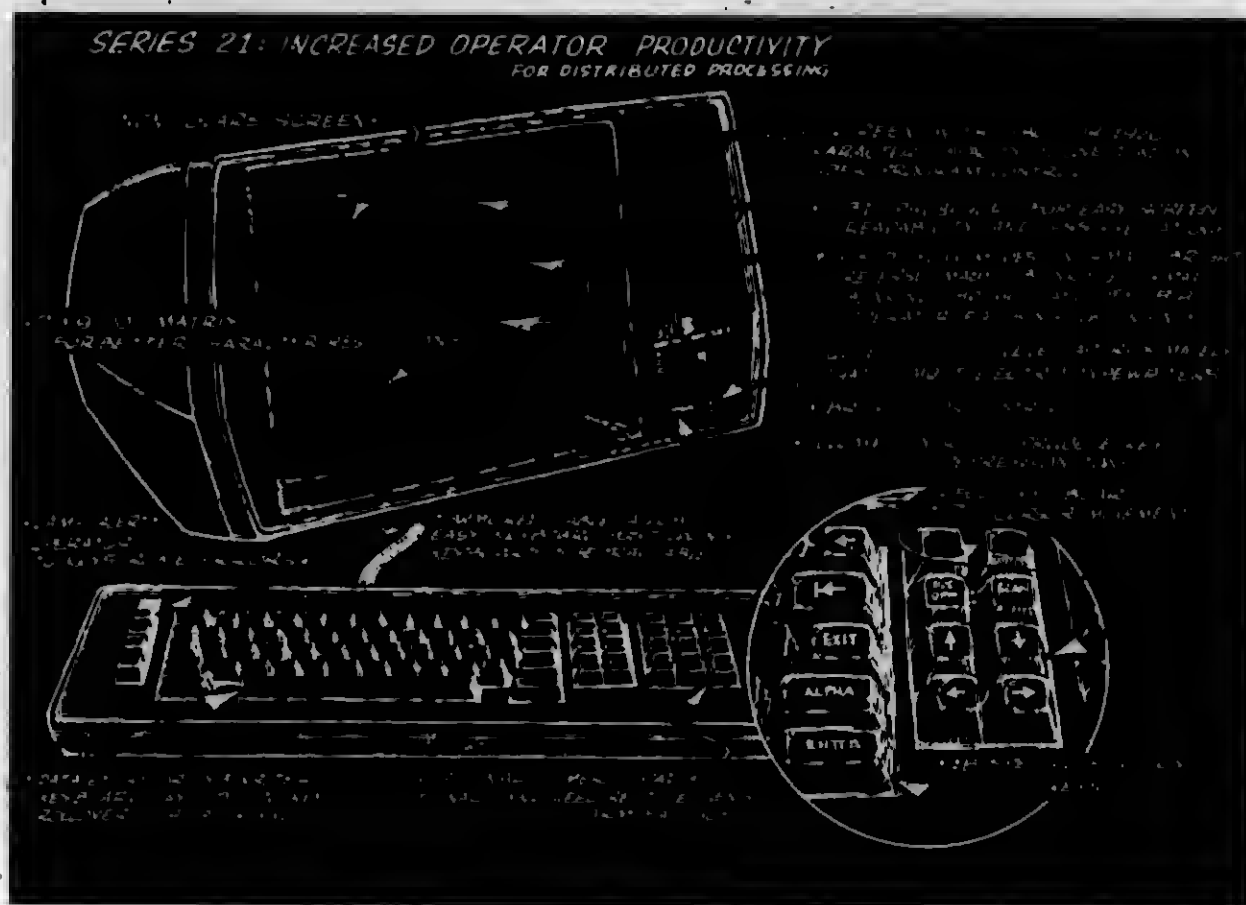
ment for the terminal will have to provide a cost-effective solution to our processing needs, taking into consideration that telecommunication technology has changed and an on-line inquiry and update is a necessity.

Advances in RJE terminal versatility now provide for time-sharing line concentration. Disk subsystems for down-line loading of data bases and interface software with the RJE terminal functions are available.

These and other requirements must be met by the remote processing site, while cost must remain within the range of the objectives of centralization, reducing the cost of upgrading computer equipment to each department by large capacity regional center.

(Continued on Page 38)

MDS Series 21. Engineered to make your operators more productive in 25 different ways.



Mohawk Data Sciences learned a lot about data entry productivity over the past 13 years while meeting the high-volume needs of more than 6,500 customers worldwide. In the engineering of Series 21™, we put those lessons to work on behalf of users requiring reliable source data entry tools for low-to-moderate volume applications.



We learned, for example, that a large display screen makes an operator station easy to use. A 15-inch, non-glare CRT is standard on all Series 21 systems. We learned that some record formats fit well on a 480-character screen while others require 1920-character capacities. Series 21 offers both, under program control, and displays 7x9 dot matrix characters in green against a green background — a combination we've learned is easy on the eyes.

Or consider the Series 21 keyboard. We offer a choice of data entry or typewriter style layouts, either of which can be moved to suit the preference of each individual operator. Features like programmable function keys, full keyboard cursor movement, moveable keyboard and "N" key rollover — to enable operators to key at maximum speed — are only some

of the 25 different features engineered into Series 21 to make your operators and your system more productive.

Engineering for data entry productivity is only one reason why Series 21 provides your best growth path into distributed processing. Others are its two-level software, its peripherals flexibility, its communications capabilities and its low system prices. Consider your distributed application, then consider Series 21 from MDS™.

MDS is now conducting seminars on distributed data processing in major cities throughout the country. For an invitation to a seminar and a demonstration of Series 21, call our headquarters, 1599 Littleton Road, Parsippany, N.J. 07054, (201) 540-9080, and ask for James J. Byrne, VP, U. S. Sales.

™Trademarks of Mohawk Data Sciences Corp.



Mohawk Data Sciences

Eastern Airlines Consolidating Communications

(Continued from Page 31)

either the Uniscope 100 mode or the Pars mode, he said. Thus there is no operator retraining involved, he said.

The Pars system is based on a 6-bit code, whereas the Univac-based systems have Ascii code. Basically, although data may be entered as if on a Uniscope 100, the system will convert it to 6-bit code handled by the IBM CPUs, he explained.

All communications, whether in the Pars or Univac format, will be received by the IBM machines, which will either handle it or convert it to Ascii for processing on the Univac 494, according to Steve Barnes, manager of communications systems.

Therefore, data being sent in from

the field may undergo two conversions: from the Univac format to the IBM format back to the Univac format for processing on the 494, he said.

After an initial testing phase in December with about 16 modified terminals on-line, Eastern is implementing the modifications and taking out the Uniscope 100 terminals, he said. About 500 terminals are scheduled to be modified by June 14, he indicated.

The hardware modifications, being implemented by Raytheon, involve some new printed circuit boards as well as some different keycaps.

The revamped Eastern network will include both Honeywell Information Systems, Inc. Model 7/16s, now in use with the 494s, as well as IBM System/



A T-Bar 3915/3916 automatic switch unit lets Eastern switch peripherals from one CPU to another.

7s, with which the firm has had experience, O'Connor said.

The System/7s will handle the 6-bit code used in Pars while the 7/16s will handle teleticketing operations and other applications previously supported by 7/16s.

Eastern is in the process of replacing System/7s used as trunk monitors with Collins automatic call directors, he said. Like the System/7, the Collins unit facilitates predicting the appropriate level of staffing for reservations, but it also provides headsets so Eastern will no longer rent these from the Bell System, he said.

The Charlotte facility is scheduled to be phased out by the second half of this year after all offices are converted to Unipars, he said. About 60 people from Charlotte have already transferred to Miami, O'Connor added.

With the focus on the conversion of the communications system, Eastern has about 90 people in systems programming, of whom 50 are involved with communications and 60 in operations, he said.

In-House Creativity

Eastern's extensive DP operation was facilitated by in-house programming creativity.

ACP was modified to accommodate Smart, which enables different users to

retain their distinct data bases. The Pars portion of ACP is also highly modified, he indicated.

Through the resulting System One, Eastern serves several other airlines and corporations.

In addition, an effort with American Airlines produced Sabretalk, a high-level compiler for ACP which is also installed at other airlines, he said.

The firm began to take in outside work when in 1972 it installed a 370/195 as a replacement for a 360/65 and found it was using only about one third of the system's capacity, O'Connor said.

Then in 1974 Eastern developed for CIT and its Canadian unit a financial system based on its version of Pars. CIT has loan offices throughout the U.S. Other clients include four airlines: Piedmont, Ozark, Air West and Southern, all of which have their own data bases operating on System One, O'Connor indicated. Last October, the firm separated its operations onto two



Two IBM 370/195s preside over the Eastern DP complex.

on-line CPUs running its version of ACP. Generally, a 195 is held as backup because a 168 cannot completely substitute for a 195, he said.

'Close to Full'

Even with separating the client work onto a different CPU, Eastern's reservation work is coming close to filling a 195, he said.

Eastern has ordered five 3033s, and IBM is quoting a 30% to 31% gain in usable cycles on its version of ACP, O'Connor said. A 195 with standard Pars handles about 200 message/sec, so that would mean about 260 message/sec with a 3033, he said.

O'Connor thinks he will make it through 1978 on the 195s. However, then he will need two 3033s for Eastern, and will have to make a decision on what clients need.

One of O'Connor's problems is the demand for people trained in ACP. During the past two years, Eastern has lost 24 people, many of them to American Airlines, he said.

To counter this trend, Eastern has begun a program to identify and train those people with roots in the community and a commitment to the company, he said.

Power Critical

With so much of its gear devoted to real-time work, power is critical. The site has two lines from the local utility feeding into a bank of batteries. The power is reconstituted, thus eliminating spikes, and then distributed to the center. A complete backup system includes batteries capable of functioning for 30 minutes at full load, as well as a diesel system, which usually activates within one minute of a power failure.

Presenting the most dynamic business Opportunity since the Big Mac.™

A National ComputerLand Retail Franchise

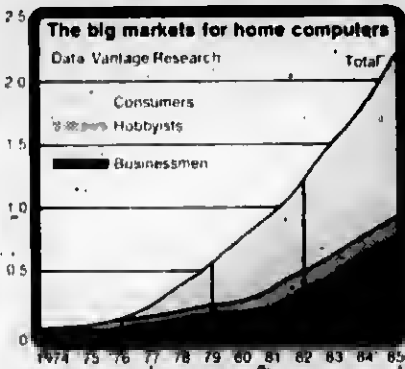
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 855-5363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Big Macs a trademark of McDonald's Corp.

Mail to E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW, San Leandro, CA 94577 (415) 855-5363

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

"Top Secrets"

New Concerns in Information Security and Privacy, Deterrents to Computer Crime, Technical Advances in Information Security, the Management of System Security Risks, and Advances in Computer Auditing and Control.

These are some of the topics that will be uncovered in depth at the Fourth Annual Honeywell Computer Security and Privacy Symposium to be held April 18-19, 1978, at the McCormick Ranch, Scottsdale, Arizona.

If you are in any way responsible for, or have an interest in computer privacy and security, you'll want to be there. Or be represented. The fee is \$425.

Send us the coupon. Or call (602) 993-3193. We'll send you all the details.

Honeywell

Honeywell Information Systems
Jerome Lobel, Manager
Computer Security and Privacy
P.O. Box 6000 (MS K95)
Phoenix, Arizona 85005

Please send me more information and a registration form for your April Symposium.

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____



The price you pay for success just went down. Way down.

You pay a price to be successful with computers. A very high price.

But you don't pay in cash. You pay in aggravation. Lots of it. Late nights. Plenty of them. And pains in your gut. Sharp ones.

At Perkin-Elmer we're working to bring down that price. Here's how.

Tell us what you want in computer products.

We build computers and peripherals for people who've been there before. People who have had enough aggravation. People who know what they want. And aren't afraid to tell us.

In fact, we encourage our customers to tell us what they want. Not the other way around. Which, if you think for a minute, is a terrific first step on the road to success.

But, the real secret to success is service. The old-fashioned kind. The kind where we go to great lengths to make sure you succeed. The kind that only a Fortune 500 company can provide.

We'll do everything we can to make you successful.

For us, service begins with building computer products for people to use comfortably. Invariably, that pays big dividends in less operator fatigue and more usable work over the life of the product.

But, we don't stop there. We test every product. For two reasons: to make sure you get exactly what you order and to prove to ourselves that our product meets our own exacting specifications.

We provide training, too. At your place

or ours. And if you need customer service, one toll-free call gets it. Days. Nights. Weekends. We're there.

Think about that when you're buying your next computer, peripheral, or system. Then call Perkin-Elmer. And pay less for success.

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free (800) 631-2154.

Here is my business card. Tell me how to be more successful with ☐ computers or ☐ peripherals in ☐ business ☐ scientific ☐ simulation ☐ OEM applications.

PERKIN-ELMER
Data Systems

Sycor Introduces Entry-Level DDP System

(Continued from Page 31)

15-in. screen housed in a desktop unit. An optional display stand enables the operator to adjust the angle of the screen.

The 405 utilizes a multiple-processor architecture which reportedly increases system throughput. In addition to the main processor, additional processors are located in each peripheral controller, thereby freeing the main processor from I/O control functions.

Bidirectional Printer

Available with the 405 is the Sycor Sprinter, a bidirectional, micro-processor-controlled matrix printer that operates at 60-, 120- or 180 char./sec. In addition, 300- and 600 line/min

printers may be used with the system.

The system can operate in binary synchronous (BSC) and Synchronous Data Link Control (SDLC) transmission modes at speeds up to 9,600 bit/sec.

Available control programs include Interactive Remote Job Entry; batch transmission using various IBM protocols; and Sycor's Network Control System, which provides automatic polling and selection of remote 405s and other Sycor systems such as 445s, 440s, 350s or 340s. Three programming languages are available: Cobol, Basic and TAL 2000, Sycor said.

Sycor Cobol is an Ansi Cobol subset with interactive display support extensions. Cobol may be used for transaction processing or for intelligent data

entry with concurrent batch processing, the firm noted.

Sycor Basic provides a business and engineering mathematics language for solving common financial problems.

TAL 2000, Sycor's own terminal application language, serves as a common bond between Sycor products. It is designed for users who need a language specifically for intelligent data entry programming.

The 405 handles job streaming, which allows a sequence of jobs to be run automatically, virtually eliminating job initiation keying errors, the company said.

Data security on the Sycor 405 is controlled by an optional keylock which allows the user to lock out activity on the terminal and by a program

function key lockout which enables the user to restrict entry into selected system facilities.

A "typically configured" Sycor 405 system incorporating 48K bytes of main memory, 500K bytes of flexible disk storage, one CRT terminal, one Sprinter printer and a communications adapter can be purchased for \$19,850. Comparable monthly lease rates are \$538, \$497 and \$456 for one, two and four years respectively, including maintenance.

Initial deliveries of the Sycor 405 are scheduled for the third quarter of 1978, from 100 Phoenix Drive, Ann Arbor, Mich. 43104.

Data Link Suits Fiber Optics DP

W. BOYLSTON, Mass. — A full-duplex, asynchronous RS-232C data link engineered for fiber-optic DP applications is available from Valtec Corp.

Designed for users with little or no experience with fiber optics, the data link accepts the 25-pin RS-232C electrical plug as input and converts directly to optical digital data transmission. The output is connected directly to preterminated fiber-optic duplex cable, Valtec said.

Each end of the link contains a receiver, transmitter, power supply and power cord with wall plug.

Transmission capability from dc to 20 kbit/sec over distances up to 3,000 feet is built in. The first model of a Fiberdata series of products, the RS-232C link provides users with the option of modem elimination, low-cost cable installation and secure lines.

Prices are in the \$1,000 range for a link pair plus cable costs of approximately \$1 per foot. Valtec Corp. is at 99 Hartwell St., W. Boylston, Mass. 01583.

Coupler Compatible With Bell 212A

PHOENIX — Omnitech Data has unveiled the Model 701R acoustic coupler, which operates at 300 bit/sec.

Described as compatible with the Bell Model 212A data set, the unit can also operate at speeds up to 600 bit/sec. Other features include teletypewriter and RS-232 interfaces, acoustic or hardwired coupling and half- or full-duplex operation.

The unit costs \$341 from Omnitech Data at 2405 S. 20th St., Phoenix, Ariz. 85034.

Low-Speed Unit Bows

FALLS CHURCH, Va. — The Model 88-Modem from International Data Systems, Inc. (IDS) provides communications over either the switched telephone network or private lines at any software selected transmission between 66- and 600 bit/sec.

The unit is fully compatible with Bell System 103A modems and provides either half- or full-duplex operation, the firm said.

The 88-Modem is available in kit (\$245) or assembled form (\$395) from IDS at Suite 200, 400 N. Washington St., Falls Church, Va. 22046.

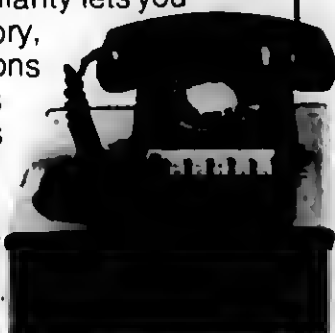
WANG'S PCS-II

THE END OF THE LINE FOR INTELLIGENT TERMINALS.

Wang's PCS-II. The small business computer that makes intelligent terminals obsolete. And introduces a whole new world of Distributed Data Processing.

Endowed with commercial BASIC and exclusive Wang minidiskette storage, the PCS-II delivers direct access data processing capabilities no ordinary terminal can. And with Wang's programmerless "EASYFORM" forms building and data-entry language, the PCS-II is a hands-on winner in any data-entry or forms-processing environment.

Wang modularity lets you expand memory, communications or peripherals as your needs grow. Or new technologies as they develop. Directly at the operator site.



The PCS-II even gives you a price tag no intelligent terminal can match — just \$6,200. With 50K memory, dual minidiskette drives and bisynchronous 2780/3780 communications it's still only \$9,200.



Hungry for more intelligence?

Call your local Wang, office or mail this coupon to PCS-II Product Sales, Dept. DDP, Wang Laboratories, Inc., One Industrial Ave., Lowell, Massachusetts 01851.

Wang Laboratories, Inc., One Industrial Ave., Lowell, MA 01851
I'm hungry. Send me information on Wang's PCS-II.

Name _____
Title _____ Phone _____
Company _____
Address _____
City _____ State _____ Zip _____

DP72/CW/8

Memorex SuperReel. A new approach to magnetic tape reels. The approach that's right for today's drives here now, and for the new generations to come.

SuperReel gives you a uniquely shaped I-Beam hub, making it 80% stronger than conventional reels, giving SuperReel the strength to withstand the higher tensions of both your current and future drives. SuperReel also has a specially shaped tape wind surface, to prevent edge damage during rewinds. And all SuperReel components are ultrasonically welded—no glues or solvents—for improved strength, product uniformity, and lasting performance.

SuperReel is the only reel specifically designed to meet the demands of advanced drive technology. The one reel that surpasses all published specifications for high-performance drives. The one reel that performed reliably in stringent testing conditions at 15 ounces of tension and speeds up to 220 ips. The one reel with no flange expansion or contraction under stress conditions. The one reel balanced to prevent hub-to-drive fit problems.

Memorex SuperReel. A better reel, to give you better results. Better winding. Positive autoloader functioning. More accurate data transfer. Greater reliability. On the drives you're using now, and the new generations of drives to come.

Memorex SuperReel. The new shape that'll put your data processing in great shape.

Ask your Memorex representative to explain how SuperReel can dramatically reduce your data processing costs. Locations in principal cities worldwide. Or contact us at 1200 Memorex Drive, MS-0064, Santa Clara, CA 95052. Phone 408-987-1043.



MEMOREXCELLENCE

Gandalf Adds Two Versions of PACX System

WHEELING, Ill. — Gandalf Data, Inc. has unveiled a third-generation private automatic computer exchange system (PACX III). This terminal switching port selection and contention system, while retaining all of the operating benefits of the earlier PACX systems, includes two features not previously available, Gandalf said.

Terminal users may access PACX III and request a specific service class using a terminal keyboard class select system. No additional hardware or other changes are required at the terminal. Existing communications links reportedly need not be altered and may continue to operate via the dial-up network, multiplexers or digital networks.

With the keyboard class select op-

tion, the terminal user types a single character to gain access, followed by a two-digit class code assigned to the requested service. PACX III searches for a free port of the requested class if one is found, the terminal connection is made and if no service is available, the terminal is disconnected, the firm said.

PACX III also has a statistics port which replaces the standard control/monitor facility of PACX I and II models. The statistics port may be connected to the CPU or other data-handling device. The port accepts commands and generates statistical data at 2,400 bit/sec asynchronous, accompanied by time of day. Messages are in Ascii and use the mixed radix port and terminal numbering system common to all PACX systems, Gandalf

said.

PACX III delivery is 90 days from date of order, with prices starting at \$10,500.

Mini-PACX Offered

Gandalf also has a "mini" version of the larger-scale PACX systems. The Mini-PACX system, which is designed for both high-speed asynchronous and synchronous operation up to 9,600 bit/sec and 19.2 kbit/sec respectively, has the ability to handle up to 48 terminals and 32 computer ports of varying speeds and communications codes allowing terminal switching port selection and contention, the firm said.

Depending upon the Mini-PACX configuration, the unit sells for between \$6,000 and \$20,000, the com-

pany said.

Mini-PACX may use dedicated lines which can be owned or leased, and the system is capable of fast response to request for service — less than half a second, according to Gandalf.

The Mini-PACX system can be re-configured to accommodate changes in system loading and in contention ratios on different classes of services, Gandalf noted.

Mini-PACX delivery is 60 days from the firm at 1019 S. Noel St., Wheeling, Ill. 60090.

Concentrator Collects Data For 360/370s

ROCKFORD, Ill. — The P1-5 data concentrator from Phone 1 can connect push-button telephones to an IBM 360/370 CPU for data collection. It can also collect the same data as a complete off-line stand-alone system, according to the firm.

The P1-5 will answer up to 16 callers simultaneously and record their entries onto a 3740-compatible diskette and/or send the information to the 360/370 CPU via the multiplexer channel, Phone 1 said.

Optional CRT/keyboards are also supported as terminals for those users who need the alphabetic input not possible with their push-button dial telephone.

Standard features on the P1-5 include dual 3740-compatible diskette reader, battery backup power supply and Modulus 10 checks for data validity.

The cost of a P1-5 data concentrator "averages \$300 per month." The optional communicating CRTs are \$17 per month and a 3272 emulation package for the P1-5 will be available by March 1, the firm said. Phone 1 is at 1330 E. State St., Rockford, Ill. 61108.

RJE Systems Evolving Fast

(Continued from Page 33)

ters. But how does a remote site accomplish this and still meet its information processing requirements?

Many vendors offer solutions to this dilemma for varying prices. Suppose we impose a monthly ceiling fee of \$10,000. The Datanet 700 series from HIS, for example, provides an adequate solution to the problem of direct replacement of the GE 435, offering such features as Multimessage Interface (MMI) software, off-line printing and time-sharing line concentration. Increased versatility may be available in that firm's Level 6 with a variety of configurations and options that could possibly provide increased functionality and performance over the GE 435 at comparable prices.

But not only HIS offers alternatives in this dilemma — Burroughs Corp., IBM, Digital Equipment Corp. and many other vendors have offerings that could solve this problem in a cost-effective manner.

C.R. Stewart Jr. is manager of programming techniques and software development at General Electric Co., Box 5000, Binghamton, N.Y. 13902.

Mini/Micro 78

THE MINICOMPUTER/MICROCOMPUTER CONFERENCE AND EXPOSITION
APRIL 18-19-20 • CIVIC CENTER • PHILADELPHIA, PENNSYLVANIA

LOOK

at over a half mile of product displays by the industry leaders! A "supermarket" of mini/micro computer systems, peripherals, and industry services all under one roof in the spacious Philadelphia Civic Center. The MINI/MICRO COMPUTER EXHIBITION will be the largest in the East in 1978, and one of the largest in the country. Many new products have been introduced at previous exhibitions.

LISTEN

to almost 100 industry speakers in about 20 conference sessions discuss a wide array of topics of interest and value to you. And all sessions will be held in meeting rooms located just an escalator ride away from the exposition floor.

CONTRIBUTE

your experience and expertise. A question, answer, and comment time is held at the end of each session at the MINI/MICRO COMPUTER CONFERENCE to encourage an informal and valuable interchange of information between both session speakers and those in the audience.

PROFIT

by taking home facts and ideas important to you and the firm you represent. The opportunity to do so will be in Philadelphia this April 18-20. You'll be an important part of an estimated international audience of 10,000 industry professionals who'll look, listen, contribute, and profit by their attendance.

SPECIAL SEMINARS:

MONDAY, APRIL 17
MINI/MICROCOMPUTER APPLICATIONS

COURSE OBJECTIVE: Beginning with a brief review of microcomputer hardware and software, this applications course is intended to build on your knowledge of basic hardware configurations, memory systems, I/O Schema, and debugging methods. Understanding the differences in approach for applying minicomputers and microcomputers will be the theme of the course. The emphasis will be on microcomputer applications. Specifically, the software development process, development of the hardware system, hardware/software tradeoffs, interfacing, system specification, and some development cases will be covered. A general understanding of the process is one goal of the course. The course will close with an explanation of the important highlights of the hardware development process.

COURSE OUTLINE:

1. Reminder on current minicomputer characteristics and capabilities.
2. Review of microcomputer hardware and software.
3. The software development process.
4. Development of the hardware system.
5. Hardware, software tradeoffs.
6. Interfacing.
7. System Specification.
8. Some Development Case Studies.

Sponsor: The Institute of Electrical and Electronics Engineers (IEEE)

WEDNESDAY, APRIL 19
STEP-BY-STEP DESIGN OF MICROPROCESSOR SYSTEMS

The aim of the course is to expose the participants to step-by-step procedures for the design and implementation of microprocessor systems using the following modes of operation: (1) Wait/go; (2) Test-and-go (test and skip); (3) Interrupts; and (4) Direct Memory Access.

The design procedures which are accomplished in five well-defined steps, will be demonstrated and verified experimentally in class. Lecturer: Prof. D. Zissos, The University of Calgary, Canada.

Sponsor: The International Society for Mini and Microcomputers (ISMM)



To: MINI/MICRO COMPUTER CONFERENCE AND EXPOSITION
5628 E. La Palma Avenue, Suite 1, Anaheim, CA 92807, Phone: (714) 528-2400

My Primary Interest Is:

- ☐ Attending. Please send me a Preview Program listing information on sessions/papers, exhibitors, and hotel reservations.
- ☐ Exhibiting. Please send a copy of the Exhibit Prospectus.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ M/S _____

Zip _____

Within State DP Center

Dialogue With Users Key to OCR Switch

By Frank Vaughan
CW Staff

SAN DIEGO — The key to the success of the OCR system conversion in the state of West Virginia was open communication channels between OCR management and the users and analysts, according to Craig Grayson.

Grayson is manager of OCR services for the state of West Virginia and recently discussed the state's OCR system conversion at the OCR Users Association (OCRUA) Winter Conference here.

In May 1977, the state converted all its existing OCR applications from an IBM 3886 to an Input 80-C1 from Recognition Equipment, Inc.

The OCR center in West Virginia is located within a division of the Department of Finance and Administration, Information System Services (ISS), which is responsible for providing all DP services for approximately 50 departments within state government. ISS is organized into two major units, services and systems, each under a deputy director.

The systems section is responsible for all programming, systems analysis and application development, he said. The services section is responsible for all functions from the initial input of data to the distribution of the corresponding output, he explained.

The processing services department includes the central computer center for the state government, which maintains twin

IBM 370/158s with an attached processor. In addition to a batch environment of almost 15,000 jobs per month, it operates a teleprocessing network utilizing IMS, CICS

CW at OCRUA

and Quik-Draft (a bill drafting system) with over 200 terminals state-wide. The entry services section is composed of Input, OCR and support services.

Formerly Skeptical

"A series of bad experiences in the late 1960s made state government users skeptical of OCR," he said. "What eventually made scanning into a viable technology was a Department of Education need for apti-

tude test scoring. Approximately 500,000 forms had to be graded each spring and fall and the results distributed to schools in a timely manner."

In 1973, an IBM 3881 optical mark reader was obtained in hopes of meeting the needs of the user within the time constraints established. This approach cut the test scoring time down from a period of a few months to about two weeks and became the selling tool needed to enter the field of OCR.

"Shortly after this, the state leased an IBM 3886 character reader. The first application processed was the vehicle registration system for the Department of Motor Vehicles. The success of this application, which scanned approximately 2 million documents per year, prompted requests from other users for additional applications. By the fourth quarter 1974, when a second 3886 was installed, there were 20 operational jobs on the scanners which necessitated operating both units 16 hours a day, five days a week.

(Continued on Page 41)

Performance Seminar Planned

DELRAN, N.J. — Datapro Research Corp. will hold a three-day seminar examining the techniques of DP system performance and productivity in New York on Feb. 1-3.

The course, entitled Computer Performance Measurement, will discuss ways in which users can make better use of DP re-

sources by more effectively scheduling equipment and operations, a spokesman said. Topics in the course will include improving program performance; generating a systems profile; locating systems blocks; and understanding the capacity of system performance, he stated.

A workshop will also be available to demonstrate certain techniques as they are applied to system hardware and software, he added.

The course will also take place in Washington, D.C. on Feb. 6 and March 27, in San Francisco on March 1, in Chicago on March 13 and again in New York on April 17, the firm stated.

Fees for the meeting are \$425 for Datapro subscribers and \$475 for nonsubscribers. Team and prepayment discounts are also available from the firm at 1805 Underwood Blvd., Delran, N.J. 08075.

Kennedy Adds Tape Transport

ALTADENA, Calif. — A bidirectional tape transport that can be equipped with one, two or four write/erase heads and has an unformatted storage capacity of 720K byte/track or 2.88M byte/cartridge has been introduced by the Kennedy Co.

The 631 has a normal operating speed of 30 in./sec with an optional speed of 25 in./sec, a spokesman said. Using a phase-encoded format at a recording density of 1,600 bit/in., the unit has a data transfer rate of 48,000 bit/sec at 30 in./sec and 40,000 bit/sec at 25 in./sec, he stated. Reverse search, forward search and rewind operations are performed at a speed of 90 in./sec, he added.

The direct-drive motor features a start/stop time of 25 msec at 30 in./sec; 30 msec at 25 in./sec; and 75 msec at 90 in./sec, the firm stated. Start/stop displacement is .375 inches during read/write operations and 3.38 inches during search and rewind. Power requirements are 5VDC regulated to within 5% and 24VDC unregulated, the firm said.

The 631 also incorporates an integral tape cleaner that removes dust during write/read, search and rewind operations and allows a tape life in excess of 20,000 passes, a spokesman said.

Price of the unit is from \$500 to \$795 depending upon speed and the number of tracks specified. The Kennedy Co. is located at 540 W. Woodbury Road, Altadena, Calif. 91001.

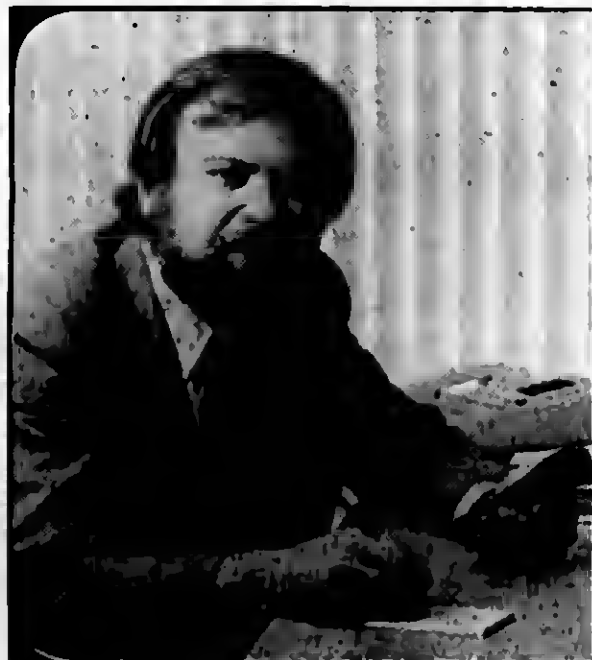
Switch Replaces IBM 2914s

CLIFFSIDE PARK, N.J. — An 8-channel switch utilizing emitter-coupled logic and designed to replace two IBM 2914 switches in 360, 370 and compatible systems has been introduced by John Beall & Co., Inc.

The unit allows switching of peripheral units and computer channels and is also capable of providing a path to a backup computer, the firm stated. Any of the channels can be logically disabled to isolate a malfunctioning control unit, the firm noted.

The BCS-4 is pre-wired for remote-controlled operations and requires a 50- or 60-cycle power source, a spokesman said.

Price of the switch in an 8 by 8 configuration is \$75,000, with rental on a 12-month basis costing \$1,725. Eight by 6, 6 by 8 and 6 by 6 configuration rentals are priced at \$1,450, \$1,400 and \$1,200 respectively from the firm at 447 Gorge Road, Cliffside Park, N.J. 07010.



I've got the sharpest pencil... when you want to buy a terminal...

Hi... I'm Bert Rudofsky, President of MTI Sales, and if you're looking for terminals or accessories, you can stop looking!

We've got it all, from DECwriters and DECscopes to Modems and Couplers. We've also got the service and the know-how with full factory backup to help the new guy get started in data communications or the old pro update his system for more efficient operation.

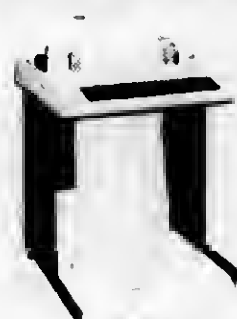
It all means that when you need computer peripherals, you can count on me and the MTI professionals to give you the best deal, best delivery and fastest service.

Buy, lease or rental plans available. Give me a call at 516-482-3500, 212-895-7177 or if you're outside New York 800-645-8016... thanks.



159 NORTHERN BOULEVARD • GREAT NECK • N.Y. 11021

When you buy from MTI you get a price advantage
and a lifetime friend you can count on!



DECwriters
DECprinters

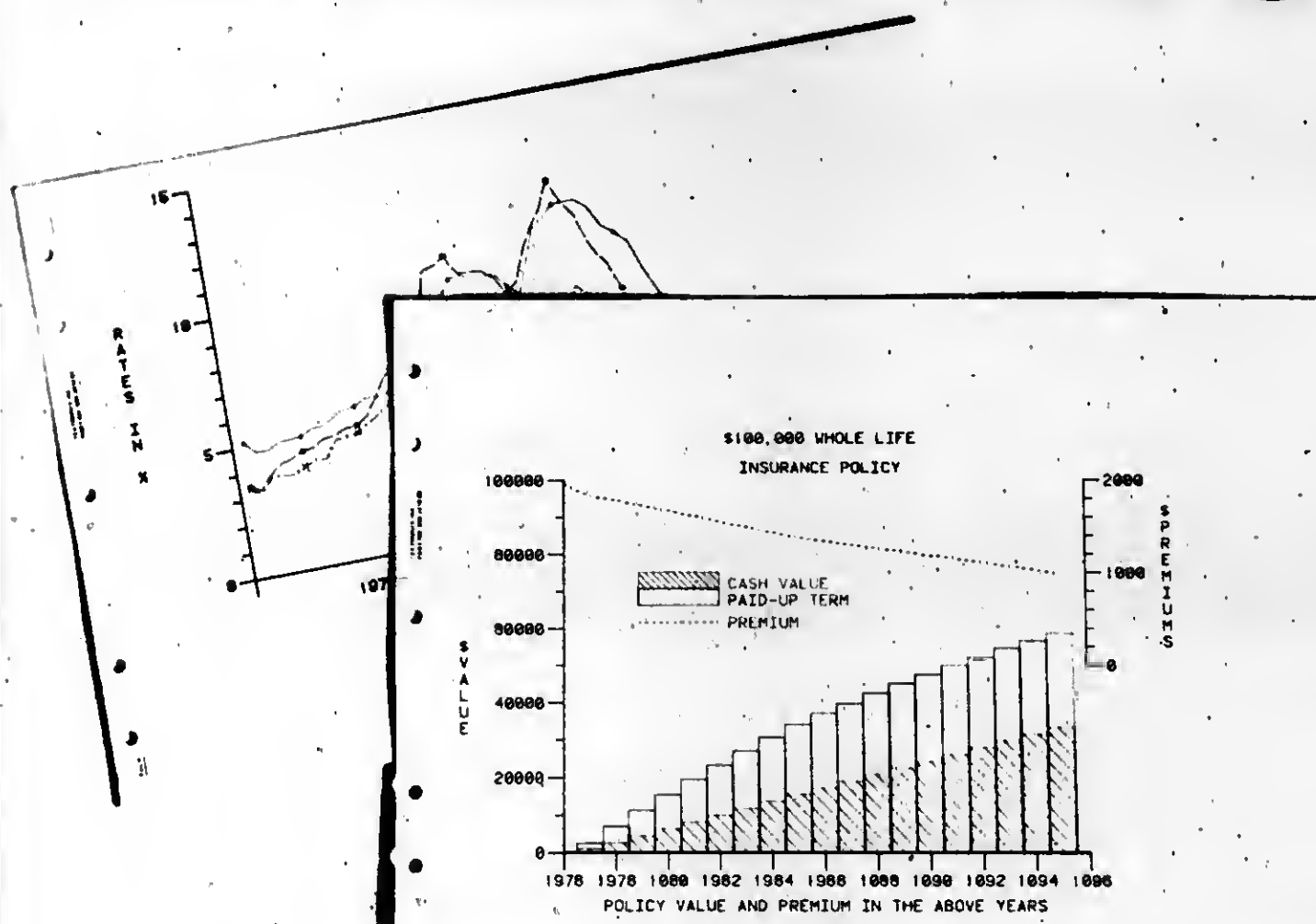


Terminals



DECscopes

"There's no plotter like it. My terminal easily commands any graphics."



Problem: You'd like computer graphics, but not at the price of adding more terminals.

So you continue to use paid personnel to hand-plot charts, graphs and diagrams.

Solution: Tektronix 4662 Interactive Digital Plotter. Plugs into most terminals for precise, multi-colored graphics.

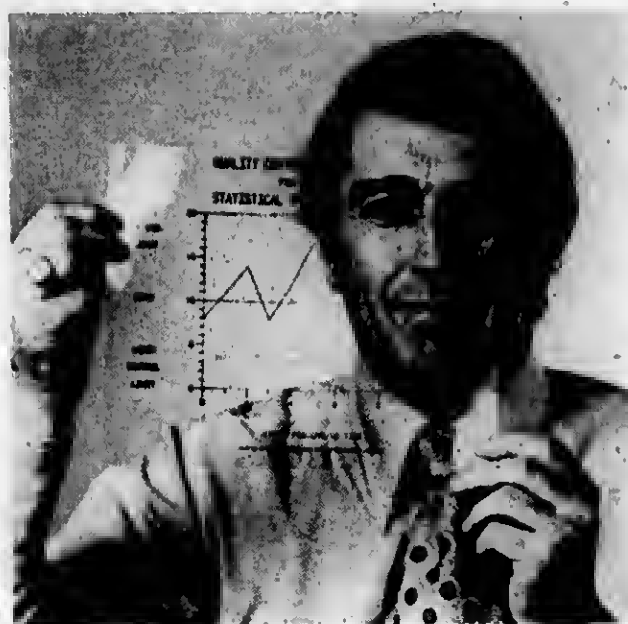
The 4662 plugs into almost all RS232-C or GPIB-compatible terminals. Use the 4662 to prepare graphics on paper or Mylar® polyester film for sales meetings, program presentations.

With computer accuracy and unexpected economy. Plus multiple colors from felt tip or wet ink pens.

Easy interface to timeshare environments.

Thanks to its built-in micro-processor, Tektronix modems, and Plot 10 software, operation is simple, accurate, and faster than any other plotter at the 4662's low price.

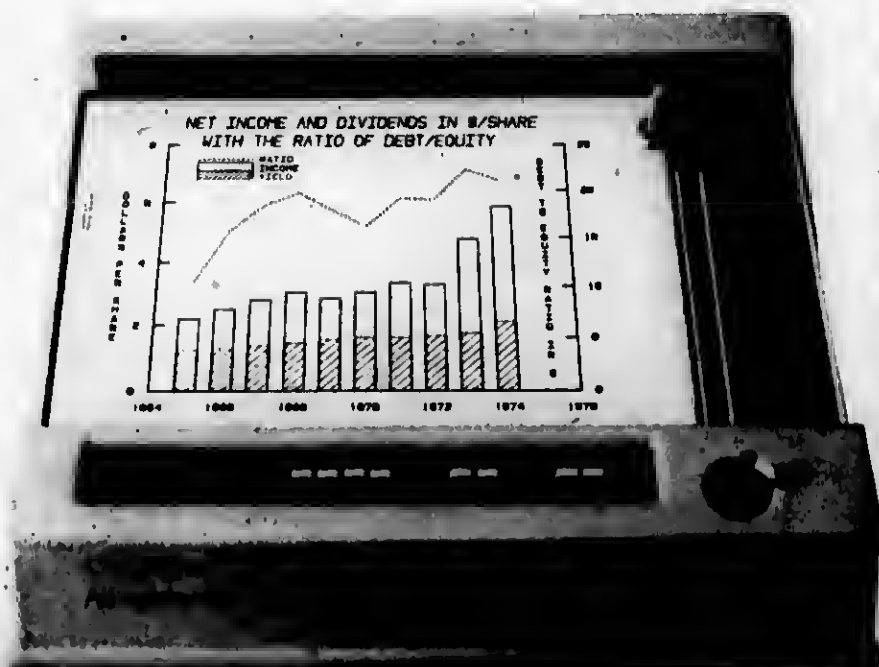
Don't ask your people to do a plotter's job. Get a graphics specialist that pays for itself. Because the 4662 is from Tektronix, the worldwide graphics leader, you're assured of exceptional reliability and fast service wherever you are. Talk to your local Tektronix Sales Engineer now, or call toll free, (800) 547-1880.



The 4662 can draw precise plots on Mylar® polyester film or acetate, offering an especially valuable graphic assist to overhead projectors.

Tektronix, Inc.
Information Display Group
P.O. Box 500
Beaverton, Oregon 97077
Tektronix Datatek NV
P.O. Box 159
Badhoevedorp, The Netherlands

Get the 4662. Teach your old terminal new graphics.



Dialogue With Users Aids State's OCR Switch

(Continued from Page 39)

"Early 1976 saw requests for different types of applications from a number of user agencies. They wanted the ability to scan large-volume jobs in a very short period of time and to process multifont applications," he explained.

After a review of the user requirement, it became apparent that the then-installed equipment could not meet either of the user needs, and the state decided that it required a faster, more versatile system.

In July 1976, following an analysis of present and future needs, the Input 80-C1 was ordered, Grayson explained.

The REI system was configured to include the ability to read OCR-A, OCR-B, numeric handprint, Gothic, E13B and marksense in addition to inline reject reentry and microfilm capabilities.

Initially, the goal was to replace the existing hardware with the Input 80-C1, ensuring the same basic capabilities, he noted. The intention was to convert the applications being

processed on the 3886 as quickly as possible and then upgrade the system to include the multifont feature.

Following a period in which equipment requirements were defined, documentation distribution, capabilities seminars for management and systems analysts and individual departmental briefings, all of the software was converted to the language used by the 80-C1. The programs were then tested and debugged on the equipment in Dallas prior to shipment.

This ensured that parallel processing could begin as soon as the installation was completed and that the conversion would continue as smoothly as possible, Grayson claimed.

While the system was being installed

in April 1977, each application was re-documented according to I/O specifications of the Input 80-C1. This was not as great a task as the initial documentation effort, since the methodology and all the required data had already been established.

User Presentations

Once the documentation was completed, a meeting was held with each user or analyst to explain exactly what had to be done to convert the application to the new system, he said. Attendees received copies of both sets of documentation with detailed comparisons noting the differences, plus those items that would have to be modified in processing the output from the new system.

If there were any changes, they were made jointly during those meetings.

"The total time required to convert the first application, the Vehicle Registration System, was approximately three weeks. The processing of this system through the edit programs was closely monitored by the analyst, user and OCR personnel.

"Within 45 days, over 300,000 truck license renewals had been scanned, a task that traditionally had taken us more than three months to complete," Grayson reported.

"The remaining 12 applications were converted at the rate of one per week through the month of August. By September, all systems were being processed in an operational mode on the new scanner," he added.

Air Cooling Poses Problem For OCR Center

SAN DIEGO — Despite a basically successful OCR conversion within the state of West Virginia, not all has gone as planned, according to Craig Grayson, manager of OCR services for the state. Grayson recounted the state's conversion experiences at the OCR Users Association (OCRUA) Winter Conference here.

One problem that has hurt the entire operation is the lack of sufficient air-conditioning in the OCR center, according to Grayson.

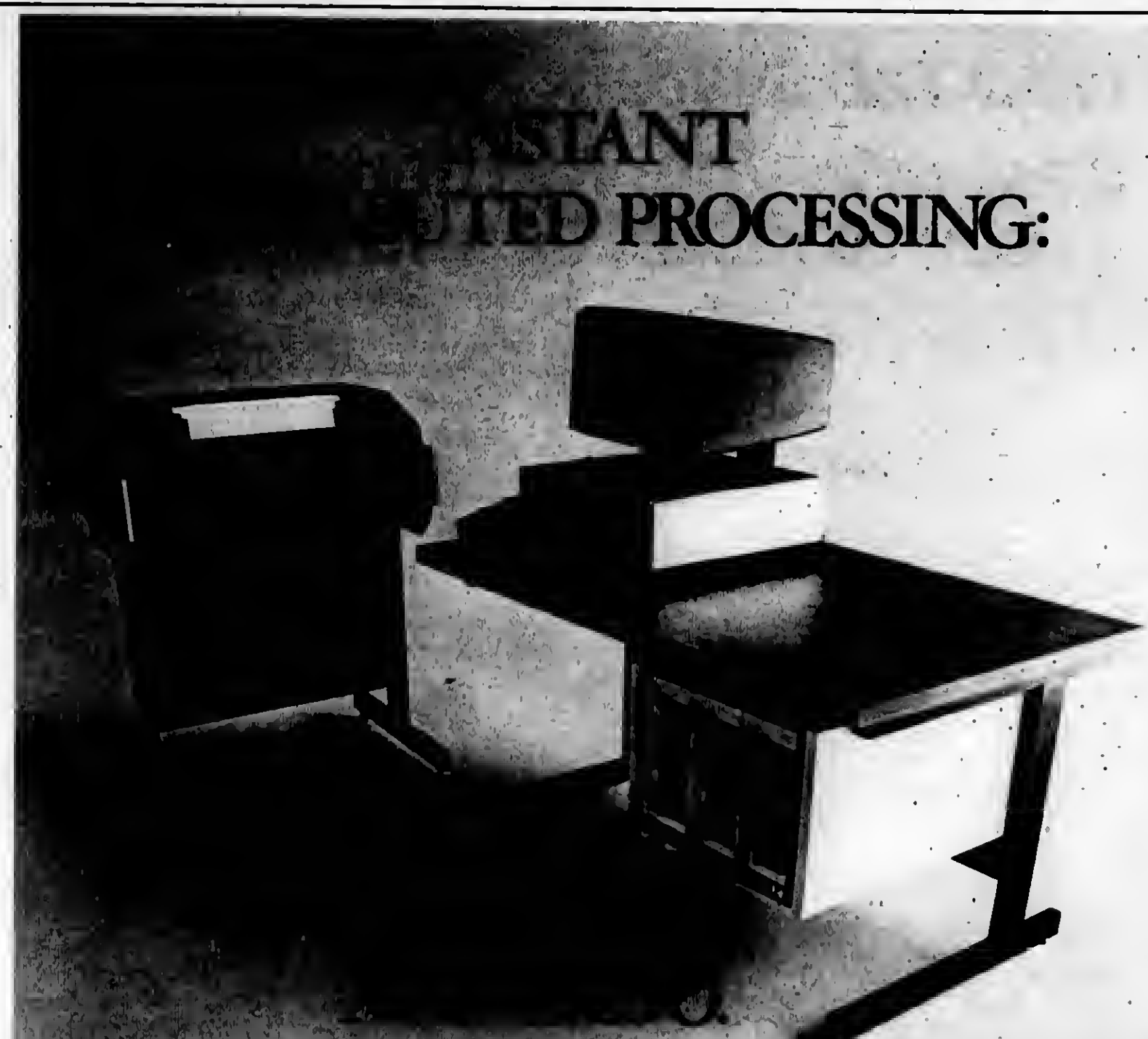
"At first, additional cooling was not deemed necessary since the existing equipment was operating efficiently in the area, which maintained a normal temperature of about 70 degrees. When the OCR equipment was installed, it became evident that a separate air-conditioning unit would be needed since the new system generated more heat, a situation that could not be regulated by the building environmental control system.

"At the present time, it is necessary to shut down production at various periods during the day to allow the system and area to cool," he explained.

The air-conditioning problem has had its greatest effect on the processing of numeric handprint documents, he noted. The high, variable temperatures affect the hardware in such a way that the reject and substitution rates for handprint characters rise drastically as the temperature increases, he observed.

In most cases, it is possible to circumvent this problem by processing the documents on the second shift or on weekends, although these measures have not completely solved the problem as these applications continue to have high error rates, he explained.

Air-conditioning equipment, scheduled for installation this May, will provide sufficient cooling to eliminate this situation, he forecast.



It's the only system that combines computing power and disk storage with terminals made by the Bell System.

It processes data at the source of that data.

It communicates with your mainframe.

It keeps track of things—like orders and inventories.

It has a unique file management method that stores data onto diskettes three times more efficiently than IBM does.

It gives you responses in under half the time it takes to process how big the file.

It lets you edit with data processing and gives you more information with.

It's called the CADO DATABASE 40—the most effective turnkey distributed processor in the business. And you can learn all about it by sending in the coupon... instantly.

CADOSYSTEMS

2730 Monterey Street, Torrance, CA 90503
(213) 320-9660

I'm interested in Instant Distributed Processing.
☐ Send me free full color brochures on the subject.
☐ Have my local CADO Representative call on me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

Industry Representative Says OCR Paper Strictures Becoming More Flexible

By Frank Vaughan
CW Staff

SAN DIEGO — The optical quality of paper isn't as critical a consideration as it was in the early days of optical scanning, Robert R. Green of Moore Business Forms, Inc. told an audience at the OCR Users Association (OCRUA) Winter Conference here.

The more recent OCR machines are more forgiving of paper imperfections, weight, caliper and the like. Some scanners don't require an OCR grade of paper, as regular continuous bond is acceptable. This was unheard of not too many years ago, and it is still unheard of in some OCR systems today, he observed.

In discussing the technical considerations of paper use in OCR applications, Green noted that the characteristics of OCR papers may be broken down into two general categories, optical

properties are basis weight, caliper, smoothness, porosity and stiffness — all of which relate to forms and forms handling in the scanner transport system.

CW at OCRUA

cal properties and mechanical properties.

Among the optical properties are reflectance, opacity, gloss, dirt level and fluorescent content — all of which determine whether the paper can be scanned satisfactorily. Mechanical

Reflectance is a measurement of the amount of light the paper reflects as compared with a known value representing absolute white, he explained. Papers for OCR should be good reflectors, but don't necessarily have to be white; natural tab card stock and pas-

tel shades can be used, he noted, adding that in general, a paper reflectance of at least 70% is acceptable.

Opacity is the property of paper that minimizes the amount of light that passes through it. Normally, opacity is related to the basis weight of paper; as a general rule, the higher the basis weight, the greater the opacity. Normally, a paper opacity of between 80% and 85% is sufficient to preclude problems such as "show through" either from backer printing on a form or black transport belts or obstacles in the read station, he said.

Dirt Fluorescence

Dirt in paper refers to the presence of nonreflective foreign particles embedded in the sheet. These spots could be unbleached pulp or other foreign particles. Dirt can be a critical factor in some OCR applications, causing character rejects and substitutions, Green warned.

Fluorescent additives are used as optical brighteners throughout the paper industry to enhance the appearance of various grades of white paper. These additives absorb energy in the ultraviolet region of the color spectrum and emit it in the visual range, he explained. Fluorescence can adversely affect the reading and/or sorting of OCR forms in certain OCR systems. This is not to say papers cannot contain any fluorescence whatsoever; a certain degree cannot be avoided in the paper-making process and typically, paper manufacturers have made it a general practice not to use excessive amounts in papers intended for OCR use, Green noted.

Gloss Undesirable

Gloss is seldom specified by OCR equipment vendors, Green stated. Yet, paper for OCR should be restricted to the low-gloss variety such as uncoated bonds, ledger, index and tab card stocks. Gloss is undesirable because it affects diffused light reflectance of the scanner. It also affects the printability for both the forms manufacturer and user, as some inks won't penetrate the surface of a glossy sheet as well as regular bond and ledger papers, causing printed images to smudge and smear, he observed.

Dirt level and fluorescence are the primary paper characteristics that set OCR paper apart from other quality grades of paper. Some scanners are more tolerant of dirt and fluorescence in paper than others.

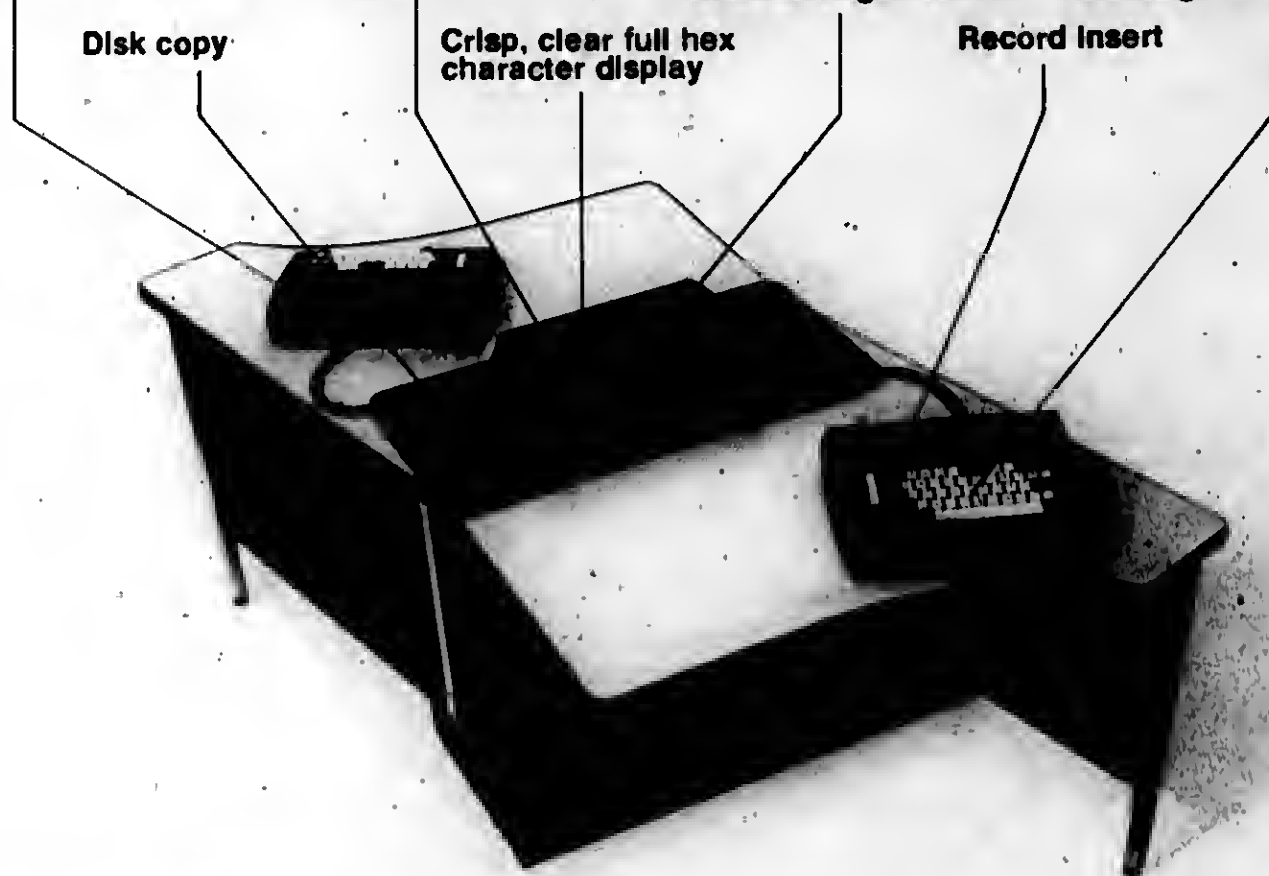
Standard Prepared

In recognition of this, the American National Standards Institute (ANSI) has prepared a standard on OCR paper, to be released soon, classifying paper according to levels of dirt and fluorescence. OCR paper with a low tolerance to both characteristics will be designated as Type I. Type II will have a low tolerance to fluorescence and a higher tolerance to dirt, allowing a higher dirt count. Type III papers will be those with the highest tolerance to both dirt and fluorescence. Once this standard is officially announced, scanner vendors will be able to advise users on what level is sufficient for given applications, he predicted.

New Tab System 700- Best price/performance yet in key to diskette entry!

The New Dual Station 702 Has These Standard Features At No Extra Cost

Four search methods Operator prompting 1 to 128 character variable length record Movable keyboard and large work surface



Additional Exclusive Standard Features Assure Better Performance

- High-speed diskette data searches
- Constants from memory and character insert/delete save keystrokes
- Operator productivity enhanced with six display lines
- Teleprocessing and optional interfaces provide for a wide range of attachments

Tab's System 700 Will Deliver Increased Throughput for your Dollar

The new TAB 700 System, single or dual station, is designed for operator efficiency and maximum data entry throughput. Our movable keyboard allows operators to select their most comfortable and productive positions. The CRT displays up to 240 characters to each operator, thereby allowing prompting and a complete display of the full

128 character record. In addition, the System 700 features extra large display characters for easy viewing and reference. The tabletop provides space for even the largest of source documents.

Exclusive Uninterrupted Data Keying
With 10 program levels and 84 characters of constants per station, the 702 allows each operator uninterrupted data keying. A data record can be located and displayed in less than sixty seconds. Our field-installable options provide the capability of attaching magnetic tape, printers, and our TAB 501 Microprocessor Punch-Verifier.

Whether your needs are distributed or central, local or remote, TAB offers you a complete key-to-diskette system. Want to know more? Call your Tab representative, or write Tab Products Company, 2690 Hanover Street, Palo Alto, California 94304.

TAB
PRODUCTS CO.

Executive Perspective on Human Resource Management

March 8-9, 1978
Atlanta, Georgia

To be held at...

The World's Tallest Hotel

The Peachtree Hotel
Atlanta, Georgia

Call Toll Free Today 800-228-3000.

Conference attendees will receive...

- Reservations for 18 Conference Sessions
- Executive Perspective Dossier
- Conference Luncheons (2)
- Human Resource Office of the Future Demonstration

Sponsored by...

WANG

Wang Laboratories, Inc.

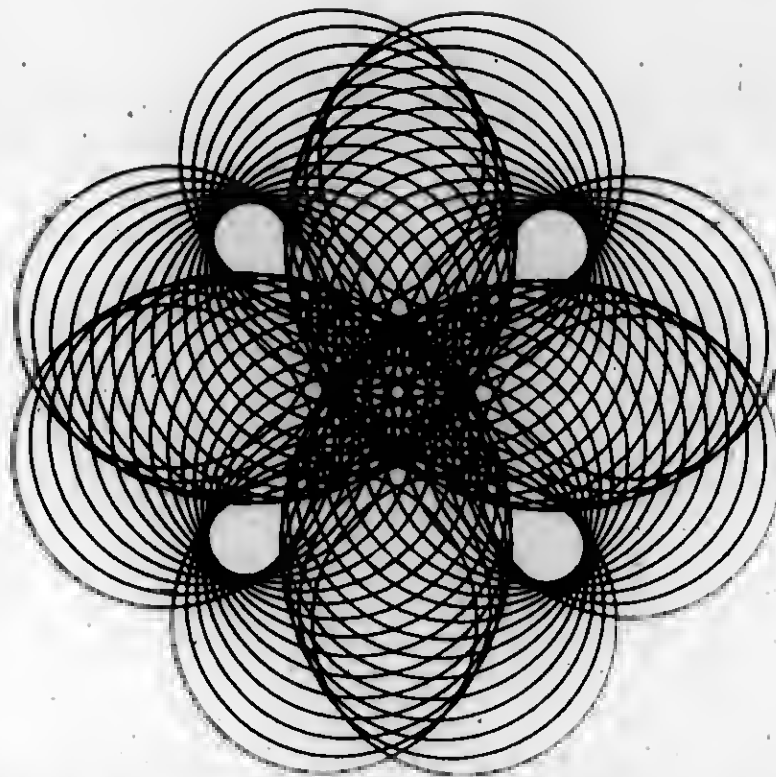
Program Products Division

To register...

Fill out and return the registration form or contact
Emlyn Griffin, Conference Registrar, at 617-851-1111
Extension 2735. Confirmation will be forwarded.

Individual Fee \$495 person

Group Rate for
Twelve or More \$360 person



**"That's what you'll get from this intensive,
on-target Human Resource Management
Conference."**



Senator Birch Bayh
Focus on
"Industry's Legal and Social
Obligations to Employees"



**Congressman
Barry M. Goldwater, Jr.**
Prepare for
"Privacy in America"

*Focus on the relevant issues facing
Human Resource Managers today and
in the next decade!*

*Preview the future of employee rights
legislation and how it affects the
corporate P&L and, most importantly,
you as a Human Resource Manager.*

*Gain a realistic perspective on future
Human Resource Management trends
and technology!*

*See the "HUMAN RESOURCE
OFFICE OF THE FUTURE" where
Wang will display computer systems
exclusively designed for the Human
Resource Manager. You'll see the
"coordinated information flow"
concept at work in a distributed
workload environment.*

Program topics include...

"National Health and Industry"

"Enforcement of ERISA"

"Benefit Trends in America"

"Equal Opportunity for Women and Minorities...
Closing the Gap between Corporate Intent and
Results"

"Future Demands of OSHA"

"Employment of the Handicapped"

"Fair Information Practice is Good Management
Practice"

"Salary Trends in the U.S."

Mrs. Marvella Bayh

J. Vernon Ballard, Deputy Administrator of ERISA,
Department of Labor

Charles B. Jackson, President, American Benefit Plan
Administrators; Board Member, International Foundation of
Employee Benefit Plans

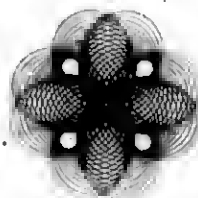
Barbara Boyle Sullivan, President, Boyle/Kirkman
Associates, Inc.; Country's foremost FORTUNE 500
Affirmative Action Consultant

Dr. Lawrence Partridge, Occupational Safety and Health
Unit Manager, Arthur D. Little, Inc.

Norman Hammond, IBM Representative to White House
Conference on Handicapped Individuals

Jane Yurow, Esq., Privacy Protection Study Commission
Project Manager for Employment and Personnel Records

Benjamin Cole, President, Cole and Associates, Inc.;
Country's Leading Compensation Analyst



Please register me for the Wang Conference,
Executive Perspective on Human Resource Management

Atlanta, Georgia
March 8-9, 1978

Name _____ Title _____
Company _____ Division _____
Street _____
City _____ State _____ Zip _____
Phone (Area Code) _____ Signature _____

Please register the following who will also be attending:

Name _____ Title _____
Name _____ Title _____
Name _____ Title _____
Name _____ Title _____

WANG

Mail to: Ms. Emlyn Griffin, Conference Registrar,
Wang Laboratories, Inc., One Industrial Avenue,
Lowell, MA 01851

ADD RACING STRIPES TO YOUR CENTURY



Now Available For Your

NCR 101 & 151

Computer Enhancement Corporation

Memory For: 101 151 200 201 251 300 Criterion

☐ Urgent! Please Phone Me Ext

☐ Have Your Rep Contact Me

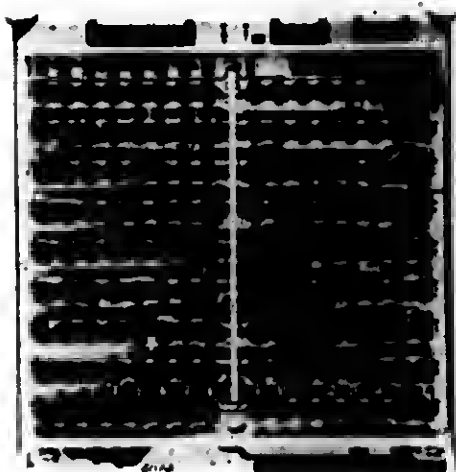
☐ I Want A Demonstration

☐ Send Me All Literature

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone () _____ Ext. _____

For further information call or write:
COMPUTER ENHANCEMENT CORPORATION • 3189 E. Airway Ave., Costa Mesa, California 92626 • 714/754-0521

MASS STORAGE CONTROLLERS FOR INTERDATA® COMPUTERS



SMC903 STORAGE MODULE

1 or 2 drives/controller
40 to 600 MB online
OS/16 and OS/32 support
Limited one-year warranty

\$2160
(at 10 per year)

*Reg. TM PERKIN-ELMER CORP



MiniComputer Technology

2470 Embarcadero Way • Palo Alto CA 94303

The 1978 Computerworld Index will have about 10,000 entries from "ADAPSO" to "Zip Code Systems."

If you have a need to know, write for details:
Computerworld Index
797 Washington Street
Newton, MA 02160

Users Briefed on Qualities To Evaluate in OCR Paper

By Frank Vaughan
CW Staff

SAN DIEGO — Users should assess the mechanical properties of paper used in OCR applications including basis weight, caliper, smoothness, porosity and stiffness, according to Robert R. Green of Moore Business Forms, Inc., who spoke at the winter conference of the OCR Users Association (OCRUA) here.

Green discussed the mechanical properties relating to forms and forms handling in the scanner transport system.

Basis weight is the term used to express the weight of a given size sheet in pounds per ream. Ream size in the U.S. is generally 500 sheets, but the federal government specifies 1,000 sheets per ream. OCR bond papers are normally specified in terms of weight in pounds of 500 17-in. by 22-in. sheets, Green explained.

The industry tolerance of basis weight is plus or minus 5%, so a 20-lb. paper may range from 19 lb to 20 lb. This variance isn't sufficient to adversely affect scanner performance, he claimed.

Caliper is simply the thickness of the sheet of paper, he said. Caliper is usually of little importance in OCR, since most scanners are designed to handle a wide range of forms. Problems do crop up, however, for forms thickness varies considerably and several are intermixed in the same run through the scanner. More than likely, the scanner's input feeder and double document detector can't be adjusted to handle the intermix efficiently. Normally, paper manufacturing tolerance of caliper is plus or minus 5%, which won't cause feeding or scanning problems, according to Green.

Surface Smoothness

Smoothness of the surface is one of the most significant mechanical properties of the paper, since the ability to be able to print with a minimum of

offsetting and tracking of ink is quite important. The sheet's surface should be rough enough to permit ink absorption so offsetting and tracking can be avoided. If sheets are excessively smooth, it can also affect the print quality of the typewriter, the high-speed line printer and the imprinter. The inks from ribbons and carbons should penetrate paper surfaces; if they don't, images are susceptible to smudging and smearing, he warned.

CW at OCRUA

Normal OCR paper specification for smoothness is 100- to 200 Sheffield units, named after the instrument that measures this property, he explained.

Porosity can also affect OCR. Some scanners use vacuum pickup mechanisms in the document transport unit. On these systems, porosity is very important. In some cases, documents have been double-fed because the vacuum pickup mechanism penetrated the top document and picked up the second document as well. Normally, only sheets under 24 lb have this type of problem, he cautioned.

Stiffness refers to the amount of sheet stability. Very flimsy paper, if sent through a document transport, would probably jam the transport unit, where a more rigid paper wouldn't. The test for stiffness measures the bending strength the paper can withstand in both directions. The minimum specification for this property varies from 25 milligrams to over 200 milligrams, depending on paper weight and thickness, he said.

All of these characteristics are extremely important because they may affect the quality of printed images, the operating efficiency of the forms press and the optical scanning equipment, he noted.

Printer/Plotters Unveiled

SANTA CLARA, Calif. — A series of printer/plotters capable of interfacing with video sources that meet RS-170, -330, -343, -375 or -412 specifications have been introduced by Versatec Co.

The 3000 series of printer/plotters offer a choice of resolution (100- or 200 dot/in.), printing speed (500- or 1,000 line/min) and plot speed (1- or 2 in./sec.) and are designed to operate at a 15-degree tilt in any direction, a spokesman said.

All models use 11-in. wide roll paper that is trimmed to the desired length by a programmable cutter and controlled by a differential drive that keeps the paper aligned. Cutter assembly, backplate electrode/writing head, and toner wiper bars/channel are self-aligning, he added.

An Ascii 96-character font set is standard. Scientific/engineering (124 char.) and typesetting (128 char.) styles are available as options, the firm stated. Other options include a differential receiver for output up to 1,000 ft. from the data source and an RS-232 serial input, the firm said.

Prices for the printer/plotters range

from \$8,550 to \$11,400 from the firm at 2805 Bowers Ave., Santa Clara, Calif. 95051.

Bankers to Hold 'Branch' Meet

PHOENIX — A four-day workshop covering the procedures and concerns of branch operations will be presented here at the Hyatt Regency Hotel beginning April 2.

Sponsored by the American Bankers Association, the workshop will incorporate presentations from industry spokesmen on staffing and scheduling, systems, equipment, profit plans, loss control and branch productivity measurement, a spokesman said. The meeting will also address current events in the legal/legislative and regulatory areas, he stated.

Registration fees for the workshop are \$345 for nonbankers and \$275 for bankers. The association is located at 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

For Maryland County

On-Line Unit Handles Building Permit Boom

By Tim Scannell
CW Staff

ROCKVILLE, Md. — Faced with an increase of almost 100,000 housing units since 1960 and a demand for new construction, Montgomery County's Permits Division, based here, is utilizing a large-scale mainframe to aid in the day-to-day issuance of licenses.

With an IBM 3275 CRT terminal linked to an IBM 370/148 in the Tax Assessment Department, workers can access information within the tax data base. A parcel account number is used as an indirect link to obtain data related to the issuance and finalization of building permits.

Currently, this building file contains 26,500 records, of which 15,000 are active, according to Tom LaFleur, an official in the permits unit.

Permits must be issued for both construction and repairs, a division spokesman explained. A major problem encountered under the previous manual system was the difficulty in providing responses to inquiries about permits and the inability to give accurate statistical reports to the management on outstanding applications, he said.

The reason for this was that a permit was and still is subject to approvals from a multitude of county and bi-county agencies.

After a permit is issued and building has begun, inspections are performed and their results recorded in the appropriate file. Depending on the type of structure involved, there might be 20 building inspections.

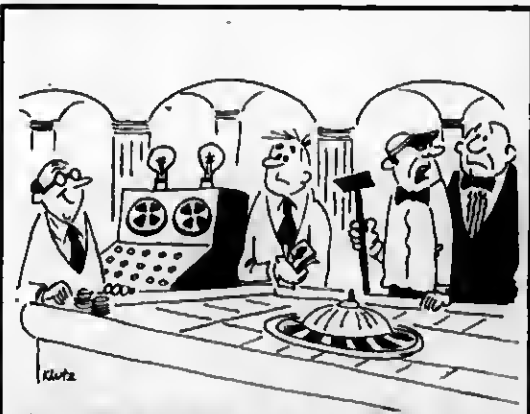
Also involved in the permit process is the numerous statistical reports, one-time reports and comments needed and filed by the various county agencies.

County officials found a central source of information was needed to alleviate the problems caused by such a torrent of information. Because an active tax assessment data base was already operational and contained relatively the same data, they decided to tap it and form a subfile.

Batch Not Satisfactory

The system at the tax bureau is composed of an IBM 370/148 with 2M bytes of memory. Peripherals include four 3330-11 and two 3333-1 disk drives, four 3420 and one 3411 tape drives, two 1,000 line/min. 1403 printers, a 2450 card reader/punch and a 2671 paper tape reader.

The system was initially designed as a batch operation, but that proved to be unsatisfactory, the spokesman said. It was then that the on-line system was implemented, although statistical reporting is still handled in a batch mode.



'Better Tell the Boss, I Think We've Got Trouble.'

When an application for a building permit is received under the computerized system, the name is matched with the one in the assessment file and the information is extracted from the tax records. A subfile is then formed within the assessment data base to hold data pertaining to the permit and its progress.

The forms containing all the releases necessary for the permit to be issued are then circulated concurrently among the involved agencies. The agencies' dispositions are entered into the data base via terminal.

All of this information can be displayed and is frequently used in answering queries concerning the

status of a permit.

Inspections of the various sites — about 300 each day — are also processed against the outstanding permits and the results are available on the terminal as early as four working hours after the inspectors have returned from the field.

System Benefits

The entire permit process usually takes four to five months for a single-family dwelling. The building permit itself is retained on-line for about one year; after that it is moved to magnetic tape so the data base is kept to a manageable size.

Benefits of the system have been

most apparent in man-hour savings. Because of the direct inquiry capability, a search through bound listings that normally would have taken hours is now accomplished in about 10 seconds, the spokesman reported.

Permits are now ready for mailing the day after final approval is given, he added, and officials can keep track of the different inspectors and balance the workload more fairly.

But "perhaps even more significant than the time it has saved us is the smoothness of the operation," according to Ralph Graber, chief of the Division of Construction Permits. "We have easy access to data that we simply did not have before."

SHORT MEMORY?

Improve it
with a CIG memory system

When your information outruns your memory's storage capacity, you need a CIG add-on main memory.

CIG memory systems are plug-compatible with IBM 370 and 360's and are offered on short-term leases—one or two years—as well as on longer terms and purchase.

Our products include the latest 13X/14X UMS memory up to 4 megabytes, 158 and 168 memory to 16 megabytes as well as memory for the 360's.

CIG Computer Products has been a leader in the development of plug-compatible computer memory products for nearly a decade. Because we are not tied to the products of any one manufacturer, you can be sure of getting the latest equipment available. And, thanks to our own Technical Services Center, you'll receive reliable technical support and back-up maintenance from a single source.

If your memory capability is running short, talk to us about a CIG add-on main memory to enhance your present IBM system. We can help you bring your memory capacity into line with your present needs . . . at a cost you'll want to remember.

CIG

CIG COMPUTER PRODUCTS, INC.
303 Cameron Street,
Alexandria, Virginia 22314

Call CIG at (703) 683-4606 or mail
this coupon today

Tell me more about CIG add-on main memories and how they can help solve my short memory problems.

I'm also interested in:

☐ Block Multiplexer ☐ Computer Leasing Channel

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone number _____

Type of system now in use _____

Mail to: CIG Computer Products, Inc.
303 Cameron Street,
Alexandria, Virginia 22314

"I'd rather supply than demand."



Like any businessperson, the minority supplier's reason for being in business is to produce goods and services, provide gainful employment, and to make profits and progress in line with her qualifications to contribute to the general economic good.

In short, she'd rather get her share by doing her share.

Any good businessperson can appreciate this — and what's more, help make it happen — through the National Minority Purchasing Council, Inc.

The Council, a not-for-profit corporation, has been in the business of promoting increased purchases from minority-owned firms for five years. In that short time, it has scored impressive gains.

The chief executive officers of about a thousand major U.S. firms have committed their support to the concept. And purchases by participating companies from minority-owned firms are up from \$86 million in 1972 to \$700 million in 1976.

The goal for 1977 is one billion dollars.

It's reasonable and it can be attained if every business executive in a position to help, does. Call (202) 466-7077, or write:

National Minority Purchasing Council, Inc.
1925 K Street, N.W.
Washington, D.C. 20006

National Minority Purchasing Council, Inc.
Our strongest recommendation is a business recommendation

A Public Service of This Magazine
& The Advertising Council



Bank's File System Assesses Loan Risks

Special to CW

SEATTLE — The Seattle First National Bank here is using a file management system to provide custom credit scoring. The scoring ensures that applicants for Mastercharge and Visa are judged under equal standards.

As with most credit-granting institutions, Seattle First had previously assigned loan officers the tasks of assessing credit risks. Those assessments were made on a subjective basis and "human prejudices and personal attitudes" invariably crept into the process, according to Martin Neilson, credit manager.

The scoring system, designed by Faire Isaacs Co., assigns numeric point values to specific items of information supplied by credit applicants and aids the bank in documenting its compliance with federal regulations prohibiting discrimination in the granting of credit.

"More important, by making our credit granting process objective and consistent, the scoring system improves our control over that process," Neilson said. "It enables us, for example, to 'loosen' or 'tighten' our credit approval requirements. That, in turn, can directly affect our profitability."

Security Problem

Seattle First, however, faced a major security problem in implementing the manual scoring system. "The items on the application form that are assigned weighted point values are not known; neither are the specific number of points assigned to each item of information," Neilson explained. "If those point values were known, the bank would be quite vulnerable to fraud."

The system as designed also did not include provisions for extracting demographic information on applicants, information needed for financial and marketing decisions.

"For those two reasons primarily — the need for security and the need for readily available information — we installed an Inforex, Inc. System 5000 file management system for use in controlling the manual scoring system," Neilson said.

"The items scored and the points assigned to each item would have to have been accessible to each credit scorer," he added. "Now, that information is stored on the System 5000. Data taken directly from the application form is keyed into the system from keyboard/display terminals, and that data includes items which will be scored as well as items being collected for demographic purposes."

"The credit scorer at the Inforex terminal does not know the point values assigned, or even whether an item of information is being scored. In that way, by collecting, say 20 pieces of information and scoring only 8 or 10, we enhance security and also collect the demographic information we need," he continued.

Instant Approval

Neilson explained that credit scorers enter information from application forms in response to questions which appear on the CRT of System 5000 keyboard display terminals. As items to be scored are entered, the Inforex system calculates the specific number of points to be assigned to each entry. When all required information from the application form has been entered, the system calculates a score for that

application.

"The system allows us to establish high and low cutoff scores, so that any application above a certain total is automatically accepted and any application below a certain score is automatically rejected, Neilson said. This naturally speeds the granting of credit to particularly good risks and also allows us to concentrate our expenses for credit checks on only those applications which should be checked. Before we installed the manual scoring system and the Inforex system, every application had to go through a credit check."

He explained that the credit scoring system developed by Faire Isaacs for Seattle First allows the bank to predict the percentage of applications which will be approved and the percentage which will be rejected.

The Inforex System 5000 has also proven helpful in service to Seattle First 160 branch offices. Previously, according to Neilson, inquiries from branches into the status of individual customer applications required credit department personnel to comb through thousands of paper documents.

"Now, we key in the applicant's name or the number automatically assigned by the system to each application and we can tell the branch whatever the application status is. That improved speed, of course, al-

lows branches to be more responsive to their customers," he said.

Checks for 'Reasonableness'

Neilson said the manual system ran approximately two weeks prior to installation of the System 5000. Errors resulted from human calculations of each application score, but those errors have been virtually eliminated by the Inforex system.

"One reason for that is a feature of the system called the 'reasonableness' check which, as its name implies, signals the operator whenever information is entered which seems unreasonable. The system asks the operator to recheck that information, then allows a new entry to override the first," Neilson explained.

He added that the Inforex system can prepare a variety of reports for Seattle First credit managers; for example, on the performance of individual loan officers. He estimated that the credit-scoring application uses only about 40% of the system's processing power to handle up to 1,100 entries daily.

"Since we were not on-line to the bank's mainframe, it seemed reasonable to look for a system which could handle not only our immediate needs, but future applications as well. We will automate the assessment of credit lines and also plan to use the System 5000 to batch letters to applicants," he said.

Reflex. The Winchester disc drive that responds to you.



Reflex gives you high storage capacity and fast access at an extremely low cost.

It gives you trouble-free storage ranging from 12.5 to 63 megabytes unformatted in a moving head fixed media disc drive.

Reflex is so reliable and the air filtration system so advanced that preventive maintenance is not required. It's modular, so service is a snap. And it's compact, requiring only 7 inches of rack mounting space.

Reflex. Economical, efficient, reliable storage. Built and backed by Microdata.

Contact one of our local sales offices or the Director of Peripheral Sales, Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.

Microdata OEM Peripherals
A significant difference.

SALES OFFICES:

Anaheim, CA: 714/533-8035 • Atlanta, GA: 404/252-9700 • Bellevue, WA: 206/455-0152
Dallas, TX: 214/387-3073 • San Francisco, CA: 415/573-7461 • Scarsdale, NY: 914/472-1141
Schiller Park, IL: 312/671-5212 • Tampa, FL: 813/872-1557 • Washington, DC: 703/620-3995

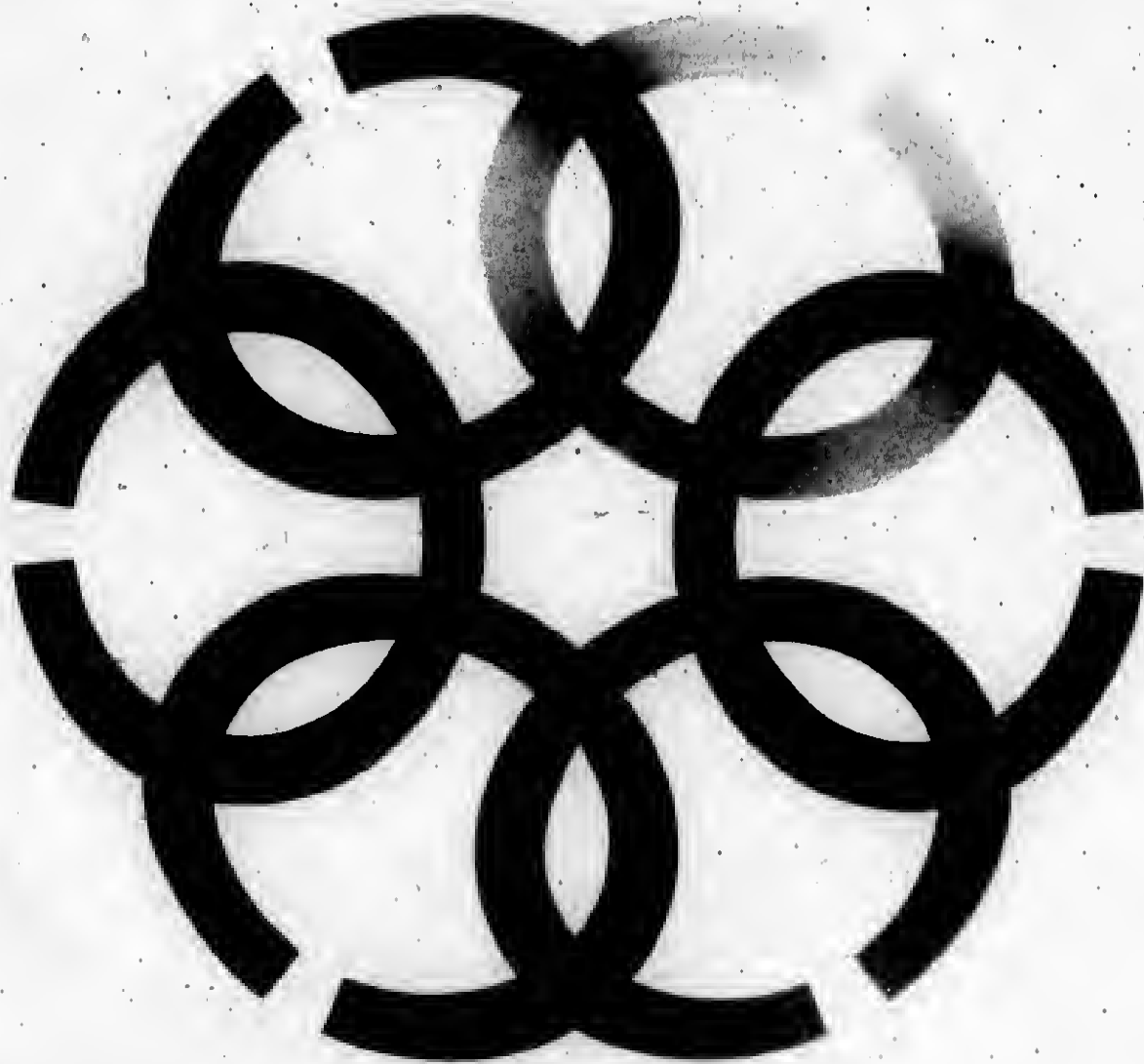
Imagine:

A large-scale computer system.

Functionally dispersed data processing.

A common, integrated data base.

Unlimited growth without economic penalty.



The ARCTM System
from Datapoint.

Put
Your
Imagination
to
work.

Turn
the
page.

Imagine. A large-scale computer system that would solve all of the problems that system planners have complained about in conventional computer architecture. That would work and grow without interruption, without extensive operator re-training, and without endless new model upgrades. A system that will adapt itself to your budget, and not the other way around.

The Attached Resource Computer™ System is Datapoint Corporation's solution to the inherent problems of conventional computer system architecture. It will eliminate the headaches which until now have seemed inevitable. Like updating several data bases, costly programming changes, and complete system failure. Not to mention the huge expenditures involved in hardware upgrades.

The ARC™ System is an *attached processing system* — based upon the idea of functionally dispersed processing resources, located in a company's offices, stockrooms, transaction counters, and warehouses. Operating independently, and yet as parts of a whole.

Because ARC allows all of these task-oriented processing stations access to the common data base, in as large (or small) a capacity as each company's needs dictate.

A unique modular architecture

How can ARC combine the effective throughput of a large traditional computer with the flexibility and convenience of a small computer?

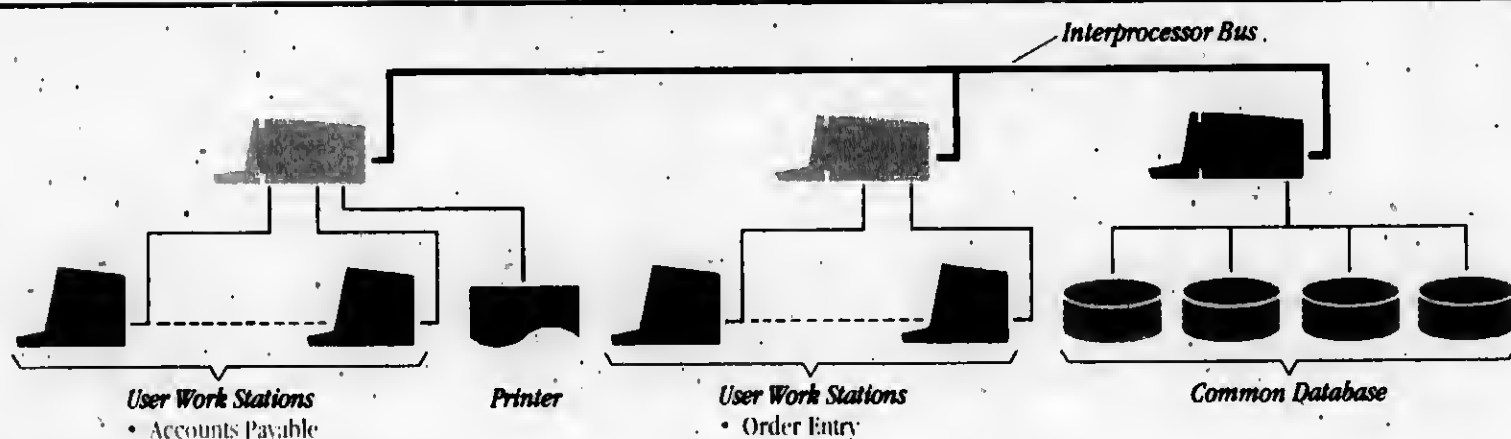
Because it takes the two basic functions of any conventional computer — applications program execution and data file management — and distributes them among two or more specialized computers: the applications processor and the file processor.

By attaching these two types of functionally specialized processors to an ARC System, each company can select just the right amount of processing power and on-line data storage that it needs. Without over-buying to stave off some future requirements. Or over-burdening an existing, insufficient computer.

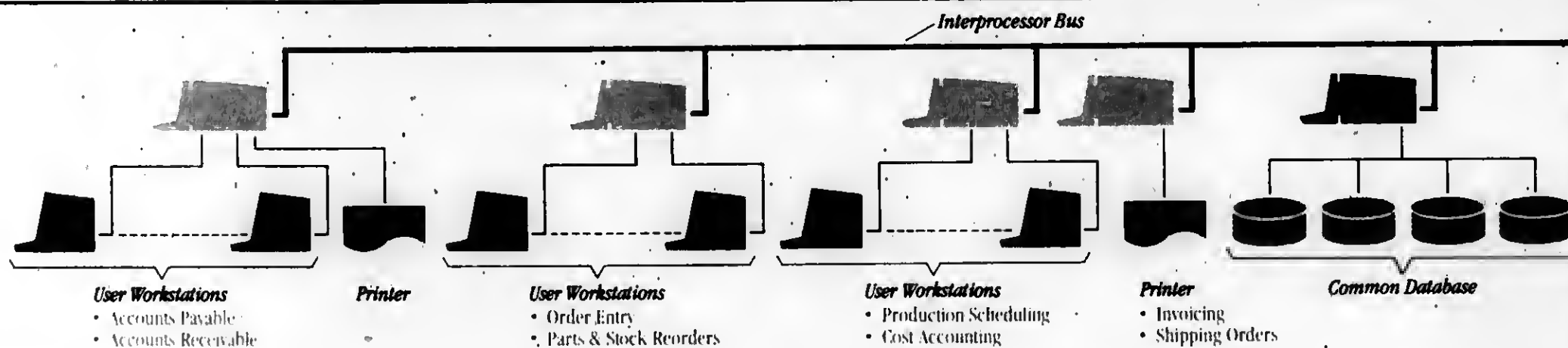
Unlimited growth without economic penalty

If more processing muscle becomes necessary as time passes, just add another Datapoint applications processor. Right where the work gets done. And if data

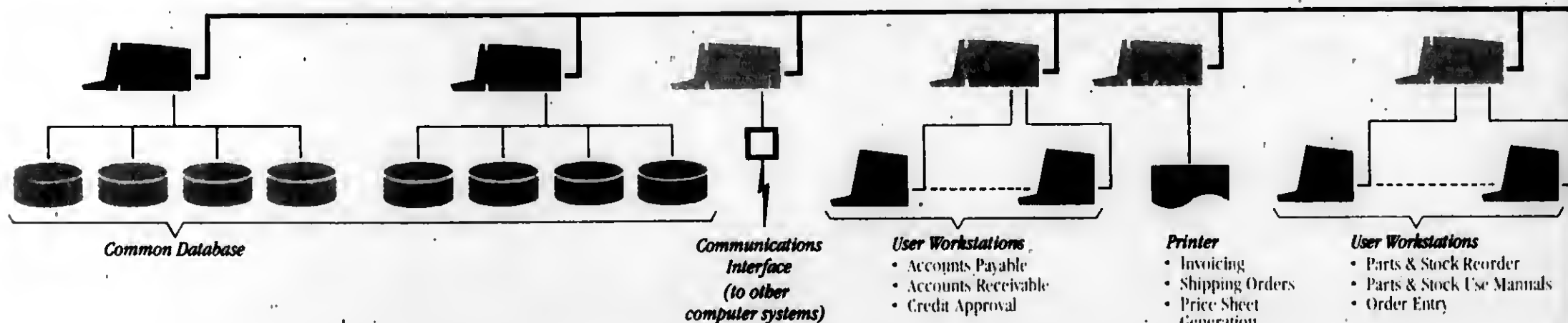
A small ARC system.



A medium ARC system.



A large ARC system.



handling capacity (or speed) needs to be boosted, additional file processors will each provide up to 200 megabytes more disk storage. While preserving the commonality of the data base. And at predictable, economical costs.

Every ARC system comes equipped with user-definable security software that allows each company to restrict access to the data base in several ways.

But the best news is that there is no central processing unit to get bogged down. No single component that will drag the whole system under if it fails. With the Attached Resource Computer, adding (or removing) any attached component requires no system downtime, no re-programming, and no re-training.

Functionally dispersed resources

The ARC System uses an electronic pathway called the Interprocessor Bus to communicate requests and data from one attached resource to another. This communication takes place at such high speeds that applications processors can get the data they need faster than if it were on their local disks. Even though the source of the data may be in another department.

Any number of applications and file processors may be connected to the Interprocessor Bus and located in the offices where they're needed. Each applications processor can have the printers, card readers, magnetic tape, or local disk storage that a traditional computer would have. And each applications processor can be dedicated

to its own function, using any of the software in Datapoint's extensive library:

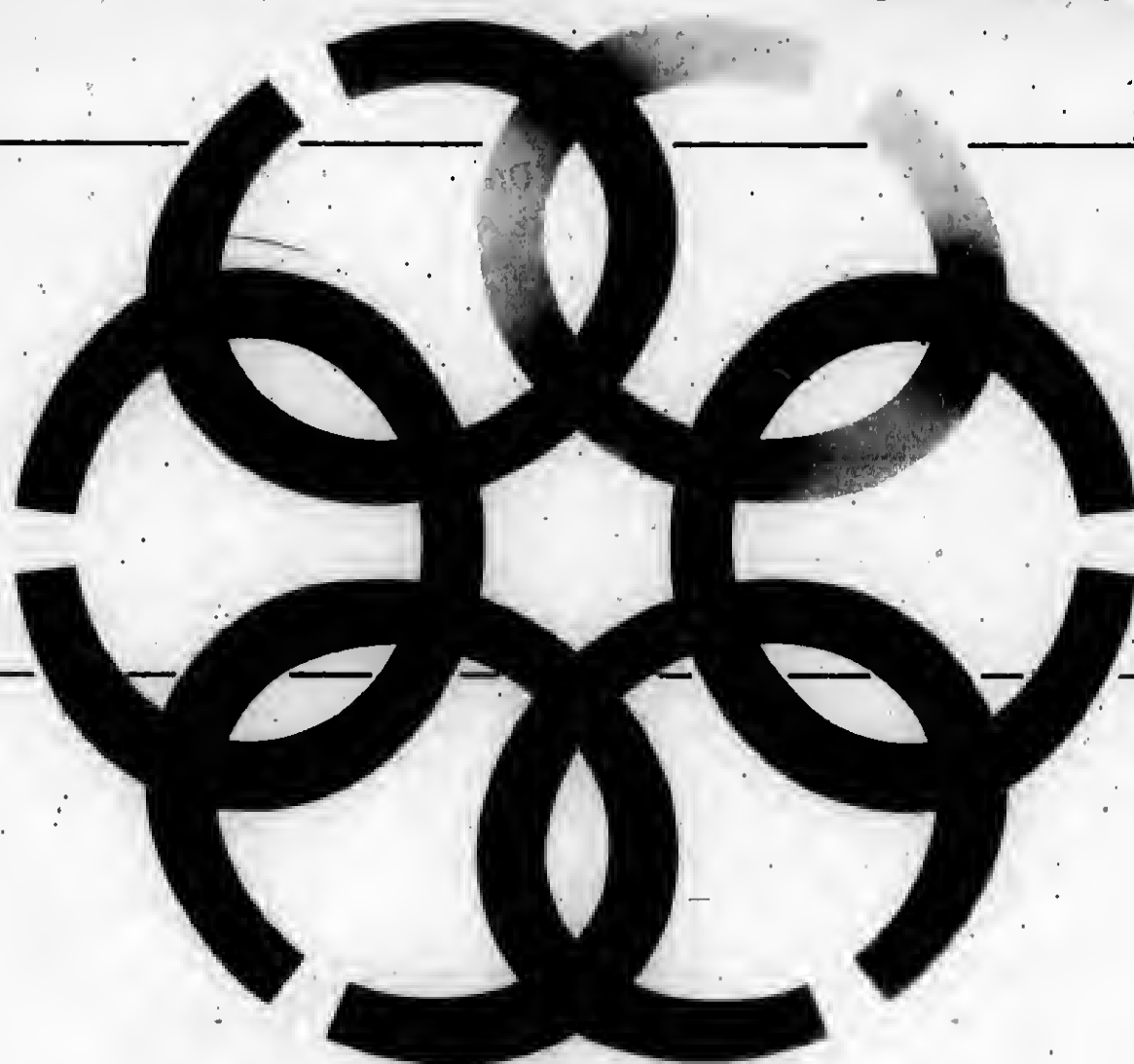
- DATASHARE® for multi-user, on-line transaction processing;
- COBOL for industry-standard batch processing;
- DATABUS®, RPG, SCRIBE®, and BASIC for other business needs;
- Telecommunications to other computer systems with Datapoint's networking software.

In fact, ARC even enables an existing IBM 360/370 mainframe to come on-line as an applications processor, using Datapoint's Direct Channel Interface Option.

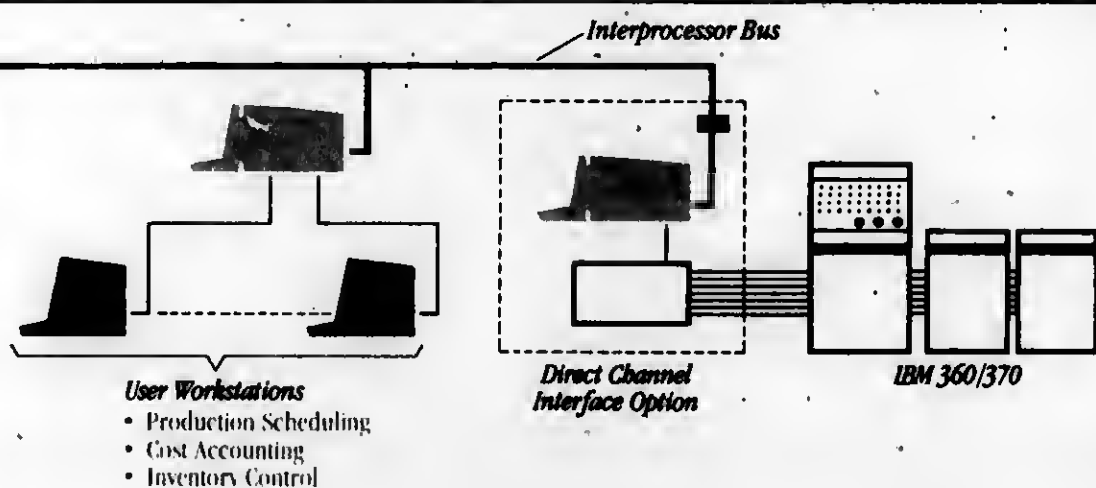
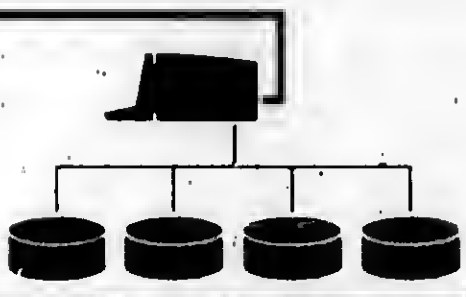
ARC supports all of the functionally dispersed tasks to be carried out at the same time — all on the common data base of the file processors.

Use your imagination.

Take a look at some typical ARC Systems. And just imagine how they could be put to work for you.



The ARC™ System



ARC™ system components

Datapoint provides you with all the building blocks necessary to construct an Attached Resource Computer™ System to meet your needs.

Processors



6600 Advanced Business Processor, 120K user memory, supports all Datapoint peripherals and up to 24 user workstations.

5500 Advanced Business Processor, 48K user memory, supports all Datapoint peripherals and up to 16 user workstations.

6000 Series Attached Processors, 60K or 120K user memory, supports all Datapoint peripherals and 16 or 24 user workstations.

3800 Series Attached Processors, 60K and 120K user memory, for single-user data processing, data entry, and telecommunications.

1170 Dispersed Processor, 48K user memory, supports Datapoint peripherals and up to 4 user workstations.

1150 Dispersed Processor, 24K user memory, supports all Datapoint peripherals.

Peripherals



Disks:

25MB Mass Storage Disk drive, up to 200MB per processor as a local or common database

20MB Cartridge Disk drive, up to 160MB per processor as a local or common database

5MB Cartridge Disk drive, up to 40MB per processor as a local database



Printers:

30 cps Servo printer

80 or 160 cps Freedom Printer

120 LPM printer

240 LPM printer

300/600 LPM printers



Magnetic Tape Drives:

7 and 9 track

556, 800, and 1600 bpi recording densities

Software:

COBOL: industry standard business programming language

BASIC: general purpose business programming language

RPG: report-oriented business programming language

DATABUS/DATASHARE®: Datapoint's high-level business programming language for single or multiple users

DATAFORM/MULTIFORM®: Datapoint's two-level data entry and checking language

DOS: powerful operating system with comprehensive utilities

SCRIBE®: Datapoint's powerful yet easy-to-use text processing language

DATAPOLL®: Datapoint's automatic polling and data communications program

Communications: IBM, Honeywell, Burroughs, Univac, and other disciplines

Use your imagination.

Mail this coupon today and find out more about the most important development in data processing since the minicomputer: the Attached Resource Computer. From Datapoint.

DATAPoint CORPORATION



The leader in dispersed data processing™

Datapoint Corporation
Attn. Marketing Communications
9725 Datapoint Drive
San Antonio, TX 78284

Tell me more about the ARC System!

Name _____

Title _____

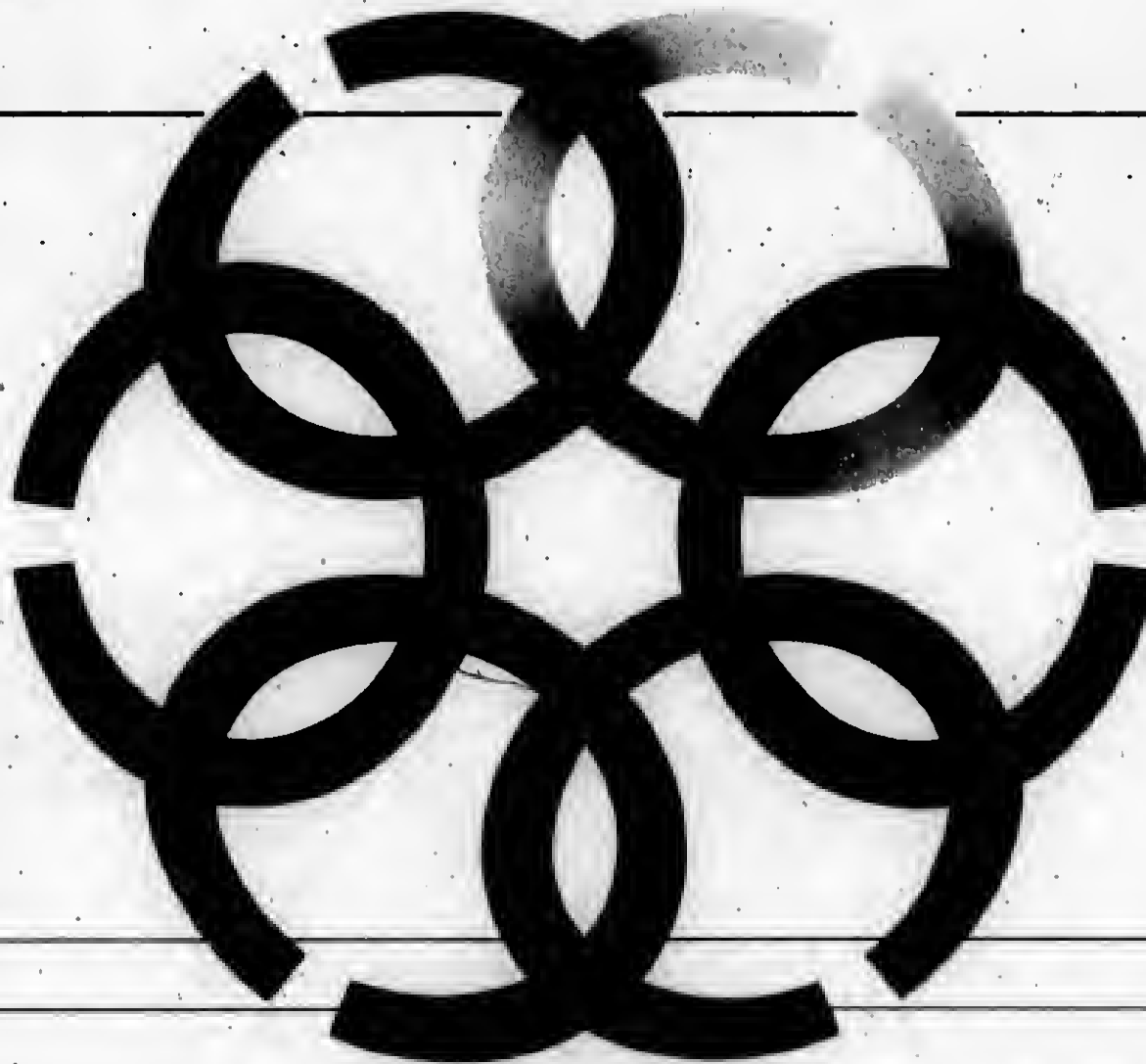
Company _____

Address _____

City _____

State, Zip _____

Do you presently use Datapoint equipment? _____



Establish DP Cooperative Working Together, Counties Cut Costs

By Ann Dooley
CW Staff

ST. CLOUD, Minn. — Unable to afford computer services by themselves, 19 Minnesota counties banded together and formed a computer cooperative that saves them money and the time involved in performing the tasks manually.

The Minnesota Counties Computer Cooperative, established three years ago, uses Burroughs B700 or B800 minicomputers in each of the counties for real estate tax billing purposes.

Although all the DP work is done at each site, none of the counties has a regular DP staff. The programming, maintenance and training is provided by Computer Concepts and Services, Inc. here.

The counties split the cost of using the

software service company's staff by dividing the cooperative's bill into "fair shares" according to the amount of service used by each county.

The idea for a cooperative originated when five counties which had purchased the same type of hardware independently of each other discovered they were using the same software firm for the same type of application. They realized a system of cooperation might be preferable, according to Tom Hennen, Scott County auditor, so they could "share the problems as well as the solutions."

The counties also share the software provided by Computer Concepts; they therefore don't have to spend money on salaries for a DP staff, he said.

The counties pay only for the service they get on a monthly retainer fee, Hennen said. The software vendor also provides a software and hardware backup for each county, he noted.

The hardware configuration and service team for each county varies according to its

size and needs. But the application programming used is similar for all the counties.

For example, one system in a county might handle information on 7,000 parcels of land for real estate tax purposes and another system might handle 50,000 parcels, according to Monte Westphal, Computer Concepts project manager.

Most of the counties were on manual systems before joining the cooperative. It takes two to five months to convert a county's operations to a computer, Westphal said.

Input methods differ depending on an individual county's needs, he noted. Some counties enter information on a keyboard, others by punch card or direct data entry.

Once the procedure is past the input stage, however, everything becomes more standardized. Computer Concepts provides a staff of nine programmers to service and backup the counties.

Although the major application for each county is real estate tax billing, some are considering computerizing their voter reg-

(Continued on Page 52)

DEC Unveils 308 With One Terminal

MAYNARD, Mass. — A small business system designed for firms which require the use of only one terminal is available from Digital Equipment Corp.

The unit, which operates on ordinary current, includes the company's VT-78 processor CRT and memory combination. Dubbed the Datasystem 308, it can handle business applications such as order processing, invoicing, inventory control, accounts receivable/payable and payroll, DEC said.

A software package for word-processing applications is optional, a spokesman added.

Two line printers are available for the system, the LA78 serial line printer with an 180 char./sec speed and the LQP78, a 132-column, 96-character letter-quality printer.

The Datasystem 308 runs under DEC's COS-310 operating system and uses Dibal, DEC's business-oriented language. Programs are transferable to other systems, the spokesman noted.

The system features self-diagnostic capability and single-button program load. Activated by a start switch, the 308 checks itself to ensure proper operation and pinpoints problem areas, the spokesman claimed.

Prices for the 308 range from \$10,600 for a system without software support to \$18,000 for a completely configured system. A low-end 308 with the VT-78 processor, CRT and 32K bytes of memory, automatic program load, dual diskette drive, desk, operating system and two training credits costs \$12,600, DEC said from its headquarters here in Maynard, Mass. 01754.

Talking to Mini Makers — Part 3

Vendors Point to Rapid Growth As Cause of Service Problem

By Esther Surden
CW Staff

Users have two gripes about the service people who vendors send out to fix hardware or isolate software bugs: they're either ill-trained or spread so thin that a different person shows up each time.

That's what users told *Computerworld*, and CW asked a random sampling of vendors to address the problem.

According to a spokesman for Data General Corp., the problem stems from coping with a 50% growth rate every year. Every manufacturer facing rapid growth has trouble getting enough trained people to serve the products in the field, he indicated.

DG provides a 13-week training program for its software people "with a good part in the local office using self-study programs" to bring them up to a base level of proficiency, he stated.

Hardware people at DG go through an "intensive" training program lasting 12 weeks, he said, adding the program is being continually strengthened.

Computer Automation, Inc.'s end-user Commercial Systems Division believes it has avoided the problem of "spreading the field force too thin ... because we only have two possible configurations" and 90% of the

components making up both systems are the same.

This contributes to a service organization that knows its systems very well, a spokesman there said.

Datapoint Corp. is trying a system of assigned territories for software support. Particular service people are assigned particular

In July, *Computerworld* asked readers to tell us what they thought about minicomputers by filling out and returning a survey form. The results of that survey, published in August and September issues, showed support and maintenance were areas of great concern to users.

This is the third article in a series that will fill users in on what vendors say they are doing to alleviate some of the problems in those areas.

territories backed up by people assigned to pick up a service call if the regular service person cannot. That way, "one person has primary responsibility to those users in his territory," a spokesman pointed out.

"We are also establishing a skills index to

(Continued on Page 52)

MINI-TWORLD

FIGHT TERMINAL INFLATION

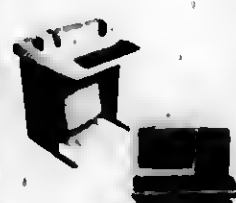
- Low Rates
- Fast Delivery
- 1 to 3 Year Rent/Lease Plans
- No Automatic Renewals on Any Rental or Lease
- Choice of Rent/Lease/Purchase
- Mix and Match Master Agreements

AND OF COURSE
All Rentals and Leases Include
Complete On-Site Maintenance



**NATIONAL
COMPUTER**
The Greatest Name in Terminals

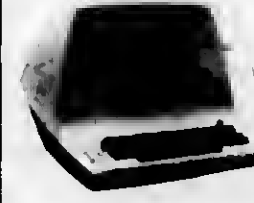
Call **800-243-9006**
Conn. - 203-325-3831
Bc 'on - 617-235-7055



DEC LA-36/LS-120
LA-180/VT-52



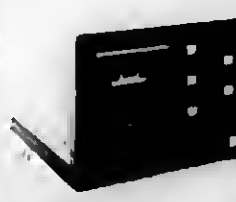
T.I. 745/743/733/765
Bubble Memory



Lear Siegler
ADM 1A/2/3A/400



Diablo 1620/1640
IBM 2741



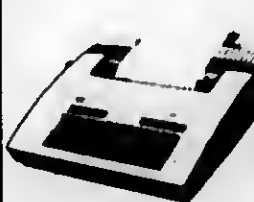
Techtran Cassette Drives
815/8410/8400/8420/8421



National Computer
1050 Reader Punch
1050 NC
for Numeric Control



NEW
NCC LA-36 ASR



Teletype TTY 43



Modem and Couplers
NCC 103 AJ A242-A
AJ ADAC 1200

Conference to Cover Trends

MENLO PARK, Calif. — A conference on "The Small Computer Industry 1978-1980: Key Issues Facing Suppliers, Users and Investors" will be presented by Dataquest Inc., at the Orlando (Fla.) Hyatt House March 5-7.

Speakers will cover issues including communications trends and their potential impact on small computers, future semiconductor technology directions and its impact on the computer industry, trends in network architecture and the evolution of the programmable desktop calculator into a small business computer.

Selection Panel

The relationship between small business computer manufacturers and their dealers and distributors will also

be covered, according to a spokesman.

A panel of users will discuss "Why We Selected the IBM Series/1." The discussion will cover the selection process, advantages of the mini over competitive offerings and how well it fulfilled expectations, Dataquest noted.

Dataquest can be reached at 3000 Sand Hill Road, Menlo Park, Calif. 94025.

HI Printers, LSI-11 Linked

AUSTIN, Texas — Users can now interface the Houston Instrument (HI) 8200 series printers to Digital Equipment Corp.'s LSI-11 microcomputer by using the printer firm's 017 option, according to a spokesman.

The controller plugs into the LSI-11 bus and a printer cable is at-

tached before running. The controller is said to be transparent to the host unit and compatible with diagnostics, drivers and operating systems written for it.

The 017 interface option costs \$1,150. HI is at One Houston Sq., Austin, Texas 78753.

Counties Form DP Co-op to Cut Costs

(Continued from Page 51)

istration or county personnel files.

"The system is basically unlimited and the flexibility is definitely there," Hennen said. But participation in a new application should be weighed by each county.

A county could go into an application completely on its own, but it would have to shoulder the entire cost instead of sharing the expense with other counties, he pointed out.

Scott County, located 20 miles south of Minneapolis, enters its real estate

tax billing data by keypunch. The information entered includes the number of the parcel of land, the owner's name, the estimated and limited market value and the legal description.

The system is programmed to determine the mill rate — the rate upon which the real estate taxes are based. Once that figure is determined, an automated tax statement is prepared and mailed out.

The computer breaks down the tax statement by indicating how much of the tax dollar goes to what, such as schools, city and any other special assessment.

ATTN: 3270 USERS

Here's a *tailor-made* system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. Systems Programmers, in particular, find the following features very valuable.

Both Local and Remote 3270 are available, of course,

PLUS

Local Job Entry. Line printers up to 1200 LPM with 1403 addresses and card readers with 2501 addresses can be placed next to any BRAEGEN CRT. These "hot" printers and readers are located in the users' areas up to 7,500 feet outside the computer room. Most popular uses are for programmer listings and accounting work. Users get the benefits of increased productivity because turn-around time is reduced to minutes.

PLUS

Address Switching. Any BRAEGEN CRT terminal provides as many addresses as required for Console, TSO, Applications, etc. Any CRT can have both Local and Remote addresses. This feature can reduce the number of CRT's required and will eliminate NCP,

VTAM type software overhead requirements.

PLUS

Multiple Controller Interfaces. The BRAEGEN controller allows multiple channel and remote interfaces. Any CRT can access multiple local IBM CPU's or remote CPU's. Just 2-3 seconds to switch a CRT between CPU's or addresses.

PLUS

Fast Cursor, Programmable Keyboard, 7500' Coax,

Multiple Drops per Coax, Wide range of speeds in 3286/3288 compatible printers; from 45 cps to 1200 LPM, Offline Data Entry, and our Offline TSO Editor.

PLUS

Features others have promised for 1978-1979 are **AVAILABLE NOW . . .** Local Copy, 128 character set CRT, Typamatic keys, Home key, etc.

PLUS

Low Prices — 1, 2, 3 year leases available.



Customers throughout the U.S. are benefiting from these features now. For more information please write or call; The BRAEGEN Corporation, 20740 Valley Green Drive, Cupertino, California 95014. (408) 255-4200.



BRAEGEN

Growth at Crux Of Service Woes

(Continued from Page 51)

determine the training and technical education of each person to make sure they are each adequately trained," the Datapoint spokesman noted. Training is developing a "symptom and solution" approach, he noted.

Another vendor asked to respond to the problem said it is beefing up its training program. Basic/Four Corp.'s management commitment has been in the training of system support personnel, a spokesman said.

"The next thing we need to do is the same [training] with vendors and dealers," he added.

Recognizing the difficulty in providing good service, a spokesman for General Automation, Inc. said his firm has an attrition rate of less than 13%, but "growth swells the ranks." The user has to ask himself, "Do I want the same person back, or do I want my problem fixed?" he said.

GA is "supporting over 300 different products" and still has to train its people on older product lines, adding to the problem, he indicated.

On software problems, Digital Equipment Corp. said it is more valuable to the user to have "someone familiar with our product there sooner than to have someone who is familiar with his particular installation there later.

Hewlett-Packard Co.'s customer engineers are assigned by account, allowing an engineer to establish a relationship with the systems manager, a spokesman for that company said. The HP workers are even outfitted with beepers so they can be reached if they are not in the office if a call from the user comes in, he said.

HP has two levels of training for its customer engineers, a basic training course of 16 weeks for those who install the systems, maintain them and run diagnostics, and a more specialized course lasting six weeks for operation software specialists, CPU hardware specialists and peripheral specialists.

Software Seen Problem for Small Businesses

By Esther Surden
CW Staff

ANAHEIM, Calif. — Since hardware costs keep coming down, software remains the major bottleneck in bringing small business system prices low enough to appeal to most small business people, two panel members at a recent conference here agreed.

And price isn't the only reason some users will not consider a small system. Another reason is that customized software takes control of the business out of the hands of the person who built it and puts it into the hands of DPs.

Speaking at a session on small business systems, Charles G. Milden, president of Interactive Computer Systems, Inc., and Charles G. Muhle, director of marketing support for Basic/Four Corp., told about 200 attendees that the development of standardized, parameterized applications packages could help decongest that bottleneck by reducing costs and putting control back in the hands of the user.

The Ground Up

Muhle pointed out that the typical small business person is someone who has built a business up from the ground, is in touch with his business and has survived to this point without a computer. He's heard some horror stories about them and thinks that in order to have one he must invest in a DP staff. In addition, the small business person has a hard time putting trust in a machine.

The vendor, on the other hand, would like to put in a system that is easy to service, so as to cut down on overhead costs, installs quickly and doesn't require much support.

The vendor and the user's interest merge, because the same solution that will provide a good system for the small business person will also be more easily supported, Muhle indicated. That solution is a software product that is both "horizontal and vertical in its appeal." Such a product would draw on classic accounting programs which, through "yes, no" parameters and set user choices, could address many different industries.

Printer Added For PDP-11s

MAYNARD, Mass. — Digital Equipment Corp. has a line printer with both plot and character printing capabilities designed to work with the firm's PDP-11 minicomputers.

The LXY11 printer, which outputs at 300 line/min for characters and 170 line/min for plots, can produce both double- and single-height characters in the full Ascii 96-character set, a spokesman said. Underlining capability is also available.

The plotting feature uses the PLXY-11M software package, a library of Fortran callable routines, and is supported by the RSX-11M operating system. Character and plot generation by impact allows multicopy forms to be used with the device.

The LXY11 costs \$14,400 including the software from DEC, which is headquartered in Maynard, Mass. 01754.

Such software does not put the control of the business into the hands of a third-party expert, but leaves it in the hands of someone who knows the business, he said.

Over-Extended Software Firms

Not only the problem of the user and the vendor can be solved by using parameterized software, but the problem of the over-extended systems software house can be alleviated, Milden pointed out. In the past there have been more machines to install than qualified people to help install them and anyone with a business card could be a software house, he asserted. But smaller software houses were consumed by their user base — that is, they spent all of their time on support

and little on new installations.

The problem, he said, was that the only person who could support custom software was the person who wrote that software. Flexible, standardized software was needed to prevent this from happening, he said.

It would prevent any user from becoming an island because no one will support software installed by someone else. If the basic modules are the same, it will become easy to support that software.

Parameter-driven software also allows the user to change the software to suit his business. The modules used, of course, should be based on sound accounting principles so that the user does not need to develop a new accounting procedure to do his work, he

added.

An example of parameterized software would be a package that uses the word "product." Used by a wholesaler, that word becomes "style" throughout. For an auto parts manufacturer, it would become "part." With such a package, modules could be added or deleted depending on the business so that if characteristics of a part had to be detailed, for example, they could be.

Support will be simplified because a programmer will not have to learn the styles of several different analysts.

Soon this software will be produced through "dialogue with a computer," which will in effect produce the software package tailored to the user's problems," he predicted.

Register now for DataComm 78!



Call 800-225-4242*

Don't miss the one Data Communications Industry Conference and Exposition held in the city where DataComm policy and regulation are established!

Profit from vital information, insight, ideas brought to you by nationally known data communications experts! Be there in person. Don't get DataComm secondhand!

Call 800-225-4242

Take part in panels and sessions that let you ask your questions, share experiences, express your needs.

Make DataComm your personal conference, choosing your options each day — ranging from tutorials for the beginner to advanced networking panels for the sophisticated user.

Call 800-225-4242

And register for one, two, or all three action-packed days, including:

19 Vendor/User Rap Sessions • 3 Special Management Sessions • 6 Network Tutorials and Panels • All Day Government Miniconference — and MORE!

FREE! The Exposition at DataComm 78 will feature exhibits from manufacturers all over the country. Discuss your needs and plans with key representatives in a quiet-paced, informative atmosphere.

Call 800-225-4242

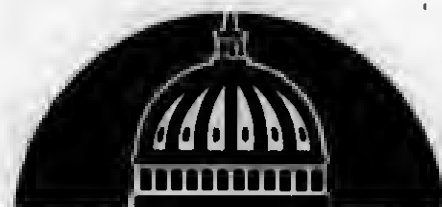
REGISTER NOW!

If this is the first news you've learned about DataComm 78, don't miss this chance to attend.

AFFORDABLE:

UNMISSABLE! Just \$115 for the whole DataComm Conference, or \$50 each for single days.

Don't delay! Master Charge, American Express, Visa/BankAmericard accepted. Call our toll-free number now to arrange your attendance at DataComm 78 — the ONE conference you don't want to read about later and be sorry you missed.



DataComm

78

CONFERENCE AND EXPOSITION

February 21-23, Washington, D.C.

*Inside Massachusetts, call collect: (617) 964-4550. Or write DataComm 78

Registration

The Conference Company

60 Austin Street, Newton, MA 02160

Firm 'Burns Up' Paperwork With Large Mini

BUFFALO, N.Y. — The installation of a large-scale minicomputer at the National Fire Adjustment Co., Inc. (NFA) here has helped stoke the firm's growth and rescue the company from a bottleneck created by manual procedures, according to the company's president.

NFA is a "public adjustment firm" that provides services to its clients in the event of a fire, Frank R. Papa explained. After a fire hits, NFA reviews a client's insurance policy to determine the scope of his coverage, sends an estimator to itemize losses and damages, prepares the claim to be submitted to the insurance company, reviews the claim with the insurance company's adjuster and handles negotiations for its client.

Before installing the minicomputer, all of these services were handled manually. After a client's insurance coverage was analyzed, an NFA estimator would go to the fire site and make notes detailing the damage.

An "extender" then made calculations to convert the rough notes into

dollars and cents — for example, so many board feet of lumber at so much per board foot or so many square feet of finish plastering at so much per square foot. Extenders had to know hundreds of prices for building materials and labor.

The extender's notes were then typed, leaving room for error in the translation of handwriting. The finished data required detailed error-checking.

Floods Spark System

New business that came after NFA began handling insurance claims for floods in western New York State provided the impetus to try a new system. The company hired Charles DeWald, a consultant with Custom Computerization, Inc. here, because NFA knew of other firms he had helped.

Custom Computerization developed a two-dimensional organization of building trade items and services and also developed a standard language to help estimators describe construction or repair details. The system was de-

Frank R. Papa gets a lesson on the operation of NFA's mini from Charles G. DeWald.

signed in Fortran for a commercial time-sharing house first and then moved in-house to the minicomputer.

A data collection form was designed to ease the estimator's writing burden. This form is important because estimators work under adverse conditions in damaged buildings and in all types of weather, DeWald said.

The organization also included two other elements: a simplified scheme for the typists who put the information in the computer and a systematic means to check input data for errors and omissions before a claim is generated, he noted.

NFA had to establish separate pricing for each city, and the system had to allow material prices in the computer to be updated or overridden. Matching and material loss had to be computed and noted as part of the description in the claims.

The system also had to include an insurance recapitulation, note variations in the grades of materials and associated pricing where appropriate and be flexible enough to accept any aspect of loss that NFA could encounter, DeWald emphasized.

Because each description that appears on the claim must be complete in every relevant detail, estimators needed to be able to add comment lines anywhere in the claim.

When the firm decided to move to an in-house system, it established several

criteria. For one, the computer would have to support the claims-generating process in a time-sharing mode while simultaneously allowing NFA to develop and operate a conversational management information system.

NFA decided on Prime 400 time-sharing system after analyzing the mini and mid-size computer systems available. "The references of companies using Prime equipment were very positive," DeWald said.

Overnight Automation

NFA's operations became automated overnight, DeWald recalled. "Training the estimators to use the language and coding sheets required only a three-hour session," he said.

"The estimator group manager said, several months after the system had been in use, that it was reducing the site time required to list damage by 25% to 40%. The estimators generally agree that the computerized system makes their job easier."

The system has reduced by approximately 4 to 1 the number of typists required to produce the same number of claims, he added. But its most significant benefit is the dramatic reduction in time it takes to prepare a claim.

When NFA used manual method, it took several days to prepare a claim from the estimator's notes. Now, DeWald said, an average claim takes 30 to 45 minutes to complete.



Eliminate Tedious Manual Tasks

Small Systems Check Out at Inns' Front Desks

CLAREMONT, Calif. — The lodging business is not a place for amateurs, in the opinion of Robert S. Sanford, general manager of the Services Division of Griswold's, a growing Southern California hospitality enterprise.

"Management has become more and more professional, particularly with regard to properties in the 150- to 300-room category, where operators are finding they can make money if they know how to run the business properly," Sanford said.

Griswold's is an example of how small-to-medium-sized properties can benefit by using small computers with programs designed to handle hotel control, accounting and reporting applications.

Uses Three Systems

Two years ago an IBM System/32 was installed at the front desk in the company's 188-room Griswold's Inn here. Another System/32 has since been placed in a 265-room property which Griswold's opened recently in nearby Fullerton.

Using a program designed by Sanford and his staff, the two systems have eliminated the many tedious manual chores previously involved in front-office operations, Sanford said. In addition, a third System/32 is used at Claremont for back-office accounting for both hotels, as well as for general accounting for the company's other enterprises.

Despite an increased workload brought on by steady expansion, the systems have made it possible for Griswold's to maintain a consistently high standard of guest service without increasing the size of its front-office and accounting department staff, according to Sanford.

Moreover, he added, efficiency in reservation control has helped keep occupancy levels well above 90% year-round without overbooking.

Deciding Factor

Griswold's turned to IBM for its small systems because it felt it needed around-the-clock maintenance service. People don't check in and out of a

hotel between set hours, Sanford noted.

At first the company got a System/3 Model 6 and considered upgrading to the Model 8. Instead, he said, it went to two System/32s, which turned out to be an economical solution.

When the 3/6 went into operation in 1972, Griswold's had 350 employees, processed about 4,000 invoices in payables each month and had seven profit centers.

The operation now has over 750 employees, about 12,000 payables transactions a month and 28 profit centers.

"Since Griswold's Inn is a destination-type hotel with about 80% of its income derived from corporate business, we have to be extremely accurate in our reservation counts, particularly since our policy is to find and pay for a guest's lodging elsewhere in case of an overbooking," Sanford said.

"This, plus the need for closer control of room inventory and guest accounting, led us to decide on a separate, small computer dedicated to front-office operations.

"We selected the System/32 for several reasons," he noted. "First, its compactness makes it ideal for front-desk installation. But, despite its small size, the System/32 has about twice the power of our previous computer at about half the price."

Software Now IUP

The hotel front-office management system developed by Griswold's is now available to other companies in the lodging industry as an IBM Installed User Program (IUP) for the System/32. The IUP covers all of the traditional front-office functions including reservations, registration/check-in, guest accounting/checkout, housekeeping, room status, preparation of telephone lists, travel agency accounting, guest history, shift and night audit, city ledger and management reporting/sales analysis.

The program prompts the user through all functional procedures a step at a time. As the operator enters data to make a reservation, register a guest, post charges or print a folio, instructions on the computer's CRT

screen indicate the next step in the transaction.

"The key to efficiency in the system is one-time entry of data which can be reused as often as necessary for the various accounting and reporting functions associated with front office operations," Sanford pointed out. "For example, when we enter a reservation we provide the system with the guest's name, address, city, state, Zip Code, company or group affiliation, arrival and departure dates, type of room desired, special requests and, where applicable, travel agency information."

"The program assigns an account number for the reservation, and thereafter the same information is used repeatedly."

"First it is used for automatic generation of a confirmation and deposit request, next for production of an arrival list and the registration card (which is

printed in advance of the guest's arrival to facilitate rapid check-in), then to provide the basic information for printing the folio and for production of telephone lists, and room status worksheets.

The program also automatically posts advance deposits directly to the guest's folio, eliminating the need to transfer this data from a monthly folio.

Individual guest charges are the only additional information required for the folio, and these are entered via the System/32 keyboard as they are received, along with a code identifying the type of charge.

The system posts the room charge and tax to the account each night and prints the folios for those guests who are scheduled to checkout the following day. If additional charges are incurred after the folio is produced, these can be posted at checkout time and a new folio printed.

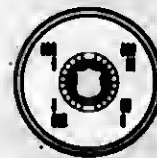
COMPUTER DISASTER.

95% of the computer contingency/recovery plans surveyed failed to work.

Would yours?

This startling fact has been revealed again and again in our review of the computer emergency recovery plans of many of the nation's top corporations. In our role as an independent computer security consulting firm for over 250 major companies, we have also found that only a few have even undertaken a formal risk analysis survey.

Considering what's at stake, perhaps you'd like to know more about our services. They include risk analysis, data security, physical protection, emergency/recovery plans, theft and fraud control as well as facility design. For more information contact: J. C. Metlock, Jr., Dept. C, 235 Northeast Loop 820, Hurst, Texas 76053, (817) 589-2244.



DATA PROCESSING SECURITY, INC.

Atlanta Chicago Dallas/Fort Worth Los Angeles New York Washington, D.C.

And that means the people in this car are pretty intelligent. Because they realize that the world's most popular video terminal is a steal at its new low sticker price of \$895.

With a 24-line screen and 1920 bright, easy-to-read characters included as standard equipment, the Dumb Terminal™ makes you wonder why anyone would settle for second best. Especially when it's an asynchronous terminal with 59 data entry keys. And 33 positive action switches that let you activate functions like 1 of 11 different baud rates, an RS232C interface, or a 20mA

current. Without thinking, it started a



Floppy Has Four Heads

W. LOS ANGELES — A dual-headed, dual-diskette drive that reportedly reads and writes on both sides of two 8-in. floppy disks is being offered by Persci, Inc.

The drive, which stores up to 3.2M bytes of data in the space required by a standard size floppy drive, was designed for both minicomputers and microcomputers based on 8080, 6800 and Z-80 systems, Persci said.

Data can be encoded in single or double density in IBM-compatible soft-sectored formats or expanded hard- and soft-sectored formats on IBM Diskette I-, II-, or IID-compatible media, according to a spokesman.

The drive will store up to 1M byte of data in IBM-type format, 1.6M bytes in unformatted single density.

The drive features an average seek time of 33 msec. It costs \$1,595 from Persci, 12210 Nebraska Ave., W. Los Angeles, Calif. 90025.

Here's
EZcom



State of the art in intelligent communications

EZ Com achieves new versatility, speed and lowered time sharing costs, and does it at a sensible price. A unique combination of microprocessor and miniature flexible disk has produced an intelligent communications buffer with string search, editing and data retrieval capabilities. Versatile vocabulary provides extensive local/remote communications control.

EZ Com provides a competitively priced alternative to less versatile paper tape and cassette devices. Compatible with most terminals and modems. Storage capacity is 71,680 characters. Transmission speeds from 110 to 9600 baud.

EZ Com, a long step ahead in data storage and forwarding equipment.

Contact Joel Stephens, VP Marketing, Crown Communications, Inc., 2750 Northaven, Suite 111, Dallas, TX 75229.

Crown Communications, Inc.
2750 Northaven,
Suite 111 Dallas TX 75229
Phone (214) 243-6941

Also Crown's CCI-5000. For those who need a cassette device Crown offers CCI-5000, with many of the advanced advantages of EZ Com in cassette form.

Pertec Builds Business Systems Around Mits/Altair 8800B Micro

WOODLAND HILLS, Calif. — Pertec Computer Corp.'s Microsystems Division has introduced a microcomputer-based integrated business system called the Mits 300.

The Mits 300 is a complete hardware and software system. It is available in two configurations, the hard-disk Mits 300/55 and the floppy disk 300/25.

Word Processing

Both provide capabilities for word processing, inventory control and accounting functions including general ledger, accounts payable, accounts receivable and payroll, according to the vendor.

From Datapoint

Freedom Printer 160 Char./Sec

SAN ANTONIO, Texas — Datapoint Corp.'s Freedom printer, designed for the distributed processing environment, is now available in two 160 char./sec versions.

The Model 9236 was designed as a system printer for any Datapoint business system producing parallel data output. It is compatible with existing system line printers and uses address and control code sequences which are identical to the 80 char./sec parallel data version, the Model 9232, the firm said.

The Model 9235 accepts serial data and is intended for use as a terminal printer on Datapoint's Datasware business time-sharing systems. It functions as a receive-only terminal or can be connected to CRT terminals for hard-copy output, Datapoint said.

Uses Cartridge Ribbon

Both printers incorporate a cartridge ribbon and use a 5 by 7 dot matrix to impact print a full 96-character set with upper and lower cases. Up to 132 columns may be printed

Each configuration is comprised of a mainframe, a CRT terminal on a desk and a printer on a pedestal.

The Mits 300/55 incorporates a Mits/Altair 8800B turnkey mainframe with 64K of dynamic random-access memory, 1K of programmable read-only memory and serial I/O interface.

It also has a Mits/Altair B-100 CRT terminal with a 12-in., nonglare monitor, formatted to display 24 lines of 80 char./line with a memory page of 1,920 characters, the firm stated. Its printer is a bidirectional Mits/Altair C-700 that can print 60

char./sec with 26 line/min.

The system also includes a hard disk and controller and, Basic language software.

The Mits 300/25, also for accounting applications, is identical except that it includes two floppy disks.

Inventory Package Available

An inventory management software package is available for the accounting system. The Mits/55 is priced at \$15,950 and the Mits/25 costs \$11,450. The accounting package costs \$4,000. Pertec Computer Corp.'s Microsystems Division is at 21111 Erwin St., Woodland Hills, Calif. 91367.

on standard sprocket-fed paper, a spokesman noted.

The tractors may be adjusted to suit paper as narrow as 1.5 in, he added. Up to six-part forms may be used.

The Model 9235 serial printer costs \$4,540 and leases for \$185/mo on a two-year lease with maintenance included. The Model 9236 parallel

printer can be purchased for \$5,540 or leased for \$215/mo on a two-year lease with maintenance.

A dual tractor option is available on either version for \$500 or \$26/mo on the two-year lease with maintenance, the company said from 9725 Datapoint Drive, San Antonio, Texas 78284.

Canadian Vendor Designs Manufacturer's Turnkeys

OTTAWA — Katcard Systems Ltd. has an on-line system for manufacturers based on General Automation, Inc. minicomputers.

The turnkey system includes software for inventory accounting, order entry, shipping and invoicing, backlog reporting and work-in-progress for production with bill-of-materials and full accounting.

The bill-of-materials system features an explosion prescan, allowing the user to see what materials are needed for items currently in production and which parts are on hand, as

well as their quantity, a spokesman explained.

Subcomponent breakdown is also accommodated.

A small system based on the GA 440DS with 128K bytes of memory includes 10M bytes of disk, an 800 bit/in. tape drive, a 400 card/min card reader, one 200 line/min printer, a 4-line controller and four terminals. It costs \$104,000.

Prices range upward to \$172,000 depending on configuration, the company said from Suite 306, 376 Churchill Ave., Ottawa, Ont. K1Z 5C3, Canada.

Industrial Control Backed

MAYNARD, Mass. — Digital Equipment Corp. has introduced a system for dedicated industrial process monitoring and control based on its LSI-II microcomputer.

The IP300 was designed to bring fully programmable process I/O to localized applications, the firm said. It

handles up to 78 I/O modules.

With 56K bytes of MOS memory, dual flexible disk unit, Decwriter II console terminal, RSX-11S real-time operating system and space for up to eight I/O modules, the IP300 is priced at \$17,450, DEC said from its headquarters in Maynard, Mass. 01754.

Floppy Stand Revolves

COMMACK, N.Y. — The Floppy Merry-go-Round from the Data Products Division of Robins Industries Corp. is an integral stand that revolves on a ball-bearing

track.

The unit holds 64 diskettes (two in each pocket). Its costs \$110 from the vendor at 75 Austin Blvd., Commack, N.Y. 11725.

DEC DATASYSTEM

310 • 354 • 356 • 540

WITH DEC DATASYSTEM SOFTWARE LICENSE

40% and more OFF DEC LIST!

IN STOCK NOW • IMMEDIATE DELIVERY

84-PAGE CATALOG • 1500 ITEMS • DEC • MINIS • IBM
MICROS • PERIPHERALS • Send \$1 for 1st Class Postage/Handling

AMERICAN USED COMPUTER

P.O. BOX 68, KENMORE STATION
BOSTON, MASSACHUSETTS 02215

• 617-261-1100

Looking for a Micro Second User's Search Ends Differently

By Jan A. Heise
Special to CW

There are many people who have been faced with difficult decisions when purchasing microcomputers. Like William Colsher, I, too, sent for literature from all of the manufacturers.

In the course of my search, I considered a few more systems than Colsher did — the Cromemco (Z-80), Vector (8080), Polymorphic Systems, Inc. (8080) and Processor Technology (8080) systems.

I also thought about building a unit from scratch by ordering an S-100 bus motherboard and 8080 or Z-80 microprocessor board from various companies.

In addition, I visited computer stores and other computer hobbyists for actual demonstrations of the various systems and a chance to grab some hands-on experience. This included a Digital Group system.

I came very close to ordering a system similar to Colsher's, but instead I bought the Imsai Manufacturing Corp. 8080 system.

To me, the advantages of having a machine with an Altair S-100-compatible bus, a heavy-duty power supply and, in my case, front-panel switches for development work far outweighed the initial savings which Colsher claimed he gained with his system.

The primary reason I decided on the Imsai system was that the S-100 bus has become the de facto standard bus for microcomputers. There are currently dozens of manufacturers making S-100-compatible components.

On the other hand, purchasing the Digital Group system virtually locks one into the products from that company. People buying the Heathkit, Radio Shack and Commodore units will also face this problem.

If one is willing to accept the fact that he will probably have to be content with the products produced by that manufacturer, then there is no problem. As sales increase, other manufacturers may start making boards for these computers.

It is not that I don't like Digital Group products, but I wanted the versatility offered by the S-100 bus. For example, I have a friend who just upgraded his Imsai to a

Z-80. He made a toll-free call to S.D. Sales in Dallas, purchased a Z-80 board for \$139 and was running it in his system a week later.

I currently have boards in my system from five different manufacturers, and I have encountered no problems with any of them. One philosophy which I followed when

The search for a microcomputer system can be a complex undertaking. William L. Colsher recently discussed how he decided to acquire a Z-80-based system [CW, Dec. 5]; in this issue, another user tells how he reached a totally different decision while engaged in a similar search.

purchasing my components was not to buy any boards that I had not actually seen or that were not being used and recommended by hobbyists I knew.

The \$675 for the four-board system which Colsher described should not really be compared with one of the complete kits. A more appropriate comparison would be the complete Digital Group system with cabinet and power supply at \$895 plus \$40 for the heavier 18A supply, a total of \$945.

The purchaser must decide if he wants his computer mounted on a piece of plywood and sitting exposed on a workbench or whether he wants a compact unit that can be taken to the office or classroom, as I do with

mine.

With a curious two-year-old son in my home, the exposed component approach was not acceptable to me.

Colsher chose the \$200 8K memory option, which means he did not select the Digital Group low-power, high-speed memory option to take advantage of the possible increased Z-80 speed. That option is \$250 for the 8K.

Neither of these is a real bargain. I paid \$170 each for high-quality 8K memory kits six months ago and Godbout Electronics is currently selling 8K random-access memory (RAM) kits at \$130 each or four for \$475. S.D. Sales has assembled and tested 8K RAM boards for \$160. These are all high-quality components and this is what competition is doing for the S-100 bus owner.

Colsher was mistaken in his reference to the "tarbell/KC standard." The Tarbell tape interface (which I am using) is a high-speed tape interface. The Tarbell standard is approximately 1,500 bit/sec or 187 byte/sec.

This is over six times faster than the Kansas City standard and one and one-half times faster than the Digital Group tape interface Colsher is using. An advantage of the Tarbell interface is that even though it is very fast, the phase-encoded self-clocking method allows use of an inexpensive recorder, such as my \$35 Panasonic.

I agree with Colsher that Digital Group appears to have put effort into producing a lot

(Continued on Page 58)

Personal System From Umtech Includes Library of Programs

SUNNYVALE, Calif. — Umtech has introduced a personal computer with a pre-programmed library of educational, home management and entertainment programs.

The Videobrain contains an 8-bit Fairchild Camera and Instrument Corp. F8 microprocessor with 1K byte of random-access memory (RAM) and 4K bytes of read-only memory (ROM).

Input to the computer is made either by using the 71-symbol keyboard, joysticks or preprogrammed cartridges that contain up to 13K bytes of ROM or RAM.

The unit can be attached to a standard television set and utilizes LSI circuits to provide high resolution and tonal ranges, the firm claimed.

The Videobrain has built-in text and timekeeping programs; they permit the user to type and edit messages of seven lines with 16 char./line and keep track of the year, month, date, day of week; hours, minutes and seconds in background to other programs, the firm said.

Programs available on cartridge include cash management, real estate analysis, music teacher, math tutor, blackjack and pinball.

With an ac adapter and television hook-up cord, the system costs \$500. Umtech is at 150 S. Wolfe Road, Sunnyvale, Calif. 94086.

RCC REX System Features Z-80 And Double-Sided Floppy Drive

DAVENPORT, Iowa — Realistic Controls Corp. (RCC) has introduced a microcomputer system featuring a Z-80 microprocessing unit (MPU) and a double-sided microfloppy disk drive.

The Rex system includes an S-100 motherboard containing the MPU, 24K of random access memory (RAM), a CRT interface, bootstrap and monitor programmable read-only memory as well as power-fail and vectored interrupt circuitry, a spokesman said.

The system also has a 15A power supply and includes space for a second microfloppy drive plus five slots for S-100 bus options, he stated.

The microfloppy drive reportedly has a capacity of up to 75K bytes per diskette surface. Software options include Ansi Fortran IV with subroutine library and 8080 and Z-80 extensions; floppy disk operating system; file management system; text editor; and linking loader.

Equipment options are black-and-white or color CRTs, a radio frequency modulator generator, expansion microfloppy drives, RAM memory up to 64K, a 120 char./min

80- and 96-column printer, a programmable serial communications channel and a data communications modem.

Assembled and tested, the system costs \$2,495 from RCC at 404 W. 35th St., Davenport, Iowa 52806.

D/A Board Fits Intel SBC-80

NORWOOD, Mass. — A digital-to-analog (D/A) converter board that is compatible with the Intel Corp. SBC-80 series of single-board computers has been announced by Analog Devices, Inc.

The RTI-1201 was designed to plug into the bus connector of the user's card cage. All analog interfaces are made through a pin-connector mounted at the opposite board edge, according to a spokesman.

Data conversion is performed through 12-bit D/A converters that are software-driven using double buffered registers, he added.

The unit also contains four high-current logic drivers for system control functions, the spokesman noted. These are software-

controlled open-collector drivers with 30V, 300mA capability.

Additional features include D/A read-back and reset functions; a 10V reference; memory overlay for random-access memory and read-only memory (ROM) inhibit; a multiple card select function; an on-board programmable ROM socket; four 20mA current loop outputs; and an optional single 5V power supply, the vendor said.

Applications for the RTI-1201 range from process control and laboratory automation to graphics plotting, automatic test equipment and electromechanical positioning.

Prices for the board begin at \$298 from Analog Devices, Rt. 1 Industrial Park, P.O. Box 280, Norwood, Mass., 02062.

MICROCOMPUTING

Unit Has Shugart Floppies

OAKLAND, Calif. — Digital Systems Corp. has announced a microcomputer system that includes two Shugart floppy disk drives and either 32K or 64K of random-access memory (RAM).

The Micro-2 features a Z-80 microprocessor unit (MPU), four RS-232C serial interfaces and a real-time clock. The disk controller can use either IBM 3740 or a double-density format of 571K bytes per disk (77 tracks of 58 sectors with 128 bytes per sector), the vendor claimed.

With optional double-sided drives, the system can store up to 2.3M bytes, a spokesman added.

The unit includes the Critical Path Method (CP/M) disk operating sys-

tem and hardware diagnostics. However, other software including C-Basic, Basic-E and Fortran is also available, the firm said.

The controller handles data transfers for sector read/write through a direct memory access (DMA) interface, permitting concurrent processor execution.

The Micro-2 with two single-sided drives costs \$4,995 with 32K RAM and \$6,090 for 64K RAM; with two double-sided drives, it costs \$5,695 and \$6,795, respectively; and with four single-sided drives, it is priced at \$7,040 and \$8,135.

Service contracts and OEM discounts are also available from the firm at 6017 Margarido Drive, Oakland, Calif. 94618.

Micropolis Systems Include S-100-Compatible Floppies

CANOGA PARK, Calif. — Two floppy disk drives that are S-100-compatible and were designed to integrate into 8080A and Z-80 microcomputer systems have been introduced by the Micropolis Corp.

The Macrofloppy 1041 and 1042 both have a 143K-byte storage capacity and offer a transfer rate of 250 kbit/sec with an average latency time of 100 msec, the firm said.

Track-to-track access time is 30 msec and recording density is 5,162 bit/in., the firm stated.

Both units are hard-sectored into 16 sectors, each 256 bytes long, and contain 35 track/surface.

The floppy drives use a head-

positioner system that incorporates a stainless-steel lead screw with a steel follower. They feature a read-only memory (ROM) bootstrap loader and a file protect function, a spokesman said.

The units' disk operating system needs at least 16K of main memory to function, with 24K required for the firm's extended Basic, he added.

The 1401 with cabling, connectors, disk operating system and extended Basic is priced at \$695. The 1402 is priced at \$795 and includes a power supply and dc regulators.

Micropolis Corp. is located at 7959 Deering Ave., Canoga Park, Calif. 91304.

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.

NCR	Control Data	IBM	Intel Corporation	Sperry Univac
Varian Graphics	Datapro	General Computer	Peripheral Products	Terminal Rentals
Informatics	Printronic	Atlantic Research	Applied Digital Data	Applied Data Communications
National Semiconductor	Codex	Telefile Computer Products	Epic Data	Data Forms Company
Datamation	Lear Siegler	General Electric	Sykes Datatronics	Imperial Technology
Communication News	E M & M	Oume	Cummins Allison	Mathematica
McCormack & Dodge	The Morley Company	Moore Business Forms	American Microprocessor	Rianda Electronics
Data Rentals	Vanier Graphics	DataMedia	International Data Corp.	Computer Corp of America
Computer Sales International	Total Typography	Texas Instruments	Programs, Inc.	AT&T
Intel	Wang Labs	Computerworld	Beehive International	Cullinane
Electronic Ventures	Computer Devices	NCI	Interdec Data Systems	Hewlett Packard
Computer Roomers	Ann Arbor Terminals	Deltak	Software AG	Pansophic Systems
Customer Priorities	Datapro Research	Kodak	Creative Engineering	General DataComm Industries
Computer Software Solutions	Inforex	BASF	Graphic Controls	Continental Peripherals
Systems Marketing	Perkin-Elmer	Western Union	Mini-Computer Systems	Computer Associates
S. E. A.	Telcon Industries	Anderson Jacobson	Tandem Computer	Oantel
Tri-Data	Versatec	Computer Inout Services	PCC/Pertec	Diablo Systems
Midwest Marketing	Computer Performance	Paradyne	Computrend	Marketechs
Logabax	Advanced Systems	ComData	Extel	Racal-Milgo
AAA Chicago Computer	Delta Data Systems	Genesis One	Mentel	Data Systems Specialists
Intelligent Systems	Inform	Data Processing Sciences	Sycor	Key Tronic
Shasta	Computer Decisions	Applied Computer Systems	Digitronics	Administrative Management
Mosiek	Intosystems	Agile	Computer Services	Small Systems World
DIVA	T-Bar	Woodford Systems	Datamart	American Terminal Leasing
SBC Magazine	Corporate Systems	American Used Computer	Courier Terminals	Journal Systems Management
Tele-dynamics	Dynatech	Business Forms Service	Trac/Hughes & Bomac	Optical Business Machines

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

For complete information on how the 1978 Computer Expo can work for you, use the coupon below or call Kim Wichert, toll free 800-225-4242. In Massachusetts, (617) 964-4550 (collect).



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

We're Interested In exhibiting.

- ☐ Have Sales Representative call me
☐ Send Reservation Agreement
☐ Send Copy of 1977 Attendee Analysis

Southern California Computer Expo	Anaheim/LA	March 21-23
Northwest Computer Expo	San Francisco	March 28-30
Southwestern Computer Expo	Houston	April 11-13
Southeastern Computer Expo	Atlanta	April 18-20
Gateway Computer Expo	St. Louis	April 25-27
Midwestern Computer Expo	Chicago	May 2-4
Mid-Atlantic Computer Expo	New York	May 9-11
Great Lakes Computer Expo	Detroit	May 23-25
New England Computer Expo	Boston	May 30-June 1

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (____) _____

User Search Has Different Result

(Continued from Page 57)

of system and application software. Two important points that he failed to mention are:

- It appears Digital Group is offering Z-80 software which actually takes advantage of the larger Z-80 instruction set.

- The price is right.

The availability of good microcomputer software is a problem, especially Z-80 software. Most Z-80 owners are using 8080 software, negating the prime advantage of the Z-80 — its instruction set, which is about twice as large as the 8080's.

It seems most of the larger microcomputer manufacturers are not really interested in selling software. The trend seems to be for them to contract with a software company to develop an assembler and a Basic interpreter and leave the software development and sales to the computer stores, software companies and microcomputer magazine publishers.

Some of the larger companies, such as Mits and Imsai, are charging far too much for software such as the Basic interpreter, but that is my opinion.

My purpose in writing this article is not to deride Colsher or downgrade the Digital Group equipment. However, there are many sides to the selection of a microcomputer system, and there were certain points in his article I felt needed to be corrected.

It is not as simple as deciding whether you want an 8080, Z-80 or 6800 type of microprocessor, as implied in Colsher's article. One must also consider the impact a particular bus structure, the number of slots on the motherboard and the size of the power supply will have on future system expansion.

The user must decide if he will be doing significant system software development work and whether he wants a functional front panel with switches or a pad for entering data as well as lights or a digital readout for output.

Finally, the initial added expense of \$100 to \$200 on a basic system should not deter any serious microcomputer system builder, because it is the cost of the peripherals that really drives up the cost of a total system.

Heise is a hobbyist in Montgomery, Ala., who teaches a university course on minis and micros.

FAIL-SOFT SYSTEM — A computer system which will continue to run (with deteriorated performance) despite failure in parts of the system.

FAILURE, MEAN-TIME-TO (MTTF) — The average time the system or a component of the system works without faulting.

FAULT — Refers to various physical conditions that cause a device, a component of an element to fail to perform in a required manner; for example, a short circuit, a broken wire, an intermittent connection.

FEEDBACK — When applied to transmission, feedback is the return of a fraction of the output to the input in a closed-loop system. It is part of the system which brings back information about the condition under control.

FETCH — 1. The particular portion of a computer cycle during which the location of the next instruction is determined. The instruction is taken from memory and modified if necessary. It is then entered into the register. 2. To bring a program phase into main storage from the memory image library for immediate execution. 3. The routine that retrieves requested phases and loads them

into main storage. 4. The name of a macro instruction (fetch) used to transfer control to the system loader.

FIRMWARE — 1. A term usually related to microprogramming and those specific software instructions that have been more or less permanently burned into a read-only memory (ROM) control block. 2. An extension to a computer's basic command (instruction) repertoire to create microprograms for a user-oriented instruction set.

FLAG — Refers to a bit (or bits) used to store one bit of information. A flag has two stable states and is the software analogy of a flip-flop.

FLIP-FLOP — A type of circuit having two stable states and usually two input terminals (or signals) corresponding to each of the two states. The circuit remains in either state until the corresponding signal is applied. Also, a similar bistable device with an input which allows it to act as a single-stage binary counter.

FRONT-END PROCESSING — Refers to minor microprocessors that are used to interface communication terminals to a "host" data processing system (an information processor).

LEARNER'S LEXICON

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc. 207 Kenyon Road, Champagne, Ill. 61620.



COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS. California Microcomputer Company's (CMC) previous ads in Computerworld has resulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved business software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927 (916) 691-1420.

The Computer Shop, a full service store in State College, Pa. (814) 238-7711. Closed Wednesdays.

FOR SALE: IBM 5100 COMPUTER. 64K APL, Printer, Aux Tape, Excellent For Colleges, Etc. LCS, Box 44, Banning, CA 92220 (714) 649-6758.

LEARN MICROCOMPUTER PROGRAMMING. At home. At your own pace. Complete course consisting of 10 lessons, problems, solutions, practical examples in 8080, 8085 assembly language. \$49.95. Write or call Pat for FREE BROCHURE. Logical Services, Inc., 711M Stierlin Road, Mountain View, Calif. 94043. (415) 965-6365.

Byte, Kilobaud, Interface plus three other major microcomputer journals. Cover price is \$11.25. Your price is \$9.95 postpaid from Personal/Professional Computing Association, 438A Racetrack Rd. West, Fort Walton Beach, Florida 32546.

Radio Shack TRS-80 Users. Several financial, accounting and personal finance programs available on cassette. Write the Accountants' Computer Company, Suite 1748, 3390 Peachtree Rd. N.E., Atlanta, GA. 30326.

Microdata 1600 Cpu (Reality) Wanted for above: mag tape controller and disc controller (201) 751-3000.

Microsoft ("Altair") BASIC for 8080/Z80/8502 and FORTRAN IV for 8080/Z80 now available to OEMs, end users. 8080/Z80 BASIC has random, sequential files; double precision; IF ... THEN ... ELSE and more. FORTRAN produces optimized relocatable code, meets ANSI66 except complex. CP/M and ISIS-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 Sen Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 282-1466.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02160.

I have read the rules, and would like to place my ad as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (_____) _____

Show and Tell.

To learn more about computers at any level, you have to hear. Discuss. Ask questions. Share ideas. Watch things work.

Computer shows dot the map every year. But Computer Expo 78 is different. An exhibit showing you all that's new. A conference telling you about new ways to use it.

The Show.

The Exposition. Your chance to hold a one-to-one consultation with hundreds of representatives in the know from the nation's top manufacturers. You don't have to travel all over. They're coming soon to a city near you.

And the Show is free! Including exhibitor seminars and demonstrations of the latest developments in:

Data Communications Terminals • Software • Minicomputers • Data Input Equipment • Computer Output Equipment • Supplies • Magnetic Media • Modems • DP Education • Small Business Computer Systems • Flexible Disk Drives • Data Communications Interconnect Equipment • Miniperipherals • Magnetic Tape Transports • Cassette Systems • Power Supplies • Printer Terminals • Keyboards. And more.

Ask your questions. State your needs. Discuss your plans. This low-key, non-selling atmosphere is your chance of the year to compare what's on the market, all in one place. As sophisticated or as simple a show as you need. You're the center of attention, whatever your level.

You're important enough to bring top people from all over the country to you. Find your show dates here:

ANAHEIM	March 21, 22, 23
Southern California Computer Expo	Disneyland Hotel
SAN FRANCISCO	March 28, 29, 30
Northwestern Computer Expo	San Francisco Civic Auditorium
HOUSTON	April 11, 12, 13
Southwestern Computer Expo	Astrodome
ATLANTA	April 18, 19, 20
Southeastern Computer Expo	World Congress Center
ST. LOUIS	April 25, 26, 27
Gateway Computer Expo	Gateway Convention Center
CHICAGO	May 2, 3, 4
Midwestern Computer Expo	McCormick Place
NEW YORK	May 9, 10, 11
Mid-Atlantic Computer Expo	New York Coliseum
DETROIT	May 23, 24, 25
Great Lakes Computer Expo	Cobo Hall
BOSTON	May 30, 31, June 1
New England Computer Expo	Northeast Trade Center

COMPUTER CARAVAN'S



The Tell.

The Conference. Computer Expo's Conference takes place from 9 AM to 1 PM, leaving your afternoons free for the Exposition. The Conference includes keynote speeches, case studies, presentations, panel discussions and workshops. All put together by experienced conference planners, making this the most respected conference in the country. Well-known authorities—consultants and users—will share experiences, ideas, insights and foresights with you.

These are days that will bring you facts you need now, to put to practical use now. No frills, no fluff.

Whatever your level, you'll find at least one of these days a must:

Tuesday

For you on the executive level, dealing with data processing personnel, problems, payments, plans.

The Executive Briefing.

A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing. Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday—Simultaneous Double-Conference

For you who are bringing in a first computer system for a small company, or are involved in light inhouse computer use—maybe about to trade up—or just thinking about your own system.

Small Business Systems.

A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

For you who interface with computer personnel on a day-to-day basis and need to anticipate, communicate, elicit their best work.

Managing People Problems.

A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Thursday

For you, the manager or technician whose organization is thinking of distributing its computer resources to regional offices and plants.

Distributed Data Processing.

A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Take one, two, or all three days.

Send yourself. Send your key personnel.

The Exposition is free.

The Conference is just \$55 per single day, only \$135 for all three days.

Register now.

For the Show.

And for the Tell.

Write to
Conference Chairman
Computer Expo 78
60 Austin Street
Newton, MA 02160

Save time!

To register, to get more information or for your free advance tickets to the Exposition, call TOLL FREE: 800-225-4242. (In Massachusetts, call collect: 617-964-4550.)

Model	Old 168-3'	New 168-3'	3033	Old 158-3'	New 158-3'	3032	Old 148	New 148	3031
Characteristics									
Purchase Price	5,828,050	4,388,480	3,805,000	2,279,785	1,597,885	1,900,000	859,000	799,000	1,000,000
Memory in Bytes (No. of Channels)	8M (12)			2M (8)			2M (5)		2M (8)
Price/Mo On 48-Mo Lease	132,999	122,829	77,480	48,155	45,290	43,740	22,850	20,740	25,000
Maintenance/Mo	9,791	9,468	8,320	2,819	2,804	8,500	2,405		3,070
Memory Size In Bytes (Minimum-Maximum)	1M-8M		4M-8M	512K-6M		2M-6M	1M-2M		2M-6M
Machine Cycle Time (Nsec)	80		58	115		80	180-270		115
Memory Cycle Time (Nsec)	320		290-464	620-1,035		320	405-540		345-805
Channels (Minimum-Maximum)	0-12		12-16	3-6		6-12	5		6
Price/Channel			\$320,000 (4 Channels)	See Footnote 2		\$360,000 (6 Channels)			
Multiprocessor Configurations?	Yes		No	Yes		No	No		No
Memory Buffer	32K		64K	16K		32K	0		32

CW Chart

The pricing trends of IBM CPUs have established a whole new set of ground rules in price/performance. Prices shown above include CPU, memory, channels, power supply and operator's console. Old prices are as of March 1, 1977.

1. Includes extended memory features.
2. Price for fourth channel is \$16,160; for fifth, \$15,040; end for sixth, \$7,565.

Price/Performance Game Rules Change

By Molly Upton
CW Staff

During the last nine months of 1977, IBM changed all of the price/performance rules of the medium- to large-scale computer marketplace, recent figures compiled by *Computerworld* show.

The IBM moves (see chart above) are worth investigating; not only did they make IBM a low-cost alternative, but they also broke with more than 20 years of tradition in the industry.

The price slashing on IBM's part, in fact, was nothing short of revolutionary.

IBM machines went from being the industry's high price alternatives in March to the point where they ended the year on the lower end of the mainframe pricing totem pole, a significant turnaround [CW, Jan. 16]. More importantly, however, IBM accomplished the price cutting by setting a

whole new set of ground rules for pricing in the industry.

For 20 years each performance gain in the mainframe industry was accomplished by IBM at the cost of increased prices. The prices generally grew at about 45% for each 100% gain in performance. With the introduction of the 30 series by IBM, however, all that changed.

An IBM First

Initially, the firm introduced a processor — the 3033 — with increased performance at reduced prices, a first for IBM. Then it introduced the 3031 and 3032; while these did carry higher price tags, the rate of increase did not follow the old curve when compared with the performance increases.

So now those competing with IBM have a whole new set of rules with which to live. The new, more erratic pricing structure

promises to cause problems in the future, observers believe.

Not only has IBM jettisoned its umbrella pricing stance, it has all but bared its fangs as a price-competitive vendor.

Late last March, IBM lowered its prices to be nearer — and even under — some of its competitors' prices. That move served to set the stage for the pricing of its 30 line.

If IBM's prices had remained the same on its 370s and if IBM had kept the same price/performance ratio on its 30 series, the prices of the new line would have been significantly higher. Using relative performance figures estimated by International Data Corp., a market research firm in Waltham, Mass., CW calculated that the 3031 would have cost \$2.5 million, the 3032 would have cost \$5.97 million and the 3033 would have carried a \$9.8 million price tag.

(Continued on Page 64)

3031 3032 3033
Walk away leases from Comdisco.

Comdisco now offers short term leases for your on-order IBM 3031, 3032 and 3033 Processors. Let us customize a lease for you now with or without IBM peripherals. Call or write your nearest Comdisco office. The logical choice.

Re-

THINK

COMDISCO

THE LOGICAL CHOICE

Atlanta 404-250-5950 • Dallas 214-750-1111 • Denver 303-733-1111 • New York 212-691-9000 • San Francisco 415-444-1111

Annual Growth Averaging 20%

Input Sees '82 Service Revenues at \$14 Billion

By Jeffrey Beeler
CW Staff

MENLO PARK, Calif.—Computer services has emerged in recent years as one of the fastest growing and most profitable sectors of the high-technology field, according to a newly published study entitled, "Investment Opportunities in the Computer Services Industry."

Annual growth among computer services companies has averaged 15% to 20%, two to three times higher than the gross national product's rate of expansion, and the trend shows no sign of slackening, Input, a market research and consulting firm here, concluded in the study.

Industry revenues, which totaled \$5.9 billion in 1976, will rise to \$14.3 billion in 1982, when they will account for 20% of the U.S. computer business' total sales, the \$295 study predicted.

The industry's rapid expansion has resulted from growth in member companies of all sizes. Firms whose annual revenues exceed \$100 million grew from \$335 million in 1974 to \$541 in 1976 for an average increase of 39%, the study reported.

During the same period, \$20 million to \$100 million companies expanded 35% from \$160 million/year to \$216 million/year, while organizations under \$20 million swelled from \$68 million to \$100 million, an increase of 47%.

Rise in Profits

At the same time, the corporations also reported a healthy rise in profits, the report showed. Among the largest firms, earnings jumped 40% from \$54.4 million to \$76 million.

For medium-sized corporations, profits rose from \$16.3 million to \$26.4 million, a 62% increase, while small companies averaged a 31% earnings growth from \$7 million to \$9.2 million.

This widespread prosperity has attracted many new entries to the computer services industry, Input noted. Large companies in the aerospace, petroleum, communications, insurance and banking industries view the industry as an opportunity to capitalize on a market with higher growth rates than in their own businesses, the study pointed out.

The entry of these newcomers in the market has swelled the ranks of the computer services industry to roughly 5,000 firms, including 2,000 processing suppliers and 3,000 software vendors, Input found. Among this number are several multimillion dollar firms, including

Automatic Data Processing (ADP), Computer Sciences Corp. (CSC), Electronic Data Systems (EDS) and Control Data Corp., the U.S.'s largest computer services company with annual service revenues of over \$500 million.

As with most other members of their industry, the leading computer services firms reported healthy growth, both

in revenues and earnings, during the past year. ADP's sales jumped 23% to \$145 million and its profits 25% to \$23 million, the study said.

CSC's 1977 revenues of \$235 million represented a 7% growth over the previous year's figure, while its earnings rose to \$11.6 million, a 61% increase.

A 23% sales jump boosted

EDS' revenues to \$164 million, compared with \$16.4 million in profits, which rose 21%.

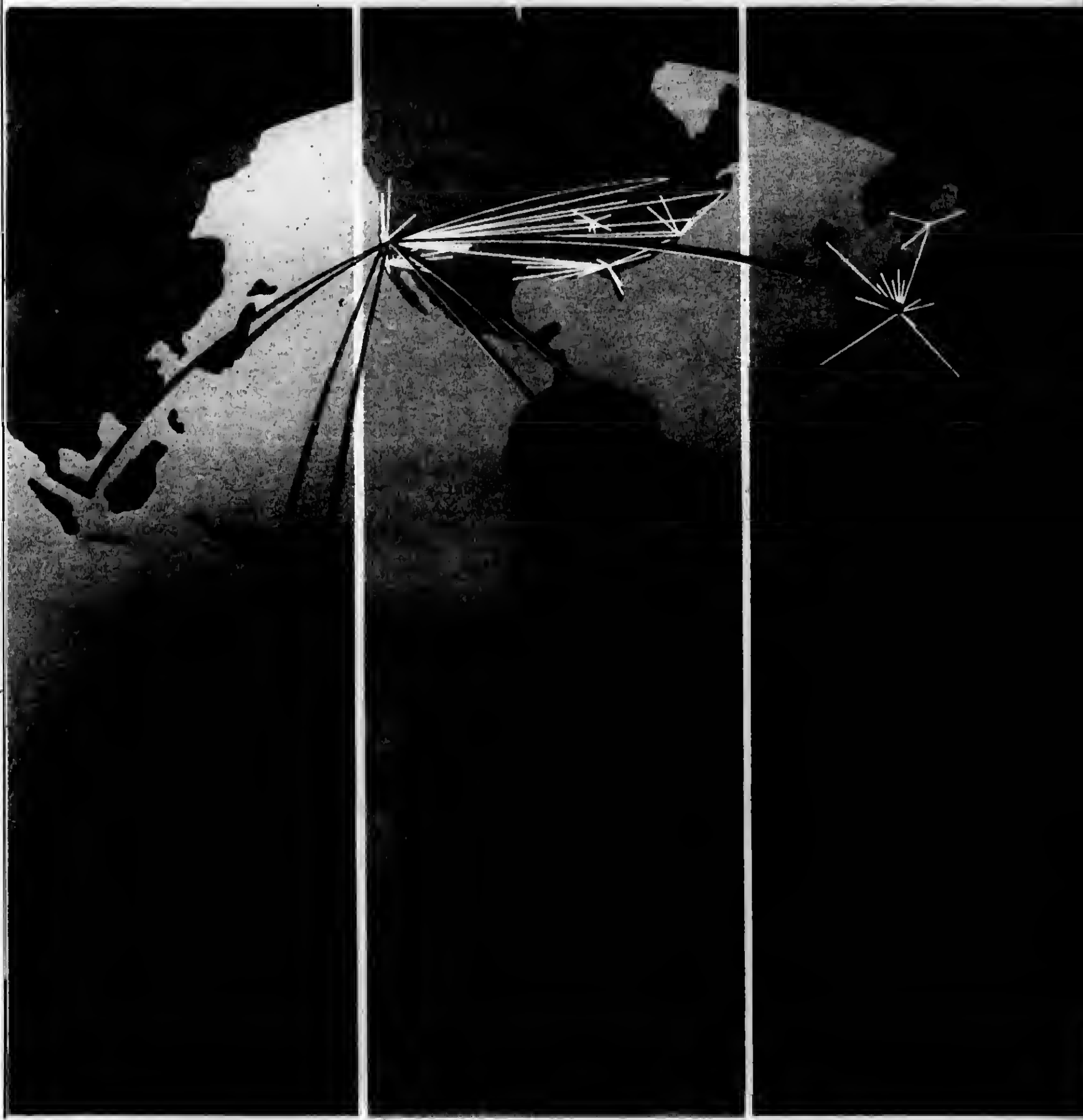
In other findings, the study noted that many companies in the industry have begun to integrate new hardware developments into their services by supplying their customers with minicomputers, terminals, turnkey systems, dis-

tributed processing networks and advanced software. They have adopted this tactic to offset revenue drains caused by in-house mini- and microcomputers, the report speculated.

Input also predicted that IBM will reenter the computer services market in 1979 and that the move will effectively certify services as an acceptable alternative to in-house DP.

How can you tell if distributed

Look at the job it's done for us.



Kennedy to Keynote February CCIA Caucus

WASHINGTON, D.C. — The Computer & Communications Industry Association (CCIA) has added four new members and announced plans for its fifth annual Washington Caucus.

Sen. Edward M. Kennedy (D-Mass.) will keynote the caucus, which is set for Feb. 28-March 1 at the Madison Hotel here. In addition, Assistant Attorney General for Antitrust John Shenefield will

address the conference as will Allen Dougherty, director of the Federal Trade Commission's Bureau of Competition.

Major issues to be covered by the meeting include capital formation and tax policy, antitrust enforcement and reform, international trade, national telecommunications policy and federal procurement policy, according to Jack Biddle, CCIA president.

Frank Carr, the new com-

missioner of the Automated Data and Telecommunications Service of the General Services Administration, will make his first major address to an industry group at the conference, Biddle noted.

The new members of the association — which boost the membership to more than half of the "leading independent" vendors in the industry, according to Biddle — include General Datacomm In-

dustries, Inc. of Wilton, Conn., National Data Corp. of Atlanta, National Computer Systems, Inc. of Minneapolis

and Datum, Inc. of Anaheim, Calif.

The CCIA is at 1500 Wilson Blvd., Arlington, Va. 22209.

New Companies

Misco, Inc. has been established to provide supplies and accessories for users of small computers throughout

the U.S. The firm is located at 963 Holmdel Road, Holmdel, N.J. 07733.

Rational Systems, Inc. will focus on software system development, design and implementation, primarily for mini and microcomputer-based real-time applications. The firm is located at 431 S. Cooper River Drive, Collingswood, N.J. 08108.

Western Microtechnology Sales, an electronics distributor firm, has been formed to specialize in advanced technology products such as microprocessors, LSI memories and advanced linear circuits for processing and instrumentation. Operations have begun in a new facility at 977 Benicia Ave., Sunnyvale, Calif. 94086.

XXCAL, Inc., a software house, has been formed to provide products and services to the DP industry. Its offices are located at 2423 S. Beverly Drive, Los Angeles, Calif. 90034.

Pathfinder Business Brokers, Inc. has been formed to assist principals in the purchase and sale of manufacturing and technology businesses. The company, whose offices are located in Suite 800, Southgate Office Plaza, 5001 W. 80th St., Minneapolis, Minn. 55437, also offers consulting services to both buyers and sellers.

Gen/Comp, Inc. has been formed to supply new and used minicomputers, controllers and peripheral devices to the computer industry and end users. It is located at 6 Algonquin Road, Canton, Mass. 02021.

Used Graphics Co. has been founded to provide the service of purchasing and reselling used and discontinued working graphics equipment. The firm can be contacted at Box 16013, Philadelphia, Pa. 19114.

processing will work for you?

At Hewlett-Packard, we began distributing the computer workload around our factories in 1967. Then, in 1971, we instituted a worldwide systems network that has helped us grow to \$1.36 billion in shipments, with 42 percent of our business in computational products.

Today we make 4000 different products at 40 divisions around the world and have offices in 65 countries. This rapid financial and geographical expansion in a highly technical field made the distribution of our data processing an absolute necessity.

We began with the basics.

Small systems went to work in our factories, automating the testing of circuit boards and, later, hand-held calculators. The next step was linking these minicomputers with other factory systems so they could relay data and programs. The obvious need then was to tie these computers into an information network so that key managers could make decisions based on accurate, up-to-the-minute data.

As we continued to grow, we connected our widespread sales offices with the factories. Today we have 130 high-speed communications systems in 94 locations, sending compressed data via satellite and phone lines. About 12 million words a day come into our California headquarters. Yet the cost is phenomenally low. For example, we can send a ten thousand word message to Toronto in one minute for 85 cents. On a teleprinter, it would take 16 hours and cost \$800.

We need a system that can change. So do you.

One major reason our distributed processing approach works so well for us is the same reason it will work for you. It's extremely flexible.

You don't have to choose between a star network, or a circle, or a string. Our way, you can have any or all of them. And you can hook up an HP network for as little as \$5,000. You won't have to throw out your old equipment, either. Some non-HP computers and peripherals are still carrying a share of our workload. There's no reason why your present systems can't do the same for you.

The keystone of our system is the HP 3000, a powerful general business system. It communicates with the HP 1000, a computer generally dedicated to design, test and control applications in the factory. (Both can also link directly with an IBM mainframe.)

Most long-distance communications between sales office and corporate headquarters are handled by the HP 2026, which can also take care of on-site editing. This keeps information (much of it off-loaded from the central computer) on-hand for local use, shrinking the amount of unusable data funneled to headquarters.

We've just introduced new software for the HP 3000 that makes it an even more powerful management information tool. You can, for instance, sit down at your computer in New York and use all the processing power and data base of your Los Angeles computer—or any other HP 3000 in your network. Software is also available to tie HP 1000 systems together in a plant-wide information sharing network. So you can find out exactly what's going on in your business—from the ground up.

Protecting the biggest investment of all.

Programming—that's where you really spend money. We know that from experience, too. We spent hundreds of man-years developing the operating software for the HP 3000. So we're just as interested in protecting that enormous investment as you are. We do it by designing our new systems to use existing software. They'll run your programs faster and more efficiently. Otherwise, you'll hardly notice the difference.

There's not much point in building good computers unless the peripherals are just as good. That's why we make our own printers, video terminals, disc and tape drives, and data entry devices.

If any part of the system does need servicing, we can fix it. With so many Hewlett-Packard offices around, we can respond quickly when you call.

The moral of our story.

It's simply this. If you need to distribute your computer workload across oceans or in your plant, you don't have to go out on a limb. The Hewlett-Packard system has a bright future as well as a pretty impressive past. You can find out all about it by calling your local Hewlett-Packard office listed in the White Pages. Or write to Doug Chance, Hewlett-Packard, Dept. 316, 11000 Wolfe Road, Cupertino CA 95014. We'll send you information on Hewlett-Packard Distributed Processing. It could make a big difference in your company's planning.

HEWLETT  PACKARD

CSG801HP28



(402) 392-2606

VOLUME DATA ENTRY SERVICES ... TAPE OR CARDS

"QUALITY AT A LOWER COST"

AMERICAN KEYDATA

Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Commerce Has Survey to Aid Marketing Abroad

WASHINGTON, D.C. — The U.S. Department of Commerce recently issued the first installment of a global marketing survey designed to help U.S. computer vendors boost their shipments of CPUs and peripherals to foreign countries.

Prepared by the department's Bureau of International Commerce (BIC), the publication is one of a series of market studies that describes overseas sales prospects for companies in 15 selected domestic industries, including the computer field.

BIC will periodically update

each of its 15 surveys with supplementary reports that it hopes will keep executives abreast of recent developments in foreign markets with high sales potentials.

The survey focusing on the computer industry consists primarily of a series of market analyses, one for each of 16 target countries including most of the Western European

nations and Australia, Brazil, Hong Kong, Iran, Japan, Mexico, Singapore and Taiwan.

Each of the separate analyses identifies the subject country's major computer markets and discusses the important sales trends within each sector. It also denotes the DP expenditures for each market area (manufacturing, banking, in-

surance, etc.) and estimates its installed base, which it examines by hardware category — peripherals, small business systems, minicomputers, medium-scale systems and large mainframes.

The 16 reports also deal in detail with the market trends for each major CPU size class and for each peripheral type — memory storage devices, data entry devices and output devices.

The reports also evaluate market trends in teleprocessing, analyze the employment outlook for DP specialists and examine each country's computer equipment imports by nation of origin.

Information on obtaining the surveys is available from the U.S. Department of Commerce, Bureau of International Commerce, Office of International Marketing, Room 1009, Washington, D.C. 20230.

Technology Transfer Seen Easing U.S. Trade Deficit

WASHINGTON, D.C. — The increasing deficit in the U.S. balance of trade highlights the importance of the resolution of the technology transfer issue, according to William S. Anderson, chairman of NCR Corp.

An increase in the volume of foreign trade for the U.S. and a rise in technology transfer are closely related, he continued.

In view of a trade deficit of almost \$30 billion for 1977, the U.S. needs to expand its foreign trade and stimulate the growth of technology, he observed.

Growth Slowing

In 1976 the volume of international trade grew by more than 10% whereas the 1977 growth rate was about 5%, and a further slowing is anticipated for 1978, Anderson indicated.

Although exports are accounting for an increasing percentage of the U.S. gross national product of the U.S. gross national product, up from 5% a few years ago to 10%, "this country's competitive position in the interna-

tional marketplace has seriously eroded," he said.

"In 1958, for example, the U.S. share of the world's manufactured exports was 28%," Anderson said.

"Today that share has shrunk to 20%," he continued.

Output Rising

Whereas a study indicates the manufacturing output from Western nations has been virtually flat since 1973, the output from developing countries has been growing at 6% a year during the same period, he observed.

"Meanwhile, the percentage of U.S. gross national product devoted to research and development has steadily declined — to the point where, in many industries, the technology of other Western nations equals, or exceeds, our own technology," he said.

"Those are disturbing developments. They suggest that we face not only the problem of achieving more intelligent control of the transfer of our technology, but also the problem of stimulating the further growth of that technology."

IBM Changes Game Rules For Price/Performance

(Continued from Page 61)

The actual prices of these systems represent a savings of 68% to 56% over these hypothetical prices, prices that would have resulted had IBM continued its existing price/performance ratio from its 370 prices in early March.

Cuts to 38%

Looking only at the pricing aspect of IBM moves in the past year, one can see the giant from Armonk effected a price cut of up to 38%, as in the case of the old price of the 168-3 and that of the 3033.

There was a 17% price cut between the old prices of the 158-3 and the 3032, while the firm levied only a 16% increase between the 148 and the 3031.

On the 370s alone, the price reductions effected last spring ranged from 42% in the case of

the 158-3 to 7.5% with the 148-3. The 168-3 dropped 32% in price.

Ratios Skyrocket

But price alone does not tell the story. Indeed, the price/performance ratios have skyrocketed.

With the relative performance figures, using the same specifications for the systems as indicated in the chart, the 3031 represents a 162% performance improvement over the repriced 148 with only a 25% increase in cost. The performance and cost figures were identical in the case of the 3032 and the repriced 158-3.

However, with the 3033, there is an estimated 69% increase in performance accompanied by a 22% decrease in price compared with the 168-3's recent price.

CITY OF RYE, NEW YORK

Notice to Suppliers of Electronic Data Processing Equipment and/or Services.

The City of Rye is soliciting proposals for the installation of an electronic data processing system capable of accommodating the joint computing needs of twelve Westchester municipalities.

The equipment proposed must meet the expected needs of the users for a minimum of five (5) years after hardware installation. The equipment must be geared for remote, on-line processing, as well as a batch processing mode for report generation.

Copies of the consortium's Request for Proposal may be obtained by contacting Mr. Michael Perril at (914) 967-5400 or writing:

Mr. Michael Perril
Project Coordinator
City Hall
Rye, N.Y. 10580

Letters of intent to respond to the RFP must be submitted no later than 5:00 P.M. on February 2nd, 1978 at City Hall, Rye, N.Y.

Guy F. Carlsen
Project Director

\$ WANTED FOR CASH \$

Do you own the rights to proprietary source code, or have copies of Public Domain source code to:

1. Simulate popular Interactive Terminals supported by IBM, Univac, CDC, Honeywell or other 'mainframe' (ASCII, 2741, 3271, Uniscope, etc.)
2. Simulate popular Batch Terminals supported by the above 'mainframes'. There is special interest in 2780/3780, HASP Multileaving, and GRTS protocols.

If that code runs on an Intel 8080 and/or an LSI-11 and/or an Interdata 6/16, then I want you to call me collect or write me a letter.

A handsome finder's fee will be paid for Public Domain code. Licensing of Proprietary code will be considered under most commonly practiced terms. Courtesy to agents, representatives and/or principals.

Contact: Pete Hansen
Product Manager
VERSATEC, INC.
2805 Bowers Avenue
Santa Clara, CA 95051
(408) 988-2800 (Collect)

COMPUTER TERMINALS Save Up To 40%

On purchase or lease of the following Hazeltine, Infoton, Decwriter, LA 36, LA180, LS120, Diablo 1620 I, Texas Instruments 745, 743

Example: Texas Instruments 745: \$1,739

CALL FOR A QUOTE
201-469-9344

Terminal Sales & Development Inc.
867 Sabring Ave., Bound Brook, N.J. 08805

ACQUISITION WANTED

Boston-based computer terminal lease/service Company would like to acquire Sales-oriented company with Fortune 1000 customer base. Our strong suits are administrative and financial expertise, plus excess cash flow from operations and lines of credit. Qualified organizations are invited to participate in our explosive growth — We double revenues every two years, and earn 10%+ profits. Contact PHILLIP K. CIOLFI, Pres:

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300

EDP MANAGER

High pressure, creative environment in \$11.5 million not-for-profit manpower corporation. Duties include: Data base administration in a very sophisticated CDDASYL data base management system. Understanding of accounting, general management practices, public sector operations, and organizational behavior in the development of user oriented applications and sub-systems. Experience in design and use of on line integrated corporate management systems with non-IBM large mini computers. Experience with payroll, accounting, welfare, personnel information and project planning programs. Knowledge of and experience with CDBOL, FDRTRAN, AND DBMS required. Supervise staff of 2. Train user staff. Complete benefits pkg. Title — Vice President of Systems. Salary — High 20's. Send resume to:

Wildcat Service Corporation
437 Fifth Avenue
New York, N.Y. 10016

Equal Opportunity Employer

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call and per-call field service at rates much less than the competition.

NEED FAST TURNAROUND? CALL OR WRITE:

COMPUTER SYSTEMS SUPPORT CORPORATION
9112 Gaither Road
Gaithersburg, Maryland 20760

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

Mainframers to Gross \$15 Billion in '78: Probst

BLUE BELL, Pa. — Univac expects gross shipments by mainframe manufacturers worldwide will grow about 16% in 1978 over 1977, increasing to more than \$15 billion compared with \$13 billion last year, according to President Gerald G. Probst.

Univac itself is targeting a higher growth rate for its newly acquired minicomputer operations over the next five years than the average for the minicomputer industry, he stated.

Industry shipments of minis are growing at an average rate of 30% compared with an 18% average for the computer industry as a whole, he said.

Univac's minicomputer growth will result from greater penetration of both existing markets and new marketing areas, he added.

"We will continue to pursue the traditional minicomputer markets and, in addition, will place strong emphasis on using minicomputer products in distributed processing networks in conjunction with our larger systems," he continued. Univac acquired Varian Data Machines, now called Univac Mini-Computer Operations, last year.

The overall growth in the mainframe industry will follow existing patterns and come from expansion of existing computer installations, new applications, greater user development of computer-communications systems, increasing usage of data base management and expansion of both teleprocessing and distributed data processing networks, he said.

"Despite the predictions of some economists of an economic downturn in 1978, we are looking forward to another good year. Past experience has not shown any close parallel between the growth of the computer market and the strength of general business conditions.

"On the contrary, in recessionary periods business and industry strive more than ever to become more efficient in their operations and look to computers to play a leading role in reducing costs and extending the opportunities for potential growth," Probst stated.

The year now ending has been another successful one for Univac with computer revenues currently approaching 50% of the total revenue of Sperry Rand Corp., he said. Based on results for the first half of the current fiscal year, Univac is expected to establish new records in terms of revenue, bookings and shipments for the full year, he added.

Although the Western European nations did not recover as fast from the last recession as had been anticipated in 1977, the U.S. was a particularly strong market throughout the year for Univac. The Middle East continued to be a rapidly developing new market with a number of significant orders received from Iran. In South America, Brazil continued to be a strong market," Probst noted.

Small Business Systems

In addition to entering the minicomputer market, last January the firm entered the small business systems market with the introduction of the BC/7 small business computer and its planned further extension into a complete family covering the needs of the small business marketplace, he continued.

"Within a short period of time, we created an entirely new nationwide sales and support organization dedicated to this market and product. The results to date have fully justified our commitment to this market and led to the release of the BC/7 to the Canadian market in September," he stated. "All of these new products maintain the price/performance advantages that Univac has traditionally enjoyed over the competition, Probst said.

1100/80 Popular

"The incoming rate of new orders for all of our products has been in line with or above our forecasts. In particular, our largest system, the 1100/80, has been exceptionally well received. Worldwide demand has boost-

ed the order rate for the 1100/80 more than 200% above the plan for the year. We are confident that the impetus generated by this system will continue strongly in 1978," he observed.

"We have continued our considerable investments in research and development during the year in such areas as bubble memory development, fiber optics and voice input and output.

"In addition, our extensive software development program has resulted in numerous enhancements to existing operating systems and programs as well as the creation of new application packages and work in such important areas as the privacy and security of information. This year, about 8.5% of our total revenues were invested in

R&D to give us one of the highest R&D-to-sales ratios in the industry," Probst said.

Univac will be consolidating all of its existing ISS disk memory system plants in the San Francisco Bay area into a new 400,000 sq ft facility in Santa Clara, Calif. In Winnipeg, Canada, it opened a new Defense Systems Division facility which will produce electronic devices to be used by the Canadian Defense Forces.

Overseas, a new complex of two multistoried buildings has been completed in London consolidating the various headquarters of its operations based in the UK including the International Division and the UK subsidiary company. A new Executive Centre has been opened near Nice, France.

"We have not yet begun to distribute."

A Special Report on Distributed Data Processing in our February 27th Issue

According to independent studies by Becker Research, Inc., only 20% of *Computerworld* subscribers' organizations "currently use a distributed approach to data processing," so the buzzword of the late 70's has yet to become a byword.

On the other hand, 27% of *Computerworld* subscribers say their organizations are now "planning to use a distributed approach to data processing" — which indicates a substantial current interest in what some have called the wave of the future.

Of course, there are still wide differences on just what is meant by distributed data processing. And that's one of the topics to be covered in our February 27th Special Report.

Edited by Esther Surden, this report will gather opinions on what DDP is from several sources, including mainframe manufacturers and users.

It will also give some practical help to DDP users and prospective users — with articles on configuring networks, distributing data bases, and selecting and maintaining equipment.

"Distributed Data Processing" will also report on users' experiences with DDP — both pro and con.

If you're into DDP, planning to be into it, or thinking about it at all; this report is the place to be when our February 27th issue reaches your desk. Closing date is February 10th.

And if you're marketing products or services in the DDP field, make sure your ad is there. Contact your *Computerworld* salesman, or call Terry Williams at (617) 965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION ANNOUNCEMENTS

SENIOR PROGRAMMER/ ANALYST

Mattel Toys has a challenging position for a senior analyst offering exposure to a sophisticated online data base/data communications system on our IBM 370-158-3 and participation in the development of a distributed manufacturing system utilizing IBM 3790's. Applicants should be self-starters eager to participate in a challenging state-of-the-art environment. 3 years COBOL programming experience in an IBM OS or VS environment is required. Previous experience with online data base/data communications and TSO is desired. Salary commensurate with experience. Send resume with salary history to:

Sharon Carvalho



5150 Rosecrans Ave.
Hawthorne, CA 90250

computer hardware



and software candidates RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

D. BROWN & ASSOC.
Dorothy Spiegel DP Specialist
610 S.W. Alder, Ste. 711
Portland, OR 97205
(503) 274-6860

COMPUTER CAREERS INC.
Specialists Data Processing
4720 Montgomery Lane
503
Bethesda, MD 20814
(301) 654-9225

BRENTWOOD
PERSONNEL ASSOC.
Computer Division
1280 Route 46
Parsippany, N.J. 07054
(201) 335-8700

ANDERSON-TAYLOR
P.O. Box 21
Exton, PA 19341
Philadelphia Area
(215) 363-1600

members of

National
Personnel
Associates

Specializing in DP

COMPUTER CENTER MANAGER NCR EQUIPMENT

Medium sized, multi-plant mfg company has outstanding opportunity for individual with right blend of technical and managerial skills.

Computer Center is separate facility operating on full charge-back basis. Environment includes NCR Century with Wang mini-computers used in on-line and distributed processing modes.

We require NEAT/3 programming background preferably including on-line work. Experience in mfg systems a plus.

Southeastern Wisconsin location offers recreation oriented lifestyle with convenient access to Milwaukee and Chicago.

Salary open - commensurate with experience. Please submit resume including salary history to:

AMERICAN
ROLLER COMPANY

1018 Main St.
Union Grove, WI 53182
Attn: Duane Peterson

SOFTWARE DEVELOPMENT

Have you ever been in the right place at the right time?

Perhaps you missed out on some of the other phenomenal growth records and the companies that enjoyed them. You did not get with them at the inception. Now you can. This is the time and National is the place. National seeks software talent that turns on to our growth-oriented, fast-paced and informal atmosphere. These positions have been created through dramatic growth — 10 FOLD IN 3 YEARS — in our Computer Products Group and offers stimulating, ground-floor potential to the competitive individual.

Project Leader/Minis

The ideal candidate will have a minimum of five years' state-of-the-art operating system experience and the desire and CAPABILITY of applying this experience in some of the following: OS design, file system design, virtual storage management, distributed processing and systems architecture. The individual we select will lead a group with responsibility for the design and development of a major operating system. A BS/MS or PhD in computer science is required.

Systems Architect

National also offers an individual an opportunity to play a major role in defining a total system architecture including the operating system languages and facilities. Qualified candidates should have five years' applicable experience with IBM 370 OS internals and a BS or MS in computer science.

Project Leader/Micros

We desire four or more years' experience in software development tools such as compilers, editors, operating systems and debuggers. Will have responsibility for defining and implementing software development systems for microprocessor based systems. A BS or MS is required. 8080 experience is desirable.

Diagnostic Programmer

Three or more years' mini or micro-computer systems experience is required. Responsibilities will entail development of software and firmware diagnostics for current and next generation systems. Requires a BS or equivalent.

For more discussion and an interview please forward your resume in complete confidence to, or call, Bob Hasselbrink COLLECT at (408) 737-5640. National Semiconductor Corporation, 2900 Semiconductor Drive, Santa Clara, California 95051. We are an equal opportunity employer male/female/handicapped.

We would like to tell you
more, but the competition
is also reading this ad!



National
Semiconductor
COMPUTER PRODUCTS
DIVISION

MIT's Laboratory for Computer Science has several opportunities for computer professionals. B.S. in the field required. Jobs range from programming to collaboration on the construction and design of computer systems. All share in the research of this 250 member laboratory whose work is in computer science and engineering.

Affirmative action/equal opportunity employer. Address inquiries to Dr. Kamplis, LCS, 545 Tech Square, Cambridge, Mass. 02139.

PROGRAMMER

PDP-11

1+ year's experience with RSX-11M at systems level.
3+ year's experience with MACRO-11 and FORTRAN.

Responsibilities include executive modifications and maintenance, device driver, writing, real time and database applications. Ability to work closely with hardware engineers.

Salary commensurate with ability and experience. Excellent fringe benefits package. Pleasant location in Philadelphia suburb.

Send resume in confidence to:
BRIDGEPORT TETRON

200 Precision Rd., Horsham, PA 19044
An equal opportunity employer

REAL-TIME

position announcements

position announcements

position announcements

position announcements

position announcements

San Diego Openings for COMPUTER PROGRAMMERS IN SOFTWARE SYSTEMS DEVELOPMENT



Want to combine the ideal career opportunity with your favorite lifestyle? NCR Systems Engineering-Torrey Pines needs your help now in developing advanced, high-technology EDP systems for customers around the world. You could be part of the highly skilled team working in our modern facilities just one mile from the ocean and minutes from La Jolla and downtown San Diego. Live in the setting of your choice—beach, valley, mountain, country, small-town or urban—and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too—from mild coast to dry desert. San Diego is a place of extraordinary choices—and right now the choice is yours.

Systems Engineering has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- | | |
|---|----------------------|
| ■ TELECOMMUNICATIONS SOFTWARE | ■ OPERATING SYSTEMS |
| ■ FILE PROCESSING | ■ COBOL APPLICATIONS |
| ■ NETWORK DEVELOPMENT | ■ ASSEMBLY LANGUAGE |
| ■ LARGE MAINFRAME, MINI and MICRO PROCESSOR | |

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems, both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.

Thom Harris, Employment Specialist

NCR

SYSTEMS ENGINEERING-TORREY PINES

4046 Sorrento Valley Blvd., San Diego, Calif. 92121

We are an equal opportunity employer

position announcements

position announcements

position announcements

position announcements

position announcements

WANTED Software Development Engineers for Interactive Timesharing Systems

Compiler Development-ANSI '80 COBOL Software Engineers/Senior Software Engineers

The Large Computer Group in Marlboro, Massachusetts is initiating the development of COBOL compilers conforming to the forthcoming ANSI '80 standard. This project offers the opportunity to participate in state-of-the-art software development and to influence new hardware/software products of critical long-term importance with high visibility.

Experience and interest in the development of transportable software using implementation languages and structured design techniques is important and knowledge and interest in compiler technology is vital. Project management or lead design background is a definite asset. Desirable skills include knowledge of implementation languages, parsing techniques, code generation, operating systems, input-output systems, software methodology, testing methodology, performance analysis, business applications and system architecture.

Key openings exist for software engineers with a variety of experience and background.

Distributed Systems Development Engineers

If you have a high level of creativity and inventiveness in utilizing extremely advanced computer system methodology, we have an excellent opportunity for you. We're seeking professionals to design and develop programming systems for a major network program: integrating the DECSYSTEM 20 into a large sophisticated network using PDP-11 front ends. Program assignments include software systems, real time systems, and communications programs.

Responsibilities include interacting with other senior level engineers in the areas of programming research and design problems, plus acting as a consultant on advanced computer system technology.

You should have a BS in Mathematics, Computer Science, or other technical discipline, or equivalent, plus 3-7 years programming experience. A background with large-scale operating systems is a plus.

Operating Systems- Software Supervisor/Engineers

This is your opportunity to join the highly professional and motivated individuals in our TOPS-10, and TOPS-20 monitor groups in developing enhancements to a large scale, state-of-the-art, timesharing system. If you have 3-5 years experience in assembly language programming on large systems, this could be the chance you've been waiting for to utilize your skills in a challenging environment. A BS degree in Computer Science or equivalent is preferred.

System Performance Analyst

We need a highly qualified individual to help us design, measure, and evaluate high performance software systems with an expertise in demand paging operating systems, commercial languages and data management. You'll also handle the technical aspects of these systems including hands-on activities and coding. And it's most important that you're able to translate resultant findings into understandable market terminology for our sales force to utilize. Hardware experience is not necessary. This is a difficult but highly visible career assignment with extraordinary career potential.

Software Integration Toolsmith

Working closely with our operating system developers, you will be building a set of software tools for the DECSYSTEM 20 to help validate our products before they leave the door. This is not a QA position — it requires a developer with an appreciation for system integrity, a flair for building easy-to-get-along-with software, enough technical expertise to work alongside systems developers, and at least three years of experience with operating systems internals.

The challenge and opportunities you've been looking for are waiting for you at Digital in Marlboro. Please forward your resume including salary history, and indicating position of interest to Carol Reed, Digital Equipment Corporation, Dept. G123 3807, 200 Forest Street, Marlboro, Massachusetts 01752. We are an equal opportunity employer m/f.

We're the company looking for people.

digital

Programming

SR. SYSTEMS PROGRAMMER

We have an immediate opening for an experienced Systems Programmer to assume total responsibility for portions of a major conversion effort, assisting our MIS.

Required background must reflect at least 3 years experience as a Systems Programmer on OS/360-370 and/or OS/VS, and a minimum of 1 year on MVS. Working knowledge of DB/DC systems and VTAM/NCP would be an asset.

Competitive starting salary, highly attractive benefits program and challenging work environment are featured. Interested candidates are welcome to submit resumes, complete with salary history, to:

Sharon Carvalho



5150 Rosecrans Ave.
Hawthorne, CA 90250

An equal opportunity employer

Programmer Analysts

SAN FRANCISCO

Decimus Corporation, innovators in supplying Data Processing services to the Financial Industry, is currently seeking several growth-oriented individuals to serve as Programmer/Analysts.

Responsibilities include the detailed design and implementation of advanced database systems to support a variety of business, financial, and commercial applications.

You must have 1-4 years experience in designing and writing COBOL and/or Assembler programs using OS or DOS, and a demonstrated ability to test and implement assigned tasks. Knowledge of Librarian, Parvalet, and experience in RPG II, Assembler, and Banking/Financial Systems would be extremely helpful.

Work in State-of-the-Art environment with 370/155, 168, 195, SYS 3 (Mod 15), SYS 32, and various mini-computers, under OS, MVS, OOS, IMS, CMS-VM.

Send your resume with salary history/requirements in confidence to O.B. Michaels, Suite 320, 1700 Montgomery St., San Francisco, CA 94133, or call (415) 622-2030. EOE, M/F/H.

Join The Proud
People At

DECIMUS

A BankAmerica Company

NBC SYSTEMS PROGRAMMER

NBC's New York systems programming group needs an intermediate level programmer to write software applications programs and provide technical support and programming support to computer operations.

One to two years experience with UNIVAC 1100 series and EXEC 8 required. Should know UNIVAC Assembly language and FORTRAN. Experience with SSG and SECURE preferred.

This position offers an opportunity to develop EXEC internals and performance measurement skills at an active site, using large scale 1100 series equipment, front-end computers, and mini-computers.

Salary commensurate with experience. Contact Colleen Matoney at (212) 664-3937, or write her, Computerworld Box Number 1394.

797 Washington St., Newton, MA 02160

We are an equal opportunity employer, m/f.

SOFTWARE SALES

We're looking for highly motivated systems software salesmen with experience selling to the IBM DOS and OS/VS marketplace. If you want to increase your income potential with a broad and diversified product line, call Bert Parsloe at (203) 792-5100, Universal Software, Inc., Brookfield Office Park, Brookfield, CT 06804.

D.P. PROFESSIONALS

We represent a number of firms throughout the United States seeking qualified D.P. Professionals. Firms include manufacturing, banking, insurance and consulting firms. If you are an experienced programmer, systems analyst or project leader seeking professional and financial advancement, we invite you to submit your resume, including salary history, to:

EXECUTIVE RECRUITERS
INTERNATIONAL

4101 Medical Parkway
Suite 204

Austin, Texas 78756
(512) 454-5247

CONSULTING ANALYST CORPORATE MIS STAFF

We are a multinational corporation offering an opportunity to lead in the planning and control of multi-national international development projects.

We are looking for a performer who has demonstrated accomplishments in the MIS field. We need an analyst with 7 or more years financial and administrative systems development experience.

BSBA/Accounting or Marketing is preferred; however, if you have the equivalent work experience required, we will be glad to review your accomplishments.

Send your resume with salary history to:

NCR
Complete Computer Systems

Mr. Wm. H. vonReichbauer
Corporate Executive and
Professional Recruitment
NCR-Corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

Government of Kuwait Ministry of Planning Computer Center

The Computer Center provides services to Ministries and other government organisations in Kuwait. The present installation is an IBM 370/158 with RJE and conversational terminals. The computer is run under VM/370, with OS/VS1, DOS/VS and IMS/VS.

The Computer Training Center forms part of the Computer Center and provides EDP training to the Computer Center and

government staff. Courses cover all the normal EDP disciplines as well as instructing user staff how to participate in the design, testing and operation of new systems. Multi-media teaching methods are used including class room instruction, audio visual and inter-active computer assisted learning.

The Computer Center is recruiting the following staff to help support future services to the Kuwait government.

Training Center Manager.

Salary up to \$50,000 p.a.

The main duties of the manager are:

- * line management of the Training Center
- * planning government staff training needs with Ministries and the Computer Center
- * evaluating and planning the acquisition and implementation of new courses.

Applicants for this position must have:

- * managed a number of systems development projects from initiation to installation
- * experience in training computer and user staff
- * at least 2 years' experience of managing a computer education activity with complete responsibility for budgetary control, staff, student administration and course development and presentation.

Production Supervisor - Training Center.

Salary up to \$38,000 p.a.

The main duties of the supervisor are:

- * preparation of course schedules and lecturer and physical resource allocations
- * liaison with external training organisations providing courses to the Center
- * maintaining quality standards on all courses
- * presenting some courses.

Applicants for this position must have:

- * managed a number of system development projects from initiation to installation
- * experience in training computer and user staff
- * excellent communication skills
- * been responsible for the development of computer training courses.

3 Lecturers - Training Center.

Salary up to \$30,000 p.a.

The main duties of the lecturers are:

- * course presentation.
- * preparation of new courses
- * maintenance of existing courses
- * counselling of Trainee Lecturers.

Applicants for these positions must have:

- * practical experience over 3 or more years as a system designer, lead programmer or shift supervisor
- * experience in training computer and user staff
- * excellent communication skills.

At this time all salaries are tax free. Higher salaries can be negotiated for exceptionally well qualified candidates. In addition employees receive free, furnished accommodation and 45 days holiday per year with free air tickets for them and their families to the port of embarkation.

If these positions interest you please send your full career and salary history, relating this to the position applied for, to:

N. J. Blakeney-Edwards,
Director - Education Division,
John Hoskyns & Company Limited,
91-93 Farringdon Road, London EC1M 3LB. England.
Telephone: 01-242 1951

Interviews will be held in New York in late February.

hoskyns

A systems company with over 500 professionals, 12 computer centres and 13 years of continuous growth

Computer Science Professionals

TASC has grown solidly in each of the 12 years since its founding. We are a small, very special, people oriented organization which promotes intellectual challenge and professional development in a high technology environment. We are proud of our growth, progress and standards of quality. If you have a BS/MS in Computer Science, Mathematics or a related field and are dedicated to professional excellence in a stimulating environment, we invite you to explore our opportunities.

Data Base Management Design Analyst

Requires several years of data base management experience in a scientific environment. Responsibilities will involve analysis of data base management requirements in support of engineering analysis activities and design and implementation of data base management systems. Familiarity with implementation of DBMS packages is desirable.

Programmer/Analysts: Scientific Applications

As a Scientific Programmer/Analyst, at TASC, you will be part of a small team working on a variety of programming applications supporting the analysis, simulation and modeling of engineering systems. PL/1 or FORTRAN experience is required.

TASC is located 10 miles north of Boston, convenient to the area's exceptional educational, cultural and recreational resources. Relocation will be assisted and benefits are liberal. Compensation is fully competitive and regularly reviewed.

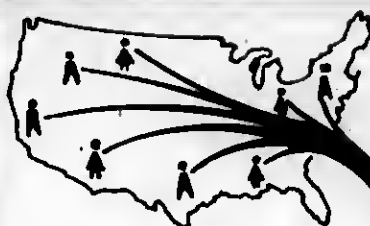
Please forward your resume and salary requirements, in confidence, to:
Mr. Robert R. King

TASC
THE ANALYTIC SCIENCES CORPORATION

The Analytic Sciences Corporation
6 Jacob Way, Reading, Mass. 01867

U.S. Citizenship Required. An Equal Opportunity Employer M/F

COMPU SEARCH



specializes
in careers
for you...

See us in your city

Since 1968, CompuSearch has sought out exceptional individuals with data processing related skills for large and small companies throughout the United States. We also have been very successful in locating challenging new positions for thousands of people who have requested our assistance. If you are a talented achiever interested in learning about situations that will best meet your goals, contact our office nearest you in complete confidence. We keep a close watch for the best available opportunities locally and nationally.

Appleton, WISC	(414) 731-5221
Arlington, VA	(703) 841-1700
Boston, MASS	(617) 262-5050
Braintree, MASS	(617) 848-1866
Cincinnati, OH	(513) 651-5500
Cleveland, OH	(216) 623-1037
Dearborn, MICH	(313) 336-6650
Indianapolis, IND	(317) 257-4261
Jacksonville, FL	(904) 356-8513
Los Angeles, CA	(213) 830-1313
Louisville, KY	(502) 456-4330
Milwaukee, WISC	(414) 273-4430
Omaha, NEB	(402) 397-8115
Pittsburgh, PA	(412) 343-7410
Rochester, NY	(716) 325-1660
Rockford, ILL	(815) 968-1552
San Francisco, CA	(415) 362-0911
Southfield, MICH	(313) 569-2828
Stamford, CONN	(203) 324-2232
Troy, MICH	(313) 585-4200
Tulsa, OKLA	(918) 622-6632

COMPU SEARCH
Division of
Management Recruiters

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

COMPUTER PROGRAMMERS

Candidates should have a college degree or equivalent, and a minimum of 1 year experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and knowledge of JCL for OS/MVT is desirable.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If interested and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C
EG&G Idaho, Inc.
Box 1625, Idaho Falls, Idaho 83401

U.S. Citizenship Required
We are an equal opportunity employer M/F/H

EG&G

position announcements

position announcements

position announcements

position announcements

position announcements

COME - GROW AT HARRIS SEARCHING FOR YOUR PLACE IN THE SUN? TODAY - SEARCHING IS NOT ALWAYS AN EASY TASK

The Computer Systems Division of Harris Corporation is perhaps the fastest growing division within our Fortune 500 company. New Divisional Headquarters are in the process of being built in the highly desirable Fort Lauderdale location where we are now situated. Most of the positions listed below will be situated in Florida, where the cost of living and the climate, as well as avocational activities are highly desirable.

MANAGER GENERAL ACCOUNTING

The successful candidate will have prior supervisory experience in accounts payable, accounts receivable, payroll and cash flow forecasting. Will also be responsible for controls and processing methods for travel expenses. We prefer an individual with an accounting degree coupled with either an MBA or a CPA. The successful candidate will have prior experience in general accounting supervision. This is a replacement position as a result of promotional opportunities. The successful applicant will be headquartered in our Divisional offices in Fort Lauderdale, Florida.

SENIOR COST ACCOUNTANT

We prefer a bachelor's degree plus an MBA in accounting. The individual we seek will be responsible for closing, cost accounting accounts, preparation of financial statements for new products and P&L by product line. In addition, the individual will interface with Management Information Systems group for the design and implementation of new or improved systems and procedures. This position has excellent growth potential into financial management.

FIELD MARKETING ANALYSTS

The individuals we seek will have broad exposure for pre and post analyst field support. We prefer experienced systems personnel having backgrounds with Honeywell, UNIVAC, Control Data, IBM or RCA mainframe exposure. Experience in FORTRAN and COBOL with a solid grasp of operating systems will be helpful in aiding our customer revenue base. This position is the result of a solid product line and competitive expansion in the data processing community. Individuals seeking a company with a future in the data processing community should consider HARRIS. We prefer degreed individuals with 3+ years' experience in the field. Several positions are available throughout the United States, including Florida.

SOFTWARE DEVELOPMENT ANALYST

We prefer a minimum of a BS in Computer Science or math coupled with a background in Systems Software or Systems Software Development. The successful candidate will be assigned to our VULCAN Operating System and will interface with our compiler development group in maintenance and/or development of new high level languages. The development of compiler check-out programs will be necessary to fill our requirements.

SENIOR SALES SUPPORT SPECIALIST

An excellent growth position which leads to several marketing management positions. The individual we seek will be responsible for interfacing with key marketing personnel in assisting with software demonstrations at our Fort Lauderdale location, as well as in several key regional areas. Responsibilities will also include technical presentations to key accounts, trade show participation, in-depth involvement with program conversion, which interfaces with our benchmark analysis group in order to bring about successful benchmarks. We expect that the successful candidate will be instrumental in providing pre sales and post sales support where needed. We prefer a BS degree in Computer Science or math plus 5 years' of programming and systems experience. Expertise in FORTRAN and COBOL are necessary.

SENIOR SOFTWARE ANALYST

Due to the rapid introduction and sale of our S-100, S-200 Computer System, which incorporates the VULCAN, multi-purpose virtual operating system, our Quality Assurance group has established this new growth position. The individual we seek must have a BS or MS degree in Computer Science or math and a minimum of 5 years' solid experience in operating systems coupled with some in-depth exposure to compilers. Language capabilities should include a minimum of Assembly, FORTRAN and COBOL. In addition, communications skills, both verbal and written, will be necessary. Functional responsibilities include: establishment of Quality Assurance tests with appropriate documentation and advance planning for continuous software testing. In accomplishing these tasks, vertical and lateral communication with key management personnel will be expected. Software oriented individuals with familiarity with CPU's and Operating Systems from CDC, H-P, DEC, UNIVAC and/or IBM will help in determining applicant's success.

SENIOR SOFTWARE TECHNICAL WRITERS

Will be responsible for both reference and user manual production. Senior writers must have a minimum of 2 years' experience plus a degree in Computer Science or English.

HARDWARE TECHNICAL WRITERS

The individuals we seek as applicants must have digital logic backgrounds as well as digital computer experience. 2-4 years' minimum experience in the technical writing field coupled with mil-spec documentation is desirable. 5-10 years' experience will satisfy applicant's requirements.

OPERATING SYSTEMS ANALYST

For design and development in medium to large scale operating systems. Computer Science degree, math or a scientific discipline coupled with ASSEMBLY LANGUAGE experience. Will design and develop enhancements for a large virtual memory operating system or the communications software associated with the operating systems.

SYSTEMS ANALYST - COMPILERS

A major new compiler development effort offers growth positions for candidates with appropriate compiler experience plus a BS degree in Computer Science or math.

SENIOR FIELD SERVICE ENGINEERS

Several positions are now available throughout the United States and parts of Canada for experienced individuals having a minimum 2-5 years' in large to medium scale computer systems. Hardware and software knowledge, as well as installation, trouble-shooting, maintenance and repair on peripheral hardware necessary. The most successful candidate will come from CDC, UNIVAC, Honeywell, IBM, DEC or H-P.

QUALITY ASSURANCE ENGINEERS

Responsibilities include diagnosing and resolving manufacturing quality problems, generating quality standards and inspection procedures and reviewing new design and engineering changes. Experience in Quality Cost reporting and Corrective Action systems is desirable. BSEE, ME or IE with 6 years' experience in the manufacture of computer or related electronic equipment, or an MS with 4 years' experience.

DIAGNOSTIC ENGINEERS

Immediate openings in our Engineering area for digital hardware and diagnostic software engineers. We require a possession of in-depth knowledge of software design/implementation, digital fault isolation and protection procedures. Successful candidates will be degreed in engineering or possess suitable on-the-job experience.

LOGIC DESIGN ENGINEERS

Individuals experienced in the design and development of digital computers will be most welcome in our engineering development area. We prefer degreed individuals having a minimum of 2-5 years' experience in the development of CPU circuit design.

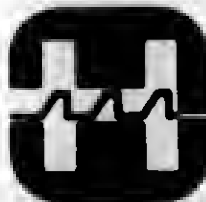
PRODUCT SPECIALIST

Must assist design engineers in the development of new computer paraphernalia and communications products, generation of engineering documentation, interface with prototypa testing, product assurance testing and change order control. Associate degree preferred; 1 year of experience in production development area desired.

SENIOR INDUSTRIAL ENGINEERS

Will develop and maintain Time Standard Data Base and perform cost estimating for new products. Special products and engineering change orders will also be functional responsibilities. We seek an individual with the ability to design systems which will automate cost estimating functions, and must have the ability to audit manufacturing processes. BS degree in IE preferred.

Send your resume and salary history in strictest confidence to: Mr. W.D. Taylor, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309



HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

An Equal Opportunity Employer Male and Female

The ROMAC DIFFERENCE

Our Clients Call Us Names

Al... Bud...

Lance... Jim...

And we're proud of it. It's the result of a close, long lasting relationship with employers and qualified professionals who we have placed in key positions in EDP, Accounting and Banking.

For years, we have prided ourselves on providing consistent service. The quality of that service can be measured by the number of career professionals who have moved up within the organizations of Romac employer/clients. Another part of the Romac Difference.



ROMAC

& ASSOCIATES/
Personnel Consultants

Contact Romac & Associates, A. L. Lemay, President, 2 Sun Life Executive Park, Wellesley Hills, MA 02181 for transmission to our Partners in Atlanta, Boston, Buffalo, Charlotte, Hartford, New Haven, New York, Philadelphia, Portland, Rhode Island, Rochester/Syracuse, Stamford.

West Virginia University DIRECTOR OF COMPUTING SERVICES

Responsible to the Provost for Planning for directing, coordinating, planning, organizing and controlling the data processing activities of the University. College degree or equivalent with specialization in computer sciences or related. Managerial work experience in data processing. Thorough working knowledge of data processing practices, methods, principles and techniques. A demonstrated record of effective staff development and management. Knowledge of state of the art hardware and software. Faculty rank possibilities based upon qualifications. Send resume and salary history to: Computing Services Director Review Committee, c/o Office of Personnel, West Virginia University, Knapp Hall, Morgantown, West Virginia 26506. Please apply by February 28, 1978. West Virginia University is an Equal Opportunity/Affirmative Action Employer M/F.

CFO EXPERT

Life Insurance company located in a pleasant suburb just northwest of Chicago is seeking a Senior Analyst/Programmer to spearhead conversion from '62 CFO to CFO+ and then assume project leader responsibilities for it and related administrative systems. Qualified candidates will have a college degree and heavy insurance background with at least 3 years experience with CFO. We offer a salary in the twenties and an excellent package of fringe benefits including dental insurance. Send your comprehensive resume to:

Box 437
Park Ridge, IL 60068

position announcements

position announcements

position announcements

position announcements

position announcements

WANG is Forging Ahead

And you can, too, when you join this industry leader. Our Research and Development Group needs people who will enjoy our fast-paced, challenging environment. The rewards are great - recognition, the feeling of belonging to a first-rate team and the knowledge that your contributions are shaping the future of the computer industry. Sound exciting? Then consider the following openings:

FOR OUR OPERATIONS IN GREATER LOWELL

Microprogrammer/ Diagnostic Programmer

The recent introduction of a new multiprocessor computer system has created openings in the microprogramming and diagnostic section of our Research and Development Group. If you have 2 plus years of assembly language experience with mini or microcomputers and wish to participate in the development of our new products, this is your opportunity to get involved.

Advanced Data Base System Development

An exciting opportunity to design and implement a general purpose Data Base Management System for a new medium scale computer. We seek expertise in data definition and media control language specification, data structuring, access routine implementation and CRT-oriented query language design. Familiarity with file and index structuring methods, navigational and relational data models, query parsing and optimization techniques is desirable.

Compiler Designers/ Implementors

Senior compiler designers as well as intermediate compiler implementors are needed to develop compilers and interpreters for our new virtual memory computers. Opportunities to work on COBOL, BASIC, PL/1, RPG II, FORTRAN, W/PL, data base query and report languages.

Systems Programmers

We are looking for individuals who can become part of a team in a Research and Development Programming Department. MS degree, Computer Science, desired, BS degree required. Knowledge of and/or experience in Assembly language, PL/1, mini-computer/microprocessors, data entry, word processing and turnkey systems desired.

Excellent salaries and earning potential plus superior company benefits. Please send resume, marked personal and confidential, to:

Stephen E. Pitt
Manager, Professional Recruitment
Support Group
(617) 851-4111

WANG

LABORATORIES, INC

One Industrial Avenue
Lowell, MA 01851

We are an equal opportunity/affirmative action employer

Good Reasons to Move to Amdahl... Wherever You Are.

Amdahl Corporation is growing at a rapid pace, and we currently have outstanding opportunities in several areas across the country for topnotch people. If you seek increased responsibility and job expansion, perhaps you've been considering upgrading yourself and making a move to another area... but the realities of relocation hold you back. At Amdahl, we're prepared to help you make a significant—and, we believe, rewarding—move in your professional career. And we're prepared to assist you in that move with minimum disruption for you and your family, regardless of your present location.

We invite you to come and visit us. You will find an exciting and challenging environment, an excellent compensation and benefits package, as well as a friendly regard for human feelings and a sense of involvement that have characterized the company since we began. And we'll be happy to tell you about our fully paid relocation policy.

PROGRAM SUPPORT REPRESENTATIVES

You will be working as a field systems engineer as you carry the Amdahl philosophy of complete service to the customer. You will utilize your initiative, expertise and talents to aid the customer in restoring computer center operations regardless of the origin of the problem. You will assist Amdahl 470 customers in OS/SVS/MVS/VM conversions, problem determination, installation planning and support for new 470 users in one of the following areas:

Birmingham
Washington, D.C.
No. New Jersey
Hartford
Boston

Portland
Seattle
Los Angeles/Orange County
San Francisco
Houston

Dallas
Chicago
Detroit
Minneapolis
St. Louis

You will also be responsible for assisting in the maintenance of a smooth software operation by working in close liaison with hardware engineers and the software specialists in Sunnyvale to solve knotty problems that cause most shops to throw in the towel. Qualified candidates are invited to direct their response to Phil Beckhelm, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086 or call him at 408/735-4280. We are an equal opportunity employer.

amdahl

FIELD ENGINEERS

Two field engineers: one senior level and one junior level with experience to work in applying digital solutions to biomedical problems. Duties include maintenance of a distributed processing system, and development of interfaces to new instruments. Sigma 7 experience desirable in either position. An opportunity for professional growth. \$15000 to \$20000. Send resume to: Steve Wixson,
UNIVERSITY OF ALABAMA
IN BIRMINGHAM
University Station
McClung Bldg.
Birmingham, Alabama 35294
An Equal Opportunity Employer

CLEMSON UNIVERSITY

Division of Administrative Programming Services is seeking a Manager of Systems Development for Student, Alumni, Library, and Development Information systems. This person will serve as manager of eight to ten analysts and programmers and be responsible for the design, programming, and implementation of application systems. Also, this person will serve as the primary customer interface for the areas served. Experience as a manager or project leader as well as experience with COBOL, on-line and database systems on a large scale computer is required. The University offers excellent career and learning opportunities in a state-of-the-art environment. Salary range is \$18,012 to \$25,599. Send resume not later than January 31, 1978 to:

Clemson University
Administrative Programming Services
Ravanel Center
Clemson, S.C. 29631
An EOE/AA

PROGRAMMERS AND SYSTEMS ANALYSTS

*Put Your Experience To Work For You
In Building A Better Career Opportunity*

Sperry Univac has a variety of challenging opportunities waiting for you at one of our Minneapolis locations. These openings exist within our Airline Industry Development Center which designs and supports applications such as reservations, ticketing, cargo, departure control, message switching, check-in, hotel and fare quota. We are searching for candidates with 2 to 8 years experience in the following disciplines:

- Design, implementation and support of real time applications.
- Acceptance testing of application programs.
- Technical support in the customer environment.

In addition to requiring experience within the areas mentioned above, it is also desirable to have a background in FORTRAN, and/or general UNIVAC 1100 series exposure.

We offer highly competitive starting salary, a comprehensive benefits program and outstanding professional and personal growth opportunities.

FOR IMMEDIATE ATTENTION,
PLEASE CALL COLLECT OR
DIRECT YOUR RESUME TO:
P.Y. Peterson

SPERRY UNIVAC

Univac Park
P.O. Box 3525, M.S. U1F28
St. Paul, MN 55165
(612) 456-2309

An Equal Opportunity Employer M/F

IMMEDIATE OPENING

IBM 370 specialist 3135 and/or 3145

Salary \$32,000-Plus!

Other positions open for trained 370 CE
top pay and benefits.

Call Immediately

(312)843-0630

Circle Computer

920 Remington

Schaumburg, ILL 60195

position announcements

position announcements

position announcements

position announcements

position announcements

Hewlett-Packard needs computer systems engineers and sales representatives.

- If you want to be part of a team that last year boosted sales of technical and commercial computers and terminals more than 50%...
 - If you have a technical degree and would rather be out with people than in the lab all day...
 - Or if you have a background in computer sales or applications...
- Get in touch with us right away.

Why is moving to Hewlett-Packard a move in the right direction? Well, think about this:

You'll be working with a line of leadership products, with a reputation for quality and innovation.

You'll have a choice of good places to work. Right now, we need people in Chicago, Atlanta, Los Angeles, Washington, D.C., Boston and other major metropolitan areas.

You'll have a long-term opportunity for growth. (A cliché at most companies, but at Hewlett-Packard it's an everyday reality. We promote from within rather than hiring people over your head.)

You'll have a real sense of security. (Another well-worn promise, so here's a fact to back it up. We haven't had a layoff in our entire 35 years.)

You'll get a good salary and benefits. (At HP, a percentage of profits is distributed to all employees every six months. The last semi-annual bonus exceeded \$18 million.)

You'll receive first-rate support and service for your customers, both from the factory and engineers in the field.

You'll also be working for one of the leading small-computer companies. Hewlett-Packard is a diversified manufacturer of electronic and computational products, with 40 divisions worldwide, offices in 65 countries and annual shipments of \$1.36 billion. And *Dun's Review* has called HP one of the five best-managed companies in the country.

There's plenty of challenge and satisfaction working at Hewlett-Packard. If that's what you're looking for, write to us today.

We are an equal opportunity employer dedicated to affirmative action.

John Sundry, Regional Sales Mgr., 4 Choke Cherry Road, Rockville MD 20850

Bob Stringer, Regional Sales Mgr., 5201 Tollview Dr., Rolling Meadows IL 60008

Russ Stewart, Regional Sales Mgr., P.O. Box 105005, Atlanta GA 30348

Bob Sudkamp, Regional Sales Mgr., 23855 Research Drive, Farmington Hills MI 48024

Mike Leevell, Regional Sales Mgr., 3939 Lenkershim Blvd., North Hollywood CA 91604

Mike Neggier, Regional Sales Mgr., 6877 Goreway Drive, Mississauga, Ontario, Canada L4V 1M8

HEWLETT  PACKARD

MANAGER SYSTEMS RESEARCH

Display Data Corporation has been doubling in size each year since 1973. This dynamic, well-founded growth has created the need for an individual to join our professional staff and assume responsibility for new systems development activities.

The person we seek will have at least two years' of heavy involvement in operating systems design, and have a thorough understanding of OS design trade-offs. Previous work with compilers would be highly desirable. In addition to technical expertise this person will be a successful manager who knows how to build, develop and motivate a project team towards the timely achievement of objectives.

To investigate this opportunity, please forward a current resume to us. All replies held in strictest confidence.

Mr. W. T. Myers
Director of Personnel Management
Executive Plaza IV
Hunt Valley, Maryland 21031
301/667-9211

An Equal Opportunity Employer M/F

insight
DISPLAY DATA CORPORATION

COMPUTER CENTER KOREA

Assist in setting up mini based time-sharing system and training 3-5 person team. Appointment for 1 year. Detail experience with statistical programming, retrieval systems, supervision, training and when available.

Send resume to:
CW Box 1401
797 Washington St.
Newton, MA 02160

PROGRAMMER

To work in business environment utilizing the COBOL language on a Burroughs Medium System. Minimum-Bachelor's degree, plus one year of Burroughs programming experience. Beginning salary \$14,635, plus excellent fringe-benefit program. Call or write by February 8, 1978, John C. Cook, New Jersey Education Association, 180 West State Street, Trenton, New Jersey 08608 (609) 599-4561, Ext. 18.

MODCOMP SOFTWARE DEVELOPMENT

MODCOMP is one of the most respected designers, manufacturers and marketers in the booming mini-computer industry. There's never been a better time to consider the outstanding career opportunities with MODCOMP and the good life in sunny Ft. Lauderdale, Florida.

SOFTWARE ARCHITECTURE

Openings exist for Sr. Software engineers who are heavily experienced in operating systems, net working and communications. These positions allow involvement in the design of the overall architecture for new product lines. Candidates must be thoroughly familiar with state-of-the-art software architectures.

MANAGER, DIAGNOSTICS DEVELOPMENT

Candidate must have a proven track record in small time project management with a thorough knowledge of diagnostics development. Will be responsible for producing the standard hardware diagnostics for existing and new product lines.

DIAGNOSTIC TECHNICAL MANAGER

Must be capable of technically coordinating several diagnostic projects, including the integration of diagnostic test philosophy. Candidate must have extensive diagnostic experience in CPU, memory and peripherals.

DIAGNOSTIC PROGRAMMER

Openings exist for intermediate and junior level hardware diagnostic development engineers. These individuals will have project design and implementation responsibility with emphasis on communications, process control and online diagnostics.

COMPILER WRITER/TECH. WRITER

Minimum 2 years' compiler experience with proven skill in code generation techniques is necessary. Familiarity with procedural languages such as PL/I, COBOL, PASCAL and/or ALGOL is desirable. Graduate degree in Computer Science is desirable. Must also be experienced in the production of programming manuals for technical systems.

PROCESS CONTROL OPERATING SYSTEM INSTALLATION

Requires an individual knowledgeable in process control applications to maintain, enhance and install a special purpose process control operating system. This position provides a mixture of development work and travel.

We offer highly competitive salaries, substantial fringe benefits, challenge and the opportunity to move out in front of the pack with a leader. If you are interested in finding out more about the exciting career openings with MODCOMP, please send your resume including salary history, or call (toll free) 1-800-327-8997.

Mr. Dave Swant
MODULAR COMPUTER SYSTEMS, INC.
1650 West McNab Road
Ft. Lauderdale, Florida 33309
An Equal Opportunity Employer M/F

MODCOMP

PROGRAMMERS PROGRAMMER ANALYSTS SYSTEMS ANALYSTS

Make Your Future with the Leader

Datapoint Corporation, the leader in dispersed data processing and one of the fastest growing companies in the computer and data processing field, has excellent career opportunities for qualified systems analysts, programmer analysts and programmers in its Marketing Systems Department in San Antonio, Texas.

We are seeking aggressive individuals who have demonstrated their ability to succeed and have strong technical and business applications systems experience. Major new development in the marketing division has created positions for individuals experienced in general business applications including order entry, asset management, billing, accounts receivable and marketing reporting. If you are interested in pursuing a career in a work environment where your personnel and professional talents will be fully recognized, utilized and rewarded, please send your resume and salary history in confidence to John Ross, Mail Station 1-A, Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284.

An Affirmative Action Employer Committed to Equal Opportunity

DATAPoint CORPORATION



The leader in dispersed data processing and communications management™

For a free master, send us a check or money order.

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

a new subscription
new address
new title
new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



**797 Washington Street
Newton MA 02160**

position announcements

position announcements

position announcements

position announcements

position announcements

UNIQUE

Teleprocessing Opportunity

Enjoy Blue Grass Country living in a University influenced cultural environment. Challenging position with Kentucky's fastest growing computer company. Selectee will receive IBM 3600 NCP, SDLC training and be responsible for installation of On-Line Teller Terminal System. CICS experience desired. Salary up to \$20,000 dependent on qualifications. Other banking related Analyst/Programmer positions available. Send resume in confidence to Joanne Robinson, Meritdata Computing, Inc., P.O. Box 1748, Lexington, Kentucky 40507

INTERESTED IN A GOOD JOB? WE HAVE A PLACE FOR YOU

Growing South Louisiana Co.

Has Openings For:

- Cobol Programmer
- Senior Programmer/Analyst
- Senior Analyst

Experience with IBM System 370 Model 135, OOS/VS with 256K real storage or larger system is desirable.

IF A CHALLENGE APPEALS TO YOU, SEND COMPLETE RESUME TO PERSONNEL MANAGER, P.O. Box 2607, MORGAN CITY, LA. 70380. We are an equal opportunity employer. M/F

INSURANCE SYSTEMS

Growing client base includes many excellent career opportunities in development, consulting and package installation. Individuals with well developed technical skills, solid analytical capabilities and a "big picture" orientation will be given the opportunity to play an important role in a variety of environments.

Current openings include:

NEW ENGLAND	15-23K
ALC or COBOL	
LIFE or CASUALTY	
MIDDLE ATLANTIC	
ALC or COBOL	18-22K
LIFE INSURANCE	
MIDWEST	
ALC or COBOL	18-23K
LIFE INSURANCE	
SOUTHEAST	
ALC or COBOL	17-25K
CREDIT, CASUALTY, PENSIONS, LIFE	
SOUTHWEST	
ALC, LIFE	18-25K
INSURANCE	

Exceptional individuals at all levels are invited to explore these opportunities with Jack Edwards. Jack is an FLMI and deals exclusively with insurance clients.

Jack Edwards Associates

Suite 600
8150 Leesburg Pike
Vienna, Virginia 22180
(703) 821-0088
Insurance Personnel

FIELD SERVICE

SYSTEMS 370/350, H-200, XDS, Univac, CDC All Large & Medium CPU's

MINI's PDP, NOVA, G.A., HP, etc. All Mini Systems

I/O STC, TELEX, CDC, ITEL, CALCOMP, etc. All Peripheral Experience

MTTR

(312) 547-5582

MTTR ASSOCIATES
1107 Mannheim Road \$12.30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

ROBERT HALF PERSONNEL AGENCIES

PICK YOUR POSITION PICK YOUR PLACE PICK YOUR PAY

Robert Half, staffed by EDP professionals for EDP professionals with 55 offices throughout the U. S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

DALLAS

The demand for EDP professionals continues extremely high in the Dallas area. We have immediate openings at all levels salary ranges. All fees, interview, and relocation expenses are completely paid for by our client companies.

A brief example of a few of our current openings:

Prog./Mgr.-Mfg.	to 28K
Prog./Analyst - Trans. Co.	to 23K
Programmer - Insurance Co.	to 17K
Sys. Engineer - Electronics Co.	to 23K
Sr. Prog./Analyst - Insurance Co.	to 21K
Talaprocessing - Manufacturer	to 25K
ALC Programmer - Insurance Co.	to 25K
Sr. Analyst - Petroleum Co.	to 21K
Software Development - Mfg.	to 24K
Sys. Programmer - Petroleum Co.	to 28K
Sr. Programmer/Analyst - Bank	to 21K
Project Manager - Communications	to 28K
Consultant - CPA Firm	to 25K
Lead Prog./Analyst - Bank	to 22K

Please rush your letter or resume on a strictly confidential basis to:

Ron Urbach
Suite 750
Dallas, Texas 75231
(214) 363-3300

ATLANTA

SR. SYSTEMS ANALYST to \$22,000

Large bank seeks seasoned individual with design exp. on IBM 370/158 OS/VS Preter degree, banking & IMS.

PROGRAMMER/ANALYST \$15-\$18,000

Local hospital is recruiting for a Prog./Anal. Preter bkgd. of ANS COBOL Syst. design, CICS and BAL exp. 370/145 shop. Growth potential.
3379 Peachtree Rd., N.E.
Atlanta, GA 30328
(404) 266-2153

TAMPA

P/A 370/OS IMS	to 18K
Scientific Real Time	to 18K
P/A NCR Bnkg CIF	to 15K
ANAL Hospital Sys	to 18K
Scien Mini graphics	to 20K
P/A DOS/VS CICS mfg.	to 18K
Burr Mfg on line	to 15K
Sys Prog DOS/VS	to 18K

Contact: Stan Allen
1311 No. Westshore Blvd.
Tampa, Florida 33607
(813) 676-4191

PITTSBURGH

PROGRAMMER/ANALYST
Subsidiary of nat'l corp. seeks person possessing 2 yrs. programming experience with working knowl. of OS/COBOL & JCL. Emphasis on mfg. applications. IMS Data Base and/or knowl. of RPG helpful. Salary to \$20,000.

SYSTEMS ANALYST
Northwestern PA location. Excellent oppy. for small town, outdoor living. Company seeks person with Project Leader abilities & exposure to Ige. IBM-DOS, COBOL & Mfg. applications. Oppy. for rapid promotion. Salary to \$24,000.

OS/SYSTEMS PROGRAMMER
Exciting oppy. available for Systems Programmer with Ige. Pittsburgh conglomerate. Abilities in OS programming, MVT and/or TSO are necessary. Salary to \$22,000.

Contact: Elizabeth Hardtmayer
Gateway Towers
Pittsburgh, PA 15222
(412) 471-5946

HOUSTON

IMS PROGRAMMER ANALYST
Are in great demand in the Houston area.

(32) MS Oil & Gas	\$15-19,500
(39) MS Banking	
IMS Insur	\$18-20,000
(12) IMS Mfg	\$16-20,000

Many other positions such as Analyst, Proj. Leader and Non-IMS Programmer/Analysts

Contact Jim Fleming
4901 Woodway
Suite 231W
Houston, Texas, 77058
(713) 981-3271

MINNEAPOLIS

PROGRAMMER/ANALYST
Be one of the first to join this major company's new in-house EDP staff. New positions - unlimited opportunity for growth. If you have several years COBOL, OS, VS and big systems, company offers outstanding salaries & benefit package.

Contact Richard Haney
2236 Ida Center
Minneapolis, Minn. 55402
(612) 339-9001

MIAMI

SYSTEMS PROGRAMMER
Lge. So. Fla. corp. seeking self-motivated professional with proven track record in generation/maintenance of DOS/VS, CICS/VS systems. Indiv. must be able to evaluate new OP packages. This is a growth position. Salary to \$18,000. All fees paid, many additional opps.
1395 N.W. 167th Street
Miami, Florida 33169
(305) 625-6433

SAN FRANCISCO

No. Calif.

SR. SYS/PROGRAMMERS
Our clients need software prog. for their IBM 370/IMS/MVS and 370/VM/CP/CMS installations.

CONSULTANTS
PROG./ANALYST
COBOL. To implement systems in an IBM 370/IMS shop. Many positions.

RPG II
PROGS. ANALYSTS
Learn OCL in Systems 3 shop. Many positions to O.P. Mgr.

Jerry Anderson
111 Pine Street
San Francisco, CA 94111
(415) 434-1900

BOSTON

PROGRAMMER ANALYST
Large local electronics mfr. has immediate need for sharp programmer w/tech. exp. in fin'l. applications. Min. 1 year exp. in BASIC + OEC exp. + plus. \$18-\$17,000 (Fee Paid).

SYSTEMS ANALYST
Major suburban computer mfr. seeks degreed indiv. w/strong systems analysis exp. in mfg. systems. COBOL programming a must. BASIC+, MUMPS, RSTS a plus. \$19-\$21,000 (Fee Paid).
Contact Jim Staumton
140 Federal Street
Boston, MA 02110

PROVIDENCE

PROGRAMMER/ANALYST
Leading R.I. electronics mfr. seeks an aggressive "pro" in the development of mfg. systems. Strong COBOL OOS/VS exposure. IBM 370 environment. MRP/CICS knowledge necessary. \$20,000 (Fee Paid) Contact: Gae Ecker
400 Turks Head Building
Providence, R.I. 02903
(401) 274-6700

BUFFALO

SYSTEMS PROGRAMMER
Fin'l. institution converting to IBM 370/115 needs programmer with Assembler & OOS/VS bkgd. Intimate shop requires systems expertise to head up & maintain present programs. \$18,000 (Fee Paid).
Contact P. Siegel
1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 842-0801

FREE:
Ask for our latest "EDP Salary Survey".

KANSAS CITY

KC state of the art installation needs a degreed programmer to train as an analyst. No programming required in this high visibility position. Salary \$18,000.

Local \$50 mil. mfr. needs take-charge mgr. to make major aqut. upgrade & to install new mfg. systems. Job reports to Pres. Base salary of \$25,000 with bonus.

Nationally based KC firm has announced major staff expansion for '78. Multiple openings exist for Programmers with min. 2 yrs. OS-COBOL exp. & Project Leaders with heavy inv. control. Salary range \$17-25,000. All fees and expenses paid by client companies. For confidential review of where you might fit, contact:

George Waterman
127 West 10th Street
Kansas City, MO 64106
(816) 474-4583

ST. LOUIS

Sys Anal. mfg. COBOL	
JCL, TSO	22K
Sys Prog. mini computer bkgd	25K
/A370/OS COBOL	20K
Scientific Prog Fortran	
CDC, Equ.	18K
Sys Prog (software)	
CDC CYBER	23K
P/A B-4700 COBOL	
banking	18K
P/A 370/OS PL/I	19K
Sys Prog compiler design	23K
P/A NCR-101	
NEAT III	17K
P/A COBOL-RPG II	
Sys 3	16K
OP Manager	
retail 360/370	25K
O.B.A. 370/OS, IMS	22K
Consult. mfg degree	22K

7733 Forsyth Blvd.
St. Louis, MO 63106
(314) 727-1535

MICHIGAN

Southfield & Grand Rapids
Data Process. Professionals are in high demand in the Michigan area. We have immediate openings at all levels and salary ranges. All fees and relocation expenses are paid by our client companies. Please call or send us your resume in strict confidence.

670 Honeywell Ctr.
Southfield, MI 48075
(313) 559-1212
468 Frye Bldg.
Grand Rapids, MI 49503
(616) 458-2333

KENTUCKY

Rapidly expanding Mfg. co. is developing a national TP Network using VTAM, NCP. Opportunity exists for 2 growth-minded PROG./ANALYSTS with exp. using COBOL for 370DOS/VS, POWER/VS shop. CICS and DB concepts desired. Salary to 18,000. O.O.E. Send resume in confidence to Larry Weathers.
680 South 4th Street
Louisville, Kentucky
(502) 589-8867

LOS ANGELES

SR. PROG. ANALYST
Our client, a major retail chain, is expanding their staff by the addition of 2 Sr. Programmer Analysts. These positions require a min. of 4 years exp. in the design, development & programming of on-line systems. OS BAL, CICS & PL/I are required. A knowl. of COBOL is a plus. Starting salary to \$25,000 (Fee Paid).

Contact Duncan White
3800 Wilshire Boulevard
Los Angeles, CA 90010
(213) 388-8806
500 So. Main Street
Orange, CA 92668
(714) 835-4103

SO. CONN./ WESTCHESTER

The third largest concentration of Fortune 500 headquarters in the USA is here! You will gain career advancement and the life style others will envy in this culturally endowed, beautiful section of Suburbia. Our clients need:

Systems Project Mgrs.
Systems Analysts
Software Programmers
Application Programmers
Technical Support Programmers
Hardware "Biggies" and "Minis"
Send resume and salary history to:
Robert Half/EDP
111 Prospect St.
P.O. Box 1392
Stamford, Ct. 06904
(203) 326-4168

DENVER

Excellent positions available for the EDP "pro" with the desire for The Rocky Mountain Region. Example of two currently available positions: applications support group 370/145 DOS/VS, COBOL EXP. KEY. Also, Data Processing Operations Mgr. with a large Colo. Bank Holding Grp. Must have strong OP admin. background.

Contact
Steve Newman
1515 Arapahoe Street
Denver, Colorado 80202
(303) 628-1010

HARTFORD

DIR. CORP. SYSTEMS
N.E. insurer creating top executive position resp. for long range systems planning of prop. & casualty business. OP exposure is desirable as future may lead to top OP resp. Salary to \$33,000 (Fee Paid).
Contact Stan Ourbae
111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170

MILWAUKEE

IMS ?
Well run major installation is looking to challenge person with large scale COBOL programming experience. IMS & TSO are big plusses. \$22,000 (Fee Paid).
777 E. Wisconsin Avenue
Milwaukee, WI 53202
(414) 271-9380

DATA PROCESSING PROFESSIONALS

We are an executive recruiting firm representing one of the world's largest consulting firms. Due to recent expansion, openings currently exist for 40 qualified EDP/Systems professionals. Positions are for entry level and staff consultants.

Ideal candidates will have:

- Technical undergraduate degree, i.e. Engineering Accounting
- Graduate degree in Quantitative Methods, Computer Sciences, Business Administration
- 1-4 years experience in major computing environment
- Prior programming experience in COBOL and FORTRAN
- Certificate in Data Processing highly desirable.

Positions available in most major cities. Client offers an outstanding salary and benefits package with rapid advancement potential.

Send detailed resume and 3 location preferences to consultants,
CW Box 1400, 797 Washington St., Newton, MA 02160
or call (415) 433-0535

C.C.P. Programmer Systems Analyst

We are an irregular route carrier seeking an individual with System-3 programming experience. Our major emphasis is on-line applications, so individual should have three to four years of RPG-III experience with at least one year of C.C.P. Knowledge of the trucking industry helpful.

Salary commensurate with experience, education, and ability. Send resume and salary history in confidence to:
CW Box 1388
797 Washington St.
Newton, MA 02150
Equal Opportunity Employer

REMOTE JOB ENTRY COMPUTER TIME SALES

Leading Midwest computer services firm is seeking a marketing rep with experience in selling RJE. Knowledge of DP concepts and good communications ability is required as well as knowledge of IBM, VS-Hasp environment. Salary in 20's. Please send resume and salary history to:

Director of Marketing
Phoenix-Hecht
233 N. Michigan Avenue
Chicago, Illinois 60601

position announcements

position announcements

position announcements

position announcements

position announcements

PROMOTE YOURSELF

Move up to increased pay and promotional opportunities
and the life style of your choice

SAN FRANCISCO
MALIBU
NEW ORLEANS
TEXAS &
SOUTHWEST
WASHINGTON
FLORIDA
ATLANTA
MASSACHUSETTS
CHICAGO
PHILA. AREA
TWIN CITIES
NEW YORK

Marketing/Sales
Operations Mgr
Data Base Mgr
Director of MIS
Sys Planner
Sr Sys Analyst
Sr Sys Analyst
Sys Progrs
Sys Conslt
Mini Progrs
Account Rep
Programmers
Sys Designers
Anal/Pgrs
Programmers
Programmers

Urgent Openings

Banking/GEM/Consulting	To
CDC 6600, Res'ch env., Deg.	\$35M
Oil Co., Deg.	\$30M
College/Univ exp., Deg.	\$28M
Mktg Syst., Oil Co.	\$35M
Mktg, Proposals, MBA, Pgr	\$28M
Dir. Mail, Mgmt pos.	\$30M
370/VS1, VM, Internals	\$27M
H 6600, GECOS, TSS, IDS	\$28M
Process Ctl, non-defense	\$27M
Fin Sys, University env.	\$25M
COBOL/OS	\$24M
Banking/Ins/Lge scale	\$22M
Top consulting firm	\$25M
Data Base, IMS or TOTAL	\$30M
1 yr exp, Deg., IMS trng	\$22M
	\$16M

No fees or contracts. Our client companies pay all expenses.
Career consultation prior to any action. Over 700 EDP positions
represented.

Send your current resume (or an old one with pencil update)
together with salary history in complete confidence to our
suburban Philadelphia headquarters:

Systems Personnel, Inc.
Suite A 4
207 Fox Lane
Wallingford, PA 19086
215-565-2920

Systems Personnel

A NATIONWIDE CAREER SERVICE

Computer Professionals



Deere & Co., a leading manufacturer of agricul-
tural equipment, has openings for the following
positions:

SYSTEMS ANALYST

You must have a minimum of 2 years experience, including IMS,
in an IBM environment, preferably in manufacturing areas.
Responsibilities will be varied.

PROGRAMMER

Prefer a minimum of 2 years experience with IBM equipment
and a knowledge of COBOL, PLI, and FORTRAN.
We offer qualified candidates excellent starting salaries and
comprehensive company-paid benefits including paid relocation
to Iowa. For consideration, please submit your resume, including
salary history and current requirements to:

Ronald H. Like
Manager, Professional Employment
Deere & Company
Moline, Illinois 61265
An Equal Opportunity Employer M/F

SYSTEMS PROGRAMMER

A rewarding and stimulating career opportunity offering the
professional and personal recognition you seek is available now
at the new Earth Resources Observation Systems (EROS) Data
Center. This facility is the national center for the processing and
dissemination of spacecraft acquired imagery and electronic data
of the Earth's resources. These positions are available immedi-
ately for individuals with the following qualifications:

- Degree in computer science or related discipline with experience
in maintenance and trouble shooting of computer systems
software including supervisors, compilers and utilities. Expe-
rience in systems support of B-6700 computer preferred. Major
efforts include support of:
- B-6700 Multi processor systems
- Data communications network
- Large on-line data base
- Mini computer image processing systems
- Array processing hardware

Excellent income, comprehensive benefits, relocation assistance,
and the advantages of our midwestern lifestyle await you. Join
Technicolor Graphic Services, Inc., a wholly-owned subsidiary of
Technicolor, Inc., Hollywood, California, for an exciting career
opportunity at the EROS Data Center.

FOR PROMPT AND CONFIDENTIAL CONSIDERATION, OR
ADDITIONAL INFORMATION, SEND RESUME TO:

Mr. J.C. Pfliger

TECHNICOLOR GRAPHIC SERVICES, INC.

P.O. Box 1242
Sioux Falls, South Dakota 57101
An Equal Opportunity Employer M/F

NEW ENGLAND E.D.P. DIVISION

NATIONAL PERSONNEL CONSULTANTS PROGRAMMER ANALYST

Western Connecticut unparalleled growth
influx of Corp. Hdqrs. Offers exciting
opportunities for experienced programmers
and analysts, comm'l, scientific, and software
areas.

AAA Personnel Assoc.
14 Haystack Ave.
Danbury, CT 06810

(203) 744-1820 Since 1960

NEW 1978 EOP LISTINGS

New Year budgets are completed (OUR CLIENT
COMPANIES ARE EXPANDING) We have many
new openings in MOF, INS, Banking areas for
exp'd Programmer Analysts and Systems
Analysts. Salaries range from teens to mid 20's.
Send resume or call for more information.

DYNAMIC PERSONNEL

181 Park Avenue
West Springfield, Mass. 01089
413-734-5628

EDP PROFESSIONALS

Openings for PROGRAMMERS, ANALYSTS,
and SOFTWARE PROFESSIONALS. Clients in-
clude INSURANCE, CORPORATE HEAD-
QUARTERS, MFG, BANKING, CONSULTING.

ACCESS GROUP

Suite 303 37 Lewis Street
Hartford, Connecticut 06103
(203) 527-9107

Client companies represent all industries
and assume all expenses.

NATIONAL PERSONNEL CONSULTANTS

Over 90 Offices Nationwide
Register with any of us
and we'll take care of the rest.

LUKENS STEEL - A MODERN COMPANY COMMITTED TO GROWTH- SEEKS LEAD COMPUTER ANALYST

Five or more years experience designing and imple-
menting teleprocessing applications in a manufacturing
environment. Will be required to direct activities of a
three to five person Task Force. Objective is to de-
sign and integrate a network consisting of process
control, voice data collection and expanding an exist-
ing 25 terminal network.

Experience preferred in: IBM 370/145-148 DOS/VS,
TOTAL Data Base, ENVIRON-1, POWER, COBOL,
LIBRARIAN. Degree required, 22-26K.

Reply in confidence to:
Mr. George P. Kissell, Jr.
Lukens Steel Company
Coatesville, Pa. 19320
(215) 383-2232

An Equal Opportunity Affirmative Action Employer M/F

PRODUCT MARKETING MANAGER

ECRM Inc., a manufacturer of sophisticated computer equip-
ment for the graphic arts industry, presently seeks a Product
Marketing Manager for our innovative 7600 Copy Processing
Systems.

The prime responsibilities for this position include the coor-
dination of the entire sales/marketing effort as related to the
7600 System, as well as providing input to engineering and mer-
keting on system features and enhancements. Also, support of
the sales force through up to date documentation. The ideal
candidate will have a thorough knowledge of the newspaper
end/or commercial printing industry, and a strong background
in sales end/or marketing for multi-terminal systems.

This is a highly professional position reporting directly to the
corporate director of Sales and Marketing and offers the appro-
priate challenge and compensation. For more information or to
arrange an interview call Cynthia Carney, Personnel at
(617) 275-1760 or send resume in confidence to:

ECRM, INC.
205 Burlington Rd., Bedford, Mass. 01730
Equal Opportunity Employer M/F

ECRM

MINICOMPUTER CUSTOMER ENGINEERS

We Offer You The
OPPORTUNITY TO EXCEL

The University of California's Los Alamos Scientific Laboratory
needs outstanding applicants to support our expanding, multi-
faceted R & D efforts. If you desire challenge, responsibility, and
the chance to excel, we invite you to apply for a career with us.
Incumbents will work independently, diagnosing and repairing a
wide variety of computer systems and components in the DEC
PDP - 11 family - including mainframe, memory, peripherals and
desk storage systems - in response to trouble calls from users of
computer systems.

The successful candidates must be technical school graduates (or
equivalent) with significant manufacturer's training. In addition,
several years' experience maintaining the PDP-11 family of com-
puter systems, as well as an excellent working knowledge of
trouble-shooting techniques, central processors, mass storage devices
and other computer equipment, are required.

We provide excellent compensation, working conditions, and bene-
fits (how does 24 days' annual vacation sound?). Our location in the
mountains of northern New Mexico offers a pleasing lifestyle in a
setting of great natural beauty: abundant recreational opportunities;
a pollution-free environment; end casual, uncrowded living.
Please send complete resume, in confidence, to, or request appli-
cation from:

James Trout
Division - 78-Z
Los Alamos
Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545

los
alamos
SCIENTIFIC LABORATORY

An Affirmative Action/Equal Opportunity Employer. Women,
Minorities, Veterans, Handicapped, Urged to Apply. U.S. Citiz-
enship Required.

position announcements

position announcements

position announcements

position announcements

position announcements

SOFTWARE SALES DIRECTOR

Design and implement sales and marketing strategies for NYSE firm. Hire staff, co-ordinate market research, make this firm GROW. Base salary to \$30K plus commission. All inquiries are held in strictest confidence. Call or write:

Management Resources Agency

1370 Brea Boulevard • Suite 124 • Fullerton, California 92635

DATA PROCESSING CONSULTANT

We are a national CPA firm with an expanding Management Services Department. Our Chicago office has an opening for a business-oriented data processing professional with 2-4 years experience and good communications skills. Experience in any of the following areas would be considered a plus:

Corporate Systems Department
Big 8 Management Services
Mini-Computer Installations
Manufacturing, Distribution, Health Care, Accounting

A college degree is required. We offer a professional environment, minimum travel, excellent benefits and an opportunity for varied assignments.

If you qualify, and are seeking a challenging career opportunity, send us your resume with salary history. All replies will be held in the strictest confidence.

CW Box 1404
797 Washington Street
Newton, Mass. 02160
Equal Opportunity Employer

PROGRAMMER ANALYST

A central Ohio manufacturing plant engaged in heavy machining of truck axle components (low volume, high variety), has a challenging opportunity as a Programmer Analyst for a sharp, aggressive individual with career objectives in mind.

To be considered for this position, you should possess a minimum of 2 years of experience with the IMS/DL1 experience and/or familiarity with manufacturing systems would be a plus. Degree preferred.

This position requires a great deal of interaction, cooperation and leadership abilities. Growth potential limited only by successful candidate's own capabilities.

We are a progressive division of a large multi-national corporation, offering a superior fringe benefit program and salary commensurate with experience.

Only qualified candidates should send resume, with current salary, to:

CW Box 1405
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer M/F

UNIVERSITY OF PETROLEUM AND MINERALS

DHAHRAN, SAUDI ARABIA MINI COMPUTER SYSTEMS SPECIALIST

The Systems Engineering Department is seeking a qualified computing professional to provide systems support and real time development on HP 21MX. To install and maintain operating systems, systems programs and applications programs including on line applications. To assist in teaching laboratory sessions and research. To estimate and develop order software tools and supplies and write interfaces for satellite micro-computer systems.

Masters degree in a relevant field with 2-3 years exposure to HP Minicomputer assembly programming and operation. Experience with refreshed graphics programming and teaching.

Minimum regular contract for two years, renewable. Excellent salaries and allowances. Air conditioned housing provided, free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for schoolage dependent children. Local transportation allowance in cash each month. All earned income without Saudi taxes. Ten and a half month duty each year with 45 days vacation paid.

Apply with complete resume on academic and professional background, list of references, and with copies of degrees including personal data such as, family status (spouse's name, names of children, ages and sexes, home and office addresses, telephone numbers to:

Dhahran International Airport
P.O. Box 144
Dean of Faculty and Personnel Affairs
University of Petroleum and Minerals
Dhahran, SAUDI ARABIA

FOURTEEN OF OUR TOP TWENTY-FIVE SALES ENGINEERS NEVER SOLD COMPUTERS BEFORE THEY CAME TO DATA GENERAL.



They were Software Support Engineers, Systems Programmers, Hardware Designers...you name it.

The point is this: You can stick to your job for the next 18 months, or become a Sales Engineer at Data General, sell computers for a year—and you'll make the same money. Or more. You already have the technical credentials and, if you enjoy dealing with people and working in a competitive environment, there's no limit to what you can earn as a Sales Engineer at Data General.

We give you more of what you need to be successful: computers, peripherals, technology, reputation, position—over 44,500 Data General computers have been sold and installed in 45 countries around the world. Stay where you

are, or move up to Data General—it's your future.

COMPUTER SALES ENGINEERS

We require solid technical background in mainframes, minis or systems—plus the ability to open up new OEM and end user accounts is a must.

NORTHEAST

Cambridge, MA New Haven, CT Nashua, NH Worcester, MA 128 Belt, MA
Wellesley, MA Hartford, CT

To apply for a position in one of the above locations call Charley Polachi collect at (617) 235-8171, or send your resume, including salary history, in confidence to him at Data General Corp., 888 Worcester Rd., Wellesley, MA 02181.

MID ATLANTIC

New York City, NY

To apply for a position in the above location call Dick Rausch collect at (212) 557-1122 or send your resume, including salary history, in confidence to Ralph Wertheimer, Data General Corp., 150 Broad Hollow Rd., 3rd Floor, Melville, NY 11746.

Long Island, NY Westchester County, NY

To apply for a position in one of the above locations call Ray Tellalian collect at (516) 427-0311 or send your resume, including salary history, in confidence to Ralph Wertheimer, Data General Corp., 150 Broad Hollow Rd., 3rd Floor, Melville, NY 11746.

Albany, NY Syracuse, NY Buffalo, NY

To apply for a position in one of the above locations call Dave Crago collect at (716) 385-2000 or send your resume, including salary history, in confidence to Ralph Wertheimer, Data General Corp., 150 Broad Hollow Rd., 3rd Floor, Melville, NY 11746.

Wayne, NJ

To apply for a position in the above location call Alan Goldman collect at (201) 785-3910 or send your resume, including salary history, in confidence to Ralph Wertheimer, Data General Corp., 150 Broad Hollow Rd., 3rd Floor, Melville, NY 11746.

Princeton, NJ Philadelphia, PA Harrisburg, PA Scranton, PA

To apply for a position in one of the above locations call Art Mackin collect at (215) 643-5515 or send your resume, including salary history, in confidence to Ralph Wertheimer, Data General Corp., 150 Broad Hollow Rd., 3rd Floor, Melville, NY 11746.

MIDWEST

Detroit, MI Minneapolis, MN Kansas City, MO Milwaukee, WI Des Moines, IA
Indianapolis, IN Schaumburg, IL St. Louis, MO Kalamazoo, MI Madison, WI
Dayton, OH Pittsburgh, PA

To apply for a position in one of the above locations call Yvette Britt collect at (312) 885-0505 or send your resume, including salary history, in confidence to her at Data General Corp., 1111 Plaza Dr., Schaumburg, IL 60172.

SOUTHWEST

San Diego, CA Pasadena, CA Downtown Los Angeles, CA Orange County, CA

To apply for a position in one of the above locations call John Bennett collect at (213) 973-0401 or send your resume, including salary history, in confidence to him at Data General Corp., 2221 Rosecrans Ave., Suite 204, El Segundo, CA 90245.

SOUTHEAST

Miami, FL Atlanta, GA Memphis, TN Ft. Worth, TX Baton Rouge, LA
Tampa, FL Nashville, TN Columbia, SC Tulsa, OK Jackson, MS
Houston, TX Knoxville, TN Orlando, FL New Orleans, LA Huntsville, AL
San Antonio, TX

To apply for a position in one of the above locations call Allen Sabourin collect at (404) 325-3181 or send your resume, including salary history, in confidence to him at Data General Corp., 1639 Tullie Circle, Suite 128, Atlanta, GA 30329.

FEDERAL REGION

Richmond, VA Metro Washington Norfolk, VA

To apply for a position in one of the above locations call Stan Joseph collect at (301) 247-8900 or send your resume, including salary history, in confidence to him at Data General Corp., 1900 Sulphur Spring Rd., Suite 310, Baltimore, MD 21227.

NORTHWEST

Palo Alto, CA San Francisco, CA Seattle, WA Denver, CO

To apply for a position in one of the above locations call Terri Johnson collect at (415) 321-8010 or send your resume, including salary history, in confidence to her at Data General Corp., 2445 Faber Pl., Palo Alto, CA 94303.

 **Data General**

An equal opportunity employer M/F.

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER/ANALYSTS

If You Had To Look Back At '77 With No Professional Growth - Then Look Ahead To '78 With CSC!

The System Sciences Division of Computer Sciences Corporation

continues its expansion into the New Year with challenging and stimulating professional opportunities for those looking to the future.

We continue to offer the qualified individual an environment that provides opportunities to develop professional skills and allows upward mobility into technical and managerial career paths.

We are currently staffing positions in support of contracts with the Federal Aviation Administration and with the National Aeronautic and Space Administration. The FAA project, located in Jacksonville, Florida, deals with the development of an air traffic control system. We additionally have several NASA projects in the Washington, D.C. Metropolitan area, requiring scientific or technical programming background. Investigate your future with our division.

JACKSONVILLE, FLORIDA

We are seeking experience in IBM 360/OS, Assembly (BAL) and/or high level language (preferably JOVIAL) to work in any one of the following areas:

- Software test and validation including development of tools to test and validate real-time software systems
- Simulation/modeling of air traffic patterns. Knowledge of JOVIAL a plus
- Design and implementation of data base management systems
- OS/360 System generation and maintenance
- Diagnostic design, development or enhancement and hardware orientation
- Software Quality Assurance

WASHINGTON, D.C. METROPOLITAN AREA:

Current positions in support of our Space Tracking Data Network, Goddard Real-Time Systems, Mission Support and Scientific and Applications Projects for the NASA Goddard Space Flight Center require a degree in Computer Science, Math, Physics, Astronomy, Meteorology or Engineering with experience using FORTRAN and/or Assembly languages on large-scale or mini-computers. These skills will be applied in the following concentrations:

- Telemetry application with multi-computer configuration
- Integration and testing of real-time display software
- Data base management
- Real-time scientific applications
- Network management
- Computer-to-computer communications
- System requirements definition

- Analysis and application of climatological data
- Simulation/modeling of real-time systems
- 370/370 OS systems programming.

CSC offers a comprehensive benefits package including a liberal relocation policy. For immediate attention, please call or send resume to:

Staffing Department
Toll Free: 800-638-0842 OR Call
Collect: (301) 589-1545



**COMPUTER
SCIENCES
CORPORATION**

System Sciences Division
8728 Colesville Road
Silver Spring, Maryland 20910

Major Offices And Facilities Throughout The World
Equal Opportunity Employer M/F

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM II, Assembler and COBOL. Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:

W.M. Jones



**Harper-Grace
Hospitals**

Human Resources Department
3990 John R.
Detroit, MI 48201
(313) 494-8082

An Equal Opportunity Employer M/F

**COMPUTER/
MATHEMATICS
SPECIALIST-IRAN**

Serve as academic Departmental Advisor at a 2-year Technical Institute in Shiraz, Iran. Develop and implement the Mathematics and Computer Curriculum; select and train faculty, advise students and participate in other professional activities relative to the Department. Masters degree and academic experience required. Assignment in Iran is for 2 years, position available immediately. Overseas incentive pay, transportation and housing provided. Send resume to:

Wentworth
Institute
of Technology
550 Huntington Ave.
Boston, Mass. 02115
Equal Opportunity Employer

**WHY EDP SEARCH?**

Your life will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

PROGRAMMERS/ANALYSTS

CCP/RPG II/COBOL

What do you want from your career?

- Independent work - like being in business for yourself?
- An opportunity to learn and progress with a group of professionals dedicated to the solution of all types of computer problems?
- Full account management responsibility?
- A high salary plus bonus and excellent fringe benefits program?

If these are your career objectives, and you have at least 3 years experience in the above disciplines, contact ISS today.

For interview appointment call (213) 484-0450

ISS: The Human Equation
International Systems Services, Inc.

1545 Wilshire Blvd., Los Angeles, CA 90017
An equal opportunity employer

**HONEYWELL LEVEL 66
SYSTEMS PROGRAMMER**

Promotion has made this opportunity possible at our corporate headquarters in Milwaukee. This position requires experience and competence in maintenance and enhancement of computer operating systems. Excellent salary commensurate with experience and complete fringes. Call or write:

Robert Rendi
(414) 228-2375

GLOBE-UNION INC.
5757 N. Green Bay Ave.
Milwaukee, WI 53201
equal opportunity employer m/f

**Business Systems
Manager
\$ Mid 30's**

Multi plant manufacturing corp. using large scale IBM seeks professional manager to work with corp. management.

Experience should include varied MIS applications areas ie: MFG, mkt, sales, acct fincl.

Excellent benefits package includes paid relocation.

Send Resume or
Call for Details

(212) 682-8600

**F-O-R-T-U-N-E
DATA**

505 Fifth Avenue
New York, N.Y. 10017

**Sunbelt
Opportunities
For
You****In HOUSTON**

Date Comm Mgr to 28K
Prog/Geophysical to 28K
Sys Anal (Methods) to 22K
(no programming)
DB/DC Prog/AN open

Multiple listings for Fortran/ALC/
DEC Basic/RPG 11 & Cobol to
25K FEE PAID
**Electronic Data
Personnel Agency, Inc.**
175 One Shell Plaza
Houston, Texas 77002
(713) 225-5359

**COMPUTER
PROGRAMMER**

We are looking for a Computer Programmer with 2-3 years experience in COBOL. Finance and Burroughs experience would be helpful. Salary will be commensurate with experience. Send resume to:

Attn: Suanne Walker
First National Bank
& Trust Co. of Joplin
Post Office Box 8
Joplin, Missouri 64801
Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

COMMUNICATIONS SOFTWARE DESIGN PROJECT LEADERS DEVELOPERS

If you're seeking a challenging career in communications software, consider

**NCR's
Communication
Systems
Division**



NCR's Communication Systems Division, specializing in the development and manufacturing of data communications products and systems, is currently expanding its COMMUNICATIONS SOFTWARE group.

Get in on the ground floor of advanced communications design and participate in NCR's entry to DISTRIBUTIVE NETWORK ARCHITECTURE consisting of a series of microprocessor-based terminal systems and nodes connected by communication lines.

We are looking for key individuals who have indepth software background with solid communications experience. Qualified applicants must provide definition, design, and implementation leadership; and have experience in any of the following areas:

- Microprocessor software (assembly level)
- Operating systems design
- Communications links disciplines (SDLC, bisynch, ISO, etc.)
- VTAM, NCP (for interface to SNA network)
- Front end processor software
- Network node software
- Network definition language (system generator)
- Constructors for nodes, cluster controllers, and front ends (COBOL)

All our positions are in our beautiful, sunny South Carolina location, close to the seashores and mountains. Columbia offers a lifestyle with excellent recreational facilities for tennis, golf, fishing, boating and swimming. The area also offers excellent housing opportunities, low taxes, and it is the home of the University of South Carolina and other fine educational institutions.

If you are seeking a challenging career with a leader in the industry, need a new lifestyle and have the above experience, we'd like to speak with you.

A degree in Engineering, Math or Computer Science is required. For consideration, please send your resume and salary requirements in complete confidence to:

NCR

Ken Uhlig, Dept. CS
Industrial Relations
Engineering & Manufacturing
Columbia
NCR Corporation
3325 Platt Springs Road
West Columbia, S.C. 29169

An Equal Opportunity Employer

PROGRAMMER ANALYST

United Telecommunications is seeking applicants for positions within their expanding Corporate Data Processing Staff.

The Qualified Applicants will have 2 to 4 years of COBOL experience. IMS Data Base and Data Communications a definite plus. Duties will include development and implementation of business applications.

If you are qualified and interested in one of these challenging growth opportunities send resume with salary expectations to:

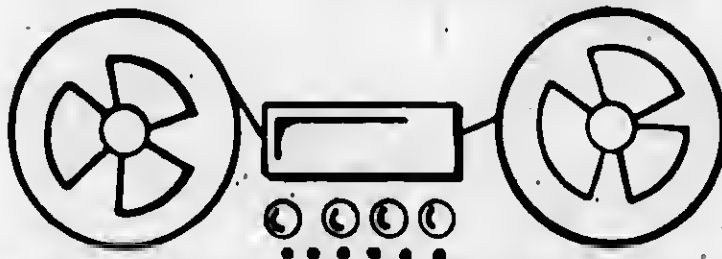
JOYCE BIER, Personnel Supervisor

United Telecom

2330 Johnson Drive
Shawnee Mission, Kansas 66205
(913) 384-7404

An Equal Opportunity Employer M/F

COMPUTER PROFESSIONALS



Burroughs Corporation, located in suburban Philadelphia, is continuing the development of its new super computer, the Scientific Processor. This on-going development has created several additional opportunities on our professional design team.

COMPILER DESIGN

Individual required to design and implement optimizing sections of a sophisticated FORTRAN compiler for a large-scale parallel processor. The successful candidate will have had experience and/or academic training in the principles of program flow analysis and code optimization.

LINK EDITOR DESIGN

Experienced software programmer needed to take full responsibility for a sophisticated linkage editor program with beyond the state-of-the-art capabilities. Duties involve implementation of significant new features as well as maintenance of a software product.

PACKAGING ENGINEER

Mechanical engineer with packaging experience needed for advanced high-speed digital packaging. Requires knowledge of air and liquid cooling techniques and multi-layer P.C. board packaging.

Other positions are also available in the areas of Diagnostic Software, Operating Systems Development, Software Quality Assurance, Systems Programming, and Logic Design.

These positions require a BS in Computer Science, Engineering or related disciplines and will provide fully commensurate with long term satisfaction and growth potential. Reply in confidence to: Mr. William L. Shaffer, Burroughs Corporation, P.O. Box 517, Paoli, PA. 19301.

Burroughs



An Equal Opportunity Employer, M/F

OVERSEAS OPPORTUNITIES TO \$25,000 (TAX FREE)

Prominent International firm has several openings for experienced EDP personnel in the Middle East.

SYSTEMS ANALYSTS

Seeks commercial applications experience in below areas:

Materials, Purchasing, Inventory
Financial/Accounting
Payroll/Personnel
Medical
Reservation Systems
(Hotel/Airline)

Systems/Software Programmer
Client operating 370/168/158 with two 3033's on order operating under MVS, with large scale on line terminal network (400 terminals) expanding to 650 terminals with TP links to Europe and U.S.A.

They seek strong technical background in one or more of the following areas:

MVS Internals, Generation and Maintenance
Telecommunications (TCAM, VTAM, NCP)
TDS
JES2
Performance Measurement & Evaluation
Program Product Installation Support and Maintenance

Our client offers highly challenging work assignments and outstanding benefit and relocation package. All fees paid. Confidential replies to R.T. Spencer, by resume including present salary.

FOX-MORRIS
PERSONNEL
CONSULTANTS
1500 Chestnut St.
Philadelphia, PA 19102

Customer Support Manager (Computers)

We are a major computer manufacturer with headquarters in the Northeast and have an opening for an experienced manager to staff its expanding network of customer support-oriented profit centers.

Successful candidate will have 8-10 years' technical experience in the software/applications disciplines. Additional experience should include 3-5 years' experience as a field marketing representative or sales support function.

This position requires a technical undergraduate degree plus business education at the graduate level. 1-3 years' prior management experience is a firm prerequisite for this well compensated position.

For an immediate confidential review of your qualifications, send a resume including salary history to:

CW Box 1406
797 Washington St., Newton, MA 02160

We are an equal opportunity employer, M/F

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER PROFESSIONALS:

Come enjoy the good life in San Diego!

Move ahead with one of the world's most successful computer manufacturers while living in one of America's most acclaimed vacation centers. San Diego offers you the climate of your choice, from the cool, mild breezes of the ocean to the constant dry warmth of true desert—and every gradation in between. Create your special lifestyle in a hilltop hacienda, an

urban highrise, a country club condominium. Explore mesas and canyons, 70 miles of local beaches and bays, the byways of Baja. Continue your professional education in one of the area's many major colleges and universities, enjoy sports all year, from tennis to whale-watching. NCR—for a good living and a good life.

Immediate openings in these areas

■ FIRMWARE

■ DIAGNOSTIC PROGRAMMING

(Design, develop programs to support software testing, release and repair.)

■ SOFTWARE DEVELOPMENT

(Design/implementation of multi-program O/S in a high level language. Experience desired in data base or telecommunications, distributive processing, virtual machine, time sharing compilers)

■ MICR APPLICATION SOFTWARE

(Experience desired in both Transir and Proof of Deposit applications plus features such as CRT Reject-Reentry.)

■ MIS APPLICATIONS

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

Please send resume immediately including salary history, training and experience to the Professional Placement Office at the address below



Engineering and Manufacturing
16575 W. Bernardo Drive, San Diego, Calif. 92127

An Equal Opportunity Employer

NEW YORK STATE & CONNECTICUT wants PROGRAMMERS

So does Pennsylvania & The Northeast

Experienced Programmers and Analysts are in growing demand, both in applications and systems software. Whether you have experience in large systems or small; one year's experience or ten; COBOL, or RPG II, or BAL, or FORTRAN or whatever; whether you've worked in manufacturing, consulting, banking or insurance, there is a good chance ROMAC can help you. We specialize in data processing, finding the right job for you. Salaries are commensurate with experience. Hundreds of clients and openings in the Northeast. Call or write.

ROMAC & ASSOCIATES

342 North Main Street
West Hartford, CT 06117
Telephone: (203) 232-4811

All fees paid. Highly Confidential

PROGRAMMERS AND ANALYSTS

Free Employment Service Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blues Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

NETWORK CONTROL CENTER SUPERVISOR/COMPUTER OPERATIONS SPECIALIST

The Equitable Trust Company, a billion dollar Baltimore Bank, is looking for experienced EOP candidates with good communication skills to apply their problem solving ability and supervisory experience within an IBM 370/158 OS/VS environment.

NETWORK CONTROL CENTER SUPERVISOR

A Bachelor's degree or equivalent, with special emphasis in data processing or will accept an Associates' degree, (two years of related work experience may be substituted for one year of college). A minimum of three years in data processing, of which one must have been in operations and one year must have been in teleprocessing. Thorough understanding of the operations of teleprocessing hardware, software and diagnostic test equipment. Must be able to communicate with all users, hardware engineers and the ability to document all correspondence and recommendations.

COMPUTER OPERATION SPECIALIST

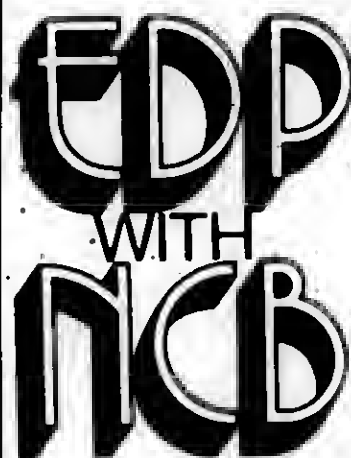
A working knowledge of 370 system architecture, thorough knowledge of IBM operation system, teleprocessing, IMS, TLMS, GCS operating system, JCL and catalog procedure. Strong verbal and written communication skills. Associates' degree preferred.

If you are looking for a career path in Data Processing, please submit resume and salary requirements to:

THE EQUITABLE TRUST COMPANY EMPLOYMENT DEPARTMENT

P.O. Box 1556
Baltimore, Maryland 21208
Attn: Ms. JOAN GHEE

An Equal Opportunity Employer



We are Ohio's largest national bank. Our Data Processing division has more than doubled in size to over 150 people in five years. We are OS with four large IBM 370 systems.

Systems, Banking and Customer demands in the areas of Electronic Funds Transfer, Branch On-Line systems, Integrated Financial Services and EDP Auditing have created openings in both banking and Financial applications for:

SYSTEMS ANALYSTS

(Project coordination and design of large on-line systems)

PROGRAMMER ANALYSTS

(OS, BAL or COBOL programming and design)

EDP AUDITORS

Analysis and design of security controls for new and extant systems

All candidates must have a minimum of 2 years EOP experience in a large computer environment and any of the following qualifications: BAL, COBOL, OS/VS1-VS-2, TP or CICS. Individuality and creativity is recognized and rewarded.

We offer excellent working conditions in a large, modern data center in the suburbs, but close to the interstate, public transportation and shopping — market adjusted, realistic salaries and excellent benefits including profit sharing.

Join a stable, growing, profitable industry. Send resume in confidence to:

Mr. Rauch

NATIONAL CITY BANK

4100 West 150th Street
Cleveland, Ohio 44135

We are an Equal Opportunity Employer, M/F

RETAIL EDP PROFESSIONALS

DIRECTOR MIS to \$40K
Large fast growing retail chain
Heavy Development Program
IBM 370-158. POS on Line
IMS.

PROG/ANALYST to \$24K
National Discount Chain. Merchandise replenishment system
IBM 370-158 IMS/VS TSO

SR. PROGRAMMER to \$21K
Expanding Retail chain-Midwest
IBM 370-135 OS/VS or OS, CICS, COBOL, BAL

PROGRAMMERS & SYSTEM ANALYSTS

Several \$15,000 to \$25,000
Medium or Large scale CPU
pkgd COBOL, OS or OS, IMS or OOB.

Call or mail resume in strict confidence

ALAN LERNER ASSOCIATES
210 Baylston St.
Chestnut Hill, MA 02167
(617) 964-7722

Alan Lerner Assoc. specializes in nationwide search and placement of retail industry executives. All fees are client co. paid.

DATA PROCESSING PROGRAMMERS/SYS. ANALYSTS

We are looking for several Programmer/Systems Analysts, preferably with background in a hospital environment. Demonstrable background with IBM 370 OS/VS environment, IMS/CICS experience desirable, 3 to 5 years Cobol experience required. Projects will include implementation of General Accounting Systems and design, coordination, and implementation of health care related systems. Salary commensurate with experience; excellent benefit package offered. If interested file application Monday-Friday 9:30 to 3:30 or send resume to:

University of Maryland
At Baltimore
Employment Office
685 W. Baltimore St.
Baltimore, MD 21201
Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS ANALYST/ PROGRAMMER

Applications oriented with extensive FORTRAN experience. Engineering (preferably nuclear) or scientific background needed. Other backgrounds considered if work experience is appropriate. Capabilities required include analytical ability to design, program and implement systems of programs, ability to take over existing systems of programs, ability to learn and use several different computer systems and ability to communicate with systems users. Responsibilities include both new and existing system development and maintenance, system utility maintenance and assisting users. Areas of interest include worldwide fuel cycle requirements and schedules, reactor operating characteristics and implementing fuel cycle systems on customers' hardware. Salary open.

LOCATION - ATLANTA, GEORGIA

Excellent Benefits
Send resume to:

NUCLEAR ASSURANCE CORPORATION

24 Executive Park West
Atlanta, Georgia 30329

An Equal Opportunity Employer

VIRGINIA NATIONAL BANK

Is presently accepting applications for the following positions:

PROGRAMMERS

Minimum of one year experience in application programming with IBM equipment. Proficient in ANS COBOL, JCL (RDR/PROCS) and documentation. OS, VS and TSO experience preferred.

SYSTEMS ANALYST

Minimum of three years experience in system design. Possess a background of accomplishments in design, development and implementation of large scale DB/DC systems. OS, VS experience preferred.

SENIOR PROGRAMMER

Knowledge of IBM OS/VS and JCL required. Experience in COBOL and/or ALC is required. Minimum of two years experience in business application required. DB/DC experience preferred. Excellent salary and fringe benefits package. Send inquiries including resume and salary expectation in confidence to: Ms. Terri C. Stockermann.

VIRGINIA NATIONAL BANK

PERSONNEL DEPT.,
One Commercial Pl
Norfolk, VA 23501

Equal Opportunity Employer

Grow With A Fast Growing And Extremely Innovative Leasing Company

O.P.M. Leasing Services, Inc. is expanding its operations throughout the United States, Canada and Europe and is looking for dynamic marketing representatives with experience in system/370 leverage leasing combined with knowledge in the remarketing of data processing equipment. Minimum two years experience.

Excellent salary top benefits provided. For personnel interview write:

O.P.M.

Mr. Michael C. Iraconda, National Sales Director
O.P.M. Leasing Services, Inc.
9601 Wilshire Blvd., Beverly Hills, CA 90210
Tel: (213) 278-4117

THE CUSTOM LEASING PEOPLE

STATE COUNCIL OF HIGHER EDUCATION FOR VIRGINIA COORDINATOR OF INFORMATION SYSTEMS

Senior staff level position for data collection and analysis with coordinating council for state system of higher education. Data collection/information system uses NCHEMS/IEP and other higher education software packages. Position requires knowledge of and ability to use modern programming and operating systems. Strong computer and information systems experience mandatory. Institutional or educational research experience desired. Duties include technical guidance and consultation on data analysis and information systems, both to staff and institutions, along with internal supervision of analysts and programmers. Advanced degree or experience in related field required. Salary \$20,500.

Interested persons should contact Ralph M. Byers, Assistant to the Director, State Council of Higher Education for Virginia by February 6.

700 Fidelity Building
9th and Main Streets
Richmond, Virginia 23219

The State Council of Higher Education is an Affirmative Action/Equal Opportunity Employer.

SYSTEMS PROGRAMMERS

-Call Now-

Marathon Oil Company has opportunities for Systems Programmers who have experience on large scale IBM 370 Systems.

We are seeking candidates:

- Who have experience in HASP, OS/MVT, VS2R1.7 (SVS), VS2R2, or any combination.
- Who have experience with the implementation and/or support of a large data base/data communication system (i.e., INTERCOMM, CICS, TOTAL).
- Who are seeking high visibility in a performance-oriented environment.

Interested? Pick up the phone NOW and call:

John J. Schwepe, Manager, Operations Software Department. Please call collect 419/422-2121, Ext. 2951. It will take just a few minutes of your time. (We will accept calls weekdays from 8:00 a.m. to 4:00 p.m. EST.)

These positions are located in Marathon's General Offices in Findlay, Ohio, and offer a salary commensurate with education and experience and a complete benefits package. Principals only, no agencies.



**Marathon
Oil Company**

An Equal Opportunity Employer

Senior Systems Programmer

Job Responsibilities: Develop interface programs to provide linkages between varied hardware configurations and software programs and establish communication linkages and networks for telephone and satellite transmission of data. Excellent fringe benefits, salary commensurate with qualifications. Call: (713) 668-1051, Region IV Education Service Center, Equal Opportunity Employer M/F.

PROGRAMMER ANALYST RSTS/E

An excellent opportunity to join a young and progressive California firm and realize your full potential. Commercial application experience required. Salary commensurate with ability.

DENTOMATICS
OF AMERICA
2835 N. "G" St.
Merced, CA 95340
(209) 383-4222

COMPUTER CAREERS IN SUNBELT

APPLICATION/SYSTEMS,
PROGRAMMERS/
PROC. ANALYST 12-27K
Experience in financial/insurance,
Industrial, scientific, software,
avionics, navigational, tele. comm.,
real time, time sharing, and data
base.

JR. and SR. DESIGN ENGRS.
PROJECT ENGINEERS
FIELD REPS 16-30K
Experience in logic, digital, RF,
MSI, LSI, circuit, and mechanical.
micro, mini, and large scale systems.

Nation-wide positions available
for hardware and software professionals.
Send resume with salary
history in confidence to:

AMEC ASSOCIATES
1525 N. Central Avenue
Phoenix, AZ 85004
(602) 258-6423

DIVISION MANAGER, COMPUTER OPERATIONS San Francisco Bay Area

The Lawrence Livermore Laboratory, an applied science R&D laboratory located in the San Francisco Bay Area, has an immediate need for a Division Manager for the Computer Operations Division of the Computation Department.

The successful candidate will participate as a member of the Department Management Team in planning and establishing the Department's policies for personnel hardware, software, services, space and budget. As the line Manager of the Operations Division, this includes daily work assignments, employee career development, and continual study of ways to improve the working conditions for the Division employees. You will also be responsible for the operation and maintenance of the LCC Computer Network (OCTOPUS), and for the time accounting for its usage. In addition, you will coordinate the work of the Operations Division with that of the System and Applications Programming Divisions and the user community.

The qualified individual will have a BS/MS degree in Computer Science or a physical science and demonstrated ability to manage a large organization, as well as knowledge of large scale scientific computer center operations and the ability to interact effectively with all levels of personnel. Knowledge of the LCC computer system and LLL application is highly desirable. Salary is commensurate with background and experience.

Qualified and interested candidates are invited to submit resumes, in complete confidence, to James McCullom, Employment Representative, LAWRENCE LIVERMORE LABORATORY, P.O. Box 808, Dept. JCW-018, Livermore, CA 94550. U.S. Citizenship Required.



**LAWRENCE
LIVERMORE
LABORATORY**

An equal opportunity
employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Traveling Programmers

MEXICO ★ BRAZIL ★ JAPAN ★ HONG KONG

Our client, a local computer manufacturer, is currently looking for 2 programmer analysts to travel up to 20% to these Latin American and Asian countries. 2 - 3 years of BASIC end/or COBOL working in an MIS environment are the keys to these positions. The applications include planning, construction and implementation of field service related systems. 14 - 20K

LOGISTICS MANAGER

20 - 30% Latin American, Asian and African travel. Total Logistics Systems for service reps and suppliers to monitor inventory levels. Material expenses, operational strategies and inventory control are assets. Strong international trafficking desirable and knowledge of custom licensing helpful. 20 - 30K

Please call or forward your resume to:

digital arts group

Engineering & Software Personnel Consultants
Nine Bedford St., Burlington, MA 01803
(617) 273-2780

Our staff will also be available for consultation Monday & Wednesday evenings until 8 PM.

Positions Available Nationwide

Call Toll Free

800-426-0342

Assured Confidentiality
and Employer Retained
Manager-Data Base Design

PROG/ANAL 18-22K

370 OS/IMS experience.

SYS PROGRMS 20-25K

IBM OOS/VS, OS/MVS & Honeywell O/S.

APPL. PROGS 16-20K

Need several with Cobol, Bal & Fortran experience.

SYS ANALYSTS 17-23K

2-5 years experience in mfg., ins. or finan. areas.

T.P. PROGS 18-23K

Several openings for CICS/VS specialists.

PARKER PAGE ASSOC.

P.O. Box, 12308

Seattle, WA 98111

Offices in Wash. O.C., Chicago, Atlanta, Portland, Or.

FIELD SERVICE ENGINEERS

If you are familiar with mini-computer systems, challenged by component level repair, and have the desire to grow professionally, we want to talk with you. Are you seeking above average salary, expanding responsibilities, personal recognition and the opportunity to join a highly motivated, professional Field Engineering organization? We have openings in Boston, Dayton, Detroit, and California. We can offer national or local travel. SRL is a highly diversified technological company established in 1955, expanding at 17% per year, on target for 100 million in business by 1986. Send a resume today or call me to schedule an interview; A.J. Davis, Technical Recruiter, SYSTEMS RESEARCH LABORATORIES, INC., 2800 Indian Ripple Road, Dayton, Ohio 45440. (513) 426-6000. Equal Opportunity Employer M/F/H.

STAFF ASSISTANT

SENIOR SYSTEMS ANALYST/PROGRAMMER, University of Massachusetts/Amherst. Position available. Bachelor's degree or equivalent professional experience. Several years experience with COBOL and IBM 360/370 JCL. Previous experience with and utilization of a University Administrative Computing System. Knowledge of and/or experience with a Data Base Management System. Salary commensurate with qualifications. Resume by February 17, 1978, to OATA PROCESSING CENTER, 150 Whitmore Administration Building, UMass, Amherst, MA 01003. The University is an Affirmative Action/Equal Opportunity Employer.

San Diego State Univ. ASSISTANT PROFESSOR INFORMATION SYSTEMS. Tenure-track position and lecture-ship available fall 1978. Candidates should be experienced business data processing instructors at both graduate and undergraduate levels in FORTRAN, COBOL, BASIC, systems analysis and data base concepts. The Ph.D. degree or ABO in information systems or a related area is essential. Salary \$15,624-\$17,136 for 10 mos. Please send resume before Feb. 28, 1978 to William E. Spaulding, School of Business, San Diego State University, San Diego, CA 92182. Equal Opportunity/Affirmative Action/Title IX Employer.

Faculty Openings-

-Information Systems

Information Systems Department - presently 2 faculty openings for 1978. Assistant to Full Professor. Salary dependent upon qualifications. Qualifications include a doctorate or a willingness to pursue same, sincere interest in teaching, 3-5 years experience in either systems analysis, systems design and information systems and/or data base management and data communication programming. Closing date for application is March 31, 1978. Equal Opportunity Employer. Send resume to: Dr. Reed M. Powell, Dean, School of Business Administration, California State Polytechnic University, Pomona; 3801 West Temple Avenue, Pomona, CA 91768

PROGRAMMER OPERATOR

Challenging positions available in sunny Albuquerque with rapidly growing electric utility. Position requires background in electric utility operation and energy management. Primary duties will include software development, implementation and operation of real-time power system computers. Experience in FORTRAN and other languages also required. We offer a complete benefit and retirement program as well as the informal life style of the Southwest. If interested, please contact: Plains Electric Generation & Transmission, Inc., 2401 Aztec Rd., NE, Albuquerque, NM 87107; EOE.

Data Processing Professionals

Here's how we can help the job you're looking for find you.

If you're looking to explore career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS • SOFTWARE SPECIALISTS and SALES REPRESENTATIVES for companies nationwide, at no cost to the applicant.

Here's how our service works. After we receive your resume, we (1) can make it instantaneously available, via computer, to our network of CYBERSEARCH® placement offices in major cities across the country. (2) Trained placement consultants at each office can then refer your resume to companies seeking EDP professionals with your qualifications. So instead of one office and one consultant, you can have all the offices of CYBERSEARCH searching the data processing job market for you. To protect your identity, your name and present employer's name are not included in the computer file.

When interest is expressed, your personal CYBERSEARCH consultant will contact you and arrange an interview. This service is available without cost to you now, or upon hire. All fees are paid by the employer. To put your resume into circulation fast, call or write the EDP Dept. at the CYBERSEARCH office nearest you.

CONTROL DATA CYBERSEARCH INC.

a subsidiary of CONTROL DATA CORPORATION

CHICAGO, IL

214 North Michigan

60601

312-454-8490

DALLAS, TX

8585 Stemmons Freeway

75247

214-688-5810

HOUSTON, TX

2000 West Loop South

77027

713-965-5666

IRVINE, CA

17744 Sky Park Boulevard

92714

714-754-7701

LOS ANGELES, CA

8616 La Tijera Boulevard

90045

213-642-2462

MINNEAPOLIS, MN

6800 France Ave. South

55435

612-830-6650

PHILADELPHIA, PA

Two Balacynwyd Plaza

19004

215-667-2400

SAN JOSE, CA

2025 Gateway Place

95110

408-866-3186

INFORMATION SYSTEMS CONSULTING

Booz, Allen & Hamilton, one of the largest and most prominent worldwide management consulting, technology and marketing research firms, seeks several highly skilled professionals to join our Chicago consulting practice. For those qualified, our consulting practice offers a unique opportunity to assist the top management of our client companies in dealing with the business and technical issues in their information systems plans and developments. The successful candidate will have:

- A BS degree; an MBA/MS desirable;
- Industry experience in manufacturing, banking or insurance;
- A minimum of 3 years of diversified experience in computer planning, implementation, and evaluation, including:
 - Project planning, financial analysis, requirements definition, design and development of data bases, performance evaluation;
 - Familiarity with large scale hardware/software offerings of major vendors;
 - In depth applications experience in financial menu-lecturing, or general business operations.
- An ability to apply your technical skills in a top level business environment.

We offer an exceptional opportunity to utilize your academic and business experience, to broaden your functional skills, and to increase your exposure to a number of industries.

To confidentially explore this opportunity, send a resume or letter describing employment and salary history to:



BOOZ ALLEN & HAMILTON

Gil Stenholm, Booz, Allen & Hamilton, Dept. ISS-6, 135 S. LaSalle, Chicago, Illinois, 60603. We are an equal opportunity employer, M/F

ANALYST PROGRAMMERS

M.I.S. International, an internationally known computer systems integration and management consulting organization, requires specialized professionals for top assignments in southeastern Michigan, Indiana and Ohio areas. MIS is developing advanced systems in:

- Financial Systems, Process Control, Communications, IMS, IOS, & OMS.

Knowledge of the following computers is desirable:

- MICROCOMPUTERS: Motorola 6800
- MINICOMPUTERS: POP-11, SPC-16
- LARGE COMPUTERS: 66700/4700, IBM 370, H6000, U1100

Top salaries, fully paid fringes include life, health and dental insurances, moving allowance and educational benefits. To arrange an interview, call or send your resume to Mr. Gene Bryant.



M.I.S. INTERNATIONAL, INC.

31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010

SR. PROGRAMMER/ANALYST

Eugene, Oregon heavy equipment mfg. seeks degreed person with minimum two (2) years experience with manufacturing information system and project leader level.

Familiarity with RSTS/E, Basic Plus and Basic Plus II, PCP 11/45 hardware, total (DBMS), end/or MRP is strongly desired.

Excellent fringe benefit package, salary negotiable. Forward resume to:

P.O. Box 607
Eugene, OR 97440
An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMERS PROGRAMMER/ANALYSTS SYSTEMS ANALYSTS

A State-Of-The-Art
Technological Opportunity

Santee Cooper, an aggressive, growth oriented electric utility located in the heart of the beautiful south, has several immediate and challenging opportunities for computer professionals. These opportunities have been created by our long-term commitment to a total system redesign and provide challenging and professional growth opportunities.

Our environment is IBM 370 under OS-VSI, IMS-VS, DB-BC, ANSI COBOL and Fortran IV. Microwave TP Network.

We offer excellent income commensurate with your experience, a generous benefits package and excellent working conditions in an employee-oriented organization. Santee Cooper is located in a year-round recreational area near historic Charleston, S.C. **FOR IMMEDIATE AND CONFIDENTIAL ATTENTION, PLEASE SEND YOUR RESUME AND SALARY REQUIREMENTS TO:**



223 N. Live Oak Drive
Moncks Corner, SC 29461
An Equal Opportunity Employer M/F

SYSTEMS PROGRAMMER

Expansion has created a new position of Systems Programmer at our manufacturing/distribution facility in Sanford, N.C. Responsibilities include operating system and software evaluation, installation, testing and maintenance; tuning and optimizing operation environment; serve as Data Base Administrator for any installed data base management system; provide technical support for systems, programming and operations staff; interface with New York CIS Technical Services on software/hardware; and, develop in-house software in support of operations and program development.

Incumbent must be a college graduate with a major in an appropriate field and three years of programming experience in an IBM 370 DOS/VS environment, or equivalent combination of education and experience. The incumbent should have additional qualifications of generation and maintenance support for on-line (CICS/TASKMASTER) systems, spoolers (POWER-VS/ASAP), software such as DFAST, EPAT and LIBRARIAN.

Coty is located in an ideal setting for family living and year-round recreation. As a Division of a Fortune 200 Corporation, we offer an excellent salary and benefit program plus the opportunity for professional growth within Coty and the Pfizer organization.

Please send resume, including salary information in complete confidence, to

John R. McDonald, Personnel Manager
COTY DIV. PFIZER, INC.
P.O. Box 1026, Sanford, N.C. 27330
An Equal Opportunity Employer M/F

Programmer/Analyst Come Grow With Us!

We are seeking new individuals with a professional attitude who have the experience and the ability to grow in the consulting environment.

This outstanding professional opportunity offers:

- Stimulating work environment
- A policy of internal promotions
- Professional and technical education
- Above average salaries
- A fully paid benefits plan

Currently we have openings for individuals who have a thorough knowledge of either of the following:

- Oil and gas applications background
- Honeywell large systems, GCOS, GMAP
- IBM Systems/7, MFP7 Macros/TPMF Macros
- COBOL, IMS, TSO, SPF, OS/VS/MVS.

Please call, or send your resume to:

CIBER, INC.

Consultants In Business
Engineering/Research

30400 Telegraph Road, Suite 386
Bingham Farms, Michigan 48010
(313) 642-2900
(713) 495-8053

We Are an Equal Opportunity Employer M/F

REAL-TIME PROGRAMMERS

NCR's Terminal Systems Division in Millsboro, Delaware is a high volume manufacturing facility concerned with the design and production of POS terminals. We are currently experiencing substantial increases in Engineering activity and as a result have immediate needs for programmers interested in growth opportunities.

Desired Experience

-Systems

- I/O Drivers
- Diagnostics
- Operating Systems

-Applications

- Vocationally oriented to the Retail Market
- Peripheral development to include scanners, communications, data collection, etc.

Basic Qualifications

- 1-3 years experience in Assembly language with mini or microcomputers 8080 experience a plus
- BS in CS, EE or Math

In addition to excellent career opportunities with NCR, our Millsboro location is right in the heart of the Delmarva Peninsula, better known as the "land of Pleasant Living." We're just minutes from marine recreational areas, wildlife preserves and the nation's finest beaches.

Please send resume with salary requirements:

Ron Tull, Dept C-123
Terminal Systems Division
NCR Corporation
P.O. Box 607
Millsboro, DE 19966

NCR

An Equal Opportunity Employer



M.I.S. OPPORTUNITIES

Our clients urgently need computer professionals for the following positions that are mostly unadvertised and exclusively listed with our firm: Chicago, Cleveland, Philadelphia and other locations.

SYSTEMS MANAGERS \$28-\$37K

Degreed individuals with technical background and some management experience in mfg. industry.

SR. SYSTEMS ANALYSTS \$24K-\$32K

Experience in finance and/or mfg. applications. Must have successfully handled a major project. Good communications skills and technical knowledge.

DATA BASE AOM. \$24K-\$32K

Must know IMS DB/OC or OMS II. Experienced in design and adm. of data base management systems.

PROGRAMMER ANALYSTS \$16K-\$25K

OS or OOS/COBOL or BAL - join our team. Will train in CICS and data base.

SOFTWARE PROGRAMMERS \$19K-\$28K

OS or OOS - must have signen and/or utilities experience. Communications software a "plus". Opportunity for management.

Call or write in confidence. Our specialists speak your language. All fees paid. No contracts. Licensed pvt. empl. agency. (312) 298-1148.

**PETER A. KECHIK
& ASSOCIATES, INC.**
1420 Renaissance Dr.
Park Ridge, IL 60068

PROGRAMMER ANALYST

Major electric utility company in the State of Vermont needs an individual with a strong working knowledge of Cobol. Experience in CICS and Data Base is desirable. Will be working with an IBM 370-138 OOS/VS System. Excellent benefits. Send resume to:

Kathy Knight
Empl. & Comp. Adm.
Central Vermont
Public Service Corp.
77 Grove St.
Rutland, VT 05701

DATA PROCESSING SYSTEMS ANALYSTS/ PROGRAMMERS Midwest Area

We are seeking degreed people with COBOL programming on IBM 370/OS; Data Base techniques utilizing IMS preferred; on-line programming disciplines with manufacturing or accounting background desirable. We are a \$350 million company and one of the leaders in the automobile aftermarket field - a major division of a top Fortune 50 Corporation.

We offer an excellent salary, fringe benefits plus relocation expenses.

Send resume including salary history in confidence to:

CW Box 1399
797 Washington Street
Newton, MA 02160

An Equal Opportunity Employer M/F

Managers of

Business Systems Development

The Information Processing Services Department of MIT is interested in hiring a person to direct the activities of systems analysts involved in the development of new information systems for the Institute. Qualified candidates must have in depth knowledge of university information systems and strong managerial experience. In addition they should be familiar with large scale systems software, operating systems, telecommunications and data base management applications. Please submit resume to: MIT Personnel Office, 400 Main St., Cambridge, MA 02139, Attn: Job No. A77-60. An equal opportunity/affirmative action employer.

Department of Information Systems Georgia State University

Faculty position available Fall, 1978. Candidates should be interested in teaching and research in the area of organizational applications of computers including management information systems, systems analysis and design, data processing organization and management, or data-base design. Candidates must possess the Ph.D. degree or have completed all requirements for that degree except the dissertation. Rank and salary are open and competitive. Send vita and names of three references to: William W. Cotterman, Chairman, Department of Information Systems, Georgia State University, University Plaza, Atlanta, GA 30303. Georgia State University is an equal educational and employment institution.

position announcements

position announcements

position announcements

position announcements

position announcements



INFORMATION SYSTEMS PROFESSIONALS

Bell Helicopter Textron, the world's leading helicopter manufacturer, is embarking on a long range program to develop and upgrade major information systems in the manufacturing/material areas. We are offering challenging opportunities in the following positions:

SYSTEMS ANALYSTS

Responsible for design, development, implementation and maintenance of manufacturing oriented data base systems. Applications include Bill of Material/Requirements Planning, Master Scheduling, and Shop Floor Control.

COMPUTER PROGRAMMERS

Responsible for writing, testing and implementing COBOL programs as part of a development team comprised of programmers, analysts, and data base administrators. Includes both on-line and batch applications.

HARDWARE SPECIALISTS

Responsibilities include hardware maintenance, problem resolution, maintenance scheduling, communication network support and performance analysis.

The environment that you will be working in includes IBM 370/168, MVS, IMS, MARK IV, UCC-10, TSO, JES2, PANVALET and TMS. Our sunbelt location in the Dallas/Ft. Worth metroplex offers ideal year-round living with the advantages of a major metropolitan area. We offer competitive salaries and excellent benefits.

For immediate consideration, forward your resume (include salary progress) to:

**EMPLOYMENT MANAGER
BELL HELICOPTER
TEXTRON
P.O. BOX 482
FT. WORTH, TEXAS 76101**

Bell Helicopter

An Equal Opportunity Employer

TEXTRON

PROGRAMMER/ ANALYSTS 370/168 OS/VS

Leading publisher of chemical information services needs experienced assembler language Programmer/Analysts. IBM 370 and/or PDP-11 experience is desirable.

We are a large installation operating chemical information and associated business information systems in both batch on-line modes. State of the art environment includes:

- *ON-LINE INTERACTIVE PROGRAMMING
- *STRUCTURED PROGRAMMING
- *DISTRIBUTED PROCESSING
- *DATA BASE MANAGEMENT SYSTEMS

We need successful people with proven skills. A college degree or equivalent experience is required. We offer competitive salary, a professional environment, good growth potential and an attractive benefit package which includes paid dental insurance, continuing education program, flexible working hours, and liberal vacations. If you qualify please write to:

CHEMICAL ABSTRACTS SERVICE

P.O. Box 3012

Columbus, Ohio 43210

An Affirmative Action Employer M/F

PROGRAMMERS

*We're Serious About Improving
The Quality Of Your Career
And Your Lifestyle!*

The Data Processing Department of Hennepin County (which includes Minneapolis and surrounding suburbs) is one of the leaders in the Data Processing Applications industry for both hardware and software.

Our continued growth and achievements has created a dynamic and challenging opportunity for the individual who is seeking unparalleled growth and development in a highly professional and demanding environment.

This position requires a minimum of 1 year COBOL programming experience and offers excellent opportunities in a large scale IBM shop (370/168, MVS, IMS). In addition we provide a liberal salary (to 17K) commensurate with your experience, a comprehensive benefits package and a unique lifestyle in the Minneapolis-St. Paul area that offers the ideal blend of year-round recreational, educational and cultural activities.

If you're serious about improving your future, talk to us at Hennepin County.

WRITE IN CONFIDENCE TO:

Hennepin County

David R. Sier

A-3 Government Center
Minneapolis, Minnesota 55487

An Equal Opportunity Employer M/F

CONTRACTS

The Burroughs Corporation, a leader in the Data Processing Industry, is seeking two career-oriented individuals for the international contracts activity.

The ideal candidates will be well versed in international business policies and contracting practices and will have the ability to interact effectively with all levels of management. The ability to communicate fluently in either French, German or Japanese is a necessity. An MBA or an MBA/JD with contract and negotiation experience, together with some background in the data processing industry is highly desirable.

We offer excellent personal and professional growth opportunities along with a competitive salary and fringe benefit package.

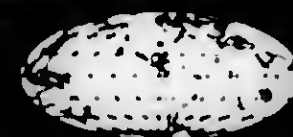
For prompt and confidential consideration, please direct your resume including salary history to:

B.W. Keyes

BURROUGHS CORPORATION

One Burroughs Place
Detroit, Michigan 48232

An Equal Opportunity Employer M/F



Wherever There's
Business There's



Burroughs

SYSTEMS ANALYST

Progressive MIS Department of expanding national meat packer/processor seeks individual to join its corporate systems and programming staff in Southfield, Michigan.

Qualified applicants will have a minimum of 3 years experience as a Systems Analyst in a manufacturing environment. Experience in NCP, VTAM, or V/M is a plus.

We offer the opportunity for advancement in addition to an attractive salary and benefits package. Send resume in complete confidence to: Corporate Personnel Manager.

HYGRADE'S

HYGRADE FOOD PRODUCTS
26300 Northwestern
Southfield, Michigan 48076

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER PROFESSIONALS



IF YOUR CAREER DOESN'T OFFER ENOUGH FUTURE,

... General Refractories provides both growth and excellent compensation in an interesting working environment. Please investigate these positions, and if you qualify, contact us immediately for complete details.

SENIOR SYSTEMS ANALYSTS

This is a key position for the experienced Project Leader possessing systems analysis and design experience. A knowledge of programming is essential, as well as user training, forms design and procedures writing experience.

In addition, a second professional opportunity exists requiring the above qualifications with supplemental experience in data base design, preferably using TOTAL or IMS. Manufacturing Systems Design experience is necessary. You will be ideally qualified for this position if you have experience with shop scheduling systems, bill of materials processing, MRP, and Standard Cost Systems.

APPLICATIONS PROGRAMMER/ANALYST

The select candidate will possess 3 years experience as a Programmer utilizing COBOL and JCL and a college degree or the equivalent of 2-4 years experience as a Programmer/Analyst. You will be responsible for developing computer programs and implementing information systems while working closely with systems specialists or independently. This will involve the development of detailed project plans including estimates of the design, programming, procedure writing, and documentation requirements, the preparation of program specifications, and the coding, testing, and debugging of computer programs. You will develop instruction manuals, instruct systems users and train less experienced data processing personnel.

APPLICATIONS PROGRAMMER

Drawing on your 3 years experience as a programmer using COBOL and JCL, you will be responsible for converting specifications into working programs and implementing systems. In addition to your programming duties, you will work with the systems analysts to plant projects and develop estimates of programming requirements and train less experienced personnel.

For immediate consideration, please send your resume including work history and salary requirements, in confidence to: Director, Employee Relations.

GENERAL REFRATORIES COMPANY

600 Grant Street/Room 3000
Pittsburgh, PA 15219

An equal opportunity employer m/f

MARKETING/MANAGEMENT OPPORTUNITY

COMPUTER LEASING

MIDWEST NORTHEAST SOUTHEAST

We are a dynamic young company with an outstanding reputation in the data processing community. Continual rapid growth necessitates the opening of several new branch locations.

Requirements call for a strong track record selling data processing equipment or services to top management levels. Candidates should have a good working knowledge of intermediate and large scale IBM systems. A college degree is preferred. Prior leasing experience is desirable, but not necessary.

This is not just another sales job. It provides outstanding earnings potential, and an excellent career path.

CALL RAY HOMA
(800) 631-1244 or (404) 449-4400

COMPUTER EXCHANGE/ NORTH AMERICA CORPORATION

302 Technology Park/Atlanta

Norcross, Georgia 30092

SOFTWARE DEVELOPMENT

Tele/Resources, a vigorous leader in the interconnect telephone and electronics communications industry has a challenging opportunity for a software development specialist. You will play a key role in the design and development of a real time operating system as a member of a results oriented Hardware/Software development team. B.S. degree in computer science or related field and 2 plus years of assembly and high level languages. Experience in operating systems, familiarity with modern operating system theory, data entry and management systems desired.

GENEROUS COMPANY BENEFITS PACKAGE

For additional information and consideration reply in strict confidence including salary history to Ms. Lynne Tryon, Personnel Administrative Assistant (518) 877-8571.



TELE/RESOURCES INC.

Better Business Through Better Communications

Northway 10-Executive Park Ushers Road/Buffton Lake, N.Y. 12019

An Equal Opportunity Employer

PROGRAMMERS

Los Angeles County's Data Processing Department has career opportunities for programmers experienced in major EDP applications. Experience in the development and maintenance of financial, election, assessment, welfare, justice, health care and engineering applications in an IBM 370/TSO/RJE/IMS, Univac 1100/TIP/IMS, COBOL or FORTRAN environment is particularly desirable.

PROGRAMMER ANALYST I

\$1415/a month to start

These positions require: TWO YEARS EXPERIENCE IN COMPUTER PROGRAMMING UTILIZING COBOL or Basic Assembler language within the last 3 years, for medium-to-large scale third generation computers. This experience should have been in the use of structured design and programming methods such as HIPO, top down development, structured programming, walk through, and program design languages.

Those professional assignments offer career stability and excellent employee benefits. Please reply to:



Los Angeles County
Data Processing Department
Personnel Office (Room P04)
9150 E. Imperial Highway
Downey, CA 90242
(213) 923-7721 or 771-5421 Ext. 2936
An equal opportunity employer M/F

COMPENSATION TO \$50,000

WANTED: INDUSTRY LEADERS IN ADVANCED COMPUTER SYSTEMS SOFTWARE DEVELOPMENT Southeastern U.S.

Our Client, a well established and rapidly growing manufacturer of Computer Systems has engaged Davies Associates to assist them in identifying a few "Industry Leaders" for challenging assignments in Advanced Computer Software Systems and Software Project Management. They are seeking innovative professionals who can personally contribute to the conceptual design and development of future Real-time, Multi-Programmable Computer Systems. Areas of interest include: Operating Systems, Data Base Management, Compilers, Language Development, Communications Hardware and Software Integration, Peripherals Development, Firmware and Virtual Computer Systems.

These positions offer exceptional career development opportunities in a stimulating professional environment. Liberal relocation and full company benefits package is provided. For additional information:

CALL Chuck White, COLLECT
WEEKDAYS: 10a.m. to 6p.m.
(301)-657-3510

If a call is not convenient, we invite you to forward, in confidence, a brief letter or resume outlining your qualification and career interests to:

DAVIES ASSOCIATES, INC.

Personnel Consultants

7101 Wisconsin Ave., Bethesda, Maryland 20014

EOE M/F/H

Agency

UNIVERSITY OF VERMONT ANALYST/PROGRAMMER I

The Office of Management Information and Computing is seeking an Analyst/Programmer with two to four years of college and coursework in math or business related fields. Applicants must have three to six years of experience in systems analysis and programming, two of which must be in systems analysis; COBOL and IBM/DOS required. Applicants with experience in higher education applications, on-line systems or OBMS preferred. We offer an excellent benefits package. Salary commensurate with qualifications. Send resume and references by February 6 to University of Vermont, Personnel Office, Box 57D, Waterman Building, Burlington, Vermont 05401. An Affirmative Action Employer.

Executive Director of Computing/Data Processing

The University of Wisconsin-Stevens Point is seeking an Executive Director of Computing/Data Processing Services. Reports to the Assistant Chancellor for University Services and is responsible for instructional computing, research computing, administrative data processing, administrative systems, and public service computing functions. Salary: \$25,000. Qualifications: Ph.D. preferred, Masters required, and successful managerial experience in computing/data processing or systems.

Apply by February 1, 1978 to Dr. David Coker, Assistant Chancellor for University Services, University of Wisconsin-Stevens Point, Stevens Point, Wis. 54481. Telephone: (715) 346-2641. Equal opportunity, affirmative action employer.

RAYTHEON

Santa Barbara, California

Raytheon Electromagnetic Systems Division, located in the beautiful Santa Barbara California area, has immediate openings in the following areas:

E.S.M. SYSTEMS ENGINEER

Senior level engineer in the receiver, microwave, digital and software disciplines. Responsibilities include all aspects of ESM Systems Engineering including: analyses, syntheses, design monitoring & review & systems test planning, integration and validation of test results. Approximate 7 years of related experience is preferred.

SOFTWARE/SYSTEMS

SOFTWARE - Define NTIS/EW interface requirements and design and develop associated software. Design and develop diagnostic software for a large scale military EW system. Requires BSEE or Computer Science degree with experience in real time development and FORTRAN programming.

SYSTEM ENGINEERS - To perform subsystem design and analysis of computer controlled ESM/ECM system. Will be responsible for development of system error budgets and analysis of system performance. Requires coordination with design groups.

Please send resume with salary history to:
Employment Office Dept. CW

RAYTHEON

Electromagnetic Systems Division

6380 Hollister Ave.

Goleta, CA 93017

Equal Opportunity Employer M/F
U.S. Citizenship Required

position announcements

position announcements

position announcements

position announcements

position announcements

TELECOMMUNICATION SPECIALISTS

Data Communications

We are a rapidly growing service bureau located in beautiful Valley Forge, Pa. Enlargement of our Data Communications Department has created the need for two technicians to troubleshoot and diagnose problems in our international network. Must have extensive user equipment familiarity and be able to interface with users and management.

Experience with TDM, FDM and high speed modems is a must. Some travel will be required. We offer an attractive starting salary, a superb benefits package and exceptional opportunity for career growth in a highly progressive atmosphere.

Send resume, with salary history in confidence to:

CW BOX NUMBER 1395
797 Washington St., Newton, MA 02160
Equal Opportunity Employer M/F

OS/VSI SYSTEMS

SOFTWARE PROGRAMMER

Responsibilities will include generation and maintenance of vendor software and development of in-house software in an IBM 370/148 environment. Software programming experience preferred. Experience in some of the following areas would be helpful:

- *OS/VS
- *VM/370
- *Assembly Language
- *CICS
- *COBOL
- *DOS/VS

We offer an excellent benefit program. Growth potential on proven performance. Send resume or call in confidence:

T.L. Boyer, Personnel Director

FARM BUREAU INSURANCE

(515) 225-5667
5400 University
West Des Moines, Iowa 50265
An Equal Opportunity Employer M/F

data processing

PROGRAMMERS

Key Positions with Our Winning Computer Consulting Team in Springfield, IL., Indianapolis and Chicago.

If you're skilled in COBOL, ALC and/or PL-1 and have at least a 2 year success record of accomplishment with large scale IBM systems under IMS... we have the programming and system challenges to match your expertise. These positions require high productivity.

As a member of our professional staff, you'll be rewarded with an excellent salary and benefits. For details call Don Breitfelder collect, from 10AM to 5PM at (312) 786-0220.

INDECON, INC.
300 South Wacker Drive
Chicago, IL 60606
since 1966

An Equal Opportunity Employer M/F

SYSTEMS PROGRAMMERS

DO YOU.....

Have 3-5 years experience? Get tired of multi-year projects? Want a variety of machine experience? Desire compensation equal to performance? Like a small company environment? Have an interest in compiler writing?

Excellent fringe benefits
Send resume or call

RYAN-MCFARLAND CORPORATION

608 Silver Spur Rd.
No. 300
Rolling Hills Est. CA 90274
(213) 541-4828

DATA PROCESSING OPPORTUNITIES

Indiana Positions

Prog Anal-Cobol to \$22K
Prog Anal-CICS to \$22K
Prog Anal-PL1 to \$20K
Prog Anal-Retail to \$20K

For the above positions, as well as others respond to: 6100 N. Keystone, Suite 657, Indianapolis, IN 46220 (317) 257-9281.

SW Pennsylvania locations

Sup Info Sys-Mfg to \$30K
EDP Auditor to \$28K
Sys Prog-370/MVS to \$23K
Prog Anal-370/Cobol to \$22K

For the above positions, as well as others, respond to: #4 Gateway Center, Suite 1705 Pittsburgh, PA 15222 (412) 391-6545

SHILOVE PERSONNEL SYSTEMS

Licensed Employment Agency

SOFTWARE DIRECTOR

Telecommunications
\$35,000-\$40,000

Exeter Associates

Executive Recruiters

James D. Heseltin, V.P.
1111 N. Westshore Blvd.
Suite 602
Tempe, Florida 33607
(813) 877-6072

FLORIDA BANK/DP

Project Leader To \$24K
(Loans, Trust or GL)
On-Line Applications To \$23K
(CICS)
Systems Programmers To \$22K
(CICS/VTAM)
Customer Service To \$18K
Performance Measurement Open
(Hardware/Software)
Documentation Writer To \$16K
Please contact or send resume in strictest confidence to:

M.O. Celada
Corporate Consulting
Mortgage Banking Specialists
Nationwide
2600 Douglas Road,
Suite 604
Coral Gables, FL 33134
(305) 446-2413

PROGRAMMERS

\$14-\$18,000

TEXAS

1-3 years exp. in bank applications. IBM 360/370 sites. Career opportunity. Fee and relocation expenses paid.

\$14-\$17,000

KANSAS

1-3 years exp. in manufacturing apps. using CICS and/or IMS. Develop on-line data entry system with IBM 3270s linked to a 370/158 Fee and relocation paid.

D.P. PEOPLE, INC.
Personnel Agency
100 N. Central Exp.
Richardson, TX 75080
(214) 231-1984

MINICOMPUTER SPECIALIST

If you're the kind of person who can't resist a challenge, here it is. Mini expert (no specific hardware) who can jump in and solve client problems for this software consulting firm. Exp in hardware configuration and systems design. \$33,000, FEE PAID

ROBERT HALE PERSONNEL AGENCIES
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

EDP PROFESSIONALS

• Project Mgrs Low \$30's
Due to unprecedented demands for their service this prestigious New England Service Firm seeks (3) Project Mgrs. Must have heavy on-line, real-time exp. Mini exp very big +.

• Internal Consultant \$20,000
Major NY Bank has position open for high powered technician (OS/VS/COBOL/BAL, on line exp, etc.) to provide application development technical expertise to systems development groups.

• Mgmt. Consultants Low \$30's
Aggressive, rapidly growing office of a major Management Consulting firm seeks (4) career oriented systems analysts. Must have excellent conceptual, problem solving skills & be interested in a fast track opportunity.

• Programmer Analysts \$25,000
Well-known Financial firm is experiencing extensive growth in their systems development dept. Multiple openings exist for 370/OS/VS COBOL & BAL Prog & Prog Analysts.

• Sys. Analysts \$26,000
Connecticut Financial firm has positions open for S/A's to design & supervise the implementation of on-line applications. Excellent location, good growth opportunity & benefits package.

For info on these & other career positions, please call or send letter/resume in confidence to:

the jarriss walker group

534-5th Ave, NYC 10017

(212) 876-2650

COLOR VIDEO SENIOR DESIGN ENGINEERS

Requirements:
EXPERIENCE
DEDICATION

VAS Corp.

2525 Maricopa
Torrance, Ca. 90503

Salary open, send
resume or call

Attn.: R. Zegers de Byl
Phone: (213) 320-8334

REGIONAL SERVICE MANAGER

A leading supplier of computer add-on memories is offering excellent career opportunities with growth potential for Regional Service Managers in both the Greater Chicago and New York Areas.

These positions require individuals with both technical and administrative abilities and a high degree of communication skills. The duties will require interfacing with the customers, sales personnel and field service.

Experience in the large scale computer mainframe memory add-on field service business plus a strong background in customer relations and problem solving in a sales/service oriented environment is mandatory. A college degree or equivalent in a related technical field is required. Qualified applicants should send resume complete with salary history and requirements to:

CW Box 1403
797 Washington St.
Newton, MA 02160

Equal Opportunity Employer M/F

SOFTWARE SYSTEMS ENGINEER

Major division of leading capital goods builder seeks qualified software specialist with EE degree or computer science degree with electrical background.

Position requires experience in machine language or DEC PDP-8 or equivalent mini-computer systems. Will report to manager of systems engineering.

Top salary commensurate with experience, liberal benefits package, and an ideal suburban Philadelphia location. Send resume and salary requirements in confidence to: Industrial Relations Manager, Wiedmann Division, The Warner & Swasey Co., 211 South Gulph Road, King of Prussia, PA 19406.

An Equal Opportunity Employer M/F

FIELD SERVICE ENGINEER DEC SYSTEM 10 EXPERIENCE REQUIRED \$22,000 +++

AKRON, OHIO
Rex Humbard Foundation
2690 State Road
Cuyahoga Falls, OH 44223
(216) 923-0434 x 380
Bill Forsyth, Mgr. D.P.

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER ANALYSTS

A consulting firm has positions available for professional personnel with a minimum of 3 years experience with IBM or Burroughs equipment. Knowledge of COBOL required, other languages helpful.

- Good salaries with paid overtime
- Fully paid benefit package
- Varied assignments
- Excellent training program

Premium salaries for individuals with a minimum of 1 year IMS experience.

Call 522-8680 or Write:
Frank Farren

CHECKPOINT, INCORPORATED

33150 Schoolcraft, Suite 104
Livonia, Michigan 48150

An Equal Opportunity Employer M/F

DIRECTOR OF COMPUTING AFFAIRS

N.Y.C. Based Medical Center

Responsible for User (academic and research) services, Administrative Programming and Production Services. Computing facility is remote 370/168 running modified CMS. Many interactive users of APL. Communications via packet network. Desired qualifications include advanced degree in Engineering, Computer Science or Mathematics and management of programming in a university or medical setting.

Excellent benefits plus immediately vested pension plan.

Please send resume and salary history to
Personnel Dept. Rm. E-024
Cornell University
Medical College
1300 York Avenue
New York, N.Y. 10021
An EOE, M/F

DIRECTOR INFORMATION SERVICES

Major northeast transportation company seeks aggressive, responsible individual to fill newly created position. Individual will be responsible for building DP organization and increasing DP penetration into the management system of the company.

Successful candidate will have:

- Minimum three years Application System Development Experience
- DP Management Experience
- Good Interpersonal and Communications Skills
- Bachelors Degree (MBA Desirable)

This is an excellent opportunity for an individual seeking to move into top management position with a firm committed to the development of a DP organization. Salary range mid to upper twenties depending on experience. Interested candidates should forward resume and salary history with cover letter detailing pertinent job experience to:

CW Box 1396
797 Washington St.
Newton, MA 02160

OMICRON

Consultants to the Computer Industry

IMS PROFESSIONALS San Francisco Bay Area

OMICRON, a professional search and recruitment organization servicing major corporations has excellent opportunities available now for IMS Professionals such as:

IMS/DB CONSULTANT (to \$30,000+)

Manufacturing concern need Sr. IMS Technicians to work in internal IMS/DB support group. Requires large scale IBM/370 and IMS data base design experience & ability to communicate. (Several positions, also exist for Programmer/Analysts with IMS backgrounds.)

SYSTEMS MANAGEMENT CONSULTANTS (to \$28,000)

Several years in systems design & implementation. Will perform evaluation of client installations & software packages & interface with senior management. Approximately 25% travel. Degree highly desirable.

Additionally, our firm currently has several search assignments in SAN DIEGO and the PACIFIC NORTHWEST. Interviewing & relocation expenses are company paid.

For these and other outstanding career opportunities, please call or write, in confidence, to:

OMICRON INC.

One Ecker Street
San Francisco, CA
94105
(415) 546-7200

525 University Avenue
Palo Alto, CA 94301
(415) 328-6150

Exclusively Employer Retained Agency

DATA PROCESSING PROGRAMMER/ANALYST

(2 positions avail.)

Responsibilities include project control, management of Data Base Systems in an on-line environment. Experience in COBOL and CICS/VS required. Previous educational environment systems experience a plus.

(One of the above positions is a limited period appointment (18 months) contingent upon funding from an external agency.) Please submit resume AND SALARY REQUIREMENTS including complete history of education, experience and recommendations — no later than January 31, 1978 to:

Paul Bartolomeo
Director
Department of
Computer Resources
Rhode Island
Junior College
400 East Avenue
Warwick, Rhode Island 02886
AN EQUAL OPPORTUNITY
AFFIRMATIVE ACTION EMPLOYER

SYSTEM ANALYST

Progressive S/3 M 15-D shop is seeking an additional system analyst. Applicants must have a minimum of 4 years analyst/programmer experience including on-line system design, CCP and RPG II. Starting salary \$16,400 to \$17,900. Send resume to Personnel Office Black Hawk County 316 East Fifth St. Waterloo, IA 50703

An Equal Opportunity Employer M/F

PITTSBURGH

As the third ranking city in corp has in the country, Pittsburgh clients of Fox-Morris have immediate needs in the following data processing functions:

Dir Com Appl To \$30,000
BSIE, CAD-CAM, OE, IS
Sr Systems Analysts To \$25,000
BS, MBA, IBM 370 OS/DOS
Programmer Analysts To \$20,000
BS, Cobol, Assembler
Fin and Mfg applications
Fortran Programmer To \$18,000
Non-degree acceptable, engineering applications
Telecommunications Analyst To \$16,000
BSEE, CICS, 370 DOS
Must have min 1 yr of industrial related exp. All interview & employment expenses paid by client cos. To investigate why Pittsburgh is known as "Someplace Special," submit resume in complete confidence to J.D. Beck, Mgr, Data Processing Recruitment.

FOX-MORRIS
PERSONNEL CONSULTANTS
4 Gateway Center
Pittsburgh, PA 15222

• PROGRAMMER ANALYSTS •

\$18-26,000

We exclusively represent a top New Jersey employer and seek "advancement conscious" EDP Professionals.

- 3-6 years ANS COBOL/Assembler 360/370 DOS
- Com'l manufacturing applications
- Analyze, convert & design systems, user contact. Learn CICS.

Client company pays ALL fees.

EXCELLENT BENEFITS.
Explore immediately in complete confidence.
(201) 249-6307

E.T. LYONS
Placement Service
1050 George Street
New Brunswick, New Jersey 08901

Corporate Staff MANAGEMENT INFORMATION SYSTEMS Florida Location

Harris, a Fortune 500 Corporation, has established a new facility in Melbourne, Florida, for corporate MIS operations. This provides an outstanding opportunity for career growth and recognition for creative, proven, results oriented professionals.

We are looking for qualified individuals who will be key participants in integrating the MIS function with the long range plans of the Corporation. Broad knowledge of business operations, hardware, software, communications networks, and operations analysis is required. Candidates must be able to work with all levels of management and have potential for advancement to an executive position in MIS or Operating Management. Background with electronic or related industries is desirable.

DATA COMMUNICATIONS SPECIALIST

Plans, designs, and develops systems and networks for computer communications. Responsible for consulting with internal users as to requirements, selection of equipment and communications services, configuring networks, specifying components, and implementation. Will coordinate installation and selection services to meet immediate needs as well as define data portions of a long-range corporate telecommunications network.

VOICE COMMUNICATIONS SPECIALIST

Requires a person experienced in planning and administering telecommunications for a large, multi-location organization. Will evaluate division and corporate telephone cost and service levels, determine requirements and select equipment and facilities. Will participate in the planning, design and implementation of a corporate voice network.

CUSTOMER SERVICES COORDINATOR

User oriented individual required to assist decentralized divisions in effective use of the Corporate Information Processing Facilities. Specific responsibilities include resolution of customer problems, analyzing job stream requirements, work flow scheduling, and general assistance to customers with design and analysis of data base systems. Position requires at least three years of experience in business systems analysis and programming (COBOL, expertise in O/S JCL, strong communicative skills).

Please send resume with salary history in confidence to: R. W. Underhill, Harris Corporation, P.O. Box 430, Melbourne, Florida 32901.

HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING
An Equal Opportunity Employer—Male and Female

controller-cpa

High energy technician to manage department of 8 for high flying transportation service company. Very high degree of client interface demands superior communication skills as well as strong budgeting exposure.

\$30-40,000

FEE PAID

ROBERT HALE
PERSONNEL AGENCIES
522 Fifth Ave., NYC 10036
(212) 221-8500

WANTED SALESMAN

For DEC, Honeywell-General Electric computer parts, peripherals, and equipment.

Please Contact
Craig Hunter at
(801) 972-8217

position announcements

position announcements

position announcements

position announcements

position announcements

Continued Cold and Snow!

Sunny and Warm California Company is expanding its Systems and Programming Department and is offering an excellent career opportunity for Programmers/Analysts. We are currently operating an IBM 370, CICS and DL/I

A minimum of 2 years experience in programming and design of Computerized Systems with Application experience in order entry, billing Inventory and Distribution. Degree desired. Immediate openings. Please submit resume to:

Hills Bros. Coffee, Inc.

P.O. Box 3149
San Francisco, CA 94119

Equal Opportunity Employer M/F

SYSTEMS SOFTWARE SUPPORT MANAGER

A challenging technical/management opportunity is current available with one of the nation's largest educational computing networks.

Primary responsibilities will include:

- Supervision of a group of Systems Analysts and Programmers engaged in supporting time-sharing operating systems at 19 campuses and a central shared facility.
- Systemwide technical advice and consulting services for the design and evaluation of computer techniques in serving extremely complex data processing problems in a network environment.
- Aid in the evaluation of requests for new or revised data processing equipment and software.
- Participation in the development of state and systemwide data processing standards and procedures.
- Involvement with adaptation of the State of California ATSS/DS communications network to meet varied and changing academic requirements.

Successful candidate will have a BA or BS, preferably in a computer related field, and a detailed knowledge of systems analysis principles and techniques using modern computer hardware and software. Requires 5 years of progressively responsible technical and management experience. Two of the 5 years must include working with the internals of DEC RSTS/E or CDC KRONOS/NOS operating systems or combination of both.

Compensation for this responsible position, located in the Los Angeles Miracle Mile area, ranges from \$23,352 to \$28,188. This position is exempt from Civil Service testing. Resumes should be addressed to:



THE CALIFORNIA STATE UNIVERSITY & COLLEGES

Personnel Services
400 Golden Shore
Long Beach, CA 90802
Equal Opportunity/Title IX Employer

Major New York City based Fortune 100 firm has

DATA PROCESSING OPPORTUNITIES

SR. SYSTEMS PLANNER

Working for MIS Director, will be responsible for providing technical planning and consulting assistance to international operations. Must have programming, systems, and project management background. Requires an experienced, articulate professional who can effectively communicate with all levels of management. Consulting experience preferred, together with proficiency in foreign language desirable. Extensive travel. Salary in mid \$20's.

MINICOMPUTER SR. ANALYST/PROGRAMMER

This position requires FORTRAN experienced technician. Background MUST be in commercial applications. Experience in on-line systems a big plus. Salary in mid to upper teens.

Interested individuals should send detailed resume indicating position desired and current salary in confidence, to:

CW Box 1398
797 Washington Street Newton, MA 02160
An equal opportunity employer M/F

TULSA

Bank of Oklahoma has an opening in its Information Systems Department for an experienced programmer with a strong BAL and ANS COBOL background in an IBM OS environment. Previous experience dealing with a Customer Information database in an on-line environment desirable. Banking application experience a plus. This position will participate on project teams which will develop, implement and maintain banking application systems. If qualified, please send your resume and salary history in confidence to:

Personnel Department
BANK OF OKLAHOMA
P.O. Box 2300
Tulsa, Oklahoma 74192
An Equal Opportunity Employer

ATLANTA INSURANCE

11 PROG ANAL To 25K
5-W/Property & Casualty expr.
3-W/Group Pension expr.
3-W/Group Claims expr.
PROJ. LOR. To 23K
Design expr. in life & health
SYS. PROGRS To 22K
Contact: Nathan Mordlar

Dunhill of ATLANTA, INC.

Suite 815
CITGO Bldg.
3445 Peachtree Rd.
Atlanta, GA 30326
(404) 261-3751

Faculty Position

Business Data Processing (Tentative Position Vacancy-contingent upon budgetary approval) Associate/Full Professor, Full-Time, Tenure Track. Level and Salary based on experience. Appointment effective September 1, 1978. Minimum qualifications: possession of Ph.D. in Management or Information Systems, and 5 years computer-related business experience. Send vitae, by March 1, 1978, to:

Dr. Franklin Strler
Chairperson, Accts/OP/Law
California State University
Oominguez Hills
1000 E. Victoria St.
Oominguez Hills, Calif. 90747

MIAMI-DADE COMMUNITY COLLEGE

Job opening for experienced PROGRAMMER ANALYST, working with advanced student information systems for a large multi-campus institution. Minimum of three years' applicable experience, OS COBOL, required; IBM Assembler a plus. Salary range: \$13,703-\$18,706, plus liberal employee benefits.

Submit resume to:
Personnel Services
Miami-Dade Community College
11011 S.W. 104 Street
Miami, Florida 33176
An Equal Access/Equal Opportunity Community College

FLORIDA ANALYSTS/ PROGRAMMERS

APPLICATIONS \$19K
Accts. COBOL OS
IMS, CICS, NICE
BANKING \$20K
Financial, OOS &
OS COBOL & BAL,
MICR CICS
TIME SHARE \$25K
Honeywell 6000
FORTRAN & COBOL
SYSTEMS \$26K
JESS II-TSO-HASP
IMS-BTAM
QTAM-VTAM
SCIENTIFIC \$22K
POP-11, RSX 11
FORTRAN, SYSTEMS
R&O
DATA BASE to \$35K
Complete design
and implement
For these and other superior positions-all fee paid-please contact or submit resume with present salary.

FRANK LEONARD
PERSONNEL
1211 N. Westshore Blvd.
Suite 100
Tampa, FL 33607
(813) 872-1853

SYSTEM ANALYST

Offering attractive salary to person experienced with on-line system design and RPG II. Send resume to Personnel Office, Black Hawk County Courthouse, 316 E. 5th St., Waterloo, IA 50703.

EDP PROBLEM SOLVERS

Frustrated?
Underemployed?

Ready for a challenging,
Career Position

The demand for seasoned EDP MANAGERS w/admin talent is unprecedented. Our thriving economy has created the following top priority, high visibility positions in the

PHILADELPHIA AREA

DIV EDP MGR

Commercial Electronics mgr.
Mfg sys reqd. Lg scale Bur-
roughs sys. To \$30,000

EDP MGR

Consumer Products mgr. Sml
dept converting to M6240
To \$28,000

MGR SYS/PROGRAMMING

Service Bureau. "Control" ori-
ented administrator reqd.
To \$28,000

PROGRAMNG MGR

Banking bkgd essential. CO-
BOL & BAL proficiency reqd.
To \$22,000

COMP DEPT MGR

Consumer Products mgr. Sml
dept. Mini bkgd w/knig BASIC
essential. To \$18,000

For immediate attention, call or forward resume to:



ROBERT HALF PERSONNEL AGENCIES

2 PENN CENTER
PLAZA
Phila., PA 19102
(215) 568-4580

PROGRAMMER/ANALYSTS

Expansion of our on-line, data base distribution processing means we need to add two Programmer/Analysts to our central staff.

They will need to have at least two years RPG II experience and the proven ability to handle projects, with a minimum of supervision, from design through implementation. A college degree, accounting and distribution application experience, COBOL, and datacom are pluses.

We offer an excellent salary and benefits program, including performance bonus, to the successful candidates. If you are interested, send your resume, including salary requirements to the Personnel Administrator.

BANDAG INCORPORATED

Bandag Center

Muscataine, Iowa 52761

An Equal Opportunity Employer M/F

PROGRAMMER/ ANALYST

Aims Community College seeks an experienced programmer/analyst to assist in the design and implementation of on-line information systems. Position requires experience in design, programming, and system implementation; proficiency in Cobol or Assembler language with bachelor's degree, or two years programming experience with an associate degree, or an equivalent experience. Salary \$11,820-\$15,360 depending on qualifications. Send resume to: Affirmative Action/Personnel Office, Aims Community College, P.O. Box 69, Greeley, CO 80631. Applications must be received by Feb. 10, 1978. An equal opportunity employer.

MOVING?

Please notify *Computerworld* at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

Whether you're buying, selling, swapping, hiring or looking,
Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/ Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy.

Cost: Our rates are \$55.30 per column inch. Minimum size is two column inches and costs \$110.60 per insertion. Extra space is available in half-inch increments and costs \$27.65. Box numbers are \$3.00 extra.

Billing: If you're a first-time advertiser, WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad Size: _____ Issue (Date/s): _____ Section: _____

Signature: _____

Name: _____

Company: _____ Title: _____

Address: _____ Tel: _____

Send this form to:
CLASSIFIED ADVERTISING

COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

BUY - SELL - SWAP

FOR SALE

3271-2 Feb. 1
3272-2 Feb. 1
8 x 3277-2 Feb. 1
2 x 3288-2 Feb. 1
ALL WITH APL FEATURE
3704-A1 Jan. 27
3705-A1 Feb. 15
3705-E1 Apr. 1
3705-B1 Feb. 1
3706-B1 Feb. 1

CONTACT
COMPUTER WHOLESALE CORP.
(504) 581-7741

FOR SALE

G.A. 1830-32K - 2 20MB Century
Disk Driver, Card Reader, 600
CPM - Printer, 600 LPI, Best Of-
fer - Will Not Divide Under
Maint K.

519 Reproducible - 2 Boards and
Pins, Asking \$900.00.

Located Chicago Suburbs.
Contact Michael Hansen
(312) 335-0600

For Sale or Lease

2701-1

with 7698 Bi-Sync
January Availability

Contact:

MBR Computer Corp.
313 E. Normal Lane
Wheeling, IL 60090
(312) 537-0970

MOVING?

Please notify *Computerworld* at
least four weeks in advance. When
writing about your subscription,
please enclose a recent mailing
label. The code line on top may
not mean much to you, but it is
the only way we have of quickly
identifying your records. If you
are receiving duplicate copies,
please send both labels.

797 Washington Street
Newton, Massachusetts 02160

FOR LEASE

3138
February 10, 1978
March 3, 1978
April 21, 1978

3148
February 3, 1978
March 3, 1978
April 14, 1978

FOR SALE

Burroughs B3500 Computer/peripherals



COMPUTER CAPITAL CORP.
1351 Washington Boulevard
Stamford, Connecticut 06902
Tel 203 357 9663

FOR SALE
IBM SYSTEM

3/10-8K

5424 9.MB
9610 (2) 9660 (1)

Call Bernard Turret
(301) 823-3770

FOR SALE BY OWNER

BURROUGHS B-1714
50% OFF

Priced for Immediate Sale.
System Under Full Burroughs
Maintenance

Parant Corporation is Consoli-
dating EOP Operations: Com-
pleta System Includes:

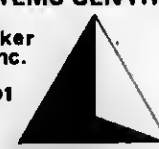
B1714 Central Processor
49 KB Main Memory
A9340 Console Printer
A 9419-2 96 Col. Card Reader
A 9245-6 Drum Line Printer
(300 LPM)

2-A 9480-2 Disk
Cartridge Drives

4 Drawers (10 MB Capacity)
Principals Only Contact:

COMPUTER SYSTEMS CENTRE

Subsidiary of Quaker
Business Assoc., Inc.
234 N. Sixth St.
Reading, PA 19601
(215) 373-5146



FOR SALE OR LEASE

(2) 3330-11

1-4 Years
Available 2/15/78

(2) 1403/2821

600 or 1100 LPM-UCS
Available 2/1-4/1/78

2501-B1/B2

Available 2/1 4/1/78

(3) 3420-3 Wanted

SYSCOMP

2150 Crestview Drive
Excelsior, MN 55331
(612) 474-8873

FOR SALE/LEASE

DEC LSI 11

POP 11V03 SYSTEMS

LA 36 DECwriters

LA 180 * VT 52

In Stock For

IMMEDIATE DELIVERY



UNITRONIX CORP.
1081 U.S. Hwy 22
P.O. Box 6515
Bridgewater, N.J. 08807
(201) 725-2560

For Sale
timesharing
system

GE-265

also
NCR Sorter
and

(2) 1710 Keypunch
Call: Murrin Price
(213) 754-6916

IBM EQUIPMENT
FOR LEASE
IMMEDIATELY
AVAILABLE

High Speed I/O Set
3 Year Lease
\$1,500 per month

High Speed I/O Set
with 2030 F
3 Year Lease
\$1,700 per month

LEASCO CAPITAL
EQUIPMENT CORP.

919 Third Avenue
New York, N.Y. 10022
Contact: Mike Morrell
(212) 750-7527

WANTED

DEALERS
SYSTEM HOUSES
To sell and use our:

- * DISK CARTRIDGES.
- * DISK REPAIRS

VR DATA CORPORATION
777 HENDERSON BLVD.
FOLCROFT, PA. 19032
(215) 583-5101

NEVER USED
IBM SERIES/1

32K Bytes
9 Meg Disk, Diskette
32 DI/DO
40 cps Printer
Lear Siegler CRT

IBM price: \$30,549.00 Our price: \$25,000.00
AVAILABLE IMMEDIATELY.
Call or Write
POWER MANAGEMENT, INC.
677 Ala Moana Blvd.
Suite 812
Honolulu, Hawaii 96813
(808) 521-7915

LEASE

3031-3032

3033

SHORT

AND LONG
TERMSATTRACTIVE
RATES

360/ 30,40,50,65
CPU 138,148,158,168

370/ 125,135,
145,155

BUY

DISK- I/O
TAPES

SELL

National Computer Rental
415 Madison Avenue
New York, New York 10017
Tel. No. (212) 532-1500

Member of Tiger Leasing Group Member of Computer Lessors Assoc.

Lessor Wanted

User has a 3052 APU coming in a
2/78 time frame. Will consider
short term lease (to 2 years) on
the 3052. ITC Lessee or Lessor.
Can guarantee release date if re-
quired.

Interested parties
contact:

Mr. Goode
AT&T-Long Lines
Room 5C160
Bedminster, N.J. 07921
(201) 234-6269

FOR SALE OR LEASE

EQUIPMENT	QTY	AVAILABLE
3803-1 DD	1	2/15/78
3420-5 DD	2	2/15/78
3420-5 SD	4	2/15/78
3411-3 SD	1	3/15/78
3410-3 DD	3	3/15/78
3340-B2 w/RPS	2	6/15/78

Call Roland Moore

Computer Exchange/North American Corp.

302 Technology Park, Norcross, GA 30092 (404) 449-4400

For Sale Or Lease System 3/15 Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.

Also complete inventory tapes — disks.
Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

BUY SELL LEASE

370, 380, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340'sIBM UNIT RECORD
EQUIPMENT026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557,

029-059-129

Call us for all your needs, we buy
rent and sell all types of IBM unit
record equipment. Over 12 years
of serving commercial and govern-
ment requirements. Contact ACS
for proposal.

7126 Mullins
Houston TX 77081
(713) 666-2122
TWX 910-881-1526
ACS
EQUIPMENT CORP. 

RAISED FLOORING
NEEDS

Maintenance & Expansion

RE • Surfacing
• Levelling
• Locating
Tile Anti-Static
Carpeting

ACCESS FLOORING, INC.
175 Fifth Avenue
New York, N.Y. 10010

For estimate call
(212) 677-2200

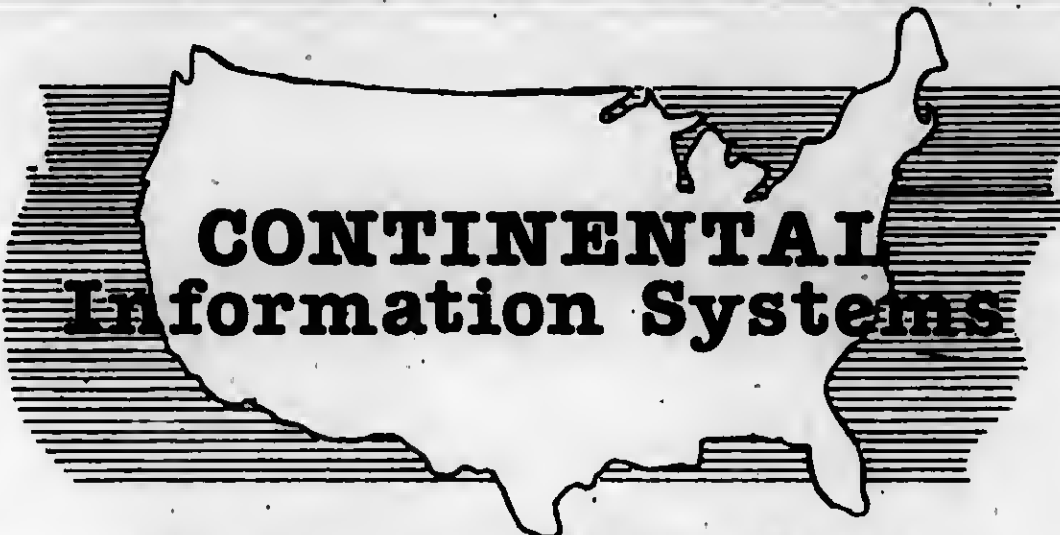
FOR SALE
360/65

2.5 Megabytes EM&M
2860-3, 2870
w/#6990

Avail. March 1978

Contact

Steve Botts
(904) 644-1590



CONTINENTAL Information Systems

BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

WERE YOU A WINNER IN THE IBM LOTTERY?

IF NOT, CIS is having a supplementary drawing for winning alternatives to the
3031, 3032, and 3033. We can deliver the following IBM 370 equipment to meet
your needs:

Jan. 78 155-DAT available
165-DAT available
158-New, ITC qualifying
168-New, ITC qualifying

Feb 78 158
158-New, ITC qualifying
165-DAT available
168-New, ITC qualifying

Mar 78 158
158-New, ITC qualifying
168-New, ITC qualifying

Apr 78 155-DAT available
158-New, ITC qualifying
168-New, ITC qualifying

Several 370 systems available beyond April, 1978.

If you hold a winner in the IBM lottery, we will buy your currently installed IBM
equipment from you.

Call Us!



CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900



INDEPENDENT

**WE BUY-SELL-
INSTALL & REPAIR**
AT REASONABLE PRICES.

**HONEYWELL USED
SERIES 200 EQUIPMENT**
COMPUTER SYSTEMS
PARTS — PERIPHERALS

Now in stock

2040-64K M7-32K M9
120-1250 — TAPE DRIVES
READERS, PRINTERS, PUNCHES
3200-131K Avail. 6/78

CALL NOW

Wilson Grabill (513) 874-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati, Ohio 45246

FOR SALE OR LEASE

3148 J
WITH 2150, 4660,
6111, 8075

3047-1

3286-1

3203-4

AVAILABLE 2/1/78

\$800,000.00

CONTACT

**COMPUTER WHOLESALE
CORPORATION**
504/581/7741

MODEM CABLES
RS232 CABLES
CIN CABLES

75 Pin Extension Cables
Production and Custom Cables
Cables installed on-site
in San Francisco Bay Area
Contact Bob Vasconcellos

WHERE ENDS MEET.

5926 Whitney St.
Oakland, Ca. 94609
(415) 652-7748

FOR SALE

165K II
DATed, up to 4 megabyte
For Sale or Lease

115J
available now with or
without new DAT

145I2
available now with ISC

3420-3, 5&7

available now with
controllers

I/O Sets

all combinations avail.
for Sale or Lease

360/301

Priced to move now

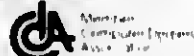
FOR LEASE

145 IO
avail. immediately on
long or short term
lease

125's
We will purchase and
leaseback your 125
system. Save rent
starting today. Call
for a quote.

IBM RENTAL
CREDITS

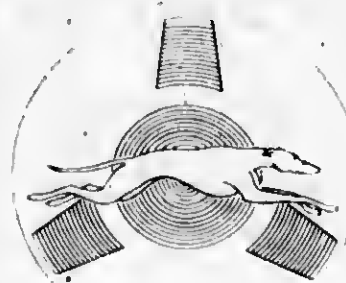
We will pay for your
rental credits on
FTP, ETP and MAC
machines. Call us be-
fore sending your
machines back to
IBM.



IPS Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

WANT TO BUY

370/168, 165, 158,
155's IBM 3420
Tape Drives, IBM
3330 & 3340 Disk
Drives, All 370
Memories and Pe-
ripherals.



GO GREYHOUND

When you plan to
Buy or Sell your
Computer Equipment

For complete information
call the Greyhound Repre-
sentative in your area.

FOR SALE

3145-HO
360/65J

U.S.

Home Office
New York
Chicago
Dallas
San Francisco

INTERNATIONAL

Canada
U.K./Europe
Mexico
Austro-Asia
Europe

NON IBM

Dallas

T.A. Takash
Oick Ventola
Pete Ahern
M.W. "Bill" Tucker
Henry Paulson

602-248-6037
914-949-1515
312-298-3910
214-233-1818
415-283-8980

Don Maunder
Joe Gold
Andres Contreras
John Hellmark
Don Haworth

416-366-1513
022-61-27-54
905-543-6850
214-233-1818
214-233-1818

John Hallmark

214-233-1818

FOR SALE

Control Data 3316-1
Disk Packs

100 Megabyte Capacity
Compatible for Use on
IBM 3330-1 Disk Drives
These 35 Boxed Units Are
Off Lease & Available for
Immediate Purchase
(301) 321-1100

ASK FOR
JAMES CONDAX

call... **the Matchmakers** **1-800-654-9179** **TOLL FREE!**
CSI COMPUTER SALES INTERNATIONAL, INC. 

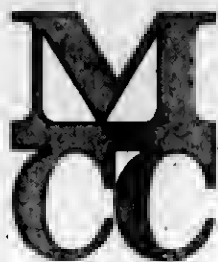
buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

BUY-SELL-LEASE-TRADE**PURCHASE LEASEBACK / RENTAL CREDITS***Write or call collect today
to these representatives!***SYSTEM / 3**
All Peripherals
call Ted Arbuckle**370's**
All Peripherals
call Don Norris**SYSTEM 32's, 34's**
3270 CRT's
call Marilyn Morris**EAM EQUIPMENT**
Refurbished, eligible for
IBM M/A
call Don Norris
or Duke Crumpton**360's**
All Peripherals
call Duke Crumpton**(214) 634-2750**
TWX 910-861-4171**METROPLEX COMPUTER COMPANY, INC.**
Suite 1208 Honeywell Bldg.
1111 W. Mockingbird Lane Dallas, Texas 75247

Industry's fastest growing Computer Dealer

**MINICOMPUTERS
& SYSTEMS**Don't waste company time or
money. Check with us before you
buy or sell.New DEC Equipment
Immediate DeliveryRK11-RK05 Disk Systems -
\$8500
PDP 11/04s and 11/34s - 20% off
list
DZ 11
DEC Station 78New DG Equipment
Immediate DeliveryDG 10 Mbyte Disk Systems from
\$7500
DASHERS - 15% to 25% off list
Nova 3/12 or 3D - 20% off list

Immediate delivery for MOS!

Inventory Clearance
call us for free brochure**MINICOMPUTER
EXCHANGE**(408) 733-4400
TWX 910-339-9272**FOR SALE BY OWNER
NCR CENTURY 100**615-100 W/16K
655-101 (9.6MB)
Dual Disk Drive
682-100 (300)
CPM Reader
640-102 (450-900)
LPM Printer
6101-0 Teletype I/D
Writer W/Interface
Available 6-1-78
Asking Price \$19,500
Call or Write
William Churchill
Rosauer's Super Markets, Inc.
East 3301 Sprague Ave.
Spokane, WA 99202
(509) 535-1555**We are
buying,
selling,
& leasing!**Buying: 3830, 3420
Selling: 360/65, 360/40
Leasing: 370/155, 360/65**Please contact:****Linda Vaughn / (415) 955-0220**
Tommy Talbot / (415) 955-0238**ITEL
CORPORATION****Sale or Lease
370/145-12**

Serial #11192

Available 3/1/78

Combination 3145 interim to 3031 lease
Plans also available.

Contact Jim Jamieson

**(804) 643-9123**Commonwealth Computer Advisors, Inc.
707 East Main St. Suite 1650
Richmond, Virginia 23219
(804) 643-4200

BUY • SELL • LEASE • TRADE

SYSTEM / 3 370 / 115
370 / 125 **ECONOCOM****ECONOCOM**
1255 LYNNFIELD ROAD
P. O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

WANTED TO BUY**IBM 370/155****with or without DAT****Contact: Harry Blair****(713) 524-8249****370/165****For****Sale or Lease**

- Will Configure to your needs
- Immediately Available
- DAT Available
- Short-term or interim lease available to 30XX System

Call or Write
George Forsythe**ALANTHUS CORPORATION**
111 High Ridge Road
Stamford, Connecticut 06905
203 348 4820**IBM
PROCESSORS
& PERIPHERALS****PROCESSORS PERIPHERALS**

SELLING:	3145	3420-3
	3165	3340-A2
	3155	
LEASING:	3165-4 MEG	3420-6
	7 Channels-Now	Avail. Now
	3155K02-Feb.	3330-1, 11
BUYING:	3158	3340A2, B2
	3168	3420-8

The Logical Choice

9701 W. Higgins Rd. Rosemont, Ill. 60018

(312) 698-3000

San Francisco
415 944-1111Fort Worth
817 534-1774Atlanta
404 256-5956Minneapolis
612 854-8107New York
201 568-9666Paris, France
374-1130

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

IBM 158 Attached Processor
AVAILABLE

APRIL 7

IBM 3505-B2/ 3525-P2

AVAILABLE

FEBRUARY 1

Contact: Jerry Borisz

JB1 ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood CO 80228
(303) 988-0820

3803/-1/3420-7

**AVAILABLE FOR
SALE OR LEASE**

IPS can supply 3420-7 systems of any size from inventory. Controllers with or without switching features. Attractive sale or lease terms available. CALL ED JOSEPH for an immediate quote.

IPS COMPUTER MARKETING
2460 Lemoine Ave.
Fort Lee, N.J.
(201) 947-4200

MEANS

**System/3 Leasing
For A Lot Less**

Save up to 60% on your installed or on-order System/3 or other computer system with our new purchase and lease back program

The Equipment Lease Exchange Inc.
P.O. Box 14
MEDFORD, NEW JERSEY 08055
609/654-1100

Sale or Lease

- 3271/002 CONTROLLER (w/ minimum of 6 CRT's)
- 3410/3411 TAPE & CONTROL
- 360/30 F Lo speed I/O
- 370/135 FEO w/3330/3340 IFA
3033 8 Meg Sys
Fall '78



383 LAFAYETTE ST. N.Y. 10003
212 673-9300

CMI BUY LINES

BUY-SELL-LEASE-TRADE

3031/3032/3033

(Lease Only)

John Mills
(313) 642-8000

3420 3803

3333 3830

3330 3340

Darryl Hastings
(313) 642-8000

360

30/40/50/65

Gary Smith
(313) 642-8000

370/165 370/168

Bob Van Hellemont
(313) 642-8000

370/158

Ron Baker
(313) 642-8000

370/155

Gary Smith
(313) 642-8000

370
148/145/138/135

Pam Hoban
(313) 642-8000

1403 2821

2501 1442

1443

If you rent any of these and are returning them to IBM call me. I'll show you how to make money using your rental credits. We buy and sell all of these units.

Kathy Housey
(313) 642-8000

370/115/125

Bob Southwell
(313) 642-8000

System/3

Model 15
Jerry Roberts
(313) 642-8000

3742

3741

5496

Jerry Sharon
(313) 642-8000

360/20

1130

Jim Carleton
(313) 642-8000

IN CANADA
IBM 360 370

System / 3
Don DuPuis
CMI Company
P.O. Box 893
Windsor, Ont.
N9A 6P2
(519) 258-8910

CMI CORPORATION

The IBM Specialists

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000

Member
Computer Dealers
Association

WANT TO BUY

DAT

for

IBM 370/155

Contact

Harry Blair (713) 524-1401

For sale or Lease

165 KJ

WITH: 3066-1

3067-1

2860-2

2870-1

(2) 2880-2

WITH OR WITHOUT DAT



Call

Ron Johnson
Pioneer Computers
Dallas, Texas
214/630-6700

WANTED

Memory for
Burroughs B-3700
Two 50 K Modules
for two CPU's
Must be eligible for Burroughs maint.

Write to:

G. Gonzalez
General Computer Corp.
G.P.O. Box G-4527
San Juan, Puerto Rico 00936
(809) 751-4343

FOR SALE

DEC PDP 11/70
272K Bytes
1-18 Line
Multiplexor
2-RP04 Disk Drives
1-TU16 Tape Drive
1-600 LPM Line Printer
(Data Printer V132C)
1-Console Dacwriter
Availability June 1, 1978
Contact Bob Wargen
(714) 744-4000
Ext. 343

FOR SALE

2501-B1
3340-A2F
3344-B2F
3211-2 SD
3210-2 SD
3203-4
AVAILABLE FEBRUARY 78
CONTACT
COMPUTER WHOLESALE
CORPORATION
504/581-7741

DEC

FOR SALE
MG 10, MM 11 DP
6-VT 50 HA
RK05 AA (\$950.00)

WESTERN DATA SYSTEMS
P.O. Box 7000-182
Redondo Beach, CA 90277
(213) 377-1414

SELLING

**PREVIOUSLY OWNED
EQUIPMENT & SYSTEMS
N.C.R. & BURROUGHS**

N.C.R. 31, 32 & 151 & 152 Teller Units
735/735 & 745 Mag. Tape Enc. & Line Printers
N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S

Also B-700 Thru B-4700 Systems w/wo Peripherals

WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS

BUYING OR SELLING-CALL US FIRST.

KEY-EXIMPORT CORP.

256 LIVINGSTON ST. (P.O. BOX 129) NORTHVALE, N.J. 07047
TELE N.J. (201) 767-3444 N.Y.C. (212) 736-7736
TELEX 135149 CABLE KEYEXIMP NORTHVALE NJ

BUYING

BUY-SELL-TRADE IBM EQUIPMENT

**IBM 370 Memory-Buy & Sell
For Sale Now**

370/135 Memory: IBM FE to GF (96K to 192K)
370/135 Memory: INTEL 96K to 320K
370/135 Memory: AMS 192K to 320K
370/135 Memory: AMS 240K to 384K
370/135 Memory: AMS 256K to 384K
370/135 Memory: INTEL - any 256K increment
370/135 Memory: AMS - any 512K increment
370/145 Memory: INTEL - any 256K increment
370/145 Memory: AMS - any 512K increment
370/158 Memory: INTEL 1 Megabyte - For lease

CALL DICK BAKER (305) 561-5207

**dataware
incorporated**

Intracoastal Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207

MEMBER
CDA

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

IBM EQUIPMENT AVAILABLE

2501/82 Card Reader
2520/82 Card Punch
2821/5 w/PFR
3330/3333 Model 1 & 11 Disks
3420/3 & 5 Tapes & Control
3505/3525 Reader & Punch
3803/1 w/7 & 9 TR RPQ
3830/2 (w/Madrids)

IBM EQUIPMENT NEEDED

3270 Display Equipment
3340/A2 & B2
3420 Tape Drives — All Models
3830/2 Disk Controller
370/158 U34 for Sub-lease

Call

**FORSYTHE
McARTHUR**

(312) 943-3770

Dealer &
Lessor in IBM
Computers

FORSYTHE/McARTHUR ASSOCIATES, INC.
919 North Michigan Ave., Chicago, IL 60611

Member, Computer Dealers Association

For Sale
**XEROX
DISK SYSTEM
MODEL 7275**

Controller
W/86 MB Disks

Call

Telefile

(714) 557-6660

Ask for
Mrs. Weddle

**BUY-SELL
TRADE**

For Computer

Call Action Write

CAC

P.O. Box 80572
404/458-4425 Atlanta, Ga. 30366

COMPUTER

Facilities & Offices
25,000 sq. ft. lease

Teterboro, N.J.

*Quality building & construc.
*8,000 ft. raised computer floor
*17,000 ft. MOD A/C offices
*Fully sprinklered plus utilities
*Excellent location for
professional & skilled
*Nr. Rte. 80, Rte. 46,
G.S. Pkwy. 20 min from NYC
*Parking facilities
50 cars (more avail.)

Brokers Invited. Call
MAJESTIC INDUSTRIES, INC.
212/594-7235 201/489-7100

FOR LEASE**3032 (4 MEG)**

JUNE 78

CONTACT:
BOB RUSSELL

SYSTEMS MARKETING, INC.
200 E. Thomas Road
Phoenix, AZ 85012
(602) 264-5600 TLX 667-334

FOR SALE

Olivetti — "Audit 6" —
Mini-Computer with Dual
Floppy Disk, Automatic
Sprocket Feed, Stand, Forms
Basket, Accounting Software
included. Two years old.

Make an offer

Mr. Jay Calamia, Assistant
Controller, Loyola Univer-
sity, New Orleans, Louisiana
70118 (504 - 856-3148)

FOR SALE

Sys 3 Mod 10 16K
4 disc S4444
6605 Dec. Data Printer

Available 3/78, Call or Write
Roger Siebers, Controller
Veeco Construction
Industries, Inc.
5205 Leesburg Pike, Ste. 507
Falls Church, VA 22041
(703) 931-3900

(NO BROKERS)

FOR SALE

BY OWNER

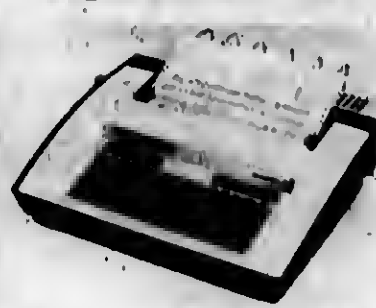
DEC 11/34**COMPLETE**

**96 K SYSTEM
AND ALL COMPUTER
ROOM EQUIPMENT
AVAILABLE.**

CONTACT CLIVE S. PEARCE
APPAREL MANAGEMENT
SYSTEMS, INC.
2407 E. 38th Street
Vernon, CA 90058
(213) 585-2129

**TI'S MODEL 745
PORTABLE**

• Purchase
and Lease Plans
• Nationwide
Factory Service

**TELETYPE
MODEL 43 KSR****Tele-Data**

DATA COMMUNICATIONS EQUIPMENT

Call Toll Free
800-327-3570
Contact
Ray Kreger

7800 Red Road, South Miami, Florida 33143
Telephone (305) 665-1611. Telex 515506 TWX 810-848-8021

SHORT OR LONG TERM LEASE

2065-100

2860-003

2870-001

AVAILABLE LATE FEBRUARY**3155-100-NO DAT**

(INCLUDE: 1433, 1434,
3950, 7855)

3215-001**AVAILABLE FEBRUARY 15th****SHORT OR LONG TERM LEASE**

FOR ALL YOUR 360/370 COMPUTER REQUIREMENTS CALL:

ALBERT BERMAN GEORGE SPRINGSTEEN

(215) 885-4990

GRANITE

COMPUTER LEASING CORP.

BENSON EAST

YORK ROAD AND TOWNSHIP LINE

JENKINTOWN, PA. 19046

MEMBER COMPUTER LESSORS ASSOCIATION

**BROKER
IN
DEC COMPUTER
SYSTEMS AND
COMPONENTS**

C.D. SMITH
730 N. Post Oak Road
#301
Houston, Texas 77024
(713) 686-9405

**MAGNETIC
TAPE SALE**

Slightly used, Money-Back Guarantee
U.S. Government Archives
Manufactured to G.S.A. Specs!

2400' 1600'bpi/3200fci
w/Hanging Seal \$4.50 ea.

Freight prepaid on orders over 200
Tapes. Shipped within 48 Hrs.

CALL or WRITE:

Computer Tape Mart

31 Sprague Ave., Amityville, NY 11701

(516) 691-2309

(Brokers Inquiries Welcomed)



dearborn giveth:

370's: 370-145J (mod 2 & ISC avail.);

3420-7 single.

dearborn taketh:

370-145's; 370-135's; 3420's; 3330's; 3340's.

Call Tom Millunchick: 312/827-9200
or any dearborn office.

(for 360 equipment, call Ed Winclehter:
312/827-9200 or any dearborn office.)

**dearborn**

computer company

dealer-IBM computers
systems software
leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788

Mini-Computers

BUY-SELL-TRADE-LEASE

FOR SALE**D.E.C. CPU'S**

11/04-DC \$ 3,800.00
11/40-BK \$ 9,500.00
PDP-8E 8K \$ 3,800.00
11T34BA New & Used \$28,000.00

D.E.C. DISCS

RP04AA \$20,000.00
RP04 & Controller \$28,000.00
RP03 \$11,000.00
RK05J \$ 3,500.00
RK11D & 2nd RK05J \$ 8,900.00

D.E.C. CRT'S

VT05 \$ 1,100.00
VT50HA \$ 1,000.00

Hundreds of Miscellaneous Modules & Cables Available

CALL FOR OTHER COMPONENTS IN STOCK

DATALEASE

700 North Valley Street, Anaheim, CA 92801

(714) 533-3920

(800) 854-0350

**Short or Long Term
Leases From
RANDOLPH**

370/138**370/148****370/135****370/145**

... and all other IBM systems ...
from S/3's and 115's ... to 168's
and all 303X CPU's or full systems.
Up to 8-year leases available.

CALL THE 370 HOTLINE

800-243-5307

Randolph Computer Company
537 Steamboat Rd., Greenwich, CT 06830
(203) 661-4200

buy sell swap		buy sell swap		buy sell swap		buy sell swap		buy sell swap																				
Wanted To Buy 3672-Memorex storage control unit 3673-Memorex disc controller 3670-Memorex disc module 3675-Memorex disc module Contact: Harry Blair 713-524-1401					BUY SELL LEASE SYSTEM/3 Models 15, 10, 8, 6 Systems 32 & 34 All Support Peripherals COMPUTER BROKERS, INC. P.O. BOX 28298 Memphis, Tn. 38128 Phone 901/372-2622 Member CDA					BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK! FOR SALE 3505-B1 and 3525 P3 3135-GF -- Fully Loaded 3155-J with Dat Box WANT TO BUY 370/145 IBM Mem. 12-J2 370/135 IBM Mem. GF-H 3-1403 N 1 1442 N 1 3420-5 Single Density COMPUTER INDUSTRIES INC. 3570 American Drive • Atlanta, Georgia 30366 404/451-1895 • TWX 810/757-3654 CHICAGO 312-298-5650 WASHINGTON 703-525-3074 LOS ANGELES 213/370-4844																		
BUY SELL LEASE BROKERAGE Buy, sell, lease, sub lease, or be your agent in placement of your pre-owned IBM 360, 370, System/3, or other units. COMPUTER INTERNATIONAL, LTD. REACH COMPUTER CORPORATION, CWS Trading Division COMPUTER WHOLESALE CORP., (504) 581-7741 SUITE 507 508 FIRST NATIONAL BANK OF COMMERCE BLDG. NEW ORLEANS, LOUISIANA 70112 MEMBER OF COMPUTER DEALERS ASSOCIATION					SALE ALL IBM Unit Record Equipment 129 & 029's East Coast (717) 564-8870 West Coast (415) 332-6265 Unit Record Leasing Company 110 Hivista Road Sausalito, Calif. LEASE					FOR SALE IBM Sys 3 5415-021 Ser. # 40979 3277-001 Ser. # 30840 5421-001 Ser. # 12512 1403-N1 3340-A2 3411 optional Avail Feb. 15-78 Will be furnished at closing of contract DATA AUTOMATION COMPANY, INC. 4888 CASH ROAD DALLAS, TEXAS 75247 BAC 214-837-8870																		
dataserv buy • sell • lease • trade					370 115 and 125 Steve Locny 800-328-2406					For Sale or Lease Any 115/125 configuration Sending 115/125 Back to IBM Call us! We'll show you how to make money using your rental credits.																		
370 135 through 168 Dave Miller 616-637-8481					For Sale or Lease 135 - 145 - 155 CPUs — Peripherals — Memory 370/138 MEMORY I-J For Sale or Lease Available in January					BUY • SELL • LEASE <table border="1"> <tr> <td>026 - \$ 850</td> <td>086 - \$ 750</td> </tr> <tr> <td>029 - 1850</td> <td>088 - 2500</td> </tr> <tr> <td>059 - 1375</td> <td>129 - 3350</td> </tr> <tr> <td>082 - 800</td> <td>514 - 800</td> </tr> <tr> <td>083 - 1800</td> <td>548 - 1500</td> </tr> <tr> <td>084 - 2500</td> <td>552 - 900</td> </tr> <tr> <td></td> <td>557 - 2800</td> </tr> </table> MOHAWK-6401-6403 NCR-736 Want to buy IBM 029 s. 129 s. 3741 s. 3742 s. COMPLETE LINE BUSTERS SHREDDERS DECOLLATORS AND BINDERS ECONOMIC LEASE PURCHASE PLANS DP SERVICE INC. STANPELCO/NATALIE REYES 312-774-2556 5505 N MENARD AVENUE, CHICAGO, ILLINOIS 60630					026 - \$ 850	086 - \$ 750	029 - 1850	088 - 2500	059 - 1375	129 - 3350	082 - 800	514 - 800	083 - 1800	548 - 1500	084 - 2500	552 - 900		557 - 2800
026 - \$ 850	086 - \$ 750																											
029 - 1850	088 - 2500																											
059 - 1375	129 - 3350																											
082 - 800	514 - 800																											
083 - 1800	548 - 1500																											
084 - 2500	552 - 900																											
	557 - 2800																											
370 Peripherals 800-328-2406					For Sale or Lease <table border="1"> <tr> <td>3211/3811</td> <td>3340/A2.B2</td> </tr> <tr> <td>3272/3277</td> <td>3410/3411</td> </tr> <tr> <td>3330/3333</td> <td>3420/3803</td> </tr> </table> STOP! Before you send any of the above machines back to IBM call us. We'll show you how to make money.					3211/3811	3340/A2.B2	3272/3277	3410/3411	3330/3333	3420/3803	IMMEDIATE DELIVERY DEC LSI - 11 KD 11 - F \$755 Mini Computer Suppliers, Inc. 25 CHATHAM ROAD SUMMIT, N.J. 07901 (201) 277-6150 Telex 13-6476												
3211/3811	3340/A2.B2																											
3272/3277	3410/3411																											
3330/3333	3420/3803																											
360 CPUs and Peripherals Neal Johnson 800-328-2406					For Sale or Lease 360/30 - 40 - 50 - 65s CPU — Peripherals — Memory We'll Buy Any 360 CPU IBM Peripheral Non-IBM Periph/Memory					BUY • SELL TELETYPE MODELS 43 • 33 • 32 NATIONAL TELETYPEWRITER CORP. 207 Newtown Rd. Plainview, N.Y. 11803 (516) 293-0444																		
Sys/3 CPUs and Peripherals 800-328-2406					For Sale or Lease 5406 - 5410 - 5412 - 5415 CPUs — Peripherals — Memory We'll Buy Your 5406/5410 5415 — Rental credit machines Peripherals — Memory					PROFESSIONAL DEALER/LESSOR OF IBM COMPUTER SYSTEMS Bob Russell Jack Emery Dave Hepburn Paul Baillie SYSTEMS MARKETING, INC. 200 E. Thomas Road Phoenix, Arizona 85012 602-254-3630																		
Call Toll Free 800-328-2406 or 612-544-0335 Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd. P.O. Box 9488, Minneapolis MN 55440										WANTED RANDOLPH NEEDS: 3340-A2 DISKS 3420-3, 4 & 8 MODEL TAPE DRIVES CALL: MIKE SEEKINGS TOLL FREE 800-243-5308 RANDOLPH COMPUTER COMPANY Division of Firstbank Financial Corporation A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON 837 Steamboat Rd., Greenwich, CT 06830 • (203) 661-4200																		

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap																																																																																	
C. E. I. B. "The world's largest used computer listing service" *MULTIPLE-SOURCE LISTINGS - CEIB's listings represent the largest pool of used computer equipment in the world - over 6,000 current offerings from more than 500 brokers, dealers, and private sellers - from 370/168s to minicomputers, terminals, accessories, and unit record equipment. *BUYERS - Contact CEIB today for free, up-to-date information on any specific listings you are interested in - or write for our comprehensive new monthly catalog (\$5/issue or \$50/yr. ppd.) *SELLERS - CEIB provides a very convenient, inexpensive approach to locating potential buyers. If you haven't already received our brochure and listing forms, please write or call..... CEIB - PO Box 163; Boston, Mass. 02117 - (617) 247-2280 - R. Ferrara, President		COMPUTER SPACE FOR LEASE IN HOUSTON Fully improved with 2848 sq. ft. Available, formerly occupied by computer group. Raised floor, self cooling unit for the computers, fully partitioned for office space and working area. Call: Abue Charski (713) 659-3123 Houston, Texas.		FOR SALE OR LEASE 1287-01 Optical Reader 2/1 1401-B4 w/1402, 1406 4/1 1442-N1 Card Reader 3/1 3505-B1 Card Reader 2/1 3330-01 Disk Drives 3410/3411-3 Tapas 1x4 3340-A2 Disk Drive & Ctl. Now 3340-B2 Disk Drives 7/1 3344-B2 Disk Drives 7/1 2671-01 Paper Tape Reader Now 2822 Paper Tape Reader Ctl. Now 370/115 H2 262 K 3/78 WANTED TO BUY 3277's 128-3's 3340-A2 029's 3333-11 3300-11 DIMENSIONAL DATA INC. 1400 Renaissance Drive Park Ridge, IL 60068 (312) 297-7210																																																																																	
Surplus DEC And Data General Hardware For Sale PHIL THOMAS (305) 272-8753 Thomas Business Systems, Inc.		DIABLO HYTERM II* MODEL 1620 I/O TERMINALS BRAND NEW W/WARRANTEE only \$2,995 ee. .COMTERM Box 41 Orange Cove, CA 93646 call (209) 332-2332 quantity price available *Hyterm II is a registered Trade-mark of the Diablo Corp.		Wanted for Purchase or Lease Spring, 1978 3X 370/158 Memory Only 2 Megabytes above Model K Call Collect DPF INC. 141 Central Park Ave. South Hartsdale, N.Y. 10530 Attn: Norman Usher (914) 428-5000																																																																																	
WILLIAM MARION COMPANY, INC. P.O. BOX 309 • HACKENSACK, N.J. 07602 N.C.R. 270-299-399-775 31, 32, 41, 42 etc. BURROUGHS "L" TC 500, TC 700 I.B.M. 029-Systems 32/34 029's & 059's immediate delivery Also: 026 - 056 - 082 - 083 084 - 085 - 088 - 402 - 403 407 - 514 - 519 - 548 - 552 557 - Eligible For IBM M/A		For Sale Norand Electronic Ordering NT50 Scanners. Excellent Condition. Reasonable Price. Contact Mr. Donald Vernon Associates Grocers of Colorado, Inc. 5151 Bannock St. Denver, CO 80217 (303) 534-1155		FOR SALE CALCOMP GRAPHIC SYSTEM 925 CONTROLLER 1036 PLOTTER CCC LEASING CORP. 946 Main St. Hackensack, N.J. 07601 (201) 343-3760																																																																																	
FOR SALE OR LEASE Immediately Available IBM 3330/001's IBM 3330/011's IBM 3333/011's with features #8150 Contact: Harry Blair 713-524-8249		WANTED 029-129 3741-3742 We Buy Rental Credit Machines. Continue to Rent at A Discount From IBM Prices. Call Stewart Krakover Data Rentals/Sales (213) 559-3822		WANTED ALL 360/370 SYSTEMS AND SYSTEM/3 AND PERIPHERALS WE BUY • SELL • LEASE • TRADE transdata P.O. Box 47762, Dallas, Texas 75247 PHONE (214) 631-5647																																																																																	
PDP 11/40 11/40-16K-Options & Cabinet \$7500 LP11-JA- 300 LPM & Controller 4900 RK11C & 2 RK05AA Drives 6900 VT05BAA-CRT 950 DL11C 400 RK05 JAA-New Drives 3400 All guaranteed DEC maintenance call (914) 895-2007 or reply CW Box 1402 797 Washington St. Newton, Mass. 02160		FOR SALE by owner 370/135 256K, 2 channels with 3046 and 3215 available February 1978 CW Box 1382 797 Washington St. Newton, MA. 02160		FOR SALE BY OWNER DATA GENERAL EQUIPMENT Eclipse S/6220 113KB 2-4231 Disc - 6021 Tapa 4034G Line Printer 6-4063 Mux - TTY35 KSR 4079-RTL Eclipse C/330 160KB 4077 ASYN Line Cntrl 4231 Cntrl Master Disc 1C6021 for Mag Tape Nova 2/10 32KB Multi Div-RTL 4063 Mux-TTY 33ASR Auto Prgm Load Cassette Tape 14-Infolon CRTs 3-Tally 2100 Printers 1-HP 7260A Card Read 10-CFI 3330 Type Pks Inquire in writing only: Data Processing Dept. MERCY HOSPITAL 565 Abbott Road Buffalo, N.Y. 14220																																																																																	
FOR SALE. 2030-128K, 2803, 2821-II, 2415-IV, 1442-N1 WE NEED: 2914, 1419, 3420-VI, 2040-H, 3340-A2 & B2 ATLANTIC COMPUTER SALES, INC. 4151 MEMORIAL DR. DECATUR, GA 30033 TELEPHONE 404 294 0515		FOR SALE by owner 370/135 256K, 2 channels with 3046 and 3215 available February 1978 CW Box 1382 797 Washington St. Newton, MA. 02160		For Lease IBM 3031 December 78 Delivery Some I/O Equip. also avail. CW Box 1397 797 Washington St. Newton, Ma. 02160																																																																																	
IBM UNIT RECORD EQUIPMENT <table border="1"> <thead> <tr> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> </tr> </thead> <tbody> <tr> <td>024</td> <td>\$ 300</td> <td>\$20/Mo.</td> <td>082</td> <td>\$ 850</td> <td>\$ 35/Mo.</td> <td>407</td> <td>\$1800</td> <td>\$ 80/Mo.</td> </tr> <tr> <td>026</td> <td>\$ 900</td> <td>\$35/Mo.</td> <td>084</td> <td>\$1800</td> <td>\$ 60/Mo.</td> <td>514</td> <td>\$ 800</td> <td>\$ 45/Mo.</td> </tr> <tr> <td>029</td> <td>\$1800</td> <td>\$55/Mo.</td> <td>085</td> <td>\$2500</td> <td>\$100/Mo.</td> <td>519</td> <td>\$1000</td> <td>\$ 55/Mo.</td> </tr> <tr> <td>046</td> <td>\$1200</td> <td>\$50/Mo.</td> <td>085</td> <td>\$1200</td> <td>\$ 60/Mo.</td> <td>526</td> <td>\$1400</td> <td>\$ 70/Mo.</td> </tr> <tr> <td>047</td> <td>\$1500</td> <td>\$60/Mo.</td> <td>088</td> <td>\$2500</td> <td>\$175/Mo.</td> <td>548</td> <td>\$1600</td> <td>\$ 60/Mo.</td> </tr> <tr> <td>056</td> <td>\$ 250</td> <td>\$15/Mo.</td> <td>129</td> <td>\$3400</td> <td>\$105/Mo.</td> <td>552</td> <td>\$1000</td> <td>\$ 40/Mo.</td> </tr> <tr> <td>059</td> <td>\$1400</td> <td>\$50/Mo.</td> <td>402</td> <td>\$1200</td> <td>\$ 60/Mo.</td> <td>557</td> <td>\$3000</td> <td>\$100/Mo.</td> </tr> <tr> <td>077</td> <td>\$ 450</td> <td>\$25/Mo.</td> <td>403</td> <td>\$1500</td> <td>\$ 70/Mo.</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> THOMAS COMPUTER CORPORATION 600 N. McClurg Court - Suite 4202 115 Harbor Island Rd. Chicago, Illinois 60611 Newport Beach, CA 92660 (312) 944-1401 (714) 675-2810		MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE	024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.	026	\$ 900	\$35/Mo.	084	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.	029	\$1800	\$55/Mo.	085	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.	046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.	047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.	056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.	059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.	077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.				DEC HARDWARE PDP 11 PDP 8 Processors/Peripherals Memories VT52's, LA36's, LS120's, LA180's BROOKVALE ASSOCIATES Seekers and Sellers (516) 586-0800		SAVE RPG/RPG 11 TO COBOL TRANSLATOR This package accepts all types of RPG and produces ANS COBOL while approaching 100% error free conversion. The resulting COBOL program is modular in design and easy to read and maintain. Several client service options are available: Perpetual Lease, Conversion only, Clean Compile and full implementation including production JCL, test and installation. Over 100 satisfied customers. For Prompt Reply Write or Call Us Today DASD Park Ridge, Illinois 60068, Suite 315 1480 Renaissance Dr., (312) 299-5005
MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE																																																																													
024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.																																																																													
026	\$ 900	\$35/Mo.	084	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.																																																																													
029	\$1800	\$55/Mo.	085	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.																																																																													
046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.																																																																													
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.																																																																													
056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.																																																																													
059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.																																																																													
077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.																																																																																

SOFTWARE

ACCOUNTS PAYABLE SYSTEM

- Many design features including:
- Auto. discount calculation
 - Cost center reporting
 - G/L interface tape
 - Check reconciliation
 - Written in COBOL
 - Single data base
 - Complete documentation
 - 3 year warranty
 - Batch mini or main frame
 - Low purchase price or rent.
- Write or call for more information

LEGLER SYSTEMS COMPANY
23 Charles Hill Road
Orinda, CA 94563
(Est. 1972) (415) 254-1264

Distribution Management Systems, Inc.
Data General
Line Printer
Justification
Program
Variable line width,
Page size, Tabs
Flush and Quad
Commands
3617 S. 107th St.
Omaha, NE 68124

IBM
SERIES
1

- End Users
- System Houses
- Software Houses

OFF-THE-SHELF
Delivery of High
Quality Diskettes
Custom Formatted to
Your Requirements:
CALL OR WRITE:

DYSAN

2388 Walsh Avenue
Santa Clara, CA
(408) 247-4109

WANTED

Inventory management software package or complete turnkey system for small specialty retailer — \$2M annual sales, 7000 items. For more information, send general description to:

Data Sciences, Inc.
One Indiana Square
Indianapolis, Indiana 46204

PROVEN Packages
from Professionals

- Financial
- General Ledger and Financial Reporting System
 - Accounts Payable
 - Accounts Receivable
- Manufacturing
- Material Requirements Planning
 - Master Production Scheduling
 - Capacity Planning
 - Shop Floor Control
- Comprehensive Report Generator
FILETAB
- Small Business Systems
System 3
- General Ledger and Financial Reporting System
 - Accounts Receivable
 - Accounts Payable
- Burroughs B-1700 1800
- General Ledger and Financial Reporting System
 - Accounts Receivable

Get all the details. Today.

Name

Title

Company

Address

City

State

Zip

Phone

Computer

Other small computer system application products available soon. Please specify computer and need.

SOFTWARE
INTERNATIONAL

Elm Square, Andover, Mass 01810 (617) 475-5040

Atlanta • New York • Washington, D.C. • Philadelphia • Chicago
San Diego • Toronto • Houston • Columbus, OH • San Francisco

Registered trademark of Software International

CWC1238

software for sale

RSTS/E
Communications

The HASPBOX(tm) is a communications front-end processor for DEC RSTS/E

- 360/370 communications via HASP protocol
- Block compression (increasing line throughput up to 35%)
- Supports line speeds up to 19.2 KB
- Automatic input queuing facility
- Allows remote RSTS printers and card readers
- Supports RSTS to RSTS systems communication

Contact
Software Results Corporation
455 West Seventh Ave.
Columbus, Ohio 43201
(614) 421-2094

TONE
TSO for VSI
Redesigned to eliminate TCAM, and the staggering overhead of user swapping

ISP
System to System
Communication for VSI
Inter-System Spool Processor

Two unique products from TONE Software Corp.

(write or phone for details)

TONE
Software Corp.

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

software for sale

ACCOUNTING SOFTWARE
FOR DEC RSTS/E
CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Successful installations in manufacturing, distribution, service bureau uses. Completely on-line, interactive systems. If you are installing or have installed a RSTS/E or CTS-500 system, contact us first for cost-effective solutions in: ACCOUNTS PAYABLE; GENERAL LEDGER; FINANCIAL REPORTING

The design specifications for these packages were developed by accountants for use by accountants. All packages provide excellent audit-trail, extensive user prompting, fast data entry, full file-maintenance and inquiry capabilities, modular design and construction. These are consolidating packages and support multi-division company and multi-company corporate accounting functions. For more information, contact us at:

(219) 936-2183
p.o. Box 160
plymouth, in 46563
Div. of Young & Co.

Plycomtm services

RPG II SYSTEMS

- A/R-OPEN ITEM OR B/F
- ACCOUNTS PAYABLE
- GENERAL LEDGER
- PAYROLL AND LABOR DIST.
- INVENTORY
- CREDIT UNION MAILING, ETC

Extensive Documentation Provided
Bancraft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

RPG TO COBOL

Detware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCOOPER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCOOPER (7070) to COBOL
- COBOL to COBOL
- AUTOCOOPER/SPS to COBOL

For more information on our translators, write or call today.

Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

RIMS/1

- Is for your POPT (RSTS)
- Is relational (table like)
- Is simple to use
- Is written in Basic-Plus
- Is ideal for small & medium uses
- Has non-programming user's interface
- Has programming user's interface
- Has report & statistics generator
- Will reduce development time & effort
- Will save you money

Call (617) 354-5755
1105 Massachusetts Ave.
Cambridge, MA 02138

GENERAL LEDGER
\$400 FULL PRICE

- Check Register
- Journal Register
- General Ledger
- Trial Balance
- Balance Sheet
- Income Statement

Complete bookkeeping system for any medium to small company. Over 500 customers processed during the last ten years. Modular parameter design can be adapted to any small computer. Written in low level IBM Cobol. Price of \$400.00 includes Source programs, sample JCL with test data, and complete operating procedures.

FREE SAMPLES
& DOCUMENTATION

GENE SUMRALL
4211 S.W. Freeway
Suite 106
Houston, Texas 77027

software for sale

MEDICAL/DENTAL
BILLING

- Complete Billing and Insurance Processing for doctors, groups and clinics.
- Complete Insurance Forms
- Profile, RVS, ICOA Files
- Bal. Forward, Ledger
- COBOL or RPG II
- 30+ users
- 380/370 or mini-computers
- On line, Real-Time or Batch Processing

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

TIME & SERVICES

COMPUTER
Time/Services

2 IBM 370/165 & OS
1 IBM 370/155
RJE CICS, TSO
Open Job Shop
CALL DAN URLEY
V.P. Marketing

COMPUTER RESEARCH
COMPANY

Chicago, IL 60601
(312) 977-7500

COMPUTER TIME

- ALL SHIFTS AVAILABLE
- DOS/VS AND GRASP ENVIRONMENT
- COMPLETE DATA PROCESSING SERVICES PROVIDED
- REASONABLE RATES

370/145-256K

PERIPHERAL DEVICES INCLUDE:

- (8) 2314 DISK DRIVES
- (8) 200/400 KB DUAL DENSITY TRACK TAPE DRIVES
- (2) 1403 M1 1100 LPM PRINTERS
- (1) 1442 CARD PUNCH
- (1) 2501 CARD READER
- (1) 2671 PAPER TAPE READER
- (1) 3215 CONSOLE PRINTER

CONTACT JIM GREEN OR LARRY YOUNG
MASS. TEL. (617) 563-0800

WE ARE
BROKERS OF
COMPUTER
TIME

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

Datacenter
370/158

3 meg VS2
Specializing in
Remote Job Entry
and Batch
Excellent Technical Support
Very Attractive Rates
Contact: Stu Kerievsky
(212) 564-3030
Datamort
132 W. 31st St.
New York, N.Y. 10001



Hands on microprocessors. Just what you need. FREE

Take home microcomputer in 10 days. No money down.

Learn microprocessors first hand from the original hands on people. For more information call Jerry W. White, (219) 231-1111 or write Wintek Corp., 902 North 9th Street, Lafayette, Indiana 47904.

WINTER

- 6800 Hardware/Software
- Custom Hardware/Software
- In-house short courses

time & services

SPECIALISTS
KEYPUNCHING
KEY-TO-DISC

- *Metro N.Y. Service Leader
- *Two Locations, Multi-shifts
- *All Applications
- *Top Quality Assurance
- *24 Hour Turn-a-round
- *Free Pick-up & Delivery

**WE CAN SAVE
YOU DOLLARS!**

Ask Kurt Schmidt for details
(201) 751-7070
**COMMERCIAL COMPUTER
SERVICES, INC.**

REMOTE
JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide Incoming Watts lines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, HASP, INTERCOMM, ROSCOE
- Complete data security including off-site storage

For information
call Walter Czerniak
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Data Craft, Data General, CDC, DEC, EMM, Fabri Tek, Honeywell, GAI, HP, Interdata, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Verien, XDS.

Any Manufacturer's Memory

THREE DELTA CORP

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

COMPUTER
RENTAL TIME

Honeywell 6060

T/S, Batch,

Remote Batch

(2) 1200 LPM Printer

(1) 600 LPM Printer

(8) DS191 Drives, 256K

(5) 9trk tapes

(1) 7trk tapes

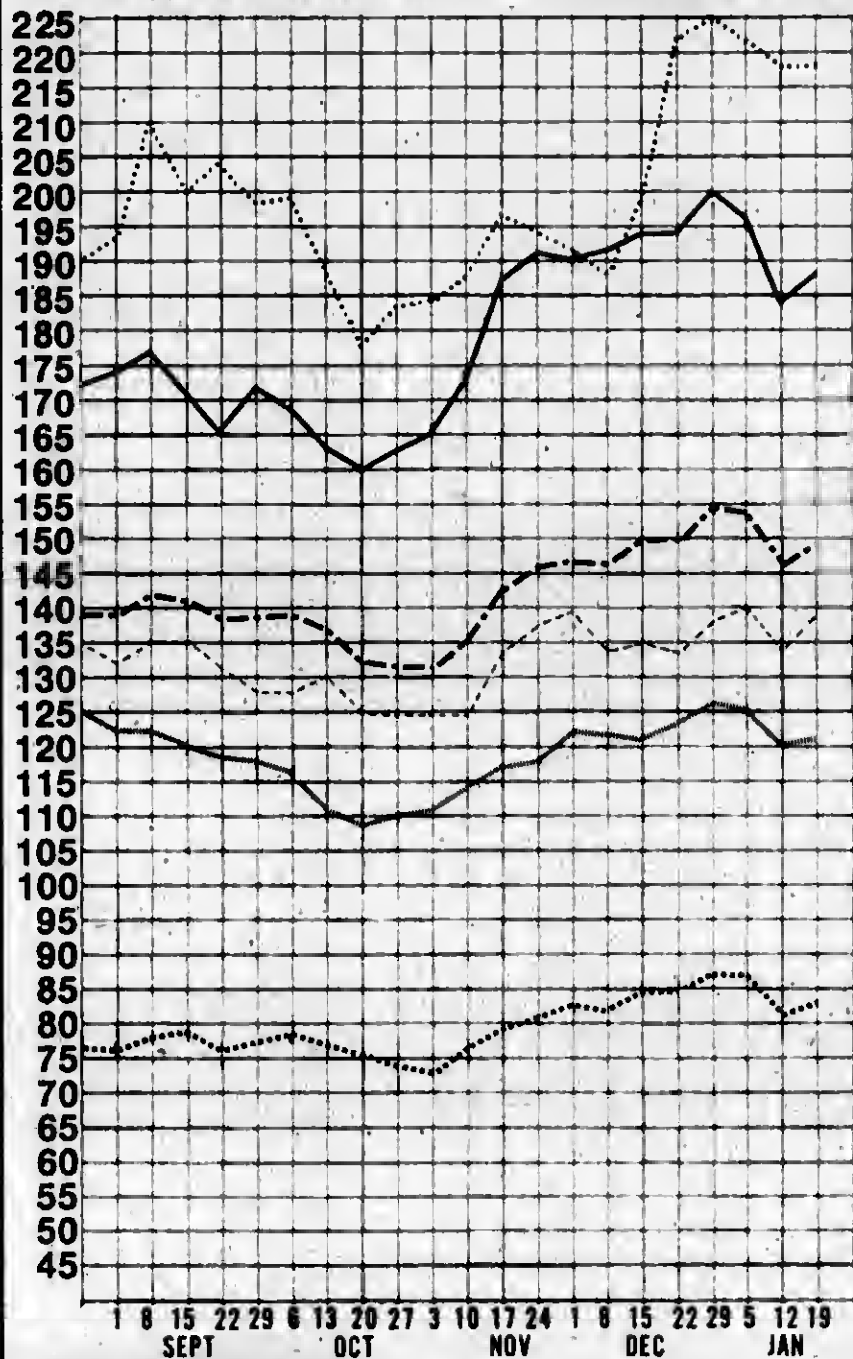
Complete data processing services including key-punching, programming, and systems analysis. Thrift-Line applications such as payroll, accounts payable, accounts receivable and general ledger.



(617) 272-7721
Programs & Analysis, Inc.

COMPUTERWORLD Computer Stocks Trading Indexes

Computer Systems Software & EDP Services
Peripherals & Subsystems Leasing Companies
Supplies & Accessories CW Composite Index



Earnings Reports

ON-LINE SYSTEMS Three Months Ended Oct 31			
	1977	1978	
Shr Emd	\$41	\$36	
Revenue	5,718,519	3,984,429	
Earnings	380,854	307,860	
6 Mo Shr	.77	.66	
Revenue	10,036,756	7,616,936	
Earnings	873,044	565,167	

a-Includes operations of Atkins Computer Services UK and Time-sharing B.V., acquired in second quarter of 1977.

PENRIL Three Months Ended Oct 31			
	1977	1978	
Shr Emd	\$18	\$14	
Revenue	2,629,469	2,243,669	
Earnings	225,493	170,111	

TCC Three Months Ended Sept. 30			
	1977	1978	
Shr Emd	\$02	\$03	
Revenue	1,170,721	1,062,500	
Earnings	15,756	26,935	
6 Mo Shr	.08	.06	
Revenue	2,240,499	2,183,156	
Earnings	45,888	44,122	

TERMINAL DATA Year Ended Sept. 30			
	1977	1978	
Shr Emd	\$71	\$63	
Revenue	7,555,000	6,115,000	
Tax Cred	22,000	230,000	
Earnings	513,000	605,000	
3 Mo Shr	.23	.26	
Revenue	1,885,000	1,776,000	
Tax Cred	28,000	28,000	
Earnings	166,000	196,000	

DPF Three Months Ended Nov. 30			
	1977	1978	
Shr Emd	\$46	\$16	
Revenue	113,252,000	108,754,000	
Tax Cred	325,000	90,000	
Earnings	1,949,000	737,000	
6 Mo Shr	1.00	.71	
Revenue	222,145,000	213,965,000	
Tax Cred	721,000	328,000	
Earnings	4,215,000	2,941,000	

a-Restated.

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreinhofer
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezellan
Account Coordinator
COMPUTERWORLD
1212 Hearst Building
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Judy Milford
Account Coordinator
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

West Germany
Hans-Jürgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 18, 1978

All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

E X C H	PRICE				E X C H	PRICE				E X C H	PRICE										
	1977-78 RANGE	CLOSE JAN 18 1978	WEEK NET CHNGE	WEEK PCT CHNGE		1977-78 RANGE	CLOSE JAN 18 1978	WEEK NET CHNGE	WEEK PCT CHNGE		1977-78 RANGE	CLOSE JAN 18 1978	WEEK NET CHNGE	WEEK PCT CHNGE							
COMPUTER SYSTEMS																					
A	ANOAML CORP	22-55	48 3/4	+2 3/8	+5.1	D	ADVANCED COMR TECN	0-2	1 1/2	0	0.0	O	DATA ACCESS SYSTEMS	4-5	3 1/4	0	0.0				
N	BURROUGHS CORP	55-91	67 1/8	+1 1/2	+0.7	J	ANACOMP INC	7-10	8 1/2	+1/8	+1.4	O	DATA 100	6-11	9 1/4	+5/8	+7.2				
D	COMPUTER AUTOMATION	18-30	24	+3/4	+3.2	A	APPLIED DATA RES.	5-10	8 3/4	+1/2	+6.0	A	DATA PRODUCTS CORR	9-19	15 1/2	+1/2	+3.3				
D	CONTROL DATA CORP	20-29	25 3/4	+1/4	+0.9	N	AUTOMATIC DATA PROC	23-30	26 3/8	-5/8	-2.3	O	DATA TECHNOLOGY	3-4	4 1/8	-1/8	-2.9				
O	CPAY RESEARCH INC	15-31	21 1/2	+1 1/2	+5.7	O	CLEHMAN AMERICAN COS	2-2	1 3/4	0	0.0	O	DATUM INC	1-2	2	0	0.0				
N	DATA GENERAL CORP	35-54	48	+7/8	+1.8	O	COMPU-SERV NETWORK	9-15	10 3/4	0	0.0	O	DFCISION DATA COMPU	2-3	1 7/8	+1/8	+7.1				
N	DATACRONT CORP	18-41	36 3/8	+1 3/8	+3.9	O	COMP ELECTION SYSTEMS	6-10	9 1/4	-1/4	-2.6	A	DELTA DATA SYSTEMS	1-1	1 1/2	-1/8	-20.0				
N	DIGITAL EQUIPMENT	37-53	44 7/8	+1/4	+0.5	O	CONRUTER HORIZONS	1-1	3/4	0	0.0	A	EDUCATION INC	6-11	10 7/8	+1 7/8	+20.8				
N	ELECTRONIC ASSOC.	2-3	2 3/8	-1/4	-9.5	O	COMPUTER NETWORK	6-11	9 1/4	-1/8	-1.3	O	DATARAM CORP	2-24	19 1/2	+1/2	+2.6				
A	ELECTRONIC ENGINEER.	8-14	11 7/8	-3/8	-3.0	N	COMPUTER SCIENCES	7-10	8 7/8	+5/8	+7.5	N	ELECTRONIC M C N	4-5	4 3/8	+3/8	+9.3				
J	EDUR-PHASE SYSTEMS	13-23	19 1/2	+1	+5.4	O	COMPUTER TASK GROUR	1-2	1 1/2	0	0.0	O	FABRI-TEK	1-2	1 1/8	0	0.0				
N	EDXBORD	28-54	30 1/8	+1/2	+1.6	O	COMPUTER USAGE	1-3	1 5/8	0	0.0	O	GENERAL COMRUTER SYS	0-2	1 1/2	0	0.0				
O	GENERAL AUTOMATION	6-9	7 1/8	+1/2	+7.5	O	CONSHARE	5-8	6 3/4	+3/4	+12.5	N	HAZELTINE CORR	8-12	9 7/8	+1/8	+1.2				
O	GRI COMPUTER CORP	1-1	5/8	0	0.0	O	DATA DIMENSIONS INC	3-5	4 5/8	+1/4	+5.7	N	HARRIS CORP	28-47	40 1/2	+3/4	+1.8				
N	HENLETT-PACKARD CO	69-87	70 5/8	+1 1/8	+1.6	D	DATATAB	1-2	1 3/8	0	0.0	A	INCOTERN CORR	10-19	18 1/2	+5/8	+3.4				
N	HONEYWELL INC	43-55	46 3/4	+1 1/8	+2.5	N	ELECTRONIC DATA SYS.	14-20	14 7/8	+1/4	+1.7	O	INDEPEX INC	4-7	5 3/4	+1/8	+2.2				
N	IBM	245-286	269 1/4	+3 1/8	+1.1	O	INSYTE CORP	2-3	1 1/4	+1/8	+11.1	O	INFORMATION INTL INC	8-14	9	+1/2	+5.8				
O	MANAGEMENT ASSIST	5-10	9	+3/8	+4.3	O	IRS COMPUTER MARKET.	1-2	2 1/4	0	0.0	O	INTEL CORP	30-57	42 1/2	+1	+2.4				
O	MICRODATA CORP	7-18	10 1/4	0	0.0	O	KEANE ASSOCIATES	3-4	3 3/8	0	0.0	A	LUNDY ELECTRONICS	3-6	3 1/2	+1/8	+3.7				
O	NINI-COMPUTER SYST	7-12	7 1/4	-1/2	-6.4	O	KEYDATA CORP	1-3	1 3/8	+1/8	+10.0	J	MSI DATA CORP	6-15	12 3/4	+1 1/4	+10.8				
D	MODULAR COMRUTER SYS	5-9	7 1/4	0	0.0	A	LOGICOM	7-17	11 7/8	+5/8	+5.5	O	MENOPEX	23-34	27 3/8	+1/8	+0.4				
N	MCR	32-47	38 7/8	+1 5/8	+4.3	A	MANAGEMENT DATA	1-2	1 1/4	0	0.0	N	MONHAW DATA SCI	5-8	5 3/4	0	0.0				
O	MRINE COMPUTER INC	12-25	22 1/2	+2	+9.7	A	NATIONAL CSS INC	10-18	17	+1 1/8	+7.0	O	PENRIL CORP	2-6	5 3/8	-1/8	-2.2				
N	REKIN-ELMER	17-22	18 1/4	-1/4	-1.3	O	NATIONAL DATA CORP	4-7	6 7/8	+1/8	+1.8	N	REARTEC CORP	7-11	10 1/8	+1 1/2	+17.3				
N	RAYTHEON CO	16-35	29 5/8	+3/8	+1.2	A	ON LINE SYSTEMS INC	16-22	16 3/4	-1/8	-0.7	O	POTTER INSTRUMENT	2-2	2	0	0.0				
N	SPERRY RAND	30-42	35 1/4	0	0.0	N	PLANNING RESEARCH	3-6	4 1/4	+1/8	+3.0	O	RECISION INST.	2-2	2	0	0.0				
O	SYCOR INC	8-20	19 7/8	+1	+5.2	O	PROGRAMMING C SYS	1-1	5/8	+1/8	+25.0	O	QUANTOR CORP	3-5	3 3/8	+1/8	+3.8				
A	SYSTEMS ENG. LABS	5-13	12 1/2	+1 1/8	+9.8	O	RAPIDATA INC	2-3	2 7/8	+3/8	+15.0	O	RECOGNITION EQUIP	6-10	7 1/8	+1/8	+1.7				
A	WANG LABS.	10-14	12 3/4	+3/4	+6.2	O	REYNOLDS & REYNOLD	17-21	19 1/4	+1/4	+1.3	O	SCAN DATA	1-2	7/8	-	-6.2				
LEASING COMPANIES																					
O	ALANTHUS CORP	3-6	5 3/4	+1/8	+2.2	O	SCIENTIFIC COMPUTERS	1-4	3 5/8	-1/8	-3.3	O	STORAGE TECHNOLOGY	10-22	19 3/4	+5/8	+3.2				
O	BODTHE COURIER CORP	8-14	13 1/2	+1/4	+1.8	O	TYMSHARE INC	14-23	20	-1/4	-1.2	O	T BAR INC	7-13	11 1/8	+1/8	+1.1				
O	CONDISCO INC	10-16	15	+1/2	+3.4	O	URS SYSTEMS	4-5	4 3/4	+1/8	+2.7	A	TALLY CORP.	4-6	4 1/8	+1/8	+3.1				
A	CONNERCE GROUP CORR	1-3	3/4	0	0.0	N	WVLY CORR	1-2	3/4	-	-7.0	A	TEC INC	7-10	6 7/8	+1/8	+1.8				
A	COMPUTER INYSTERS GRP	1-2	3/4	-	-7.0	PERIPHERALS & SUBSYSTEMS										N	TEKTRONIX INC	29-40	35	+1	+2.9
N	DATRONIC RENTAL	0-2	1 1/4	0	0.0	N	ADRESSOGRAPH-MULT	10-16	13 7/8	-1/8	-0.8	N	TELEX	2-3	2 7/8	0	0.0				
A	OCL INC	1-3	2 7/8	0	0.0	O	ADVANCED MEMORY SYS	7-9	7 3/4	+1 1/8	+16.9	O	TESOATA SYSTEMS CP	13-20	14	+1/2	+3.7				
N	DRE INC	6-10	8	0	0.0	N	AMPEX CORP	8-11	11 1/8	+1	+9.8	D	WILTEK INC	1-1	1/2	0	0.0				
N	ITEL	13-22	17 5/8	-3/8	-2.0	O	ANDERSON JACOBSON	3-6	4 7/8	0	0.0	SUPPLIES & ACCESSORIES									
N	LEASCO CORP	19-27	24 1/4	+3/4	+3.1	N	APPLIED DIG DATA SYS	10-20	13 1/4	+5/8	+4.9	A	AMERICAN BUS PRODS	6-8	7 1/8	0	0.0				
O	LEASRAC CORP	1-2	1 1/2	0	0.0	O	BEEHIVE INT'L	5-12	5 5/8	+1/8	+2.2	O	BALTIMORE BUS EDMS	10-17	15 1/2	+7/8	+5.9				
A	PIONEER TEX CORP	5-11	5 3/8	-1/8	-2.2	A	BOLT, BRANKF & NEW	6-9	6	+1/4	+4.3	O	HARRY WRIGHT	10-17	15 1/2	+7/8	+5.9				
N	U.S. LEASING	10-16	12 3/4	0	0.0	N	BUNKER-RAND	8-13	11 7/8	+7/8	+7.9	O	CYPERNATICS INC	1-1	7/8	0	0.0				
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH															N	OURLEX PRODUCTS INC	14-20	18 1/8	-1/4	-1.3	
L=NATIONAL; M=MIDWEST; D=OVER-THE-COUNTER															N	ENNIS BUS. FORMS	6-9	8 5/8	+1/2	+6.1	
D-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID															O	GRAPHIC CONTROLS	13-18	17 3/4	+1 1/4	+7.5	
0-1 TO NEAREST DOLLAR															N	3M COMPANY	45-56	47 1/2	+1 1/4	+2.7	
															O	MOORE CORP LTO	24-37	26 1/2	+1/4	+0.9	
															N	NASHUA CORP	16-28	18 1/8	+3/8	+2.1	
															O	STANDARO REGISTER	18-25	21	-3/4	-3.4	
															O	TAB PRODUCTS CO	8-19	7 5/8	0	0.0	
															N	UNARCO	18-22	19	-1/2	-2.5	
															A	WABASH MAGNETICS	10-15	11	0	0.0	
															N	WALLACE BUS EDMS	17-21	18 3/4	-1/8	-0.6	



Intel delivers more semiconductor memory than anyone. Even IBM.

When you select a computer, it often makes sense to choose IBM. Because of their size, industry acceptance, installed base and technological leadership in computers.

But when it's time to select a memory supplier for your IBM computer, it always makes sense to choose Intel.

For the same reasons.

Intel is the world's largest supplier of semiconductor memory. Over 53 billion bits shipped in 1976 alone. That's more than IBM has shipped domestically during the life of System 370.

We became number one in semiconductor memory by applying marketing strength to technological leadership. Technological leadership is what you expect from the company that invented the world's first microprocessor. And marketing strength is what you expect from the world's largest supplier of microprocessors and semiconductor memory.

Intel's financial strength and security take the risk out of selecting an alternative to IBM. We're over a quarter billion dollars strong.

And we've built an organization to equal — and often surpass — the sales, service, support and confidence you expect from IBM. Intel has over 600 IBM 370 series memories installed at companies like yours.

We could not have made it to number one if we didn't offer you more than IBM. Our memories deliver significant cost savings when compared to IBM memory prices. And we're the only independent supplier to offer a complete line of 370 memories — from System 125 through System 168.

Our memories go beyond compatibility with all IBM features and configurations. Enhancements — such as our unique microprocessor-controlled maintenance and diagnostic features — give you operating flexibility and reliability second to none.

Intel is your logical choice for System 370 memory. So whether you're planning a new 370 installation or upgrading existing capability, talk to Intel. Phone us at (408) 734-8102. Or write: Intel Memory Systems, 1302 N. Mathilda Ave., Sunnyvale, CA 94086.

intel delivers.

Headquarters: California 408-734-8102, Ext. 453 • Sales Offices: California 415-692-4762, 213-595-4811 • Canada 416-496-1140, 514-747-0637
Illinois 312-640-0050 • Massachusetts 617-237-4673 • Michigan 313-358-1640 • Minnesota 612-835-6722 • Missouri 314-821-6680 • New York 212-736-0316 • North Carolina 704-568-8966
Ohio 216-836-0457, 513-554-4424 • Pennsylvania 215-884-8697 • Texas 713-771-5781, 214-233-0270 • Virginia 703-790-1191
In Europe contact: Telex International Group, in Japan contact: Kanematsu-Gosho Ltd.

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

5

January 30, 1978

75¢ a copy; \$18/year

NEWSPAPER



'Just for Fun'

That's why programmer/artist Kerry Jones creates artistic designs like this one, entitled "Nova," using curve-fitting algorithms. See story on Page 16.

Package User Finds One Good Thing Leads . . .

By Don Leavitt
 CW Staff

NEW ORLEANS — As the use of application packages grows, the number of installations using or considering a second or third system from the same vendor is also growing.

William B. Riley & Co. is

CW Special Report on
 "The Art of Applying Application Packages" follows
 Page 48.

such an installation and its experience has been generally good, according to DP manager David Henry. The company has picked carefully, bypassed offerings that seemed too rich for its needs and taken advantage of special situations.

Riley is the nucleus of a conglomerate with subsidiary corporations in the food, food service, chemical and leasing industries. The DP center here currently has an IBM 360/30 and a 360/40, each with 128K memories, two tape drives, four disk drives and unit record peripherals under DOS.

With five programmer/analysts (including one supervisor), three operators and seven keypunchers, the center averages two and a half shifts a day five days a week, although the markets in which the subsidiary corporations operate — coffee, for example — often put unpredictable loads on the systems.

By early 1976, Riley had installed a payroll system from Management Science America

(MSA), an accounts payable system from McCormack & Dodge Co. (M&D) and a pair of utilities from other vendors. Riley wasn't even looking for anything new when M&D approached Henry six months ago.

Getting ready to market its
 (Continued on Page 4)

A 1M-Byte System

M/600 Doubles DG Mini Power

By Esther Surden
 CW Staff

WESTBORO, Mass. — Data General Corp. has continued the trend toward larger and larger minicomputer systems with the introduction last week of the Eclipse M/600, a system said to be twice as powerful as any previously offered by DG.

Designed specifically for business, educational or data analysis and reduction applications with a large number of users working on different tasks concurrently, the 1M-byte system can be compared to the Hewlett-Packard Co. 3000 Series II and the Digital Equipment Corp. PDP-11/70, DG said.

The system cannot be compared to the recently introduced Digital Equipment

Corp. VAX/780 system because VAX offers "a different mix of capabilities" from the M/600, the firm noted. VAX was designed primarily for scientific computational ap-

plying with existing standards," the "restricted" report obtained by *Computerworld* said. "As a result, potential cost savings available through competitive procurements are not being fully realized," according to the report, which estimated those savings at more than \$500 million per year.

Commerce Draws Fire

In arriving at the cost estimate, the GAO said \$450 million is being spent yearly to convert from one nonstandard higher level language to another version of the same language. Furthermore, the lack of a hardware I/O interface standard cost the government at least \$100 million in 1969, the report said, estimating the loss "is much greater now."

The problem may get even more expensive in the future, the report indicated, because the government expects to replace 80% of its general-purpose computers — 8,500 systems — by 1985. Many of these will have to be replaced on a noncompetitive basis since there are few standards.

The basic reason for the lack of progress in this area — and the subsequent high costs — is that the Department of Com-

merce has relied too heavily on the private sector for standards development and has not managed its internal resources well, the report contended.

"Progress in the standards program has not been good because the government has depended too much on the commercial sector to develop standards," the report charged (see Page 5).

"Only 10 of the 29 federal standards have been developed independently," the report noted, adding "GAO found that slow progress has been made in developing commercial standards because large manufacturers can and sometimes do delay the voluntary development of commercial standards."

The report also charged that Commerce has not made the federal standards program adequately visible to Congress and that budget requests for the program "failed to provide meaningful information on the scope and direction of the program which would justify additional funds."

Vendor-Unique Languages

Even though Congress, the Office of Management and Budget and the General Ser-

(Continued on Page 4)

present Eclipse users run-

(Continued on Page 8)



The Eclipse M/600 handles up to 64 concurrent users.



EDITORIAL

Editor E. Drake Lundell Jr.
Deputy Editor Ronald A. Frank
Managing Editor Nancy French
Associate Editor Donald Leavitt
Associate Editor Esther Surden
Associate Editor Molly Upton
Assistant Editor Frank Vaughan
Washington Bureau Edith Holmes
Staff Writers Catherine Arns
Jeffrey Beeler
Timothy J. Scannell
Brad Schultz

Chief Copy Editor Cheryl M. Gelb
Copy Editors Barbara T. VanSoyoc
Susan Gerrard

Photography Editor Ann Dooley
Editorial Assistant Denise Petski
Editorial Cartoonist Jim Orion

Bureaus:
London Roger Frampton
Munich Hans-Jürgen Ballnath
Asia Hidetsuna Sasaki

Contributors:
Education J. Daniel Couger
Legal Roy N. Freed
Taylor Reports Alan Taylor
Human Connection Jack Stone

SALES

Vice President/
Marketing Roy Einreinhofer
Advertising
Administrator Terry Williams
Display Advertising Mary Anne Furlong
Classified Advertising Donna Whalen
Recruitment
Advertising Kathy Steinberg
Sales Promotion
Director Jack Edmonston
Market Research Kathryn V. Dinneen

CIRCULATION

Vice-President/
Circulation Margaret Phelan
Circulation Manager Barbara Jeannetti
Customer Service Rep Peggy Kelly
Assistant Maureen Burke

PRODUCTION

Manager Lee Vidmer
Supervisor Henry Fling
Assistant Manager Peter Holm
Typesetting Supervisor Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352. Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristramstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S.—\$18 a year; Canada and PUAS—\$28 a year; Europe and Middle East—\$50 a year; all other foreign—\$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/
Publisher Patrick J. McGovern
President W. Walter Boyd
VP-Marketing Roy Einreinhofer
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Under Property Tax Law

Software Intangible: Tenn. Board

By Don Leavitt
CW Staff

NASHVILLE, Tenn. — "Software ... intangible property ... not taxable under the statute."

The words seemed to echo those of the Commerce Union Bank vs. Tidwell court decision of 1976, but a recent ruling by a hearing examiner for the Tennessee State Board of Equalization may become a landmark in its own right.

The Commerce Union Bank case was thrown out when the State Supreme Court held software was intangible and therefore not taxable under the sales and use tax statutes. The new ruling came to the same conclusion about software, but with reference to the personal property tax laws of the state.

Since this is the first decision regarding personal property taxes assessed against software, Gerald Young, the attorney for the petitioner, Cincom Systems, Inc., said he feels the ruling has significance for the entire software industry.

The Board of Equalization, through its appeals commission, acted on a petition filed by Cincom seeking relief from tax liabilities assessed against it last July for copies of its Total data base management system installed at user sites in Shelby County.

The taxing authorities had billed Cincom rather than the using organizations since Cincom — like most software houses — specifically retains ownership of its products under its lease agreements.

In contrast, Commerce Union Bank went to court because of taxes assessed against it for use of a software system leased from University Computing Co. The question of ownership was immaterial in that case.

The Board of Equalization's preliminary hearing in favor of Cincom

was issued Jan. 5. Although either party may file an appeal, a board spokesman said none had been received by last Wednesday and he expected the hearing examiner to make the ruling final this week.

Young, pleased with the decision, said he had deliberately chosen the administrative appeals route, rather than

the courts, since such an approach is much less expensive and state and the company work quietly on the problem.

"A court battle would very likely have been turned into a test case by other interested parties, and that would have added a whole layer of issues and emotions we just didn't want," he explained.

CDC Revamps Cyber Line

(Continued from Page 1)

its price, CDC said. A minimum configuration with 131,000 60-bit words of MOS memory, 10 peripheral and control processors and 12 channels costs \$2,257,536 and leases for \$45,625/mo on a three-year lease. Maintenance costs an additional \$6,811/mo.

A Cyber 175-200, configured like the 175-100 but approximately equal in performance to the current Cyber 175, costs 14% less than the present model, according to a spokesman. The purchase price is \$2,794,166 and the lease price is \$56,383/mo with a \$7,568/mo maintenance fee.

The Cyber 175-300, which CDC claimed gives 112% of the present Cyber 175's performance sells for \$3,263,632 and leases for \$65,796/mo with maintenance costing \$7,946/mo.

Each of the models in the Cyber 175 grouping is available with 196,000 or 262,000 words of MOS central memory at a cost of \$258,000 for each 65,000-word increment, the spokesman noted. In addition, he said, each can be configured with the CDC peripheral products that are standard for all systems in the Cyber 170 series.

The smallest version of the scaled-down Cyber 176s announced by CDC is rated about halfway between the largest Cyber 175-300 and the present

Cyber 176, according to the firm. The systems were developed by reconfiguring the current Cyber 176 without high-speed peripheral processing units or extended memory.

Prices for the Cyber 176s range from \$4,426,800 to \$5,226,800; with memory configurations expanding from 131,000 to 262,000 words. Lease prices range from \$81,596/mo to \$96,396/mo with monthly maintenance running between \$12,870 and \$14,870.

The entry-level Cyber 176s can be upgraded in the field to the larger unit, the spokesman said.

Memory Price Actions

CDC also reduced its add-on memory prices by 20%, the first such action since a price cut of 15% to 30% in December 1976.

The price cuts affect memory for all existing members of the Cyber 170 family except for the Cyber 176s and latest Cyber 175 models.

Adding 32K words of memory now costs \$79,295, down from \$99,120; 64K words cost \$154,645, down from \$193,305, the spokesman said.

The memory price reductions are effective Feb. 1 for new customers and will be available to existing customers with leased systems upon expiration of current contracts, he added.

On the Inside This Week

NEWS

GAO Report Comes Down Hard on NBS Institute... 4
GAO: Vendors Not Reliable in Standards Process... 5
NSA Charged With Forcing Encryption Standard... 6
Regulations Feared Curbing News of DP Work... 7
U.S. to Hold Out for Fiat Rates at CCITT Meet... 9
N.Y. City Makes DP Jobs More Attractive... 10
Memorex vs. IBM Opens in San Francisco... 11
Users Alerted to Vendors' Negotiating Tactics... 12
Burroughs Brings Suit in Knoxville Imbroglio... 13
Dartmouth Student Job Seekers Turn to T/S... 14
Computer Artist Creates 'Spieforms'... 18

EDITORIAL

Editorial: Come Now, Mr. Barr... 18
Human Connection: Detering DP Criminals... 19
Taylor Report: Readers Criticize Credit System... 19

SOFTWARE & SERVICES

User, Vendor Cooperation Pays Off... 21
'Sputnik' Drives Series/1 Terminals... 22
More Than 1,000 Titles in Updated Bibliography... 24
Business Tasks Packed... 25
Mini-Based Logic Lets Users Solve Problems... 28

COMMUNICATIONS

Execunet Ruling Opens Long Distance Options... 31
Terminal Handles Variety of Outputs... 32
Unit Does Remote Test of IBM 3600 Systems... 33
Controller Handles 8B1 Private-Line Systems... 35

TERMINAL TRANSACTIONS

User Operating Two Days After Installation... 38
Detamelle Adds CRT Compatible With Teletype... 38

SYSTEMS & PERIPHERALS

User Takes Off With Upgrade... 39
Disk Exerciser Designed to Test IBM-Like Drives... 43
Improved Inks Sought for OCR Applications... 44
Nonprofit Group Reaps Savings in Data Entry... 45
Airline Uses RJE to Speed Jobs, Reduce Errors... 48

MINI WORLD

Basic/Four Tops in Survey... 49
In Case of System Failure, Where to Turn?... 53
Oil Firm Using Series/1 to Monitor Loading... 54
Club Swings Savings With Modular Machine... 55
System Conveys Savings to Supplier of Belts... 56
Canadian Hotel Gets Control of Back Office... 58

MICROCOMPUTING

D.C. Expo Features Lesser Known Gear... 59
Lear Adds Peripheral Duo... 81

COMPUTER INDUSTRY

Floppy Drive Sales to Grow 41%/Year... 63
IBM 3032s May Go to Bank of China... 63
IBM Earnings Set Record for Year, Quarter... 64
NCR Checks Up 50% Rise in Earnings for 1977... 65
Bubble Memory Sales Seen Thriving by '80s... 66
DG Planning More Expansion Outside Mass... 67

FIRST CLASS

**DOS, DOS/VS users:
You are no longer
restricted to the
beginners' slope
and the rope tow.**

**(You can now take the Syncsort
chair lift right to the top!)**

Call (201) 568-9700.

**Located at
the summit of
Mt. Sort.**

OVERSEAS REPRESENTATIVES —

Brussels: CAP/GEMINI Belgium
Dusseldorf: CAP/GEMINI GmbH
Geneva: CAP/GEMINI Switzerland
Hague: CAP-GEMINI/PANDATA
Johannesburg: Computing Benefits Ltd.
London: GEMINI Ltd.
Melbourne: Shell Oil Co. of Australia
Milan: SYNTTAX
Paris: CAP/SOGETI PRODUCTS
Stockholm: BRA
Tel Aviv: ADVANCED TECHNOLOGY, Ltd.
Vienna: CAP/GEMINI GmbH

SYNCSORT 
IBM 
OTHERS 

Congratulations, DOS and DOS/VS sort users of the world. You are about to get a fair shake at last!

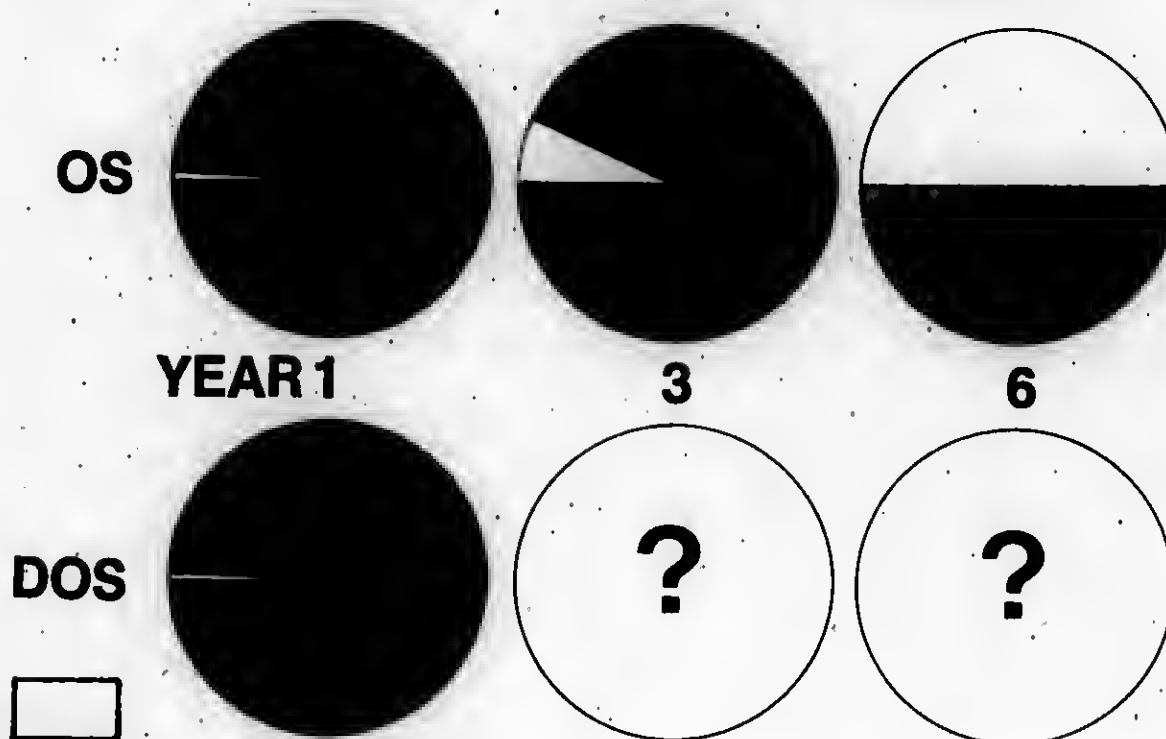
Until now you've been victims of a very curious sorting situation. While OS and OS/VS users could cut their use of machine and human resources by switching to SyncSort, you weren't so lucky.

You could only choose among lesser evils — a bunch of IBM DOS sorts that had grown "too soon old and too late smart." (Maybe it was the Computer Giant's revenge for your refusal to migrate upward on signal.)

Fortunately, with the introduction of our new SyncSort for DOS and DOS/VS, that's all history. About 1% of DOS and DOS/VS users — we call 'em the "leading edge" — have already discovered the pleasures of sorting with our new program.

Which means that the popularity of SyncSort DOS stands today almost exactly where that of our OS program stood a bare six years ago. The charts below show how it "evolutionized" OS sorting in this country:

Growth of SyncSort Popularity



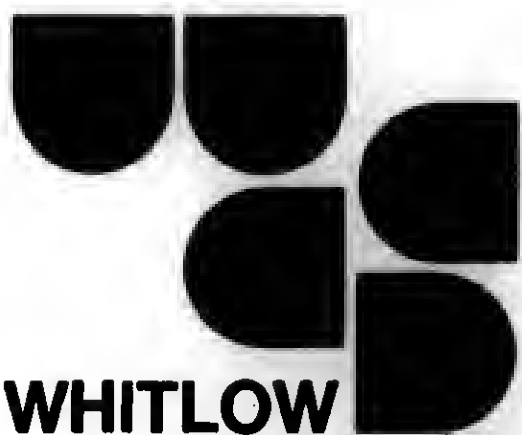
Will SyncSort DOS do as well? Our guess is that it probably will. Because it offers some advantages that no other DOS sort program can come near matching:

SyncSort does more for less. Compared with its IBM counterparts, SyncSort simply gives you more mileage for less fuel:

- 30-40% reduction in Elapsed Time.
- 30% reduction in True CPU Time.
- 40-50% reduction in Disk Work Space.
- 30% reduction in I/O Time.

And it goes without saying that you'll get the same kind of technical support in DOS that has made us famous with OS users.

So come on up to the summit and enjoy the sorting view. It sure beats clinging to a slippery rope with frozen mittens!



WHITLOW

COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Report Comes Down Hard on NBS Institute

By E. Drake Lundell Jr.

CW Staff

WASHINGTON, D.C. — The "restricted" General Accounting Office (GAO) report on standards for DP equipment saves some of its harshest criticism for the management of the National Bureau of Standards (NBS) Institute for Computer Sciences and Technology.

After 12 years in charge of federal standardization efforts, only 15 of the 65 areas identified as requiring standards have been addressed by the Institute, the draft report said.

Furthermore, a later study has indicated there are about 120 areas needing standards and guidelines in the next five years, the report noted.

The institute has claimed the standards program suffers from a lack of funds, the GAO said, but pointed out that "NBS has not developed several standards within promised timeframes even when the requested funds were provided."

Encryption Cited

As an example, the GAO noted the Institute had promised in congressional testimony to develop a data encryption standard by December 1974, but did not issue such a standard until January 1977.

In fiscal year 1976, the institute promised to develop and publish 13 standards, the report added, but only issued two during the year. One of those was a revision of a previous standard.

Moreover, NBS has estimated it would take three years to develop federal standards, but "the average time taken to develop and issue a federal standard has been six years," the report contended.

And, while claiming a lack of funds for the effort, the institute has "not provided Congress [with] meaningful budgetary information on the scope and direction of the standards program which would justify additional funds."

Although NBS and institute officials

claim that standards are their highest priority and that more than 75% of their budget goes for such projects, a GAO accounting found only about 23% of the funds are actually devoted directly to standards development.

In addition, the GAO found that the institute had failed to establish priorities for the development of standards which offer the greatest potential benefit.

"For example," the report continued, "in fiscal year 1976 only about 17% of

the institute's appropriated funds were spent to develop standards [which computer-using agencies] identified as the most urgently needed. These include programming languages, networks and data communications links and interface standards."

Further, "NBS has not responded even when priorities have been clearly established for a particular standard," the GAO charged.

For example, the institute spent an average of \$27,400 per year between

1966 and 1970 on an I/O interface standard. In 1971 Congress established that area as a priority, but NBS only increased its level of funding to an annual \$44,200 average through the next six years.

"The absence of priorities has resulted in federal resources being used to develop relatively insignificant standards having minimal potential benefit while critically needed standards have not been produced for lack of funds," GAO said.

Federal Standards Process Hit by GAO

(Continued from Page 1)

vices Administration have cited the use of higher level languages as a way to reduce conversion costs, the report pointed out that as of June 1977 only Cobol had been standardized in the government.

"As a result, agencies are using a variety of languages which are generally oriented to a particular vendor's equipment. The programs written in these languages must be converted at considerable expense when agencies change computer vendors," the report said.

The Geological Survey, for example, uses two nonstandard higher level languages for its scientific applications — and it would cost that agency over \$5 million to convert to another vendor's equipment, the report said. The National Institutes of Health "also estimated it would cost \$8.6 million to convert its programs written in non-standard high-level languages."

Cobol Problem

Furthermore, even in the one area where there is a standard — Cobol — many agencies are not adhering to it.

"Computer manufacturers, however, also offer nonstandard Cobol features designed especially for use with their equipment. These vendor-unique features may sometimes enable agencies to optimize the efficiency of their com-

puters and reduce operating costs.

"Their use ... usually makes the programs unworkable on another manufacturer's equipment and necessitates partial program replacement if other equipment is used. Thus, although programs may be written in what is thought to be a standard language, the indiscriminate use of nonstandard language features can make the pro-

grams vendor-dependent and can result in higher conversion costs," the report said.

For example, it noted that the National Institutes of Health had estimated it would cost \$3.7 million to convert its Cobol programs to run on another vendor's equipment, even though it was supposed to be using a standard Cobol.

Firm Finds Use of Package Leads to Many Advantages

(Continued from Page 1)

General Ledger/Financial Analysis (G/L Plus) package, the vendor asked the manager if his shop would serve as a beta test site. "In all candor, we weren't in the market for a ledger system then. We thought we could limp along for another year or two with what we had," Henry recalled last week.

But the "limping" was getting worse. It was caused by a 10-year-old system created originally in Autocoder for an IBM 1401 and converted twice, first to Cobol D then to ANS Cobol. It had also been modified on occasion, but still worked with only one corporation at a time.

As a test site, Riley was offered the package at a cost considerably below its current list price. Even so, Henry and his crew took time to make a cursory evaluation of other systems before accepting the M&D offer.

During the evaluation, one of the staff attended an MSA seminar. He came away impressed with the system, but felt it was too high-powered for Riley's needs.

"There just seemed no point in getting more capability than we'd ever use — especially at a cost well above the special M&D cost," Henry said.

Once he decided to try G/L Plus, the manager spent three days at an introductory training session on the package's features. In October or November, the programs were compiled here and the Riley crew began testing with on-site help from M&D.

Mixed Blessing

One of the features that clearly impressed Henry is the Translator program that front-ends the actual ledger processing logic, converting available files into formats acceptable to G/L Plus. This meant output from existing systems — MSA's payroll package, for example — could be used "as is."

Henry noted the M&D system is "very flexible" but said that is a mixed blessing; it requires users to be very

conversant with the system and with accounting to make the system work the way they want. "It can't just be picked up one day and used the next," he realized.

Global Approach

He liked the G/L Plus approach to file creation with features the vendor calls High-Volume Add, High-Volume Change and High-Volume Delete. These permit global modifications to the file with single transactions, he noted.

And the three levels of report writer within the package also impressed the manager. The high-level report system supports consolidations, period balance sheets, profit-and-loss statements and other corporate-level documentation.

Since the old ex-1401 system could handle only one corporation at a time, this has given Riley the opportunity to bring all the divisions under one system. But the secondary report facility also allows detailed daily and weekly posting of accounts within each division.

Finally, the auditor level report writer allows the user to get into each account and analyze it virtually any way he wants. At all three levels, individual reports can be generated by "filling in the blanks" on a single formatted coding sheet, Henry said.

One Disappointment

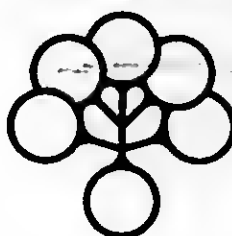
The DP manager was understanding, but still disappointed, that some of the manuals needed to gain a full knowledge of the system are not yet available. They're not really late, he admitted: "We knew that as an early user, we'd have this problem. And even now we have enough documentation to make the system work."

Beyond that, the company has sent two more staffers to an advanced features class and, when last contacted, was just about to close out the old fiscal year and start up the new, all under G/L Plus.

Run ISAM Files on 3330-II and 3350's with DOS/VS Rel. 34

With The Value Computing Advanced Function ISAM 3330-II/3350 Native Mode Support

- ☒ No reassembly of Your Programs
- ☒ No Changes to Your JCL
- ☒ Completely Transparent to Operations



Value Computing Inc.
The Computer Operations Company

Please send me more information about ISAM Native Mode Support

NAME _____ COMPANY _____
TITLE _____ PHONE _____
ADDRESS _____ CITY _____ STATE _____
ZIP _____ CPU _____ OPERATING SYSTEM _____

Mail to: VALUE COMPUTING INC.
300 VCI Building, W. Marlin Pike
Cherry Hill, New Jersey 08002

Or call toll-free 800-257-8242

Report Points to I/O Interface

GAO: Vendors Not Reliable in Standards Effort

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — The delays in developing an I/O channel interface standard provide a case study that shows why the government should not rely on commercial firms for the development of standards, a "restricted" General Accounting Office (GAO) report on problems in the DP standards program indicated.

The need for a common I/O interface was recognized in the government in the early 1960s, the draft report said, and in 1969 a GAO study estimated that the government could save more than \$100 million yearly if such a standard existed.

However, most work on the standard was left to commercial firms, which were dominated at that time by the large mainframe makers — and those manufacturers had little interest in developing such a standard, the report claimed.

The American National Standards Institute (Ansi) Committee X3 established a subcommittee to develop such a standard and work began in March 1967. "But after 20 months and 15 meetings, the only product developed was a recommendation that a permanent committee be established," the report noted.

That recommendation was adopted and the committee formally met for the first time in February of 1969. "During the next seven years, the activities of this technical committee, now known as X3T9, centered on monitoring and complicating the efforts of the [International Standards Organization (ISO)] to develop an international interface standard," the report charged.

Proposal Volleyed

As early as 1961 the international group had recognized the need for standards in this area, and in 1969 the Japanese submitted a formal proposal that was adapted from the design of the IBM I/O interface, according to the GAO report.

At the time of the proposal, eight members of the 11 on X3T9 represented computer mainframers, and that group was given the responsibility of formulating the U.S. response to the Japanese proposal.

The group contended the proposal lacked "sufficient technical detail," which caused the Japanese to offer a more detailed plan in 1970. The U.S. group did not take a pro or con stand on the new proposal, but made several suggestions for additions to it.

The ISO group working on the problem adopted those recommendations and in 1972 asked all member countries to submit a channel interface standard that met them.

Japan was again the only country to respond, offering a third proposal in 1972, but "in June 1973, X3T9 declined to submit any technical evaluation of this third proposal because it believed support for an I/O channel interface standard was diminishing," the GAO report pointed out.

However, 16 months later, Ansi told the committee to answer and it provided technical comments on the third Japanese proposal.

Japan responded in 1975 with a fourth proposal incorporating the re-

quested changes. The U.S. group then submitted more comments, "but said that [it] did not imply acceptance of the proposal even if its recommendations were incorporated," GAO noted.

Opposition Decision

Next the U.S. led a move to, in effect, table the Japanese proposal and an ad hoc group was set up to clarify the proposal and incorporate all the recommendations.

But in October 1976, X3T9 told the international body it "was taking a negative position on the Japanese proposal because it was far too complex, attempted to satisfy too broad a range of requirements and would be very

difficult to implement, interpret and maintain.

"X3T9 also stated that much of the complexity was the result of its previous comments and recommendations," the report noted.

"The Japanese... officially expressed regret... that its proposal was unacceptable and chided those who contributed vigorously to its complexity and then opposed the result as 'far too complex,'" the study found.

Goals Not Shared

Therefore, the GAO concluded, "although the explicit charter of X3T9 was to develop an interface standard, the history of this effort shows that

such committee objectives are not always shared by some of the participants.

Rather than working to develop the standard, the members of the committee from the mainframe makers "sent employees to X3T9 in order to vote against any interface standard," the GAO added.

Because of this and the policies of Ansi that permit it, the government "has an increased responsibility, not only as a federal user of computer technology but also as a representative of the general public, to take unilateral action when its and the public's best interests are not being served," the GAO said.

SHADOW II SHAVES ANOTHER 30% OFF ON-LINE APPLICATION PROGRAMMING TIME

On-Line Screen.Map Generation is a new feature just introduced for the Shadow II TP Monitor.

It eliminates the coding of 3270 screen definitions by producing them for you from the screens you design at the tube.

The Cobol Command Language has been enhanced, Logging and Recovery is enhanced, also new testing aids and new documentation.

Shadow II version 2.1 continues to make TP applications development for IBM 360/370 users easier and easier. But then what would you expect from the world's fastest-growing TP Software Company?

Return the coupon to Altergo Software Inc., 55 William Street, Wellesley, Massachusetts 02181. Telephone (617) 237-6132, or telephone your nearest Regional Office for more information.

New Jersey	(201) 224-8080
Chicago	(312) 259-8373
Atlanta	(404) 482-8827
Dallas	(214) 233-2414
San Francisco	(415) 332-4125
Montreal	(514) 769-4158

Shadow II
The World's most advanced TP Monitor
altergo

Please send me the
Concepts and Facilities Manual right away.

Name

Title

Organization

Address

Zip Phone

My computer is IBM Op. System

Present TP Package

Our need is ☐ immediate

☐ 3-6 months

☐ over 6 months

NSA Forced Encryption Standard, Critic Says

By Brad Schultz
CW Staff

PALO ALTO, Calif. — The National Bureau of Standards (NBS) ignored criticism of its IBM-developed Data Encryption Standard (DES) because of influence from the intelligence community, a Stanford University professor here has charged.

Prof. Martin Hellman claimed that the NBS invited comments on the standard when it was first proposed, but ignored the critical response of Hellman and colleagues because of pressure exerted by the National Security Agency (NSA).

However, NBS spokesman Dennis Branstad — a former NSA employee — has said that Hellman's argument was

taken into account, but was found by NBS to be derived from invalid assumptions.

Basically, Hellman argued that a machine can be built with existing technology to cost-effectively break DES [CW, Dec. 5].

This argument is predicated on the standard's 56-bit keylength that sets the number of distinct key possibilities at 2^{56} or about 72 quadrillion.

Hellman's envisioned machine would employ a "brute force" attack, exhaustively trying possibilities until the key were found to decipher the target data.

The machine can be built of parts now costing \$20 million, on the average reaching a solution within 12 hours at a present cost of \$5,000, ac-

cording to Hellman, who has predicted that declining hardware costs will reduce these figures within 10 years to \$200,000 and \$50, respectively. These dollar estimates are accurate to a factor 10, he said.

Hellman and Stanford colleague Whitfield Diffie have indicated that no organization could afford to build a

he said. "As such, it is schizophrenic — trying to give our military and diplomatic corps the best possible codes, but trying to keep them from other countries. It would therefore resist a publicly available cipher that it cannot break."

Branstad told CW that charging NBS with NSA infiltration is comparable to

What Is NSA?

FORT GEORGE G. MEADE, Md. — The National Security Agency (NSA) here was established in 1952 to be the national authority for all United States communications security activities and is an affiliate of the Department of Defense, according to a brochure furnished by the agency.

In 1972 the Central Security Service was established to provide a more centralized cryptologic organization under the NSA's direc-

tor; since then, the full name has been National Security Agency/Central Security Service (NSA/CSS), the brochure noted.

NSA/CSS conducts one of the federal government's leading research and development efforts in specialized communications equipment, with past breakthroughs including the first large-scale computer, the first solid-state computer and certain applications of high-density storage technology.

Here's your chance to clip us.

So we can send you our new MAS-80 brochure.

Because MAS-80 is worth knowing about. It's our new generation and family of manufacturing application systems. Designed to support manufacturing operations in six important functional areas. Engineering Control. Inventory Control. Production Control. Distribution Order Entry. Financial Control. Business Planning. And to support them efficiently, effectively and economically. Now and in the 80's.

For your free MAS-80 brochure, just fill in the coupon and return it to us. After all, it's not often you get a chance like this.

Martin Marietta Data Systems
We Build & Run Systems



Mr. Dick Nemerson
Martin Marietta Data Systems
300 East Joppa Road
Baltimore, Maryland 21204

NAME _____
CO. _____
TITLE _____
PHONE () _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
Type of computer now used: _____
Use/plan to use DBMS? Yes ☐ No ☐
If "yes", which one? _____

machine capable of breaking DES if its keylength were 128 or 256 bits, entailing a much greater number of distinct key possibilities to search.

Branstad has countered that "the Data Encryption Standard meets all of the requirements of the federal standard that [NBS] originally set out for ... it provides more than adequate security in all of the applications that [NBS] can possibly find."

Hellman has said his machine would be comprised of one million parallel search chips, each testing key possibilities at the rate of one per microsecond; but Branstad told *Computerworld* that such a machine cannot be built, because chips cannot be made to match the performance Hellman requires.

However, Hellman has pointed out that this NBS position maintained by Branstad presumes that at most 1000 parallel search chips can be used, testing key possibilities at the rate of one every 40 microseconds.

Hellman claims the intelligence community can afford to build the "brute force" machine and employ it to clandestinely monitor data traffic encrypted in conformity with DES.

He asserted that NBS ignored his criticism "because it had been infiltrated by the ... [NSA]."

"NSA is the American code-making and code-breaking intelligence agency and is reputed to have a larger budget than the Central Intelligence Agency,"

charging Harvard University with infiltrating Stanford. Both Hellman and Branstad have said that, as NBS began to concern itself with cryptological matters, it was inevitable that some NSA personnel, such as Branstad, would be motivated to seek NBS employment.

DES Products Available

To date several vendors have introduced hardware and software DES product lines, including IBM [CW, Dec. 12], Motorola Corp. [CW, Jan. 9] and Rockwell International. Branstad said that Intel Corp.'s encryption hardware has just been validated by NBS and Fairchild Semiconductor has confirmed that it will soon follow with its line.

Branstad said he considers encryption the best-known data protection methodology.

Hellman has indicated that dissemination of these products enhances the vulnerability of its users to clandestine monitoring by large corporations and government agencies — not necessarily from within the United States.

"We understand that there is a tradeoff between the military and civilian needs in this matter, but are alarmed that one of the interested parties (NSA) seems to have made the decision as to whose needs take precedence. That is a dangerous manner of government," he said.

CDC Institutes Adopt CMI

MINNEAPOLIS — Control Data Corp. is switching to computer-managed instruction (CMI) in its 13 domestic Control Data Institute to improve DP instruction for students.

CMI is expected to give teachers "twice as much time to spend with individual students," according to David F. Henault, general manager of the institutes.

It will relieve teachers of many administrative tasks as well as give students an opportunity to work through course materials at their own pace rather than at the pace of a class.

CDC's Plato terminals will be used to

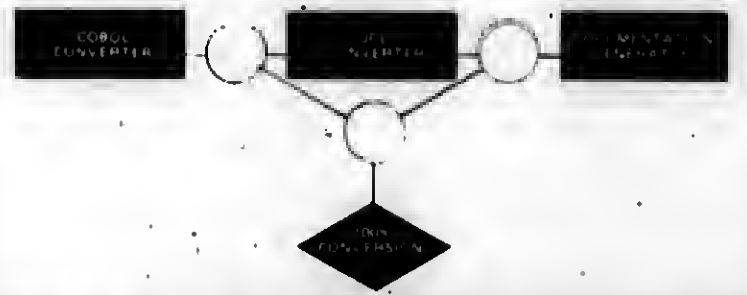
present instructional materials in the form of text, drawings and animated graphics. Fifty-three Plato terminals are now installed in various Control Data Institutes.

The CMI program records and analyzes student performance at the terminal and provides tests at the appropriate time.

"Individualized instruction has always been considered a most effective form of education, but difficult for teachers to manage," Henault said. "We believe proper application of the computer's power through Plato's interactive CMI will improve the learning process."



DOS TO OS



\$10 PER COBOL PROGRAM

- I. FOCUS CONVERTS OOS COBOL SOURCE CODING TO OS
- II. FOCUS CONVERTS OOS JCL TO OS JCL
- III. FOCUS PRODUCES OPERATIONS DOCUMENTATION

EXPERIENCED, PROVEN, TESTED AND IMPLEMENTED
FULL SUPPORT; ON SITE INSTALLATION AND BRIEFING SESSIONS
ELIMINATE COST OVER RUNS
ADDED EXPENSE OF MAINTAINING TWO OPERATING SYSTEMS
EXPENSIVE OUTSIDE SERVICES



24 MANOR HOUSE ROAD, NEWTON CENTRE, MA 02159
(617) 964-1894

IEEE Investigating Itar

Regulations Feared Curbing News of DP Work

By Brad Schultz
CW Staff

WASHINGTON, D.C. — Several computer scientists have joined with technicians from other disciplines to protest a set of federal regulations they feel could effectively bar them from publishing or discussing their work.

The federal government has interpreted the International Traffic in Arms Regulations (Itar) as prohibiting the communication of certain unclassified, nonproprietary data through such means as professional papers or even informal discussions if that data is thereby accessible to foreign nationals, the scientists claim.

The Institute for Electrical and Electronics Engineers (IEEE) is now investigating the charges, and with help from legal counsel is working to develop a legal interpretation of liability, according to spokeswoman Betty Stillman.

DES Sparked Protest

The protest was started in the computing world by several critics of the Data Encryption Standard (DES) developed by IBM and adopted by the National Bureau of Standards [CW, Dec. 5].

These critics were alarmed by a letter sent to IEEE by an employee of the National Security Agency (NSA) — the federal communications security authority — stating that they were subject to arrest under Itar if they read papers critical of DES at a symposium sponsored by IEEE's Information Theory Group.

Obtaining defense counsel in anticipation of being prosecuted, the scientists read their papers anyway. The NSA has so far declined any comment on the matter beyond disavowing association with its employee's action, and no prosecution has ensued.

Prior to its symposium last fall, the Information Theory Group appointed a subcommittee to investigate the letter-writer's veracity and motivation.

Last month the subcommittee's chairman, University of Hawaii Prof. David Slepian, conveyed its findings to IEEE President Ivan Getting. The letter was apparently the action of an "isolated individual," but Itar does seem an "unconstitutional" threat to engineers' civil liberties, the subcommittee told Getting.

The group urged further study by IEEE legal counsel in an effort to decide how the organization should respond.

IEEE is far from reaching any conclusions in its study, Getting told *Computerworld*, because "it's too complex a problem." However, the institute has advised its concerned members to show "caution and good sense" on an individual basis in dealing with their predicament.

Three Bans

Itar is comprised of parts 121 - 128, Title 22, Code of Federal Regulations, and is administered by the Office of Munitions Control (OMC) within the State Department's Bureau of Politico-Military Affairs. Part 125, entitled "Unclassified Technical Data and Classified Information," has especially disturbed the DES critics.

This section defines three types of technical data requiring OMC ap-

proval for export: "any technology which advances the state-of-the-art or establishes a new art in an area of significant military applicability in the United States"; data pertinent to weapons categorized under Itar's U.S. Munitions List; and information designated to be classified by Itar.

Itar stipulates that communicating such data to foreign nationals "through visits abroad by American citizens (including briefings and symposia), and ... in the U.S. (including participation in briefings and symposia)" without OMC approval is unlawful export, subjecting violators to imprisonment and/or a fine and other sanctions, both criminal and civil.

The DES critics fear Itar can be used against them both because oral and written communication of their dissent could be construed by OMC as illicit export of technical data advancing the state of a strategically important art and also because they work in the area of cryptology, an area concerned with devices categorized under the Munitions List as "auxiliary military equipment."

They claim they might be barred from speaking at symposia since foreign nationals might be in the audience.

However, a U.S. Customs Service spokesman indicated that Itar prosecutions in the computing world have so

far been confined to cases of surreptitious hardware sales behind the Iron Curtain, rather than illicit data exports. Customs normally investigates possible Itar violations, usually on OMC's recommendation.

Another Warning

A second IEEE group, the Aerospace and Electronic Systems Society (AESS), is also alarmed about Itar and is also pressing for legal clarification and direction on the matter from IEEE as a whole.

An article indicating the "potential severity of the problem for IEEE members" was published in AESS' November. (Continued on Page 8)

Why not the best?

We need top-flight people to stay first among tough competitors. If you are the best in your field we would like to talk to you — we are too. We're specialists in on-line systems. Perhaps you know our products:

- **TASK/MASTER**, the world's most successful independently-supported telecommunications monitor; easier to install, easier to use, flexible, and with incomparable features.
- **Flexicom**, the only 360/370-compatible hardware/software system for stand alone, front-end, or distributed networking.
- **KEY/MASTER**, the on-line data capture system that reduces or eliminates programming effort for any data entry application.

We need people for nearly every aspect of our business:

- Marketing Representatives, with commission sales responsibility for all TSI products.
- Customer Service Representatives, with field-level product support responsibility.
- Product Development Specialists, with project-level design and programming responsibilities for our new products.

- Educational Services Representatives, to extend our successful Customer Education Program to more topics and people.
- Technical Services personnel, to provide centralized and specialized product support to our regional offices.

Openings exist in our Western, Midwestern, Eastern, and European regions. If you're the right person with only a modest amount of training and experience, we'll train you (a college degree is required, however). If you're at the pinnacle of your career and want to go higher, let us know; our opportunities are unmatched.

TSI has just completed its 11th successful year. We have an industry-leading reputation for on-line systems expertise. Our major asset is our people, however, who we know to be first in our field. In return, we offer excellent benefits, top wages, and an enjoyable and challenging work environment. If that appeals to you, let us know by sending a biography or resume in confidence to our personnel department at our Norwalk address.

If you would like additional information about TSI or our products, we'd be glad to send it to you. Just call or write.



turnkey systems inc.
111 east avenue
norwalk, connecticut 06851
(203) 853-2884/telex 964351

839 mitten road
burlingame, california 94010
(415) 697-1833

tsi international, ltd.
19 bedford row
london WC1R 4EB, england
01-405-7304/telex 23302

additional representation worldwide



Eclipse M/600 Continues Trend to Big Minis

(Continued from Page 1)

ning under the firm's Advanced Operating System (AOS) can move to the M/600 without modification, while programs from other Eclipse and Nova systems are compatible at the object mode level, the spokesman said.

The company is aiming the M/600 in part at users looking for ways to off-load their mainframes rather than upgrading.

I/O Management

Several features of the M/600 differentiate it from previous Eclipse systems. For one, there are three levels of I/O management designed to cope with the bottlenecks that could occur when a large number of users access the system, the spokesman said. The M/600 accommodates up to 64 users, he added.

The Burst Multiplexer Channel, described as a direct communications pathway between main memory and high-speed disk systems, features an aggregate data transfer rate of 10M byte/sec. Since users can attach up to eight controllers to the system, the M/600 can potentially accommodate up to 6G bytes of storage, DG said.

The second level of I/O control consists of the standard data channel which handles communications between the CPU and medium-speed peripheral equipment. The standard channel also serves as an interface between the CPU and the Input/Output Processor (IOP) which handles low-speed devices.

The IOP is actually an Eclipse S/130 system with 64K bytes of its own local memory, the spokesman noted. It off-loads the CPU by buffering low-speed

input, performing error checking and transmitting the data to the CPU "one logical record at a time."

The M/600 CPU incorporates the standard microprogrammed Eclipse instruction set with some extensions for business and scientific applications, according to the spokesman. The extensions for business, for example, include a character instruction set and a decimal/edit set with console functions said to aid programmers in tracing and debugging.

Scientific extensions allow the system to handle floating point and aggregate operations such as exponentiation, logarithms and trigonometric functions. Both single-word and double-word instructions are used.

Memory Management

A memory management technique called Demand-Paged Memory reportedly divides each user's memory space into 2K-byte pages and allocates active pages to main memory; non-active pages are kept on disk.

The facility, which works with an AOS page replacement algorithm resident in the executive, predicts what pages will be needed by any given user and moves those pages to main memory, the spokesman explained.

Information on page usage is maintained in hardware. This information is used by the executive to determine the mix of pages that must be available, he added.

Up to 1M byte of error-correcting MOS memory is available on the M/600 while core memory is expandable to 512K bytes. The MOS memory with the system has read/write cycles

of 500 and 700 nsec respectively, while core has an 800 nsec cycle time.

The M/600 communicates with other systems via RJE 80 and Hasp II emulation software packages which are supported by synchronous line handlers. Up to 15 of the M/600 systems can be interconnected by a Multiprocessor Communications Adapter, DG said.

Languages available on the M/600 include Fortran IV, Fortran 5, extended Basic, DG/L — a system programming language — and the recently announced PL/I. The firm "will offer Cobol" in time, the spokesman said.

The company also redesigned the packaging of the system for easier maintenance. Printed circuit boards mounted vertically and clustered by function are contained in a card frame over an air-cooling blower system.

An M/600 with 32K bytes of core, 96M bytes of disk, a 1,600 bit/in. magnetic tape unit, 60 char/sec Dasher terminal printer, 300 line/min printer, eight asynchronous ports, a 1,200/2,400 bit/sec synchronous line interface, the AOS operating system, PL/I, Fortran IV, Fortran 5, Basic and RJE 80 costs \$164,100.

A larger system with 512K bytes of MOS memory, four 190M-bytes disks, two 2M-byte fixed-head disks, two 1,600 bit/in. magnetic tapes, a 600 line/min printer, a 600 card/min card reader, 60 char/sec printer console, 32 asynchronous ports, two high-speed synchronous line interfaces, AOS, PL/I, Fortran IV and 5, Basic, DG/L and RJE 80 costs \$325,800.

Systems will be ready for delivery in April, DG said from its headquarters at Rte. 9, Westboro, Mass. 01581.

5500 & SSA

210 days after the end of a benefit plan year, IRS and DOL want your annual report, including form SSA, a listing of all terminated employees with a vested accrued benefit.

If your present personnel software can't handle the job, Joe Nestor, (617) 851-4111, Wang Laboratories, Inc., Lowell, MA 01851 can tell you about a new Wang System that will.

WANG

Itar Seen Curbing DP News

(Continued from Page 7)

ber newsletter. The author, David K. Barton, noted that one of his associates wrote an unclassified "basic physics" paper on reflection of microwaves from the earth's surface that was dis-

approved by OMC as "not in the furtherance of the security of the United States."

In London to prepare for a joint symposium of IEEE and its UK counterpart, the Institution of Electrical Engineers, Barton was surprised by the disapproval and soon learned of Itar's nature from discussion with the U.S. embassy's scientific officer.

In his article, Barton pointed out that "conversations with foreign nationals at IEEE conferences here and abroad are made subject to the provisions of Itar."

A consulting scientist for a major U.S. defense contractor and associate editor of AESS' *Radar* magazine, Barton told AESS "there remains a threat of legal sanctions against anyone who enters into informal discussions within the field of radar or related propagation and physical principles at an IEEE conference here or abroad."

"All of us are aware of restrictions on discussing classified data or company proprietary data, but there is no guidance available on unclassified data which has not been cleared specifically by a government agency for 'public release,'" he said.

Barton does not "understand how we can hold meetings and expose our members to legal sanctions without obtaining a more relaxed interpretation of these regulations." He predicted that "if IEEE doesn't face up to it, the constraints will obviously become tighter rather than looser."

There's One Number for the Number One Computer Lease

(703) 683-4606

Call Us.

We've been solving leasing problems for end users and brokers since 1967, longer than most leasing firms, and doing it better, too. CIG has been a leader in the lease/purchase field, offering a variety of flexible financing plans. Short-term or long-term leasing, Equity funding, Walkaways. There's a CIG plan to meet your needs.

Tell us what you need and we'll help you get it. With full financing, flexible leasing terms, the latest IBM/370 systems and plug compatible equipment, and a Technical Service Center which stands ready to help you get the most from your computer investment. Plus, we have a sizable portfolio of IBM/360 systems.

Whether for your own use or for a client, leasing through CIG can save you time and money—your two most precious resources. All negotiations are held in strict confidence for your protection. Our first quote will convince you . . . when you're talking leasing, you're talking our language.

Call CIG today (703) 683-4606.

CIG

CIG Funding Corp.
303 Cameron Street,
Alexandria, Virginia 22314

Call CIG: (703) 683-4606

Private-Line Pricing at Stake

U.S. to Hold Out for Flat Rates at April CCITT

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The U.S. will hold out for the continuation of that flat-rate pricing for leased private lines when it meets with the rest of the world at the spring conference of the Consultative Committee on International Telephone and Telegraph (CCITT).

Hammered out during hot debate between U.S. international carriers and multinational DP companies at a recent meeting here, the position to be presented in Geneva in late April seeks to answer European and Japanese efforts. To end flat monthly rental rates for leased communications circuits.

The Italian government and British Cable and Wireless Ltd. (C&W) have asked the CCITT to study the pricing of leased circuits with a view toward making the rates for private lines dependent on the number of messages sent over them. C&W also hinted at pricing the lines according to speeds [CW, Dec. 26-Jan. 2].

The U.S. acknowledged the concerns expressed by the Italian government and by C&W, but pointed out that the kind of study they recommend "may ultimately have a substantial impact on the current worldwide rate structure."

Unequal Burdens

In an effort to define the study, the U.S. draft noted that a flat rate for a private communications line is effectively the charge for the maximum volume of information that can be transmitted over the circuit.

"If administrations were to replace flat-rate charging with volume-sensitive rates for each speed or service, some customers might pay less while others might pay more."

"Volume or duration charging may not safeguard an administration's revenues because the present method already assures an administration of fixed income," the draft said.

Revisions to the current rate structure should be weighed against the impacts on revenues, on potential com-

patibility problems and costs facing leased circuit customers and on public service networks, including emerging public data transmission services, the U.S. argued.

Asks Misuse Documentation

Picking up on a concern voiced by C&W, the U.S. draft stated "It appears that some administrations believe that leased circuits may have been misused by customers and are therefore suggesting volume-sensitive pricing as a means of controlling the use" of private lines.

The U.S. noted its own international carriers have tariffs and regulations prohibiting such ordinary message

switching by DP customers and asked that these allegations be proved.

If misuse is to be studied, the U.S. said, consideration should be given to the current prohibitions and safeguards used by the carriers and the DP firms to prohibit unauthorized communications services.

The U.S. wants to have instances of misuse documented; it also wants to know how significant these are in the context of all the traffic carried by each country's communications lines.

Other Efforts

The Association of Data Processing Service Organizations (Adapso) has promised to submit an additional state-

ment to the CCITT explaining the safeguards its members employ to prevent third-party traffic on domestic and international leased circuits.

The Computer and Business Equipment Manufacturers Association (Cbema) will submit a position paper in Geneva detailing why transparent communications lines are essential to business and government interests.

Members of the U.S. CCITT National Committee have argued that the privacy of messages and data sent over communications circuits cannot be maintained if the pricing of the lines is volume-sensitive. That committee plans to send its views to Europe and Japan.

NAC's Frank Named Fellow by IEEE Board

GREAT NECK, N.Y. — Dr. Howard Frank, president of Network Analysis Corp. (NAC), has been elected a fellow of the Institute of Electrical and Electronic Engineers (IEEE) by that organization's board of directors.

The IEEE board cited Frank for his contributions to large-scale network design and analysis.

Frank is a co-founder of NAC and former special consultant in the executive office of the President.

Security Seminar Set

ORLANDO, Fla. — Data Security Workshops, Inc. will sponsor the 19th International Operational Data Security Workshop at the Hilton Inn Gateway here at Disney World on Feb. 20-22.

Fee for the workshop is \$480.

More information is available from Robert J. Wilk, President, Operation Data Security Corp., 6 Swarthmore Lane, Dix Hills, N.Y. 11946.

Datamedia Video Terminals

working wonders

at thousands of user sites worldwide

Do our users know something you don't know?

Maybe so. For as users of our family of general-purpose alphanumeric display terminals, they've gained firsthand knowledge about Datamedia and our Elite video terminal family. ■ They know that Datamedia stands for performance-proven video terminals at a moderate price. ■ They know that in nearly 10 years of producing video terminals, we've established a new standard in terminal reliability. ■ And they know that we stand behind the thousands of video terminals shipped to users in industry, business services, government, education, medicine, and research around the world. ■ Datamedia Video Terminals. Nice to know.

Datamedia Corporation

7300 N. Crescent Boulevard
Pennsauken, NJ 08110
609-665-2382
TWX: 710-892-1693
Sold throughout North America and the world.

Get in the know!

I'd like to know more about Datamedia video terminals.

- ☐ Please have a salesman call me to discuss my specific needs
☐ Please send me information on your complete product line

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

Wasted Dollars on DP Gear Seen Partly Buyers' Fault

BOSTON — "If purchasing managers bought industrial equipment, like forklifts, the way they buy computers, they'd be run out of town on a rail," according to Dr. Richard Levin of the University of North Carolina.

Levin, a professor of management, said companies buy systems costing millions of dollars and then let them sit virtually idle.

Quoted in *Purchasing* magazine, Levin said buyers don't have to become DP experts to make intelligent decisions on computer equipment. "Just learn enough to sift out the smoke when your company's computer guy wants to buy some new

gadget," he said.

Often, Leven said, DP people don't want to work with the purchasing department "regardless of how much money it will save." They "just don't consider it creative work," he added.

Purchasing managers can fight such resistance, he said, by pointing out to top management that the company computer is not being fully utilized and by having someone on their staff who understands computers.

"Good things happen if a computer operation has to be cost-effective," Levin said.

N.Y. City Makes Jobs In DP More Attractive

By Tim Scannell
CW Staff

NEW YORK — City officials here who have been unsuccessful in filling some 128 DP positions because Civil Service employment has not been competitive with private-sector DP jobs have solved the problem by raising starting salaries and combining job classifications to permit more rapid advancement.

The reorganization included a provision for raising the rank and pay of DP employees without requiring promotional exams — a concept dubbed "broadbanding."

The broadbanding policy was in-

troduced to help alleviate an employment problem that existed within the Human Resources Administration (HRA), a spokesman said. It takes the city months to recruit and hire qualified computer programmers and analysts because of governmental red tape, putting the city at a "distinct disadvantage" in the highly competitive DP market, Rep. Frederick Richmond (D-Brooklyn) said.

Richmond pointed out that despite a four-month advertising campaign costing the city \$29,122, the HRA was able to fill only 17 out of 145 positions that were available. Seventy-six of those offered were computer analyst and programmer positions that pay an average of \$18,500 per year plus fringe benefits and 69 were clerk positions paying approximately \$12,000 a year, a spokesman said.

Titles Condensed

City Personnel Director Thomas Roche feels that broadbanding should help to eliminate the problems faced in recruiting professional people. "We've also condensed 48 titles to 13, making them more flexible and have increased the starting salaries for many of the programmers and computer specialists," he explained. "In light of what we've just recently done, we are now competitive and comparable with the private sector," he said.

One critic of Roche's plan is Alfred Engel, the executive director of the Civil Service Merit Council. Engel is concerned that the new rules permitting city agencies to conduct nonwritten exams might lead to the appointment of political favorites. These rules do not "forbid political activity on the part of commissioners and others who give examinations," he contended.

Roche, however, disagreed with Engel, saying, "There is no such thing as political favorites because all we've done is reduce the number of job titles and put them all into the competitive classification. We are now starting to move and develop tests so that people will fill available positions from competitive Civil Service lists," he claimed.

"Just recently, in relation to what we've done with new titles and salary levels ... the Financial Information Systems Agency (Fisa), which is responsible for running our major computer-based operations, sent in a request to hire about 15 or 20 top-level, technical computer people," Roche said. The City Personnel Department has subsequently approved that request.

The superb quality of Verbatim™ removable magnetic storage media is now on a dealer's shelf not far from you.

The reason Verbatim is now so accessible is that so many of you like the Verbatim idea: noticeably better quality and durability that show up in tough everyday use. The reason? We make almost everything ourselves, because we found that we could improve on the quality that we were getting from our suppliers.

Being demanding isn't always easy. But it's good for the people who buy and use Verbatim, and it's good for the scores of companies who specify Verbatim for the equipment they make. And we enjoy doing business that way.

Information Terminals Corp., 323 Soquel Way, Sunnyvale, CA 94086. (408) 245-4400. TWX: (910) 339-9381.

In the Far East:
ITC—Far East
404 Roppongi Skyheights
3-2-21 Roppongi, Minatoku
Tokyo, Japan
Telephone: (03) 583-1981
Telex: J 47879

In Europe:
Information Terminals S.A.
Case Postale 296
1215 Genève 15
Switzerland
Telephone: 41 (22) 34-90-55
Telex: 22647 ITGE CH

For your nearest sales office call toll free: (1) 800-821-3648 (in Missouri call: 800-892-7655, Ext. 515)

Ask for it by name.

Verbatim™

minidisks

Verbatim

Dear Verbatim people:
Tell me where my nearest Verbatim dealer is

My name is _____

Title _____

Department _____ Tel. _____

Organization _____

Address _____

City _____ State _____ Zip _____

And while you're at it, send me literature on _____

Information Terminals Corp., 323 Soquel Way, Sunnyvale, CA 94086. (408) 245-4400

89-1-30-78

GENERAL DATA SYSTEMS

"Specialists in Translating Customer Requirements into Structured Systems"

Hardware Acquisitions? Software Needs? New DP Facility? Project Overload? Data Processing Decisions?

A sample of our activities include:

- Hardware/Software Evaluations
- Systems Design
- Programming
- Documentation
- Distributive Processing Techniques

For large-scale and/or mini-computer systems.

For more information phone or write:

(617) 545-1872
GDS 11 Sedgewick Drive
Schaute, MA 02060

Memorex vs. IBM Opens in San Francisco

• 'IBM Monopolized'

By Molly Upton
CW Staff

SAN FRANCISCO — Memorex Corp. and IBM have squared off against each other in U.S. District Court here for the trial of the \$340 million antitrust suit Memorex filed against IBM in 1973.

Memorex charges that from 1969 to 1973 IBM intentionally monopolized five relevant markets including the general-purpose system area and four sectors in the plug-compatible manufacturer (PCM) area — disk drives, disk controllers, communications controllers and disk packs, according to Memorex attorney John Endicott of Gibson, Dunn & Crutcher.

Through various pricing and product manipulations, including the power to control prices, IBM was successful in undermining the viability of Memorex in the eyes of the investment community, thus cutting off its lifeline to needed capital, he said in his opening argument.

Memorex, as well as other PCMs, was heavily capital-dependent because of the market's lease orientation — a trait nurtured by IBM, he said.

Memorex seeks damages of \$340 million, including profits the firm might have made had not IBM's actions interfered with its business, Endicott stated.

Alleged IBM Plays

Memorex listed the IBM plays that were intended to exclude and succeeded in excluding "from the market any competitor who threatened to become anything more than an insignificant participant in the market." These included price balancing, manipulating its own product prices and making "unnecessary" product changes and tying in products, Endicott said.

Further, he said he will show that IBM not only had the power to control PCM prices, but carefully calculated at what product prices those firms could not survive — the "death" level mentioned in IBM documents.

"IBM took actions that unnecessarily excluded competition from the mar-

ketplace. [It] used what would otherwise be lawful practices to accomplish such exclusion," Endicott said, mindful of the reasoning of the appeals court's decision ordering Greyhound Computer Corp.'s antitrust suit against IBM back to trial [CW, Aug. 29].

Memorex Product Plan

Memorex's product progression from media to plug-compatible products to mainframes was planned to build the firm to the point where it was a systems manufacturer, Endicott stated. In that area, he said, Memorex would not need to be compatible with IBM and therefore would not be so vulnerable to IBM's actions. Memorex's plan was to raise the necessary capital from Wall Street.

Focusing on the need for capital, he stated that the leasing nature of the PCM arena constituted a barrier to entry of competition into the marketplace. He showed the jury documents that indicated IBM realized this.

Why was IBM concerned about the PCMs and Memorex in particular? Endicott showed a 1969 IBM document estimating Memorex could be a \$200 million company by 1972 — just about triple the size of the firm when the report was prepared.

In June 1970, the IBM peripherals task force calculated PCMs had 4% of the leased 2314-type disk drives and could have 30% by 1976.

IBM, Endicott said, constructed a computer model of Memorex in mid-1970 that "identified the vulnerabilities of Memorex as a competitor and the acts that IBM could take that would exploit those vulnerabilities."

IBM, rather than building better mousetraps or reducing the prices of its installed base of 2314 disk drives, brought out the 2319A and -B. These products featured altered interfaces — part of the controller was put into the drive. IBM then offered an Extended Term Plan and Fixed-Term Plan — long-term leases with discounts available on certain product categories.

• 'Memorex Poorly Run'

By Molly Upton
CW Staff

SAN FRANCISCO — "Memorex wants to sell you a theory of competition which says competition is fine so long as you are small, but if you reach a certain size you may no longer compete," IBM lead attorney Patrick Lynch told the jury here at the opening of the Memorex vs. IBM antitrust trial.

Memorex will argue that "you must stand still and let the other guy punch you out." But, IBM counsel contended, "that is not the rule of competition."

IBM is a big, successful corporation today because it "took a gamble" and because it "got in on the ground floor" of the computer industry, according to Lynch.

He contended that Memorex has not been as successful because the firm was mismanaged for the personal gain of a few insiders, not because of any action by IBM.

In fact, he argued, Memorex Corp. filed its suit against IBM, to recoup losses caused by its management's ineptitude.

Memorex's loss of credibility in the view of the investment community was the company's own doing and resulted from the firm's misstatement of its finances concerning its transactions of equipment to its subsidiary, Independent Leasing Co. (ILC), Lynch, an attorney with O'Melveny and Myers, said in his opening statement.

'Insiders' Seen Favored

In addition, Memorex officers managed the firm to benefit themselves and some other inside investors, he argued. Rather than obtaining capital from a public offering, for which it had the "golden opportunity," Memorex borrowed money. A public offering would have diluted the value of the insiders' stock, he con-

tinued.

Memorex "intentionally put itself in the situation where it absolutely had to borrow money. Then it ruined its reputation so that it couldn't possibly borrow money and because of that fact, in 1973, it did come upon financial problems..." Lynch told the jury.

"Memorex got itself in trouble because it tried to be too much of a high flyer. It tried not just to make a lot of money, it tried to break the bank and it didn't try to break the bank as a corporation, it tried to break the bank for those favorite investors who were on the inside..." Lynch contended.

"We submit...[the lawsuit] was not based upon damage or injury unless the injury [lies in] having to meet competition."

Lynch countered Memorex's charge of monopoly by contending that Memorex had shown remarkable growth — reaching the Fortune 500 — and that that would hardly have happened in a monopolized industry.

Just as Memorex's problems stemmed from management, so did the improvements that occurred after the firm got rid of Laurance Spitters and put in "real live management," Lynch stated.

Lynch said he believes one of Memorex's real problems was its assumption that IBM would act as a monopolist, that it would not compete, and that Memorex planned as if it were not in a competitive environment.

Regarding IBM pricing, none of the products mentioned was priced below profitability, he said.

Defining competition as "unrestrained interaction of competitive forces," Lynch told the jurors that if they find IBM has acted unlawfully and penalize it, they are imposing a restraint. "So if that [definition] is really competition, you are penalizing competition," he said.

DEC LS120 Terminals \$2650

- Quantity discounts available
- Immediate Delivery
- LA36, VT52, LA180 availability

Contact: Computer Systems Corporation
3901 W. 86th Street
Indianapolis, Indiana 46268
(317) 298-7200

Presenting the most dynamic business Opportunity since the Big Mac.™

A National ComputerLand Retail Franchise

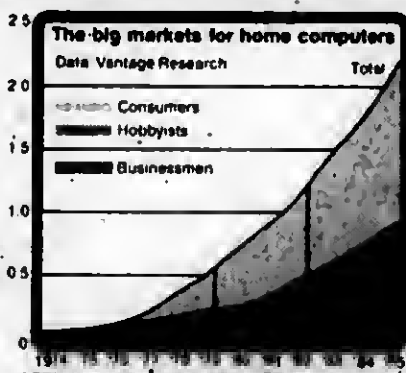
In 1987, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked end outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Big Mac is a trademark of McDonald's Corp.

Mail to E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW
San Leandro, CA 94577 (415) 895-9363

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

Users Alerted to Vendors' Negotiating Tactics

By Tim Scannell
CW Staff

WINTER PARK, Fla. — Inexperienced users faced with negotiating a computer contract should be aware of a number of common vendor ploys that can rob them of their negotiating power, according to a recent article in "Computer Negotiations Report" (CNReport).

In one ploy, the vendor's representative indicates that "as much as he would like to meet the user's demands, the matters desired by the user must be approved by 'corporate,'" a chore that is both difficult and time-consuming, the newsletter said.

Users are forced into defending their requests for various services and "if the user fails to meet the necessary

burden of proof, the vendor wins," the report said.

Such techniques are used because they are effective in gaining control over negotiations, the report explained. The user is forced to waste time and professional talent justifying relatively minor points and, as a result, is "slowly worn down."

These ploys are usually defended as a standard way of doing business. The user, therefore, is duped into believing that each of his demands, no matter how small, is a deviation from normal negotiation procedures, the report said.

Vendors often promote their standard form of agreement as "the easiest, fastest and best way for the user to obtain the necessary equipment,"

CNReport noted. Names of companies larger than that of the negotiating user that have accepted standard contracts are given as examples in hopes that the user will be hesitant to suggest a contractual change.

Vendors' representatives might also insist that users divulge all of their needs and concessions at the beginning of an agreement, resulting in the user's loss of his "slice-at-a-time negotiating strategies" as well as giving the vendor time to "plan ways to sell or maneuver around" the user's desires, the report warned.

User Defenses

The vendor strategy of limiting a user's involvement and powers of negotiation can, however, be dealt

with effectively, the report pointed out. The first step is to recognize the ploy for what it is and "refuse to accept side letters and 'local' vendor promises in lieu of formal contractual commitments."

"If it is not part of the contract, it is not part of the deal," CNReport warned.

Because most computer acquisitions involve a great deal of money and potential risks for the user, every angle "deserves to be fully studied, negotiated and documented." Users were also advised to "refuse to negotiate if the vendor will not agree to provide the necessary senior management and legal personnel, or at least direct access to them."

Users can put vendor negotiating techniques to their advantage by remaining calm, recognizing the ploy and insisting — just like the vendor representative — upon getting clearance from "corporate," the report noted.

Further, any "concessions gained with 'corporate' or 'legal' approval will have more validity, thus improving the likelihood of appropriate contractual coverage and actual vendor performance."

Finally, CNReport stressed that a user should do his best to indicate that he "has no intention of signing, or even seriously considering, the vendor's standard form of agreement."

"Wherever the vendor's marketing representative asserts that something is covered in the standard vendor agreement, ask that he read the applicable provision without 'self-serving' explanations and then ask how the provision involved provides adequate protection to you," the report recommended.

ABA Workshop Set for Houston

WASHINGTON, D.C. — The 1978 Telecommunications Workshop, sponsored by the Operations and Automation Division of the American Bankers Association (ABA), will be held in Houston on Feb. 12-15.

A featured speaker at the workshop will be Sen. Ernest F. Hollings (D-S.C.), who will address a general session and highlight competition in the regulatory arena.

The workshop will also include a discussion on electronic funds transfer (EFT) and an exhibit of telecommunications products and services.

Additional information on the meeting is available from Connie Williams, ABA, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

ACM, IEEE Set Up Eckert-Mauchly Prize

NEW YORK — The Eckert-Mauchly Award has been established by the Association for Computing Machinery (ACM) in union with the Institute of Electrical and Electronics Engineers (IEEE) to honor J. Presper Eckert and John W. Mauchly, pioneers in the design of the Univac I computer.

The award, consisting of a certificate and \$1,000 in cash, will be given for contributions to computer and digital systems architectures.

Your Business is Our Business

alanthus
data communications

Call 800-638-4006

- Leading suppliers of data communications terminals and related equipment.
- Rent, lease, or purchase.
- Nationwide service by Alanthus technicians
- Prompt delivery & expert installation

alanthus
data communications

20030 Century Boulevard Germantown, Maryland 20767 301 428 0500

COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

Please enter my subscription
(check one)

☐ I'm already a subscriber,

but I'd like you to

change my

☐ address

☐ title

☐ industry

☐ other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

Europe and Middle East – \$50 All Other Foreign – \$65

(MC Only: List four digits above your name.)

If charge we must have
cardholder's signature

Expiration
Date: _____

First Initial	Middle Initial	Surname										
Your Title												
Company Name												
Mail To:												
City			State			Zip Code						

Address shown is.

☐ Business

☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*

☐ Check here if you're interested in receiving information on *Computerworld's Index*

Computerworld's Index



THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

- | | |
|-----------------------|---|
| 10 | Manufacturer of Computer or DP Hardware/Peripheral |
| 20 | Manufacturer (other) |
| 30 | DP Service Bureau/Software/Planning/Consulting |
| 40 | Public Utility/Communication Systems/Transportation |
| 50 | Wholesale/Retail Trade |
| 60 | Finance/Insurance/Real Estate |
| 70 | Mining/Construction/Petroleum/Retining |
| 75 | Business Service (except DP) |
| 80 | Education/Medicine/Law |
| 85 | Government - Federal/State/Local |
| 90 | Printing/Publishing/Other Communication Service |
| 95 | Other |
| NEW CATEGORY FUNCTION | |
| 11 | President/Owner/Partner/General Manager |
| 12 | VP/Assistant VP |
| 13 | Treasurer/Controller/Finance Officer |
| 21 | Director/Manager of Operation/Planning/
Administrative Service |
| 22 | Director/Manager/Supervisor DP |
| 23 | Systems Manager/Systems Analyst |
| 31 | Manager/Supervisor Programming |
| 32 | Programmer/Methods Analyst |
| 41 | Application Engineer |
| 42 | Other Engineering |
| 51 | Mfg Sales Representative |
| 52 | Other Sales/Marketing |
| 60 | Consultant |
| 70 | Lawyer/Accountant |
| 80 | Librarian/Educator/Student |
| 90 | Other |

Detach here, fold, and place in post-paid envelope attached through binding.

Burroughs Brings Suit In Knoxville Imbroglia

By Jeffry Beeler
CW Staff

KNOXVILLE, Tenn. — Burroughs Corp. has brought suit against the City of Knoxville and 22 of its government administrators for alleged breaches of a contract the company contends exists between it and the city.

In complaints filed Jan. 4 in Knox County chancery court here, Burroughs charged the city violated its procurement code when it asked the city council and later the Mayor's Advisory Committee on Data Processing to review a bid for a B2810 computer system.

Burroughs claimed the requests for review were illegal because the city's DP manager had already selected the B2810 during the course of competitive bidding last fall [CW, Dec. 19].

Under provisions of the local procurement code, a valid contract existed between the city and Burroughs when the firm was formally notified of the DP manager's selection and later acknowledged the notification, Burroughs contended.

The firm also charged that a report in which the committee compared the estimated costs of the B2810 and competing systems contained over \$673,000 in errors detrimental to Burroughs' hardware proposal. Attorneys for the company argued that the report, which the committee presented at a Dec. 13 council meeting, led to the council's subsequent decision to scrap the Burroughs bid and try to settle a longstanding contract dispute with Honeywell Information Systems, Inc., the city's current computer vendor.

Defendants in the suit include Mayor Randy Tyree, municipal DP director James Ryan, 12 past and newly elected city council members and all eight members of the Mayor's Advisory Committee on Data Processing.

On the same day it filed the suit, Burroughs also applied for and was granted a temporary restraining order barring the city from negotiating a new computer contract with HIS. That order was dissolved by the court less than two days later.

The case is tentatively slated to go to court on April 24, according to Philip Durand, Burroughs' chief attorney in the suit.

Burroughs' Account

In a pretrial document listing its complaints against the defendants, Burroughs offered an account of how the current controversy over the city's computer system began.

On Sept. 7, the brief said, Ryan wrote 16 CPU manufacturers a letter requesting bids for a system to replace

the city's aging General Electric (now HIS) 437 systems, which he concluded could no longer meet the area's growing DP needs. By Oct. 5, the city had received 17 replies.

After a lengthy evaluation of all the responses, Tyree informed Burroughs in a letter dated Oct. 27 its bid had been selected.

During the first two weeks of November, however, members of the advisory committee informed members of the city council by telephone that a used computer at the Knoxville Utilities Board (KUB) was for sale and that the agreement with Burroughs "was not in the best interests of the city," the brief said. Although the KUB wrote a Nov. 7 letter denying any intention to sell its IBM 360/40, that information did not prevent the committee from reiterating its claim in a letter dated Nov. 10 and in a council meeting five days later.

Some observers here have cited the KUB incident as evidence the committee planned to undermine the bid for the Burroughs equipment and replace it with an order for an IBM system.

Although the claims about the KUB computer were eventually disproven, they created enough confusion among council members that in mid-November the council asked for the committee's help in selecting the city's new computer system, Burroughs said in its brief. That request signaled the committee's first direct involvement in the selection process.

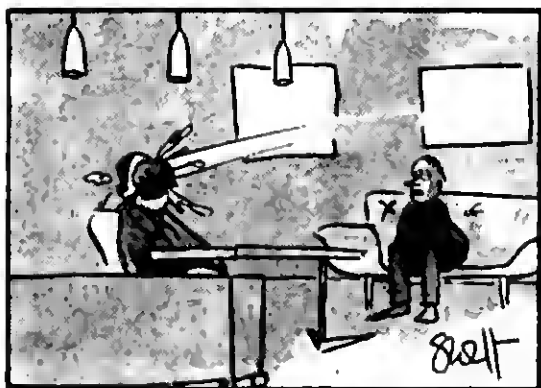
Finally, at the Dec. 13 council meeting, committee chairman Tom Sudman presented a financial analysis which he claimed proved the proposed Burroughs system would cost the city almost \$88,000 more than the existing HIS system. Sudman's claim disputed the findings of the municipal DP staff, which had concluded that the Burroughs system was the cheapest response to the city's request for proposals.

Sudman refused to explain how he derived his figures, and Ryan later presented a document that itemized numerous alleged errors in the chairman's cost estimates. Nevertheless, the city council accepted Sudman's recommendations by a 6-2 vote and, acting on the advice of the city's legal staff, directed Tyree to reject all bids and keep the 437 system.

In its suit, Burroughs contended that it and the city had already formed a valid contract as defined by Section 29A-108 of the municipal procurement code, which defines a contract in part as "all types of agreements, grants and orders for the procurement or disposal of supplies, services, construction, insurance or any other item."

Thus, the suit declared, the city council broke the law when it solicited the committee's help in selecting a new computer system. Burroughs also pronounced as illegal the council's decision to reject all hardware bids and resume negotiations with HIS.

In other charges, Burroughs argued that Tyree and Ryan lacked the legal authority to seek council's approval for the B2810 after they informed Burroughs its system had been selected.



'I See That Guy In DP Is Throwing In the Sponge Again.'

THE \$99⁰⁰ MODEM*



You're suspicious aren't you? OK, we confess. Our M-1 asynchronous short haul modem won't do what a lot of other modems will do.

However, the M-1 will solve many of your local or in-house communication problems up to 10 miles or 9600 bps. And because you aren't paying for a lot of options and capabilities that you don't need in those situations, you'll be saving a bundle of money.

Interested? Write or call us now for a data sheet and complete price information.

bo-sherrel co.

36443 SHELLEY COURT
NEWARK, CA 94560
(415) 792-0354

*100 Quantity

You have to be picky when choosing a data communications terminal system. Otherwise, you may just pick up a problem.

That's why Trendata offers a wide selection. From systems for wide flexibility and high production down to a simple reliable machine for limited applications.

When it comes to features, pick them to fit your need—half/full duplex operation, operator switchable ASCII—EBCD—Correspondence code sets, various keyboard legends, variable pitch and line lengths, interchangeable type fonts, switch selectable transmission rates and many more. Then add the options—plot mode, form readers, additional printer controls, unattended operation along with a range of workstation options.

We also have the pick of the peripherals. Add a flexible disk system, tape

reader/punch, card reader or tape cassette recorder. And with no fuss we supply accessories such as certified diskettes, type elements, ribbons, tape cassettes, etc.

What you don't have to pick is other firms to handle financial arrangements and provide service. We're very finicky about doing those in a very first class manner. Which all leads to the suggestion that before you pick a terminal.....pick up the phone and call us.



**Applied Magnetics
Trendata**

610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086
(408) 732-1790

We like customers who are picky, picky, picky



Dartmouth Student Job Seekers Turn to T/S

HANOVER, N.H. — The Career and Employment Services here at Dartmouth College has utilized the computer to develop a different approach to the standard classified advertisement for jobs.

As of last fall, Dartmouth students gained computer assistance in their job-hunting efforts thanks to a computer program known as Dart-Job.

By listing odd and part-time jobs and full-time leave-term

employment opportunities both at Dartmouth and in the surrounding community, the program presents the student with an accessible, up-to-date body of information.

No computer background is needed to use Dart-Job; the student merely calls up the program on one of the college's 300 terminals and, in a "conversational" exchange with Dartmouth's interactive computing system, asks for

the particular type of job desired.

The computer then prints out all available jobs of that type, describing each individual job, its requirements, the period of employment, the hours per week, the salary and the address and telephone number of the contact person.

Conversely, the program offers the employer the opportunity to reach a large percentage of the student body. Any

college or local employer can list a job opening with the service at no cost by either filling out an advertisement form and sending it to the Career and Employment Services or calling and asking to have the job listed. Listings are updated daily.

Caters to Interests

Before Dart-Job, students had more difficulty obtaining information on available jobs.

In the past, some were listed in Career and Employment Services, and students could browse through books of listings.

But the books were cumbersome and difficult to organize and update. Information on many other jobs was available to students only by making the rounds of all potential employers in the community.

Now a student can quickly get a full list of only the types of jobs that interest him. For example, the computer will print out the various categories of odd jobs available. The student then selects a category (office work, physical labor, baby-sitter, etc) and the computer prints out all available jobs in that category. The student then is free to contact the employer directly.

Employment information is available for the 20 hours per day that the Kiewit Center operates. Dartmouth's time-sharing system is based on a Honeywell 66/40 system.

The program was researched and designed by Ginny Darrah of Norwich, Vt., with the assistance of Eve Pratt of Longmeadow, Mass., and Carl Worrell of Montreal, Canada, both members of Dartmouth's class of 1979.

Auerbach Lauded By Israeli School

PHILADELPHIA — An Israeli academic, technical and religious center, has named its computer school after an American consultant and publisher.

Boys Town Jerusalem named its school the Isaac L. Auerbach Institute of Computer Technology in tribute to Auerbach's contributions as the school's originator.

Boys Town Jerusalem "provides a comprehensive program of academic, technical and religious studies for over 1,300 talented, needy youths from all parts of Israel," the American Friends of Boys Town Jerusalem said.

Established two years ago under Auerbach's direction, the computer school has already hosted an all-Israeli conference on secondary level computer instruction that was attended by Israel's leading computer authorities, the organization noted.

We've gone about our major training investment in a manner that's typical of Raytheon. Soon our program will reach 900 student days a quarter and grow from there. Our service engineers participate in comprehensive learning experiences involving most IBM central processing units and input/output devices which includes total 360 and 370 training. In short, Raytheon has gone after the best training program in the country with a single purpose in mind: to enhance further the background skills of our service engineers.

It's more of Raytheon's commitment not only to our customers but importantly to Raytheon

Service Company people who want their service product to be the best in the business. And to continue being the fastest growing service company in the computer business. I'd be pleased to tell you more about our training facilities, teaching staff and what it means to you and your installation. Call our Marketing Department in Burlington, MA. Our number is 617-272-9300 ext. 475.

Raytheon Service Company, Two Wayside Road, Burlington, Massachusetts 01803.

RAYTHEON Raytheon Service Company

"Raytheon's new training investment. A commitment to our customers and a statement to our staff."

Walt Schletter
Manager of Training



DECscopes

For Sale

• VT52

800-323-2288

The world's best DBMS announces the end of the chain-pointer generation.

**Adabas has broken the chain-pointer barrier.
For the first time in history, an inverted list DBMS is No.1
in both throughput/efficiency and ease of use.**

For years, others have said you could have *either* throughput *or* ease of use. Adabas has always said you can have *both*.

Datapro '77, conducted with *Datamation*, is the latest in a long series of surveys that proves our point. The user community also gave us the highest average rating for all categories. Who could ask for anything more?

Every day, more people realize that the rigid hierarchical structures of the past are giving way to

the relational approach of tomorrow.

The trend is clear. The future is here. It's Adabas. Combined with Com-plete, Software ag's tele-processing system, Adabas is the most powerful DB/DC system available anywhere.

Seeing is believing.

We've just made a lot of claims, and we want to prove them. That's why we'd like to give you a free presentation at your convenience. Simply call us, or return the coupon below.



Reston International Center 11800 Sunrise Valley Drive
Reston, Virginia 22091. Phone (703) 860-5050

1. ☐ I'd like more information on Adabas.
2. ☐ Please send more information on Com-plete.
3. ☐ Please call to arrange a free presentation.

Name _____ Company name _____
Street _____ City _____
State _____ Zip _____ Phone _____
Type of computer _____ Operating system _____

Available Worldwide



130

Member SIA  Software Industry Association

Computer Artist Creates 'Spieforms' Exploring Mandala Theme

By Jeffrey Beeler
CW Staff

NASHVILLE, Tenn. — Like most other artists, Kerry Jones is continually experimenting with new artistic styles. But Jones works with computer plotters and printout sheets instead of canvas and brushes.

In his latest creative phase, he has developed a kind of computer-assisted Op Art in which simple, geometric figures are repeatedly transformed to form complex, highly symmetrical designs. Jones, a computer programmer by training, calls his designs "Spieforms" after a drawing he once saw in a brochure published by the Society of Photo-Optical Instrumentation Engineers (Spie).

Typical of the genre is a work entitled "Spies Mandala" — a name that recalls the divided circle that in Hinduism and Buddhism symbolizes the universe. As its name suggests, the drawing consists basically of three concentric rings, each formed of eight small, equally spaced circles.

Unified Design

Around each of these 24 shapes lie nine alternately white and black concentric circles, each one more distorted than the last. Each set of deformed concentric circles is identical to every other set, creating a design that is unified and symmetrical along multiple axes.

Using "Spies Mandala" as a model, Jones has subsequently fashioned several other drawings that incorporate the same basic design as the original but differ in details that distinguish them from other members

of the series.

Counting the "Spies Mandala" group, Jones thus far has created eight such series of Op Art designs, and more are contemplated in the future.

Most of the effort involved in producing a sequence of Spieforms is devoted to writing graphics programs, Jones said. After that step is completed, he keys his instructions into a computer and transfers them to magnetic tape, from which a graphics plotter generates a finished drawing.

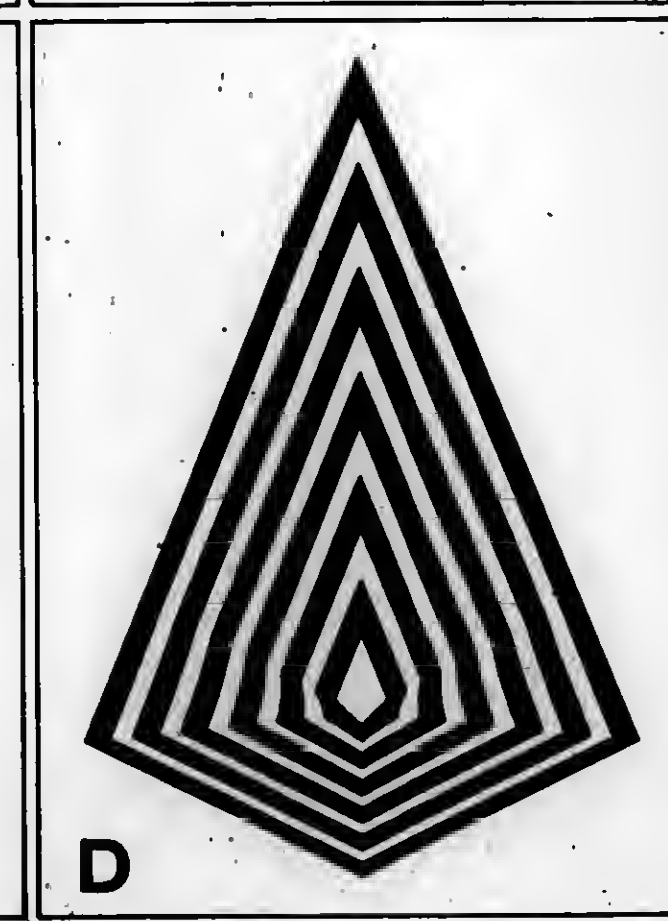
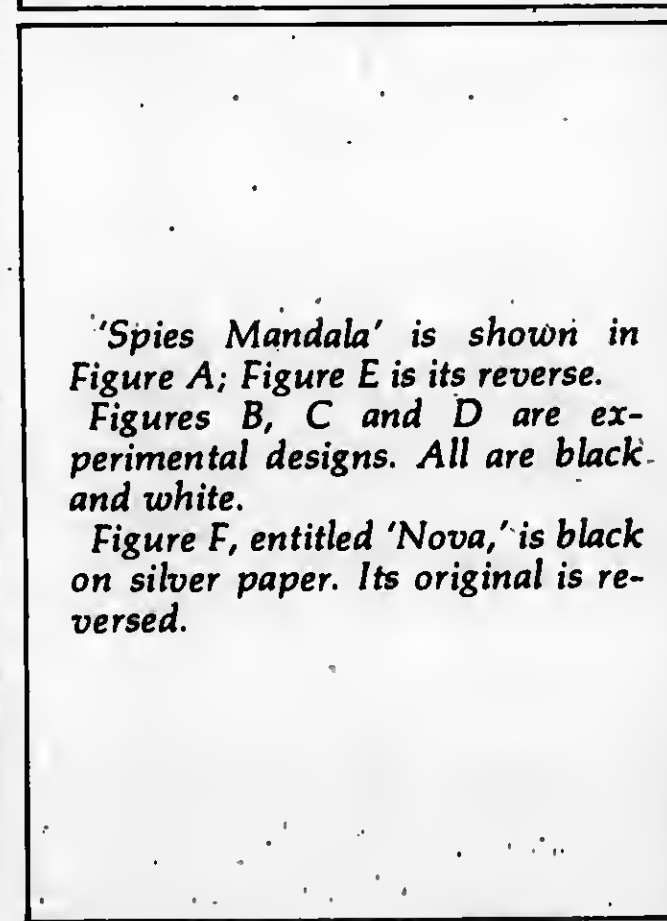
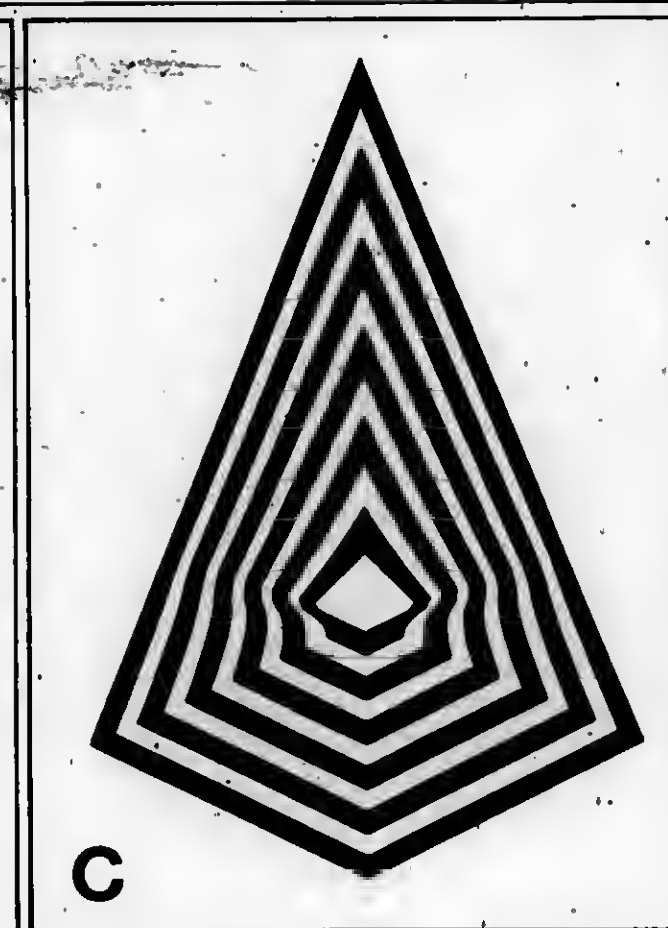
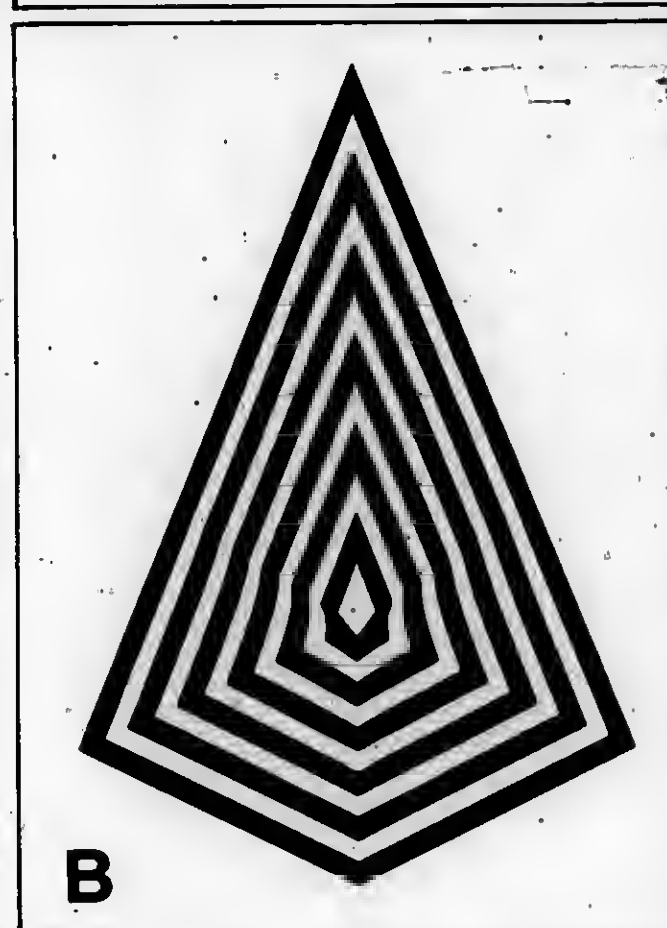
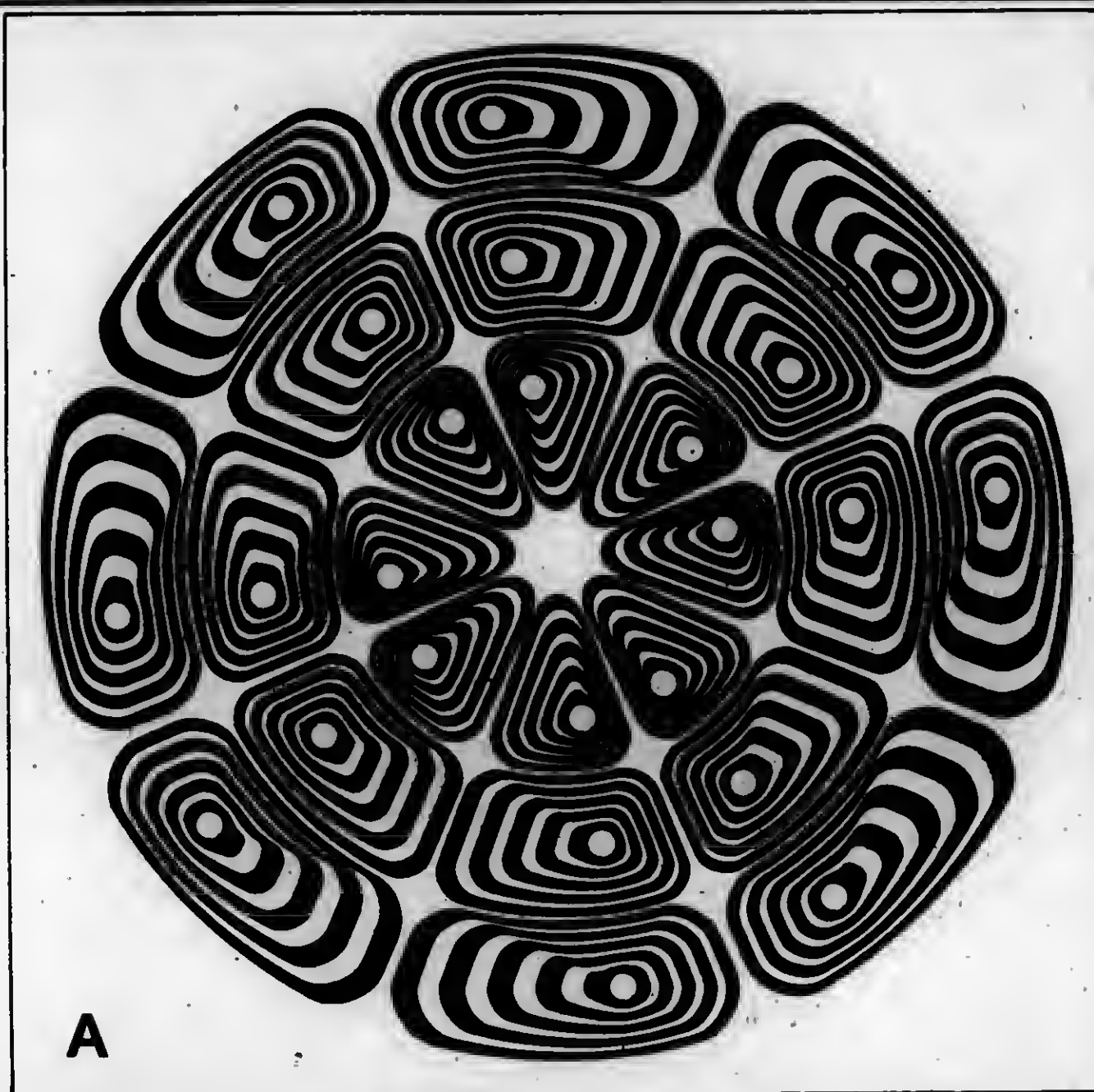
The first in a series of designs usually takes Jones about three months of intermittent labor to produce. But once he has an original drawing in hand, he can create a series of variations in just a few hours by simply changing a few parameters in his graphics program and testing the new instructions to ensure they yield the desired results.

'Curve-Fitting Algorithms'

Jones first became interested in computer art about three years ago while working as an engineer at American Buildings Co. in Eufaula, Ala.

"They had an engineering graphics system with a couple of plotters and some graphics software for producing blueprints and shop drawings," he called, and the system was almost always available for his use.

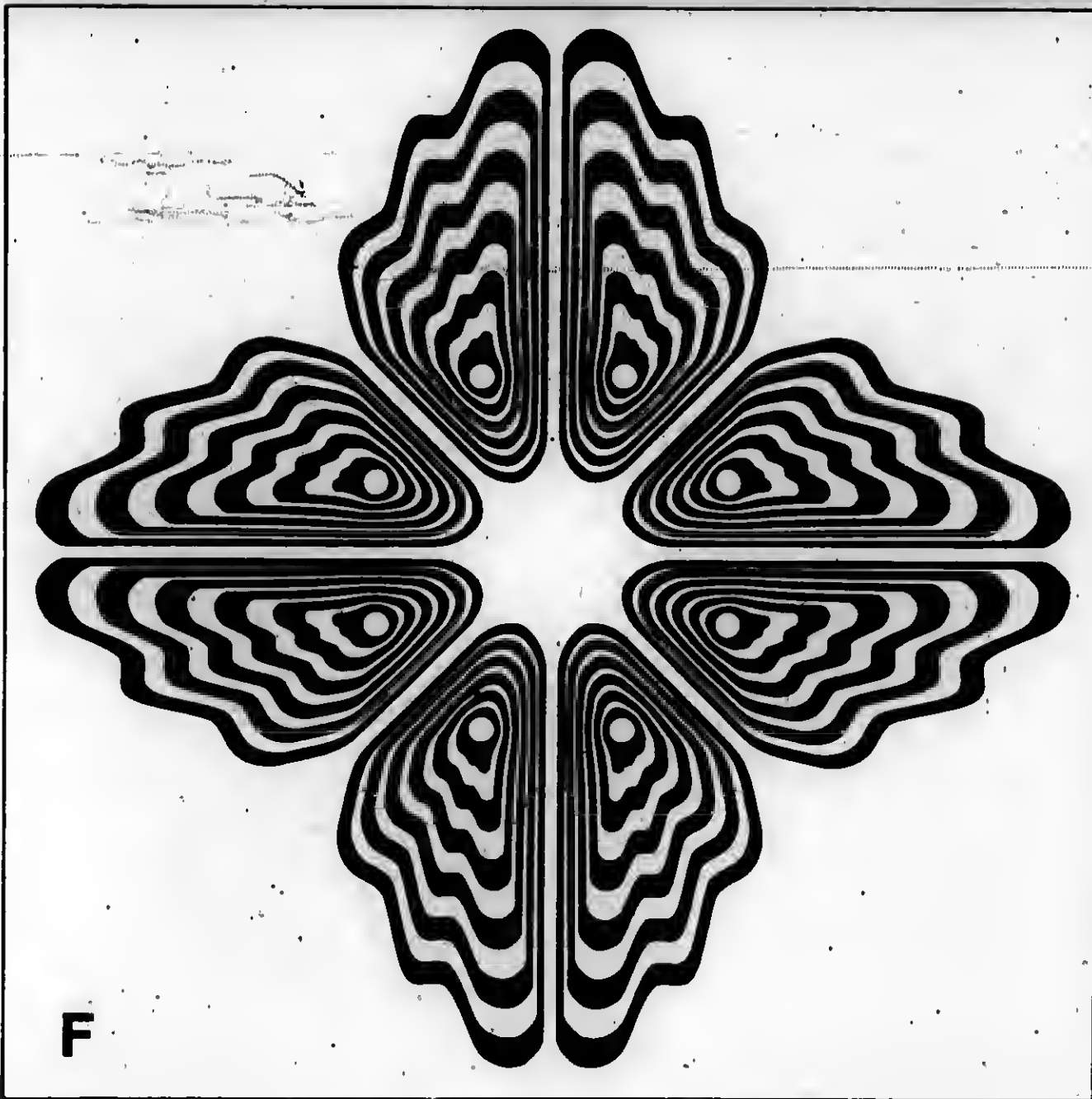
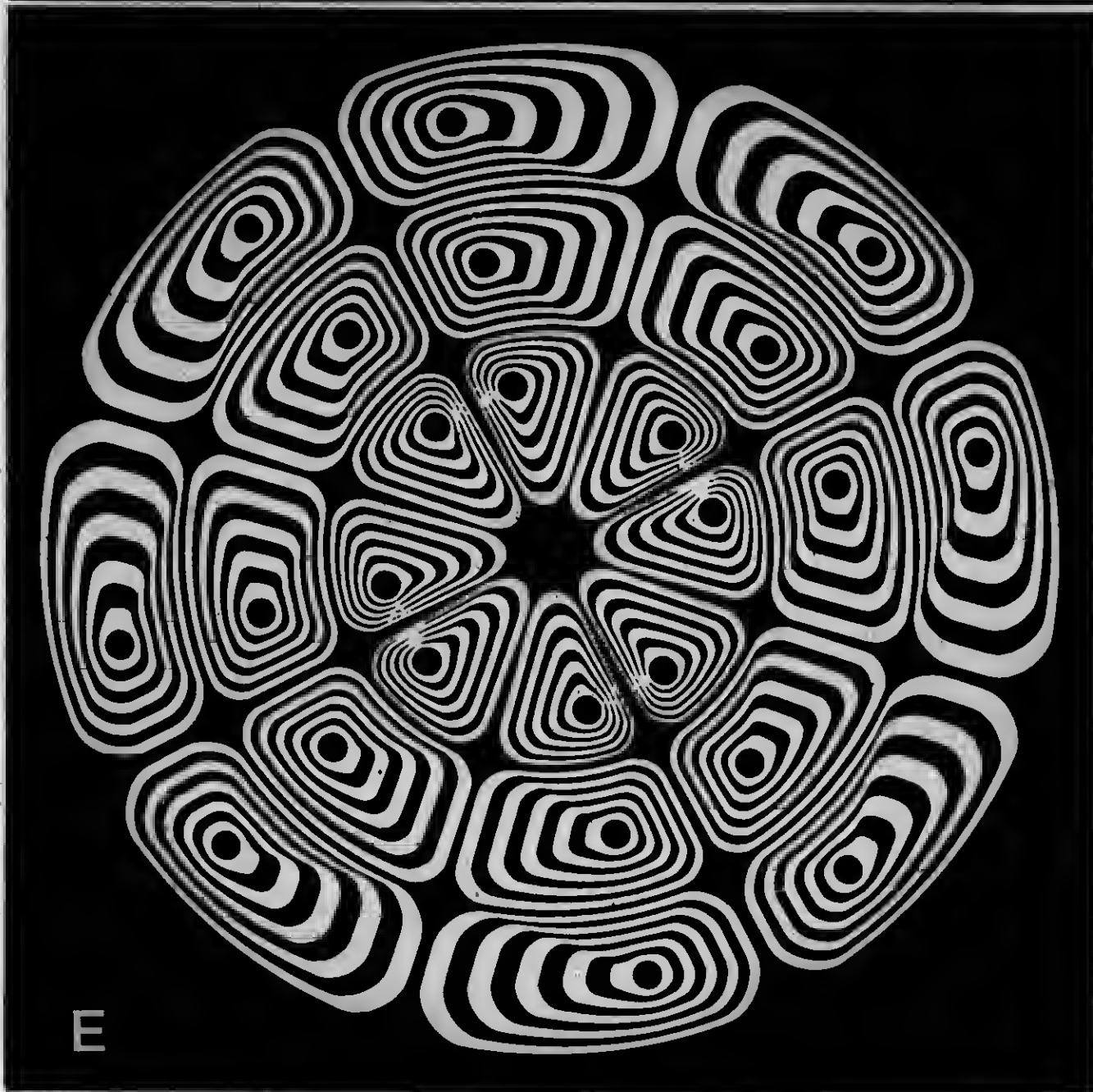
At first, Jones only "played" with the equipment. But as his interest and expertise in using the computer as an artistic medium grew, he graduated to increasingly complex programs until he began experimenting with his own concepts.



"Spies Mandala" is shown in Figure A; Figure E is its reverse.

Figures B, C and D are experimental designs. All are black and white.

Figure F, entitled 'Nova,' is black on silver paper. Its original is reversed.



The idea for his latest artistic style first occurred to him after he saw and later duplicated a design that a Japanese group had generated by computer. From that exercise, he derived the idea for the "curve-fitting algorithms" on which much of his later work is based.

Using the algorithms, he then wrote the necessary graphics programs and pro-

duced his first finished Spieform on two California Computer Products, Inc. plotters driven by an IBM 370/125.

Jones recently left American Buildings to join Datapoint Corp.'s office here as a systems engineer. The move deprived him of easy access to an on-line graphics system and, temporarily at least, brought

his budding career as a computer artist to a standstill.

Jones hopes the interruption will prove only brief, and he has already begun searching for a system to replace the one he lost at his previous job. "I've visited the computer center at Vanderbilt University," which is nearby, "and I was real impressed with its setup," he said.

Jones denies trying to make any serious moral or artistic statement through his work, and he discounts the influence of any formal art movement on his style. Rather, he said, he creates computer art mainly for the fun of it.

He professes to enjoy writing the programs that precede

The chief strength of using computers to create art lies in their ability to generate variations of an original design quickly and easily. In a recent set of drawings, Jones produced five variations with only minimal changes to his master program, he recalled. At other times, he has formed

'The computer is one of the greatest toys ever made, and I always have a lot of fun using it.'

Spieform production and viewing the finished product, which he said often results in many aesthetically pleasing shapes and patterns.

"The computer is one of the greatest toys ever made, and I always have a lot of fun using it," he added.

Because of their complexity, works like Spies Mandala would probably prove extremely difficult to execute without the help of a computer. "I guess a very skilled draftsman might be able to duplicate it," Jones speculated, "but for someone like me, who has little or no formal art training, it would be nearly impossible to do."

Jones considers Op Art a natural medium of "artistic expression" for computers, and he expressed surprise that more contemporary artists have not adopted the machines as an aid in their work. "Much Op Art is mathematically oriented or based on graphic patterns that repeat themselves, and it is just these areas that computers are best equipped to deal with," he pointed out.

a series of variations automatically.

The main weakness of computers as artistic aids lies in what he bluntly called their "incredible stupidity." In programming the machines to draw complex designs or pictures, artists must be extremely thorough in their directions.

If they omit the slightest detail from their programs or fail to make explicit even the most transparent assumption, an error will probably result.

"Getting the bugs out of your programs can be a real hassle," Jones complained. "It's very frustrating sometimes."

New Masters



Editorials

Come Now, Mr. Barr

We recently received a letter from Thomas D. Barr — IBM's top trial attorney in the U.S. vs. IBM anti-trust case — that accused us of distorted coverage of the trial [CW, Jan. 16].

Usually we do not answer such attacks, feeling it is the purpose of the "Letters to the Editor" column to let others give their opinions, unanswered by us even when we disagree. However, we cannot in good conscience let Barr's letter go unanswered.

Either Barr is uninformed about the possible negotiations between the government and IBM on a settlement or else he is being cagey.

Barr noted that we reported on a meeting between Lloyd Cutler, another IBM attorney, and top Justice Department officials and that our Dec. 19 editorial criticized members of the Justice Department for failing to disclose the settlement proposal made by IBM at that time. He asked: "Did it occur to you that perhaps no such proposal was made?" But he did not deny that the meeting took place.

We have checked our sources

again and reverified that the meeting did in fact occur. At that time, Cutler suggested that a special panel be set up to review an earlier IBM settlement proposal.

In only a very limited sense Barr may have been right — no new proposal may have been made since the Justice Department immediately told Cutler it was not interested in talking.

IBM clearly sent Cutler to the meeting to discuss settlement; and the clever language of the chief IBM advocate cannot hide that fact, although he did try to discredit our report.

But perhaps that is giving Barr too much credit. It is a common practice for firms negotiating settlements not to tell their trial teams that such negotiations are proceeding. After all, such knowledge might make them less effective in court.

So perhaps Barr just did not know what he was talking about. Now we have a question for him: "Tom, did it occur to you that perhaps such negotiations are under way and that you just have not been told about them?"

About CW and Family

Computerworld's parent company has changed its name from Computerworld, Inc. to CW Communications/Inc.

According to Patrick J. McGovern, chairman of the board, the new name "better reflects the current status and future direction of our company," which now has five additional business publications in

four countries.

CW Communications President Walter Boyd noted that in addition to Computerworld in the U.S., the firm publishes Computerwoche in West Germany, Data News in Brazil, Computer Monogement and Export Direction in the UK and is a partner in publishing Shukon Computer in Japan.

Data Past

Five Years Ago Jan. 31, 1973

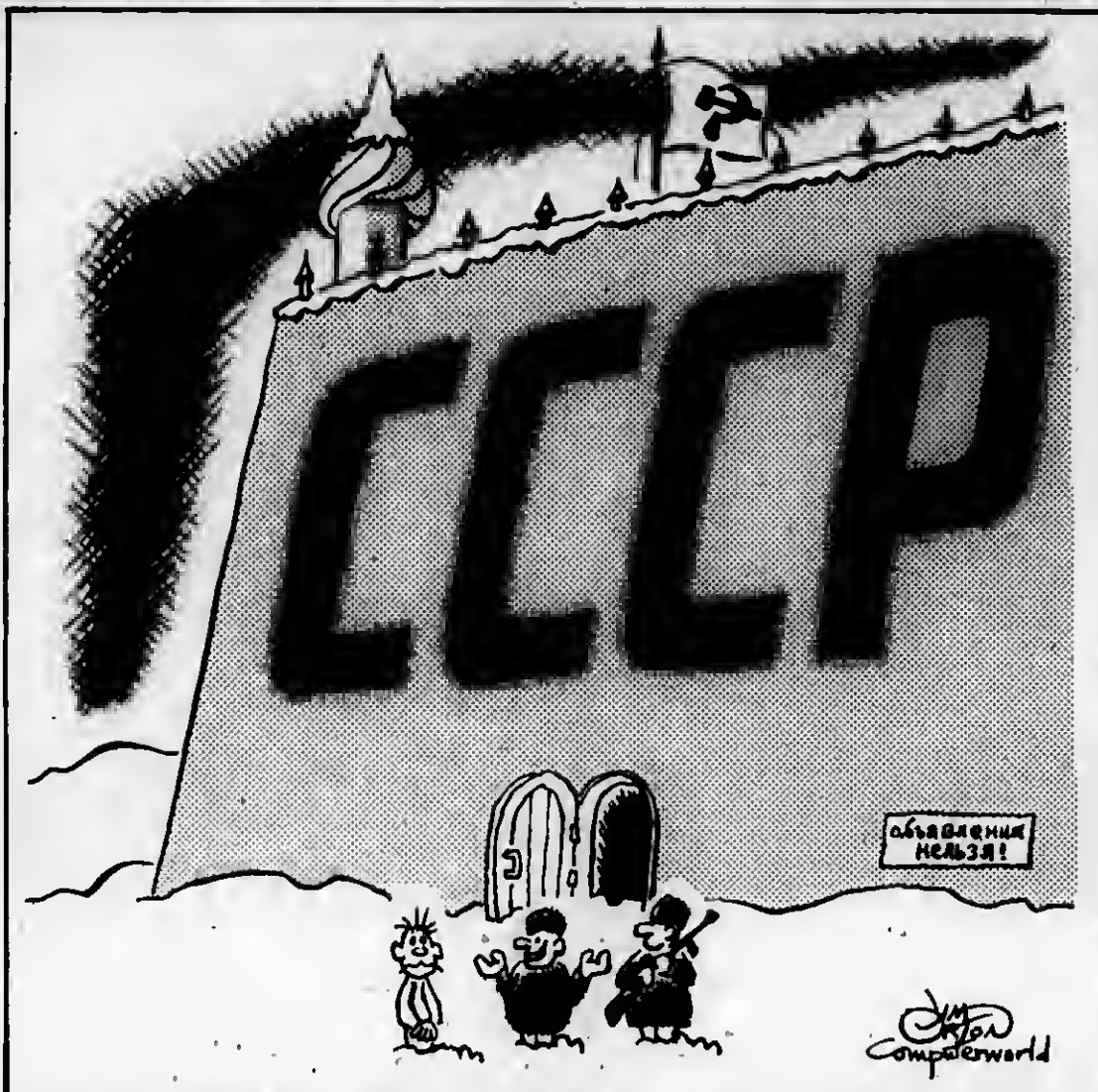
WASHINGTON, D.C. — Late last week the Justice Department acknowledged that the destruction of the computerized index of documents as part of the IBM/Control Data Corp. settlement could seriously hamper the government's antitrust efforts against IBM. In a brief filed in a federal appeals court in New York, the Justice Department contended that IBM had violated agreed-upon rules in secretly negotiating to destroy the data and further, it said, this destruction was a deliberate attempt to hamper the government in its case.

WASHINGTON, D.C. — The first application for a resource-sharing or "value-added" computer/communications network was filed with the Federal Communications Commission by Packet Communications, Inc.

Eight Years Ago Feb. 4, 1970

NEW YORK — IBM's "new world" of unbundled software and services was creating confusion both outside and inside IBM, Paul D. Oyer concluded after a seminar on "The True Price of Unbundling." From discussions at the meeting, it was apparent that many large IBM users had been able to wean themselves from the firm, but the future ability of the smaller user to get along with the remaining IBM support services was seriously left in doubt.

NEW YORK — Comma Corp., a nationwide maintenance organization, was established here last week to provide service to users owning their own computers or users with "mixed" computer systems. The company announced plans to offer reconditioning and reconfiguration services to clients in addition to straight maintenance.



'Comrade Turchin, We'd Gladly Let Your Research Material Out With You — If It Existed and If It Weren't Soviet State Property.'

Letters to the Editor

DEC Too Often Overlooked

"Technology, Actions by IBM Spur Plunge in 1977 Prices" [CW, Jan. 16] unfortunately contained a serious omission in the comparison of several computing hardware vendors. Digital Equipment Corp. machines were not included in mainframe comparisons.

For several years, DEC has been actively marketing the Decsystem-10, a large-scale time-sharing machine which has gained general market acceptance. More recently, DEC has introduced the Decsystem-20, a general-purpose mainframe capable of upward expandability. Both of these machines are being widely used in business and scientific applications. To date, over 700 machines have been installed.

These machines are providing an acceptable price-performance ratio and, when combined with DEC's Tops-10 and Tops-20 operating systems, providing adequate flexibility for almost all data processing applications.

This significant omission has been present in numerous Computerworld articles. Since DEC offers a competitive product, has developed sophisticated operating systems and has installed more than 700 large-scale machines, CW should feel obligated to include DEC hardware in mainframe evaluations.

Roger Lightowler
Cambridge, Mass.

Danger of Cashless Society

In regard to "EFT Systems? No Thanks, Not Yet" [CW, Jan. 9], I find one outstanding issue concerning electronic funds transfers

which to my knowledge has never been mentioned.

Very simply put, I'm concerned with the possibility of electronic cancellation/flagging of individual accounts in a true cashless society, either accidental or intentional, for whatever reasons.

As you realize, correcting such a situation can prove both time-consuming and frustrating. The temptation for a government to "lose" a person could be too much to resist. If an individual's personal identification number were "accidentally" removed from the master file, he could easily starve to death before the situation was rectified.

Farfetched? Perhaps. However, nowhere have I read of experts recognizing this potential problem. With corruption being what it is under the human condition, don't sit there and tell yourself such a thing would never happen.

With over 250 quarter-hours of college behind me now, I don't believe I'm being overly alarmist on this issue, considering my 12 years of experience in DP and work with various levels of government and industry.

Frederick V. Plummer
Orlando, Fla.

Ready and Waiting in Line

I was nauseated to read the article by Patrick Portway concerning EFT [CW, Jan. 9]. If consumers find it so bad, why must I stand in line to use the machines?

There must be some way Portway and his ilk can get their kicks other than sitting around thinking up ways to drive up the cost of goods and services.

Lester H. Hoyt, M.D.
Indianapolis, Ind.

Consider 'Modus Operandi'

Precautions Can Help Deter DP Criminals

By Jack Stone
And Ida Mason
Special to CW

The "Embezzler's Guide to the Computer" by Brandt Allen, a featured article in a recent issue of the *Harvard Business Review*, suggests that the best way to prevent a disgruntled employee from committing a computer rip-off is to understand his crooked methods and procedures, his modus operandi. In this column the last of four on DP crime, we have used this "guide" and our own sources to briefly examine the ways and means of computer theft.

Let's first look at some widespread misconceptions about computer crime. To begin with, it is commonly believed banks make the best targets for the culprits. In fact, computer frauds have been in no way concentrated in this industry but have been perpetrated throughout a wide variety of businesses and government agencies. Regular federal and state audits of banking institutions may even make these firms less appealing victims of computerized larceny than other classes of institutions.

Another incorrect idea is that small and poorly managed companies are especially vulnerable to computer criminality. It's true, of course, that such companies often lack sophisticated internal controls, "failsafe" system designs and adequate management supervision, thus making them particularly tempting targets. But large corpora-

tions with seemingly adequate security also provide much incentive for mischief because of the prospects for much bigger payoffs.

Furthermore, management in large businesses and in government are less apt to detect "small" losses, which can be aggregated over long periods to form substantial hauls. There is also the remote but finite possibility of management in such organizations being directly involved in schemes to defraud, e.g., the Equity Funding career.

The hackneyed saw that "the old schemes won't work anymore" is another example of a commonly held misconception. It is not fully appreciated that today's technology often makes yesteryear's flimflam even more attractive, because of proven successes of the methodology over long periods of time. For example, the FBI trains its agents in classic embezzlement strategies — presumably arguing that this is the best way to detect and control variations on old themes.

A final mistaken notion is that the computer thief is going solely after the company's cash. Not at all! Vouchers, shipping documents, accounts receivable and inventory are often just as negotiable and usually much more difficult to trace and control than cash resources.

This conclusion was dynamically demonstrated in the case of a young college student who systematically and for long periods looted a phone company's equipment inventory by

unauthorized terminal access and resold truckloads of hardware to acquire a fortune before he was turned in by one of his disgruntled employees.

Moving now from commonly ac-

The Human Connection

Accepted myths to commonly ignored truths, we should note that some disgruntled employees may already have developed embezzling schemes that may never be detected. Keep in mind that only an extremely small (considering the potential) number of computer crimes have been uncovered and that a large number of these were detected strictly by accident.

Further, the great complexity of the new technology affords many opportunities for disenchanted employees to "get even." And not only may all this be accomplished with relative ease, but often with relative impunity. Crimes against depersonalized entities like corporations and large machines, as opposed to crimes against individuals, are typically minimized or even ignored by the victims — the idea of "washing one's linen" in public is unappealing under even the best of conditions.

A final thought is that embezzlements have been especially effec-

tive in companies that employ large and constantly changing workforces. Adding the names of people never employed or neglecting to delete those who left the company is a ploy sometimes used to siphon off loose funds.

Here are some DOs and DON'Ts regarding the control of computer crimes.

- DO keep a strict accounting of computer time usage during batch operations. DON'T allow anyone access to the machine or data without knowing who the user is and who is granting authority.

- DO make a special effort to control access in the terminal-oriented environment. DON'T ever let anyone in without absolute identification.

- DO use a system of passwords with frequent changes (properly controlled, of course). DON'T let the password data-set-protect-keys float around or ever permit passwords to appear in hard copy.

- DO create temporary teams of systems people to try to penetrate security. DON'T let these teams operate in an unsupervised mode.

- DO hire and develop computer personnel as if they hold the future of your organization in their hands!

Ida Mason, a professor of DP at Lehigh (Po.) Community College, is currently on sabbatical doing research on women in management.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

ICCP Code Supported

Readers Criticize Saks Credit Procedure

Readers responding to a questionnaire in this column concerning Saks Fifth Avenue's credit procedure [CW, Dec. 26-Jan. 2] generally disagreed with Saks' position. Further, they expressed support for the code of the Institute for the Certification of Computer Professionals (ICCP) that stipulates that only properly substantiated data should be published.

Saks had used a fictitious balance figure of "0" on a customer's statement, leaving out information about an earlier credit balance.

Respondent Alfred S. Baker II from Chicago, a manager of software administration, could not accept Saks' excuse that the system as a whole "helped the research people." He wrote: "Any document that has a snowball's chance in hell of getting to a user should never contain fictitious data."

The procedure was condemned by all sorts of DPs — general manager of a systems house, EDP manager for an instrument com-

pany, systems analysts, programmers, controllers, instructors, senior vice-presidents, accountants, salesmen, an EDP auditor and an outside auditor. Society affiliation made no apparent difference.

ICCP Code Situation

There was equal agreement on the relevance of the ICCP code to this situation. The code comes from a number of earlier codes and calls on professionals to restrict their statements to matters that can be properly backed up. The "0" balance figure could not be backed up, but Saks claimed there was no systems error involved. The output was, therefore, deliberate.

In the questionnaire, respondents had three choices — that a system's authorized outputs are subject to our professional codes "totally," "in part" or "not at all." Approximately sixty percent answered "totally," 40% said "in part" and only two replied "not at all." (One person argued that the codes "obviously" only applied to "questions and answers [conclusions] about DP systems.")

Corporate vs. DP Management

A number of people brought up the employer/employee relationship. Several referred to manage-

ment attitudes of "You do what I want today, and you will have a job tomorrow." Clearly, corporate management is involved along with the professional staff.

This question of joint responsibility between the two seems to be something the ICCP people should look into soon if their code of conduct is to have any weight in keeping computer output accurate. Or perhaps the ICCP does not think this is important? I would have liked to hear from it, but I didn't.

As one person said, "Situations like this raise credibility questions about DP."

The other signal that came through loud and clear was that people who were in touch with the retail situation — and many who were not — considered the use of fictitious balances as being in one way or another against the law. One systems house president from New York State cited part of the Fair Credit Billing Act [Chapter 4, Credit Billing — Section 165].

Our profession should not officially ignore situations like this.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

The Taylor Report

By Alan Taylor
CDP

Sound Familiar?

Are programmers instructed to include rip-offs in their programs? If so, what exactly is involved? Here is one person's story:

"I was DP manager for a large ... retail mass merchandiser. Its practice was to inhibit printing of credit balance statements and print a special report of credit balance accounts with totals, for the use of the credit department in case of any investigative inquiry. The policy was to drop any credit balance after the account was inactive for one year.

"It has been the practice of retailers for years to inhibit printing of credit balance statements or print a code which causes them to be selected for further action."

If you know of any similar situations, please let me know. All names will be held in confidence. Send replies to Alan Taylor, c/o Computerworld, 797 Washington St., Newton, Mass. 02160.

"What If" . . .

"What If" we open
up a new region . . .

"What If" we market
new products . . .

"What If" we acquire . . .

FORESIGHT

When your financial planners use the "What If" strategy in forecasting the future, suggest they use FORESIGHT.

FORESIGHT —

- Is a tested planning & modeling tool
- requires no prior computer usage
- provides professional consulting support
- runs on most major hardware
- has a proven track record in the field

Another tool is tax compliance and tax planning through FORETAX.

FORETAX —

- performs calculations for tax preparation
- produces State, Federal & Municipal schedules

Look ahead with FORESIGHT SYSTEMS, INC.
1901 Avenue of the Stars, Suite 585
Los Angeles, CA 90067
Call (213) 277-2722



FORESIGHT SYSTEMS, INC.
First choice in finance. A subsidiary of United Computing Systems, Inc.



**You've got a
Computer
Terminal on
your desk.**

With your push-button dial telephones and our P1-5 Data Concentrator, you've got a comprehensive interactive system to front-end your computer. The P1-5 will answer up to 16 simultaneous callers and record their key entries on to dual floppy diskettes, which eliminates the key punching process.

The P1-5 Data Concentrator offers:

- User designated field duplication
- Modulo 10 checks on user designated fields
- Audio response to callers
- Blank fill to the next field with the "..." key
- 3740 diskette compatibility along with automatic Time and Date recording
- Battery backup power supply
- Low monthly cost averaging \$300
- Optional 360/370 multiplexor channel interface for P1-5.
- Optional CRT/Keyboard terminals for \$17/month

The P1-5 has almost unlimited applications including General Ledger, Payroll, Time and Attendance Reporting, Production Reporting, Receivables Control, Inquiries and many other uses.

Call us today and we'll tell you how the P1-5 Data Concentrator can help you get in 'touch' with your employees and customers.



PHONE 1
1330 East State St.
Rockford, Illinois 61108
Phone 815/962-8927

Letters to the Editor

'Bionic Blooper'

In a recent episode of "The Bionic Woman," a modern-day Robin Hood used a university's computer to divert funds into his hands so that he could support 38 underprivileged students, who wanted to go through college.

The head bad guy, a university official, saw the potential for the program to divert such funds and tried to steal it from Mr. Hood and Miss Bionic. Just prior to the climax of the show, Mr. Villain said "We're going to go steal that program tonight. We're going to go get the tape."

In the very next scene, the villains had broken into the computer center and taken the back off some piece of equipment and were removing the "program" with a screwdriver. After a henchman had unscrewed some piece of electronic gadgetry and the villain had slipped it into his pocket, the gang prepared to depart.

The point of all this is that stealing a computer program does not involve a screwdriver. The idea of software of any kind being represented as something as tangible as a piece of hardware that can be removed with a screwdriver is incredibly misleading.

Pansophic and many other firms in the software industry are spending a lot of money and time trying to explain to business people and others exactly what software is and what software does. I believe this show set all of our efforts back quite a few paces. I would call it a "bionic blooper."

Lee B. Mulder
Corporate Director

Advertising & Public Relations
Pansophic Systems, Inc.
Oakbrook, Ill.

Irresponsible Advice

I read with interest "Simulated Bomb Threat Uncovers Security Holes" [CW, Dec. 26-Jan. 2], and I take exception to it.

The author stressed the need, in the event of a bomb threat to organize a team of employees to search for the "bomb."

If you have ever published a more irresponsible piece of advice, I don't remember it.

In the event of a threat of violence, remove essential documents and get the hell out! Be reminded that this is not a merit badge test; nor is it a John Wayne movie. No organization — save perhaps the Secret Service or United States Marine Corps — has the slightest right to enlist its employees in a bomb hunt! There are qualified police units whose unpleasant job it is to handle such matters.

J. Stephen Schiavo
Arlington Va.

India Will Compromise

In "IBM Exit From India Not Surprising" [CW, Jan. 9], the author, whose analysis of the situation is not without substance, ignored

many important parameters with long-term implications.

The one common denominator for most developing countries is a desire to affect "participation" by technology-based and other foreign entities who import products into their domains. Participation not only ensures a lasting contribution, it also demonstrates a commitment on the part of outsiders who otherwise will be viewed with suspicion and considered a burden on the local economy as a result of the hard-currency export they create.

Participation based on joint ownership (with locals/nationals) or through licensing technology to nationals appears, on the surface, to be "the only way to go" for the emerging nation. Often, however, as in the case of IBM in India, an unyielding participation policy may become a case of one "cutting off one's nose to spite one's face."

Inasmuch as IBM is the unchallenged world leader in computer technology, one cannot expect to become fully competitive on today's world marketplace without either unique resources in demand (which India, for example, does not have) or the utilization of the most advanced technology — i.e. IBM's.

Even though, because of its vast population, India does not seem to need or want labor-saving devices, automation is essential for bringing product quality up to world standards. The Indians may find that even though automated cotton mills may displace a couple of million laborers, the quality and cost of cotton will improve sufficiently to enhance its place on the world market and bring about substantial increase in hard-currency income.

For those displaced, the added revenues can be used to make more public-supported jobs.

It is fair to assume that in due time IBM equipment will be sold in India again. The Indians, in spite of their wishes for participation and their anger at IBM's attempt to "dump" refurbished equipment in their country, are bound to learn the art of compromise.

Gordan Anan
Lincoln, Mass.

Not That Many Tricks

We take exception to "Fine Print Called Vendor Trick," [CW, Dec. 19]. We are familiar with the CNReport and it appears that the latest issue continues the campaign to besmirch the reputations of computer dealers and leasing companies.

As in any business field, there are those few disreputable firms that discredit the industry. However, the "tricks" enumerated in the "report" are less prevalent than were implied.

I am confident that I speak for others in the computer brokerage industry in requesting that future issues of CNReport turn attention to positive market assistance rather than negativism.

Joan W. Johnson
President
DP Brokers
Vienna, Va.

User, Vendor Cooperation Pays Off

By Don Leavitt
CW Staff

WALTHAM, Mass. — What can happen when the growth of a company outstrips the facilities of the service bureau it has been using for its financial systems?

Obviously, the company might be able to shift to a larger service bureau, but sometimes that's neither practical nor desirable. Three years ago Helix Technology Corp. faced that dilemma, a dilemma compounded by the firm's lack of in-house DP expertise.

Helix sought outside advice and today has its own data center and technical staff, a growing catalog of application systems and a continuing rapport with the software/systems house that helped out when the help was needed.

For its part, Interactive Management Systems, Inc., of nearby Belmont has taken advantage of its affiliation with Helix to gain a better overall understanding of what user organizations need and to extend its packaged applications in directions Helix suggested.

Search for Solution

As Suzanne Long, Helix's manager of management information services, told the story recently, it began in 1974-75 when Helix took stock of its shortcomings and sought outside help. But the company focused on getting help

from a consultant who understood DP hardware and had experience with business systems.

Long had those qualifications and joined the company in February 1976, then spent four months just getting to know the structure and workings of her new employer. Helix works with both cryogenics and power systems and has plants both in Massachusetts and Colorado.

Once she determined that no service bureau could handle the work at an effective cost level, Long considered going with a batch-oriented IBM System/3. But on-line capability was what Helix really needed, she realized, so she continued her search for a solution.

After meeting Interactive Management's President Brian Boyle, that summer, Long reasoned that his Digital Equipment Corp. PDP-11/70 was the type of equipment she wanted, that his

software was generally what Helix needed and that the closeness of the two firms might mean the Interactive Management CPU could serve as backup for Helix.

The next six months she spent "specing" what Helix would need in the way of application support, what packages Interactive Management had and what part of that software her company might be able to use or adapt to its needs.

Joint Effort

By December 1976, Long began pulling together a staff of DP professionals with PDP-11 experience and by May the software/systems house had supplemented the Helix crew with one of its own people on-site here in Waltham. Ultimately, Interactive Management had anywhere from two to five people on the project. Programming on seven systems

and special software to ease conversion from the General Electric 225-based service bureau environment began concurrently with the staffing effort, but the target date of July 1, 1977 for conversion was put off until August in order to get real user involvement in the effort.

The terminals were installed in the user areas long before the systems were up and running, and users were encouraged to become familiar with them. Practice runs were set up, and Long's teenage son David, with high school exposure to computers, showed the users how comfortable the interface could be.

Helix has now installed five systems including the central portion of Interactive Management's accounts receivable package, enhanced to allow the entry and accounting of all cash received, whatever its source.

(Continued on Page 22)

'Vollie' Eases Programming

PRINCETON, N.J. — Just introduced by Applied Data Research, Inc. (ADR), Vollie was designed as a comprehensive system for on-line program development in a CICS DOS/VS environment. Vollie is a successor to ADR's The Librarian/Online Library source program management system, a spokesman said.

The system was developed for use with IBM 3270 Model 2 CRT stations. Its facilities include a library system for permanent data storage and support for full on-line data entry and editing, the spokesman said.

In addition to a variety of security features, Vollie supports on-line maintenance for DOS/VS source statement libraries and the facilities of The Librarian as well as remote job entry and output retrieval under IBM's Power/VS, he added.

Vollie provides each user with a permanent and secure data storage facility, he said. Members of the on-line library are compressed to conserve disk space and to minimize I/O; when members are deleted, their space is immediately reuseable, he explained.

Each user creates his own members in the on-line library. Vollie supports tabbing, allows hexadecimal data to be entered from the terminal and takes advantage of the hardware editing facilities of the 3270 to perform full screen editing, he said.

"Books" from a source statement library can be displayed on the screen, copied to the on-line

library and modified. For sites using ADR's The Librarian, modules on the master file can be displayed, copied, modified and replaced on the master file by Vollie.

Vollie maintains The Librarian's data stamps and logs everything in and out of the update operation.

Vollie's interface with Power/VS is said to provide an internal reader for job submission directly to the Power queues; the ability to display various queues and all jobs active in the system; and the ability to view job output at the screen and to list, punch or delete it.

Enhancements expected during the first half of this year include on-line updating of DOS/VS source statement libraries, DOS/VS data management services, an interactive command executor and on-line syntax checkers for Cobol and JCL, the spokesman noted.

The permanent license fee for Vollie is \$9,500. A monthly lease costs \$350, but three- and five-year plans can bring that down to \$307 and \$227, respectively, ADR said from Route 206 Center, Princeton, N.J. 08540.

IBM 5110 Applications Set for Autumn Debut

ATLANTA — When IBM introduced the 5100 recently [CW, Jan. 16], it also announced several application packages that will be distributed on floppy disk for the system. Several other packages will be available on tape for use with either the 5110 or its predecessor, the 5100, according to a spokesman.

Like the 5100, the 5110 supports APL, Basic or both languages, he noted.

The floppy disk-based applications include a general ledger system that IBM said can be tailored to meet specific user requirements. It can produce in-

come statements, trial balances, general ledger balance sheets and statements of changes in financial position, the spokesman added.

An accounts payable program produces reports showing vendor names and addresses, original transactions and corrected entries, paid items in vendor sequence, trial balances, cash requirements and authorized payments. The program also produces checks and a "payables due" worksheet, IBM said.

Both the general ledger and the accounts payable programs will

(Continued on Page 22)



**WHEN YOU'VE GOT IT...
FLAUNT IT!**

JASPER JOB ACCOUNTING SYSTEM

FEATURING:

- WIZARD REPORT GENERATOR
- FREE CICS BILLING CAPABILITY
- RJE ACCOUNTING

DATA CHRON CORPORATION 174 FIFTH AVE. NEW YORK, N.Y. 10010 (212) 675-5333

NAME _____ CO. _____ TITLE _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____
TEL. _____ COMPUTER MODEL _____ SYSTEM _____

SOFTWARE & SERVICES

'UFO' Updated

HASBROUCK HEIGHTS, N.J. — Improved performance and "native" access to DL/1 or Total data bases are among the enhancements built into an updated version of the User Files On-Line (UFO) application development package, according to its vendor, Oxford Software Corp.

Running under control of IBM's CICS/VS on IBM 370s, the updated package, known as UFO R2V2, also provides enhanced paging, browsing and scrolling capabilities as well as multiple file/multiple record creation and maintenance, the spokesman said.

UFO now handles display-to-display transfers better than before and the package is the only CICS/VS

general-purpose program to support on-line report generation and sorted reports, he claimed.

The software supports two dictionaries. One lists data field names and the displays in which they are used; the other is comparable to a data base data dictionary in that it defines what the data elements are and where they can be found.

A Query facility allows non-DP personnel to enter SELECT and SORT parameters to modify previously defined displays.

UFO runs under either DOS/VS or OS/VS and is modular in structure. The system can be acquired for \$225/mo from Oxford at 174 Boulevard, Hasbrouck Heights, N.J. 07604.

Disk-Resident 'Sputnic' Drives Series/1 Terminals

NEW YORK — Described as a "CICS-type" multitasking, multiuser operating system for the IBM Series/1 minicomputer, the Synchronously Programmed User Terminal and Network Interface Control (Sputnic) package is now available from Series/1 Small Business and Communications Systems Corp.

Sputnic functions as a disk-resident operating system that is macro-driven to provide programmers with the means of developing real-time systems in a device-independent environment. The I/O subsystem is "modeled after IBM's Vsam" and includes DASD space management, a spokesman said.

The package supports both asyn-

chronous and bisynchronous communications protocols. It includes extended basic mapping facilities for IBM 4979, 4978 and 3270 CRT subsystems and support for "several" Hewlett-Packard and NCR terminals, he added.

Sputnic is an "ideal front-end and nodal component" on mainframe-based networks, the spokesman said, because of its distributed processing capabilities and easy interface with other software.

The software can be purchased for \$3,500 or leased for \$125/mo, he said from 745 Fifth Ave., New York, N.Y. 10022.

Combined Effort Has Good Payoff

(Continued from Page 21)

That was a Helix requirement and one that the software designer now includes as a standard part of its package.

Other applications currently include extensive accounts payable operations including cash projections, a transaction-oriented general ledger system, a costing system including reporting by jobs and a labor distribution system, but not payroll, which is still — deliberately — being handled by Helix's bank.

An inventory file of receipts and issues is in place, but the order entry, purchase order and inventory control routines needed to make it into a full inventory system are still some time off, Long said.

The company has implemented the software in its Massachusetts locations with data communications linking outlying sites with the PDP-11/70 here. Links to the plants in Colorado and other Helix locations are being planned.

Systems Planned For IBM 5110

(Continued from Page 21)

be available in September for identical license fees of \$75/mo which are paid up at the end of 12 months.

Also scheduled for first delivery next autumn is a generalized report generation package. With this facility, users can format and then produce a range of reports covering such diverse things as personnel, sales forecasting and analysis and equipment maintenance scheduling, IBM said.

The license fee for this business report package is \$50/mo; like the others, the license is paid up after 12 months.

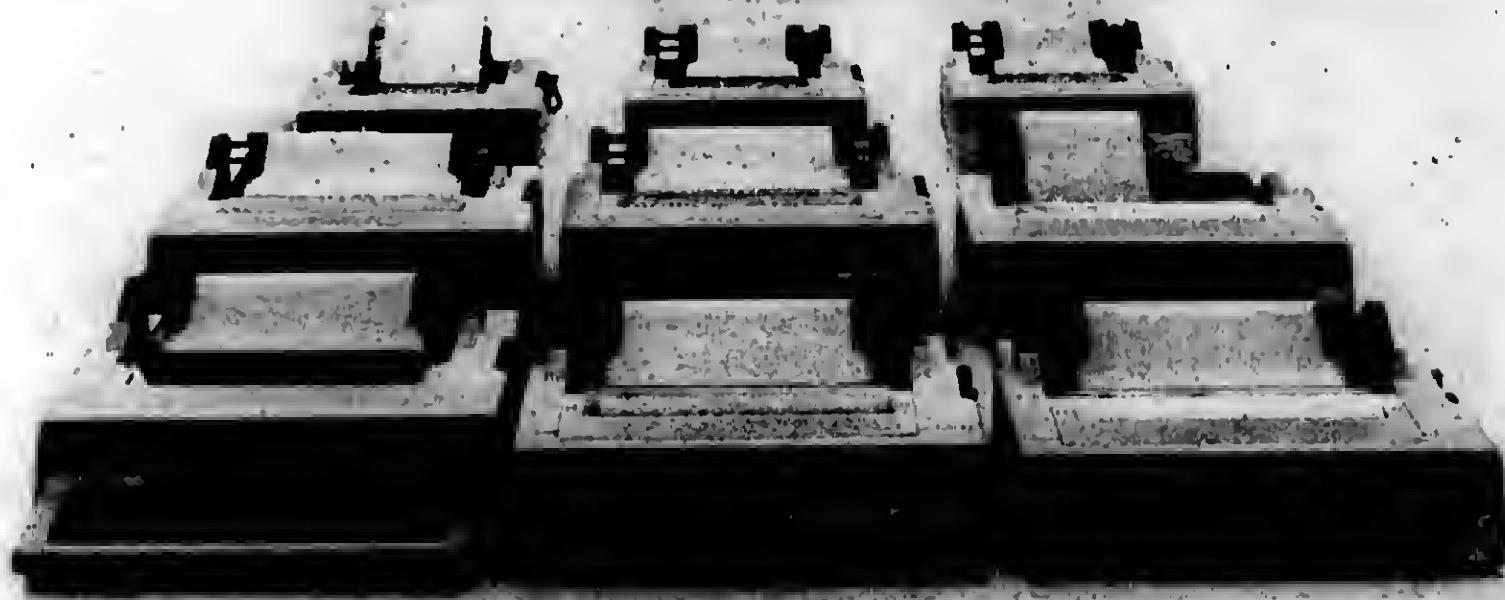
The tape-based applications available for both the 5100 and the 5110 include a construction payroll program written in Basic; a problem-solving library of business analysis, mathematics and statistical program, also in Basic; and print/plot programs, offered in APL or Basic.

The 5100, the 5110 and the software for them are all products of IBM's General Systems Division, based here in Atlanta.

Does its broad line make Centronics' matrix printer family the best?

NO. Even though the Centronics 700 series is a continually expanding printer family—currently 9 models and a range of print speeds from 60 to 180 cps—there's much more to it than just breadth of line. For example, there's a choice of 6 different types of forms handling capability; choice of uni- and bi-directional operation; and choice of 80 and 132-column formats. Why so much choice? It comes from the simple, highly flexible modular 700 series design that delivers superior reliability, exceptional parts commonality—and competitive prices.

And like all Centronics printers, the 700 series is fully supported by the largest worldwide service organization of any printer company. For complete 700 series information write or call today. Centronics Data Computer Corp., Hudson, NH 03051, Tel. (603) 883-0111.



CENTRONICS' PRINTERS
Simply Better

DP Dialogue

Notes and observations from IBM that may prove of interest to data processing professionals



BCS 'Test Flies' Online Systems with TPNS

"Putting any part of a critical computer system online without thorough testing—under every likely and unlikely condition—would be like test flying an airliner with passengers aboard."

The analogy comes naturally to Jerry Kotulan. As manager of technology for Boeing Computer Services, Inc. (BCS), Seattle, Kotulan has a complex of six IBM Model 168's in his charge. One of the most critical applications in the center is the On-Line Planning (OLP) System, which supports manufacturing operations in the Boeing Commercial Airplane Company through 330 in-plant terminals.

A Realistic Test

"IBM's Teleprocessing Network Simulator (TPNS) lets us test a system under realistic operating conditions, including heavy terminal traffic," he says. "The simulator incorporates 'scripts' of typical user transactions and exercises all of the network support software as well as the system logic."

"There's a lot more to testing a large online system than just validating the logic," Kotulan points out. "How well does it work with a full load of terminal

transactions? Where does response time fall off? At 300 users? At 350? TPNS gives us accurate measurements of such performance variables directly, without involving the terminal network at all."

Controls 470,000 Parts

Today the mainstream of the work of several hundred manufacturing engineers is on the OLP system; it controls tool planning and shop order release for 470,000 airplane parts. It is part of a developing family of manufacturing applications that will include an Order Location System to track work through the shop and a Parts Inventory Control System. This entire group of programs, Kotulan explains, will run under the Information Management System/Virtual Storage (IMS/VS).

"To use TPNS, we write a few test transactions, which are enough to exercise every system function. Then TPNS acts as an application program 'driver,' using these inputs to generate message traffic. We can ask it to generate any desired transaction load profile, to bring out hidden logic problems and obtain detailed measurements of performance under load," Kotulan says.

"When we make a maintenance change or enhancement, it must be done fast and be 'transparent'—unnoticeable—to the user. New systems must be correct at startup and stay that way. TPNS helps us meet that reliability standard."

Computer-based manufacturing systems help Boeing build commercial aircraft like these giant 747's. IBM's TPNS lets Boeing test such online programs under realistically simulated conditions.

Simulated Spine Hastens Injury Research

The effect of a 30-mph automobile crash on the human trunk is shown by these drawings derived from a computer. A normal spine is at left; the center and right views show its position 20 and 40 milliseconds after impact.

This insight into the complex mechanics of the backbone was made possible by a mathematical model of the spine, developed on an IBM System/370 Model 158 at the Chicago Circle campus of the University of Illinois, sponsored in part by the Aerospace Medical Research Laboratory. Engineers at the university are studying the effects of injuries and disease on the back.

The potential benefit is far-reaching, since eight million people in the U.S. suffer from back problems, and half a million currently wear braces.

"We don't know much about that sophisticated structure we call the



spine," says Dr. Albert B. Schultz, professor of mechanical engineering. "We're working with orthopedic surgeons to learn more, in the hope of preventing and treating back problems."

"Because we can apply engineering principles to the skeletal system," adds Dr. Ted B. Belytschko, professor of structural engineering, "we can sometimes determine in a few days responses to treatment which would take years to find by observing results of therapy."

In one experiment, the computer simulates the force applied to the spine by a therapeutic brace. "This helps show us the effectiveness of different modes of treatment," Dr. Schultz notes. "In treating lateral curvature of the spine, or scoliosis, the model has told us that applying pressure from the side will often be more effective than a stretching force."

By means of the computer model, engineers in the university group have predicted the effect of a hip-to-neck brace in a number of patients. The actual results of treatment supported the predictions in 80 percent of the cases.

Each year an additional 400,000 American workers incur back injuries; Dr. Schultz and his colleagues expect the computer model to help analyze their causes. The results will be available as guidance to therapists, orthopedists and industrial safety programs.

Auditing Aids for DP Systems

Three software products available from IBM assist the auditor of DP systems:

1. **Audit-Source Code Compare for System/370 DOS/VS and OS/VS** compares two versions of the source code of a program and lists the differences. Verifies that only authorized changes have been made.

2. **Change Management Tracking (CM/T)** keeps a record of changes to production application libraries. Generates reports of change history and aids reconstruction of a library from a backup copy.

3. **IMS/VS Data Base Structure Mapping (IMSMA/VS)** produces maps and reports on a line printer describing an IMS/VS data base.

For more information on these and other IBM software products, contact your local IBM branch office or write to the Editor of DP Dialogue at the address below.

EVENT 2000™

**super low cost
business computer system
with double density**

The small business computer market greeted the introduction of Applied Data Communications' new EVENT Series with overwhelming approval. Here's why — dual double-density floppies providing plenty of storage. Multi-user multi-task operation. Complete General Accounting Applications Software Package. Turnkey systems starting as low as \$11,300!

What Applied Data Communications is looking for in each of its distributors is an aggressive sales approach, proven performance in business system sales, and an established clientele of small businesses ready for their first computer and large businesses with multiple branch offices.



*We're looking for a few
good distributors.*

Talk to us at COMPUTER EXPO 78 — we'll be exhibiting in all 9 cities. Better yet, call Marc Covert, VP Marketing, right now at (714) 547-6954. Or write to Applied Data Communications, 1509 E. McFadden, Santa Ana, CA 92705.

**ADC APPLIED DATA
COMMUNICATIONS**

EVENT™ business computer systems to begin with.

Look Into Johnson Systems'

CICS/VS UTILIZATION MONITOR AND CHARGEBACK SYSTEM



"Now, a powerful data collection system that lets you accurately account for . . . and equitably bill for . . . all resources used by each user."

"The first feasible alternative to Performance Analyzer."

Send me your brochure about the new CICS/VS UTILIZATION MONITOR and CHARGEBACK SYSTEM.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone (____) _____

Computer _____

Operating System _____

**Johnson
Systems, Inc.**

8400 Westpark Drive
McLean, Virginia 22101 (703) 893-8700

C 130

More Than 1,000 Titles In Updated Bibliography

More than 275 new books are listed in the 11th edition of the *Annual Bibliography of Computer-Oriented Books*, published this month by the University of Colorado.

Notable in this year's listing is the increase in quantity and quality of books on the subject of program design and data base design. In addition, there is a 75% increase in the number of books on management of data processing.

All books prior to 1973 were deleted, except for classics like Dahl and Dijkstra's *Structured Programming*. Despite the deletions, the bibliography still contains more than 1,000 books from 207 publishers.

The category on program design, only in its second year, now contains 22 books. Six new books were added including the two volumes in Raymond Yeh's series on *Current Trends in Programming Methodology*. Brown's *Software Portability* is an example of the pragmatic books in this category, compared with theoretical books like Hecht's *Flow Analysis of Computer Programs*.

Although there are now more than 35 books on the subject of structured programming, few publications are available on structured design. The new book by Gane and Sarson, *Structured System Analysis*, is representative of the improvement of books in this area.

Documentation of Software Products by Lomax is a book on a neglected subject, as is *System and Programming Standards* by Wooldridge.

The section on data base was increased 40% with the addition of 16 books. Gio Wiederhold's *Data Base Design* is an example of the high-quality books now available on this subject. The 607-page tome by Wesley Chu, *Advances in Computer Communications*, is the most comprehensive of the 13 new books in that category.

Painfully Slow Upgrade

A painfully slow improvement is occurring in the books devoted to

Harris Supports 'Total' Queries

FT. LAUDERDALE, Fla. — Designed to enhance the usefulness of Cincom Systems, Inc.'s Total data base management system on Harris Series 100 and 200 CPUs, Total-IQ allows users with limited DP knowledge to get timely information from the system, according to a Harris spokesman.

By supporting accesses to the data base from a terminal, the software eliminates conventional programming requirements.

In common with many modern query systems, this one allows users to store procedures for reuse, he added.

Total-IQ costs \$10,000 and is available immediately from Harris Corp. Computer Systems Division, 1200 Gateway Drive, Ft. Lauderdale, Fla. 33309.

management of DP. Of the 13 new ones, only five are noteworthy. One of the better books is the updated version of Joslin's *Computer Selection*.

The computer reference section was increased by 10 books that should be a part of the computer library of every organization.

An important change is occurring in the books on management information systems, reflected by House's *Interactive Decision-Oriented Database Systems*. Although few of the 11 new books have an emphasis on interactive systems, the trend is clear.

The bibliography contains 12 categories on computer applications. A total of 35 new books were published in this area, among them *Marketing Management Information Systems* by William King. Beltram's *Models for Public Systems Analysis* is an example of new books in that application sector.

The Institute of Internal Auditors' three volumes on *System Auditability and Control* contain guidelines important to designers of business systems.

Eight books in microprocessor design and 10 on simulation were published in 1977.

Magic Squares by Paul Caulter is representative of some of the new math books for high school and college students.

The special category had 15 additions on subjects like security/privacy and the future of computing.

Copies of the bibliography are available for \$4 from *Computing Newsletter*, Box 7345, Colorado Springs, Colo. 80933. The cost is \$5 if an invoice is required.

Couger is professor of computer and management science at the University of Colorado.

'Total' Moved To RSTS/E

CINCINNATI — With the introduction of Total for Digital Equipment Corp.'s RSTS/E environment, installations with any of DEC's PDP-11 line, from the model 11/34 through the 11/70, now can use the data base management system from Cincom Systems, Inc.

The RSTS/E Total is available in a multitasking version which is directly compatible with the implementations of Total that have been previously adapted to DEC's RSX-11 and IAS operating systems, a Cincom spokesman said.

Total includes a data manipulation language with both command and control functions that can be accessed with Macro-11, Cobol V3, Fortran and Coral under RSX-11 and IAS, as well as any Basic Plus II and Cobol V3 under RSTS/E, he added.

RSTS/E Total provides record-level lockout, a data base recovery module, buffer pool sharing and fully reentrant code, the vendor claimed.

Released as of the first of the year, the newest version of Total costs \$18,500, but discounts are available for multiple location installations or OEM users.

Cincom Systems is at 2300 Montana Ave., Cincinnati, Ohio 45211.

For Microcomputers

Business Tasks Packaged

ORANGE, Calif. — A software package for microcomputers that includes general ledger, accounts receivable, accounts payable, finished goods inventory control and payroll has been introduced by The Computer Mart.

The Grimes Business Information System (GBIS) was developed by Larry G. Grimes & Associates and Computer Products of America. In a typical application, GBIS can store on a single minifloppy diskette up to 400 customer listings, 50 vendors, 400 line items of inventory, 25 employee records and 60 general ledger accounts, a spokesman claimed.

Requiring 24K of memory, GBIS is an interactive system in which receivables decrease book inventory, payables increase book inventory and general ledger accounts are updated automatically with accounting controls, he said.

North Star Basic

GBIS is written in North Star Basic, but other disk-based Basics can be used for the listings, he noted.

Within the individual application areas, the general ledger logic produces general journals, balance sheets, comparative balance sheets, income statements, a trial balance worksheet, ex-

pense budgeting reports and a chart of accounts.

The accounts receivables routines runs produce reports of aged balances, customer listings and mailing labels while the accounts payable routines generate account status reports, vendor listings and, again, mailing labels.

The inventory control programs are said to produce status reports and product listings as well as to support on-line order entry, invoicing and purchase orders.

GBIS costs \$200 and is available through some personal computer stores or, for an additional \$2.50 for postage and handling, directly from the Computer Mart, 633 W. Katella Ave., Orange, Calif. 92667.

'Scanner' Aids JCL Updating

PAWNEE, Ill. — The JCL Scanner from Illini Software Co. enables users to make mass changes in OS/VS job control statements by replacing every instance of a user-specified character string found in current JCL with another string, according to a spokesman.

The user has control over both the search and the replacement values, the search column range and the JCL media, he said. The search and replacement values may be different lengths, in which case data shifting will occur to maintain JCL validity, he noted.

Input to the JCL Scanner is the user's JCL on any media and the operating parameters. The output is the converted JCL in sequential form and an audit listing showing exactly where any replacements were made.

Any replacements attempted but not allowed because of logical JCL constraints are also indicated, the spokesman said.

The scanner will run in any IBM 370 OS/VS environment. The package costs \$250 and includes documentation and a test case.

Illini Software can be reached through P.O. Box 684, Pawnee, Ill. 62558.

APL Standard Discussed

NEW YORK — A proposed standard for the interchange of APL workspaces makes no attempt to define the language itself, according to Prof. Garth H. Foster of Syracuse University.

Instead, he told a recent meeting here, the draft standard "is intended to facilitate the exchange of APL functions and variables between APL installations in a manner that is independent of specific APL implementations."

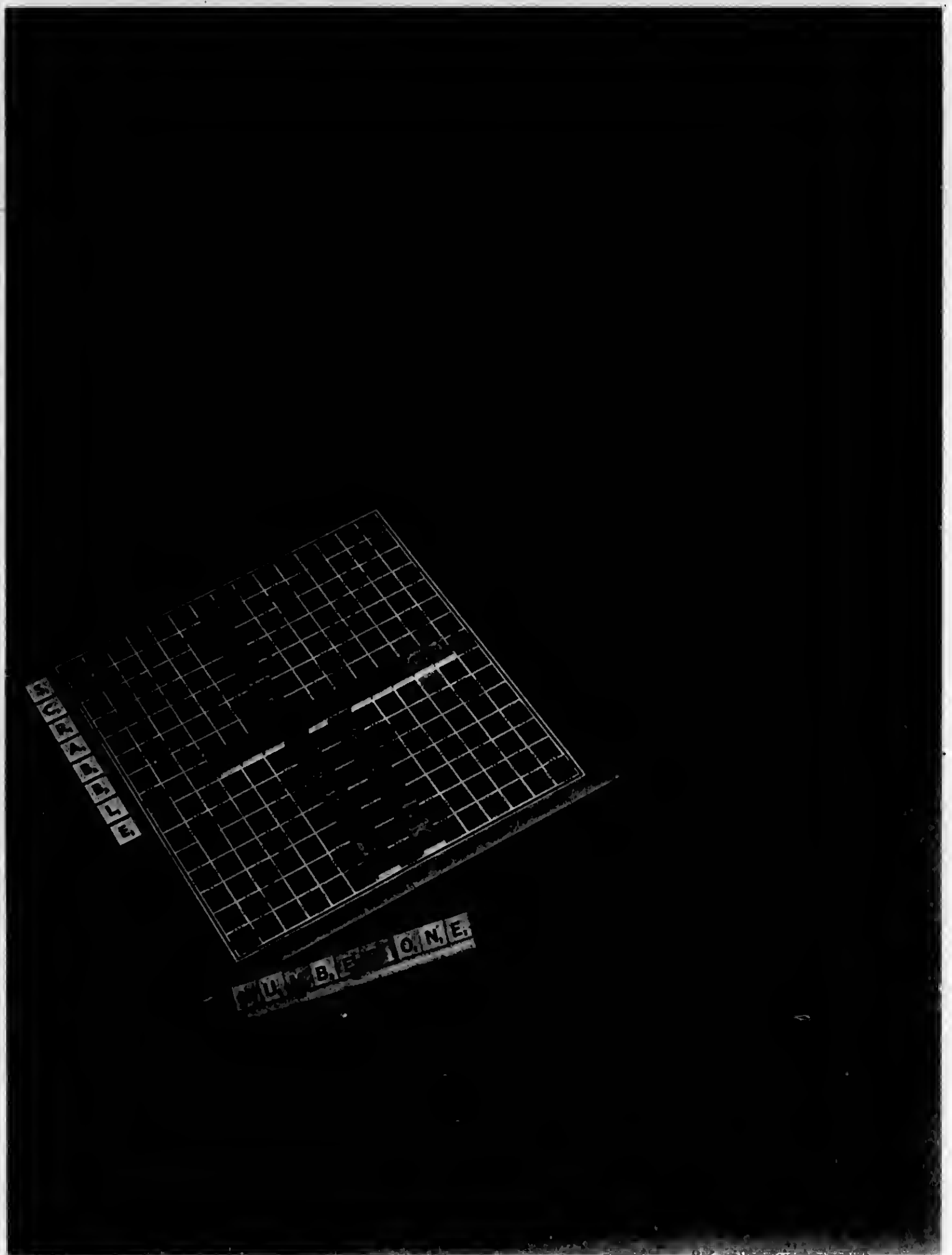
The proposed standard, now under consideration by the worldwide APL community, was developed by an ad hoc committee formed under a meeting of APL implementors last September at the Syracuse University Minnowbrook Conference

Center, Foster told the meeting sponsored by Think, Inc.

Foster has been active in APL projects since 1967 and was the organizing chairman of the Association for Computing Machinery (ACM) Special Interest Committee of APL. He was also instrumental in the planning of the Minnowbrook conference and the development of the proposed interchange standard.

The APL meetings, open to anyone interested, will continue on Thursday, Feb. 9 with consideration of the use of APL for systems work presented by E.T. Irons, acting chairman of the computer science department at Yale University.

Think, Inc., is at 310 E. 46th St., New York, N.Y. 10017.



BLIS COBOL
MULTIUSER OPERATING SYSTEM

**SYSTEMS
WORLDWIDE**
in the USA and 14 countries

For information call today...

IP Phone (305) 647-2200 USA
TWX/Telex 810-853-5033
1850 Lee Rd., Winter Park
(Orlando), Florida 32789





The odds were against coming up with a consistent winner in this business. But we beat the odds when a lot of smart money saw the pricing of our Infoton 400 Data Display Terminal: just \$1,095 in quantities of 100 or more. A remarkable price considering the Infoton 400 is designed around the Z-80 microprocessor, with editing and formatting modes settable through software that give it more flexibility than any other terminal in the industry for the price. That's what made Infoton data display terminals one of the largest selling in Europe.

And for options, choose from two additional pages of memory, a directly addressable printer interface, and polling capabilities.

No wonder we beat the odds.

To make the winning choice in video terminals, call Infoton collect at (617) 272-6660. Ask for Barbara Worth. Or write Barbara Worth at Infoton, Second Avenue, Burlington, MA 01803.



 **Infoton 400**

Mini-Based Logic Lets Users Solve Problems

By J. Van Duyn

Special to CW

BRISBANE, Calif. — By switching from manual office operations to an in-house minicomputer, a supplier of important plant-related items has been able to reduce its inventory control from 75 hours per week to less than four hours per week. In addition, by switching from a service bureau to the same in-house mini, an accounting firm saved considerable turnaround time in its financial applications.

These dramatic reductions were effected by a new concept in small business com-

puters: an integrated hardware/software minicomputer that allows nontechnical small business users to develop and execute business applications in English.

Landmark Designs International does over \$2 million business a year importing wholesale ceramics, macramés, etc., from Japan, the Philippines, Hong Kong and Taiwan. The company makes up assortments to orders and ships them in packages to 60 salesmen throughout the U.S. and Canada. Because the warehouse personnel have to select the merchandise piece by piece to make up the in-

dividual orders, inventory control is rather complex.

"We were spending between 65 and 75 hours weekly to re-cap our shipment and post our inventory control for that week," Lynn Mahoney, the office manager said, "And because we're growing so fast, it became impossible to handle the volume manually. Now we enter 2,000 line items a day into the computer, and it takes one of my staff about a half an hour a day. In addition, the computer generates a summary report daily, making our inventory control really up-to-date."

Plain English

When Landmark Designs management decided to automate its manual processing, they investigated a number of systems. Among the many small business computers they considered, Logical Machine Corp.'s Adam made the greatest impact on them. In the words of Mahoney: "When at their demonstrations we saw that we could program in plain English and not some 'English-like' computer language, and that we didn't have to be afraid to touch this computer because there's nothing on the keyboard that can 'blow up the system' or 'destroy the programs,' as is the case with all the other computers we've seen, we opted for Adam."

Mahoney expressed her obvious satisfaction with their choice when she said, "The current inventory control system we have took me less than five hours to get on the computer. It was very easy. However, I'm quite aware that when I develop a more sophisticated inventory control system on Adam sometime in the future, I will have to do a lot of painstaking programming."

"At the present time, if we don't have a particular item in stock, we make the substitution. Eventually, Adam will do these substitutions for us. Specifically, the system will go through the inventory, check the items, and if a certain item is not in stock, the system will substitute it with another item in the same price range."

Mahoney, however, is delaying putting the accounts receivables and payables, the billing and the sales commission applications on the computer until she corrects the order entry application. It seems "Adam is bringing up the wrong information. We usually have a shipped-to address and a billed-to address. Well, when I give an account number to Adam, it's responding with the name and address of that account. Only somewhere it's switching around the shipped-to address with the billed-to address, so

I'll have to get back into the program and find out why it's doing it."

Basic Configuration

What is this minicomputer that provides nontechnical business end users the ability to program in their native tongue? To begin with, Adam's basic configuration consists of a CPU with 32K bytes of and a CRT terminal with standard typewriter keyboard and a few special function keys.

Most importantly, however, Adam operates as a list-oriented interpreter, accepting and executing both basic and user-added verbs and nouns in simple, straightforward English (or any natural language) from a disk data base dictionary.

Accounting Woes

Contrary to Landmark Designs International, the CPA firm of Schwartz, McGuire & Co., of San Mateo, Calif., has been using a computer service bureau for years to process its general ledger and financial statement applications. Corporate, business and individual income tax returns, however, were done manually.

"The primary reason we considered buying or leasing an in-house small business computer, was to eliminate the delay in turnaround time the service bureau tends to impose on you," Charles McGuire, one of the partners, said. "We had to send our work to the service bureau through the mail. That took two days, minimum. Then it was two or three days until they processed the work. So typically we've had a week's turnaround time. And when we had to correct an error in the print-out statements, we were faced once again with the same delay in the turnaround time. That's why we looked into the possibility of an in-house computer. We investigated some four or five minicomputers, including Basic Four, Singer and Burroughs, before we decided on Adam."

"We chose Adam because of the ability of this minicomputer to provide or generate, if you will, applications that

suited our particular needs. We wanted to process not only a general ledger system for our large clientele, but also an income tax return system. We wanted a minicomputer that could provide both of these highly specialized systems, so that we could eliminate the service bureau cost and substitute the cost of the minicomputer. In short, make the in-house computer affordable. None of the other small business computers — with software application packages — met our requirements."

A Taxing Chore

Since McGuire, a nonprogrammer, wanted to develop his own applications, the fact he could do it in English was a plus factor. Nevertheless, it took him many months — with considerable assistance from the staff of Logical Machine — to design, develop and implement the income tax return application.

"Instead of first getting our feet wet with some simple program, we plunged into the complex income tax return application," McGuire said with a grin. "What makes this application so complex," he explained, "is the multitude of variables, such as identification, segregation and classification of capital gains, for example. But it's up and running. We have, in fact, both the income tax return and the equally complicated general ledger applications on Adam. And we're quite pleased with their total performance."

Van Duyn is the author of several books, including the Practical Systems & Procedures Manual and the forthcoming DP Written and Verbal Communications, both from Prentice-Hall.

TRAINING VENDORS

Individuals and organizations interested in providing technical training courses for New York State computer systems analysts, computer programmers, and EDP management personnel for the period July 1, 1978 through June 30, 1979, should contact William F. Woodard, Information Systems Training Supervisor, NYS Department of Civil Service, State Campus, Bldg. 1, Albany, NY 12239; phone (518) 457-2297, 457-5614, by March 28, 1978.

quality knows quality!

That's why many **FORTUNE 500** companies select Computeristics, Inc. to install their accounts receivable and credit management systems.

The Computeristics on-line **CUSTOMAR** system gives you 5 systems in one!

**ON-LINE
ACCOUNTS
RECEIVABLE
AND CREDIT
MANAGEMENT**

Computeristics can install the dependable on-line **CUSTOMAR** system on your computer faster than you would believe possible!

So... if your Management is pushing to improve credit control and productivity, take the time to call or write us and we will send you more information about on-line **CUSTOMAR**!



computeristics, inc. Dept. R1A
Benson Road
Middlebury, CT 06749
Attn: Rolf Diegel

PLEASE SEND ADDITIONAL INFORMATION TO:

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____
ZIP _____ PHONE _____

ACQUISITION WANTED

Boston-based computer terminal lease/service Company would like to acquire Sales-oriented company with Fortune 1000 customer base. Our strong suits are administrative and financial expertise, plus excess cash flow from operations and lines of credit. Qualified organizations are invited to participate in our explosive growth — We double revenues every two years, and earn 10%+ profits. Contact PHILLIP K. CIOLFI, Pres.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617) 246-1300

Amdahl Came In Quickly Package Key to Hurried But Unharried Switch

By Rocco Plaia
Special to CW

In the spring of 1976, Liberty National Life Insurance Co. ordered an Amdahl 470. While making a decision on a computer, we realized that some of our software systems were surviving solely due to the emulator on our IBM 370/155 and would soon become obsolete. New systems had to be developed or purchased prior to what we thought to be a late fall hardware conversion.

One such system was supplies and inventory control, which we had originally planned to develop ourselves. Since our company is quite unique in its DP requirements, we didn't expect to find a packaged system that would work without extensive modification.

Liberty National has about 4,000 employees spread over 13 states, working out of 150 district offices. Our current insurance in force is in excess of \$8.9 billion with assets approaching \$1.3 billion.

Most of our supplies and inventory are forms and policies. But we also maintain a large stock of sales aids which we sell to our agents to use as promotional items. These items could be anything from sewing kits to golf balls.

We process about 3,000 transactions a week on a weekly cycle. We work with six asset accounts and 15 or 20 expense accounts. Our fire company and investment group have different expense accounts. It is in this area that most of our modifications had to be made.

Delivery of the Amdahl was within 10 days of ordering, considerably sooner than expected. So our staff was already involved with other projects. We had to consider purchasing a software package for supplies and inventory control.

We had talked to MSA about its supplies inventory control and purchasing system earlier in 1976. So it was the first company we thought of and the first we contacted.

Areas of Concern

In our search for a software package, there were three areas of primary concern. First, we wanted an established product. This may not always be the situation, but our hardware conversion made it a necessity.

Second, we wanted the response of current users of the package. Their experience and remarks were very beneficial in helping us make a final decision.

Finally, we considered the kind of "defined" support that we could expect from the software vendor after installation of the product. Once we were satisfied that these areas were successfully complied with, we studied the technological aspects of the system in more detail.

We took several weeks to make a decision. During this time we visited one of MSA's client companies that had inventory requirements similar to ours and an installation only slightly larger. We saw first hand how their system operated and their favorable response to it.

Also during this time, our users contacted several other users for their comments and arrived at the same conclusion: the system was sufficient and easily adaptable to almost any environment.

Usually it takes two or three months to convert to a system like this. A parallel run is made, tests are run and all the bugs are worked out before going live with the system. But not having a system to run parallel with, we went live first and made corrections later.

It worked. We got it going in a month and very few corrections had to be made.

The support we got from MSA was very critical to us at this time. Our approach to the implementation of this system put MSA on the spot and the firm came through it very well.

We had done as much preparatory work as possible prior to MSA's coming to make the installation. We wrote two or three programs to convert our old inventory master file and create all the other files necessary for a successful conversion. When MSA came in, these programs were then modified in less than one day.

By the time the MSA people got here we were ready to go.

'Remap' Aids B4700 Users

HILLSDALE, N.J. — The Record Extraction, Manipulation and Print (Remap) program from Pascack Data Services, Inc. was designed to enable installations with Burroughs Corp. B4700 CPUs to generate reports without the aid of programmers.

Remap is a two-pass system capable of selecting records from an existing disk file, sorting them into a specified order and generating reports designed by the user, a spokesman explained. Additional capabilities include all arithmetic functions and the accumulation of two levels of totals.

Once developed, a procedure can be stored for later reuse, he added.

While it supports the creation of both one-time and regular reports, the package also allows the user to experiment during the design phase of system development, producing varied report formats quickly until the optimum one has been selected, the spokesman said.

The parameter-driven system sells for \$1,100, and Pascack can be contacted through P.O. Box 215, 77 Brookside Place, Hillsdale, N.J. 07642.

They spent two days installing our system and training our people to use it.

Even though we spent considerable time studying the documentation ahead of time, we couldn't have gone live without this period in which to answer questions.

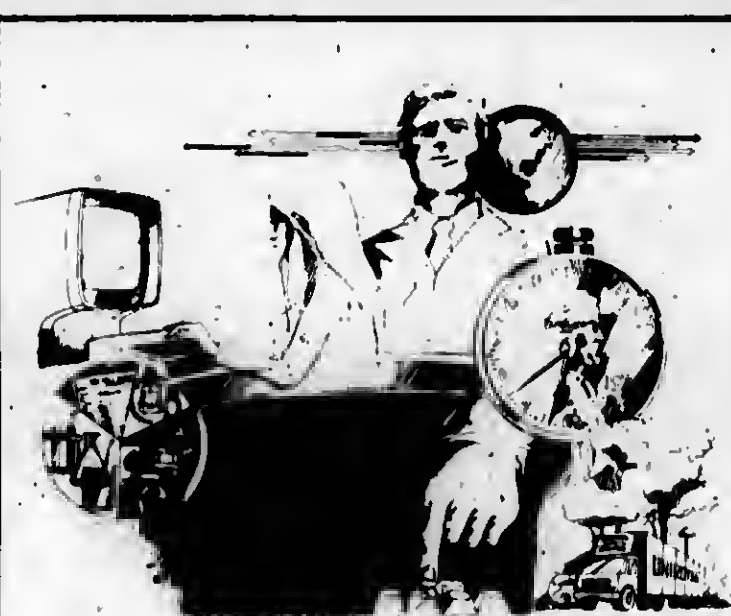
A few modifications had to be made to tailor the system to meet our needs. Although MSA wasn't actually involved with making the modifications, it did make suggestions and offer advice. During the two-day training period the company helped us decide the

best approach to take.

MSA offers five days of training and assistance with its packages. We only used two days, because we wanted to save the other three for any future assistance we might need.

We've been satisfied with our supplies inventory control and purchasing system. It has performed the way we expected it to and the way it was presented to us.

Plaia is a senior systems analyst at Liberty National Life Insurance Co., Birmingham, Ala.



CustomORDER™ makes it happen!

Smooth operation from order entry through invoicing and inventory control can happen in your facility with CustomORDER. CustomORDER, is an On-Line, Real Time computer system... ideally suited for a multi-division, multi-product manufacturing or distribution company operating from numerous plants and warehouse locations.

CustomORDER uses CRT video display terminals to maintain a file of customer names, part descriptions, open and shipped orders. CustomORDER will display the status, location and inventory of every part in your line... and as orders are entered, shipped or back-ordered, inventory levels are updated immediately!

For more information call (203) 573-2442 or return the coupon.



computeristics, inc. Dept. R1
Benson Road
Middlebury, CT 06749
Attn: Rolf Diegel

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

PROGRAMMING MANAGER/OPERATIONS MANAGER

YES

- _____ TIRED of surprises in your production environment after a PROGRAM or DATA SET change?
- _____ TIRED of paging through large PROCLIB listings looking for answers to simple questions?
- _____ TIRED of obsolete FLOWCHARTS and manually having to prepare JOB FLOWCHARTS?
- _____ TIRED of having to manually enforce PRODUCTION STANDARDS for PROCs and FLOWCHARTS?
- _____ TIRED of guessing which PROCs use PROGRAM 'A' or DATA SET 'B'?

If you answered YES to any of the above, CHICAGO DATA SYSTEMS, INC., has a LOW COST solution that will make life much easier in your OS Environment.

PROC/ANALYSIS and FLOWCHARTER are proven software products that provide CROSS-REFERENCE information on PROGRAMS, JOB STEPS, DATA SETS, and REPORT FORMS usage in both report format and computer generated system level FLOWCHARTS.

PROC/ANALYSIS and FLOWCHARTER are available from CHICAGO DATA SYSTEMS, INC., for \$2500 each or \$4000 for both products. They are available on 30-DAY FREE TRIAL and have many more uses; can we demonstrate them for you?

CALL (312) 751-5474 FOR IMMEDIATE ACTION OR SEND THE COUPON BELOW

MAIL TO: John A. Ambler, President, Chicago Data Systems, Inc.
P.O. Box 7644, Chicago, Illinois 60680

☐ Rush Me More Information

☐ SEND PROC/ANALYSIS AND/OR FLOWCHARTER FOR 30-DAY FREE TRIAL

Name _____
Title _____ Phone _____
Company _____
Address _____
City _____ State _____ Zip _____

or telephone (312) 751-5474

BEEHIVE INTERNATIONAL'S B500 IS FLEXIBLE



1. Our B500 is an 8080A micro-processor based video display terminal.



2. It is user programmable
*Controller Panel
Programming Manual*



3. It has an expandable memory
*Display-4K RAM (4000 Characters)
Program-Up to 4K PROM or 7K ROM
-Up to 48K RAM*



4. Beehive's B500 provides a printer port for printing requirements and an auxiliary port to accommodate floppy disks



5. User-defined function keys with an extra RAM memory option, *plus...*



6. Upload and Download capability

other B500 features

- Keystroke Programming
- Format Mode (Protected and Unprotected)
- Transmission Rates to 19,200 bps
- Editing Capability
- Tabbing (Forward and Back)
- Auxiliary I/O Port
- Programmable Character Generator
- RS232 Compatibility
- 25-Lines x 80 Character Display Memory
- Block Transmission
- Addressable Cursor
- Upper and Lower Case Characters
- Scrolling
- Eight Video Levels
- Detachable Programmable Keyboard
- 256 Programmable Characters

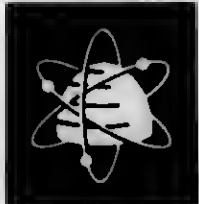
and

- ☐ One Year Warranty, Parts and Labor
- ☐ Nationwide Service, On-site service, Strategically Located Service Depots
- ☐ Federal Express Parts Bank Delivery
- ☐ International Service and Sales
- ☐ Leasing Available
- ☐ Full Product Documentation, Operator Manuals, Illustrated Parts Breakdown, Maintenance Manuals, Periodic Product Update Bulletins
- ☐ Quantity Discounts Available

BEEHIVE INTERNATIONAL
Box 25668 • 4910 Amelia Earhart Drive
Salt Lake City, Utah 84125 • (801) 355-6000

- ☐ Please send more details
- ☐ Have salesman call. I'd like a demonstration

Name _____ Title _____ Phone _____
Address _____
City _____ State _____ Zip _____

BEEHIVE  **INTERNATIONAL**

USA: 4910 Amelia Earhart Drive • Box 25668 • Salt Lake City, Utah 84125 • Phone (801) 355-6000 • TWX 910-925-5271
EUROPE: Schiphol Airport • Building 70 Schiphol East • Amsterdam, The Netherlands • Phone 020-451522 • Telex 15284

Execunet Ruling Opens Long Distance Options

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — Data communications users and others will reportedly gain more flexibility in the choice of long distance service as a result of a recent U.S. Supreme Court order relating to Execunet service.

Execunet is provided by MCI Communications Corp. as an alternative to all-Bell long distance facilities. About 1,000 users of the service are data communications customers, according to an MCI spokesman, and typically operate at 4,800- and 9,600 bit/sec.

The Execunet service had not been provided to new customers pending a Supreme Court decision on whether to review the findings of a lower appeals court. The appellate court ruled AT&T did not have a monopoly on long distance telephone service.

The Supreme Court refused to reconsider the earlier decision, effectively opening long distance services to competition.

Under the MCI service, a user utilizes telephone company local facilities to get connected to MCI's long distance facilities. At the called city, local phone company facilities are again used to carry the business information from the MCI long-haul facilities to the customer's location.

According to the MCI spokesman, the Execunet service often uses less switching than telephone facilities and is thus more reliable than compatible phone company service.

Although it was believed the court action paved the way for new customers to be connected to Execunet, AT&T filed a petition with the Federal Communications Commission (FCC) stating that it has no obligation to provide additional interconnections with specialized carriers such as MCI. AT&T cited another court ruling that questioned whether specialized carrier interconnections are in the public interest.

The FCC then issued a public notice asking for comments on the AT&T petition by Jan. 30.

tion by Jan. 30.

Despite the latest AT&T action, an MCI spokesman said new Execunet customers are being serviced using available local facilities. New local facilities apparently will not be provided to the specialized carriers until the latest AT&T petition is resolved by the FCC.

In addition to Execunet, Southern Pacific Communications Co. has a similar offering called Sprint.

DDS Rebuffed Again

In another action affecting data users, the FCC rejected for a second time the proposed AT&T tariff for its Dataphone Digital Service (DDS).

The DDS rates were rejected as being too low and thus being anticompetitive. The service is the subject of an antitrust suit by Wyly Corp., which is claiming DDS forced its Data Transmission Co. (Datran) subsidiary out of business.

At present, DDS users are being charged under interim rates until the FCC approves permanent rates.

User Gains Control, Switching Memorex Unit Cures Hospital's Net Ills

BALTIMORE — To obtain console network control and switching of communications lines between computers, Johns Hopkins Hospital here has installed a Memorex Corp. programable 1380 communications processor.

The Memorex 1380 handles data communications between two IBM 370/148 mainframes and a variety of terminals and peripherals. These include a custom-built Siemens minicomputer and a Digital Equipment Corp. PDP-11 minicomputer.

Network applications at Johns Hopkins include an electronic reporting system for radiological examinations, studies and medical plans. It also handles remote job and key-to-disk data entry.

The 1380 enables console-controlled switching of communications lines from the terminals or computer used by these applications to either host mainframe. In addition, the 1380 performs system tests and diagnostics over the network, on-line or off-line, without host participation.

According to Howard Buckholtz of the hospital's DP center, "We selected the Memorex 1380 for greater convenience in switching communications lines and for the added benefits of running diagnostics and system tests off-line. The 1380 effectively handles these tasks, while the IBM 3705 we used previously could not."

The Johns Hopkins network processes a

mixture of experimental, medical and routine data. The most exotic use is a radiological exam reporting system developed with the IBM Customer Information and Control System (CICS).

In this system, a radiologist projects a diagnosis from a film strip onto a rear projection screen containing an embedded wire grid. With an electronic probe, the radiologist then selects the appropriate

symptom on the projection.

The wire grid picks up signals from the probe and transmits them to an optical image-handling system composed of two IBM terminals.

Supplementary remarks are added manually via the terminal keyboard. The entire report is then transmitted through the Memorex 1380 to the mainframes and can

(Continued on Page 36)

T/S Service Credits Network With Doubling Customer Base

SANTA CLARA, Calif. — MJK Associates, a time-sharing service here for the commodities futures community, reported its customer base has doubled because of its conversion to a data communications network.

"With the interface installation," MJK President Michael A. Marriott said, "we went from a local customer base to one reaching the major capitals of the world... It's let me go after customers I couldn't have considered approaching before."

MJK offers access to an extensive data base of daily and historical figures on 36 commodities reaching back to the 1960s. The company also provides standard and custom

software for data retrieval and analysis, although customers are free to write their own programs.

Subscribers use these services to test hypothetical trading strategies and make daily trading decisions.

Before converting to Tymnet, MJK's immediate needs related to its own stress on quality. "Our forte compared with all other services is accuracy," Marriott stated.

The company's data is based on figures released daily by the commodities exchanges, but each figure is verified from alternative sources, sometimes with a call to the releasing exchange itself. At times figures are

(Continued on Page 32)

COMMUNICATIONS

BUDGET

DOWN?

DECWRITER II & III
3 MONTH LEASE

THEN ONLY MONTH TO MONTH TO MONTH TO
WE SHIP FROM OUR NEW STOCK IN 1 DAY

AMERICAN TERMINAL LEASING • 617-261-1100
P.O. BOX 68, KENMORE STATION, BOSTON, MASS. 02215

T/S Service Cites Net for Doubling Client Base

(Continued from Page 31) verified as many as three weeks later.

The data is also verified mathematically and manually. Discrepancies are regularly discovered and corrected with all of these approaches.

To maintain this level of quality while providing geographically dispersed terminal access, MJK needed a communications network with reliable transmission and value-added features such as alternate routing in the event of line or equipment failure and power fail-safe automatic restart at nodes. At the time, the company also needed a network with buffering capability to absorb input and output backpressure for its leased host CPU.

Other criteria weighed in MJK's network decision related to future needs, particularly for expanded domestic and international coverage and for higher speed transmission.

MJK applied its research and validation skills to its network

problem and found Tymnet met these criteria, Marriott said. He described the primary factors in the decision as Tymnet's reputation and record of service and reliability.

Tymnet, Inc. implemented Tymnet service with a CP/8A communications processor and standard asynchronous interface to MJK's communications controller for a Hewlett-Packard Co. HP 3000-II. This Tymcom han-

dles eight simultaneous users at 30 char./sec, but MJK plans to move to a larger capacity model serving more ports at 120 char./sec.

MJK's users are primarily commodities traders, brokers, individual speculators and pool managers and advisors.

Participation in the commodities futures market has always demanded extensive technical analysis to predict

prices and trends, but MJK services typically reduce its customers' analysis time from hours to minutes a day, Marriott said.

Most subscribers use MJK to develop and use proprietary programs they feel best predict the market. In general, users rely on MJK for software development, but about 20% write their own programs.

MJK's most popular service

provides daily market information and trading signals shortly after the exchanges close. The second most popular service goes by the acronym "Poise" for Portfolio Opportunities Investigated Through Simulated Execution.

This series of programs develops and tests trading strategies against historic data and then generates appropriate daily trading signals.

Terminal Handles Touch-Tone, CRT Or Voice Output

SAN DIEGO — Wavetek Data Communications has a microprocessor-based terminal called the Model T520 that reportedly can transmit Touch-Tone input and receive either audio response or CRT display output.

The terminal operates over dial-up phone lines and receives audio response output via an optional handset. The CRT output is compatible with audio systems handling FSK/Ascii data at 300 bit/sec, Wavetek said.

The buffered unit can display 256 characters, facilitating verification and correction of data on the screen before transmission, the company said.

The T520 transmits 16 Touch-Tone characters; it is modular so a magnetic card reader, personal identification number (PIN) pad and printer can be added, depending on application.

Prices for the basic terminal start at \$1,850, Wavetek said from 9045 Balboa Ave., San Diego, Calif. 92123.

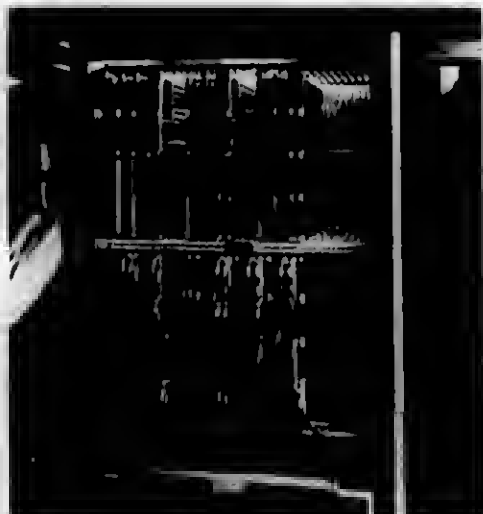
There's only one thing non-It's non-stop.

Where others fail. It's simple. You must have a non-stop system to have non-stop COBOL. And only Tandem has it. A unique multiple processor on-line system which ensures protection of the data base, and that no transactions are lost or duplicated, even if a processor, I/O channel, disk controller or disk should fail. Best of all, the system keeps running.

Multiple Processor COBOL Easy.

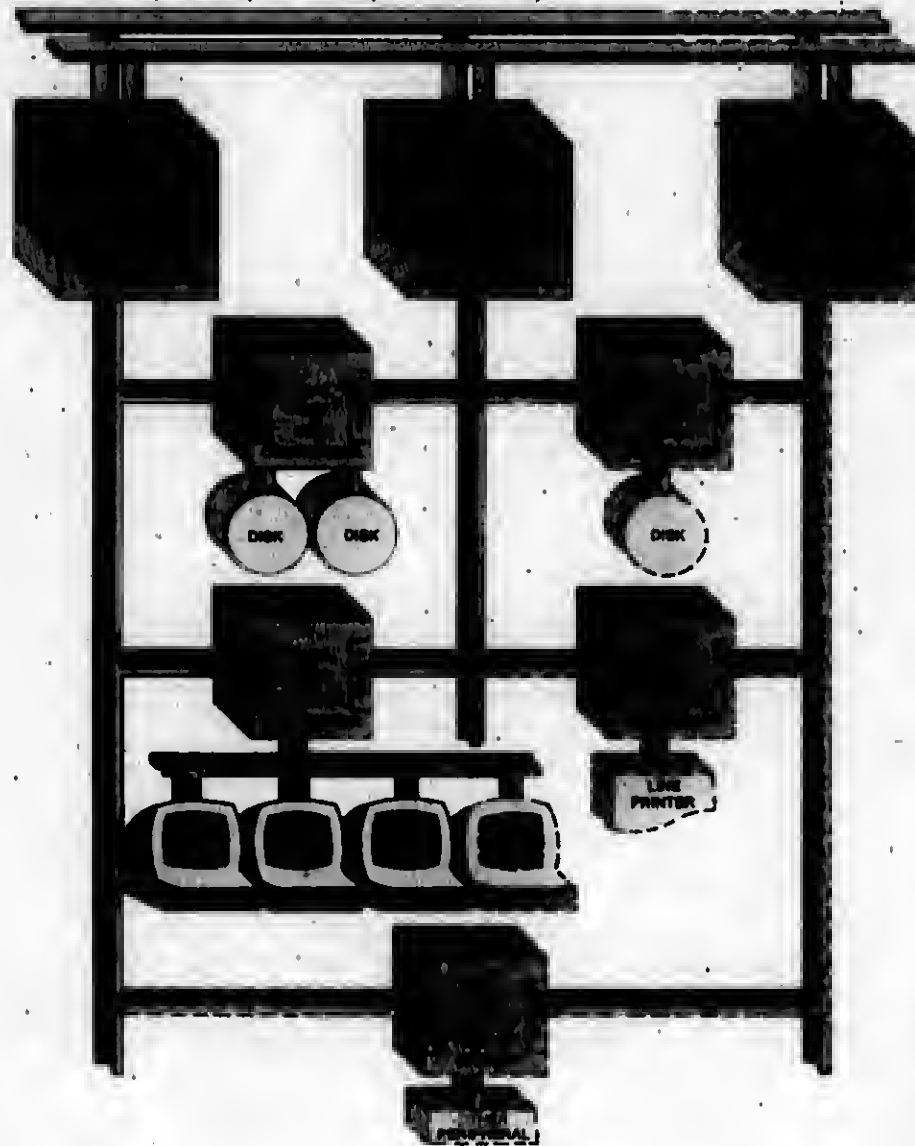
Bearding the Lion. You'd think that programming for a multiple processor on-line system would put you in a jungle, but Tandem COBOL purrs. Completely standard.

Because Tandem COBOL runs under our Guardian Multiple Processor Operating System, no custom system software is required. No special development tools are required. None. Our COBOL program development is standard. Our run-time software is standard. Everything you've always liked about COBOL, easy to use and trouble-free. And COBOL programs can run concurrent with other languages.



Four BILLION bytes per file. With no limit on the total data base size. Key sequenced, entry sequenced or relative file structures. With up to 255 alternate keys per file. And optional mirror copy by disk volume. It's incredible storage and tremendous flexibility in a mini-based system. And of course, it's non-stop.

DYNABUS™ (Dual Independent Interprocessor Busses)



The Tandem NonStop System is composed of up to 16 multiple, independent processors with dual communications paths between all system modules. The result is not only continuous operation, but throughput unmatched by any other system of comparable cost.

Sharing a common data base. Three new verbs, LOCKFILE, UNLOCKFILE, and UNLOCKRECORD have been introduced to the Tandem COBOL I/O facility to permit the use of corresponding system file and record locking routines, and allow separate processes to share a common data base. READ and REWRITE verbs have been extended to allow specification of LOCK or UNLOCK operation. OPEN syntax has been

extended to specify the file access, EXCLUSIVE, SHARED, or PROTECTED, and to permit the SYNC-DEPTH for files opened in the OUTPUT, I/O or EXTEND mode.

With STARTBACKUP and CHECKPOINT. These are logical extensions of Tandem COBOL which implement the NonStop™ features of Guardian Multiple Processor Operating System. STARTBACKUP is called once at the

DECwriter II & III
FOR SALE
• LA36 • LS120
800-323 2288
IN IL CALL 312 279 1960
ICE INC.
CHICAGO, ILL.

Tester Gains Capabilities

ALEXANDRIA, Va. — The Data Tech 9600, manufactured by Atlantic Research Corp., is now available with two plug-in modules for measuring and generating on/off time in RS-232/V.24 interface signals.

The time measurement module, ATM-1-1, is said to allow the Data Tech 9600 to measure on or off time of any RS-232/V.24 control lead. For example, it measures duration of carrier dropout on a full-duplex circuit. It also provides measurement of the time delays between any two interface signals.

The time-generating module, ATG-1-1, re-

portedly provides flexibility in inserting delays where needed for a specific application. For example, the Data Tech 9600 can perform such tasks as full-duplex or half-duplex automatic polling with a capability of sending a return message.

The addition of these plug-in modules can expand previously delivered asynchronous Data Tech 9600s for some applications in synchronous networks.

Price of the Data Tech 9600 is \$2,300. The modules are \$200 each from Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22314.

Unit Does Remote Test Of IBM 3600 Systems

BURLINGTON, Mass. — Intertel, Inc. has extended the capability of its NCS4000 network control system to include IBM 3600 systems that contain remote loops of daisy-chained terminals.

Previously, central-site-initiated remote testing of IBM 3600 system networks could only be made to the upstream side of remotely

located IBM 3601 controllers and not beyond to a given remote loop. Now, with the Intertel EI200 adapter, discontinuous terminal subloops can be identified at the central site and bypassed, the company said.

Dial Backup

The EI200 is a direct replacement for the similar IBM RPQ adapter. When combined with an Intertel DA300 module, it provides automatic dial backup, a feature hitherto not available for the 3600, Intertel noted.

The EI200 performs the conversion between IBM and EIA digital data signals and is fully compatible with standard Intertel products and modems at 1,200 and 2,400 bit/sec. However, the EI200's performance is capable of being extended to 4,800 bit/sec. IBM loop integrated modems, external 3603 modems or RPQ adapters are not required with the Intertel network control system, the company said.

The EI200 is priced at \$400 and delivery is 60 days from Intertel, 6 Vine Brook Park, Burlington, Mass. 01803.

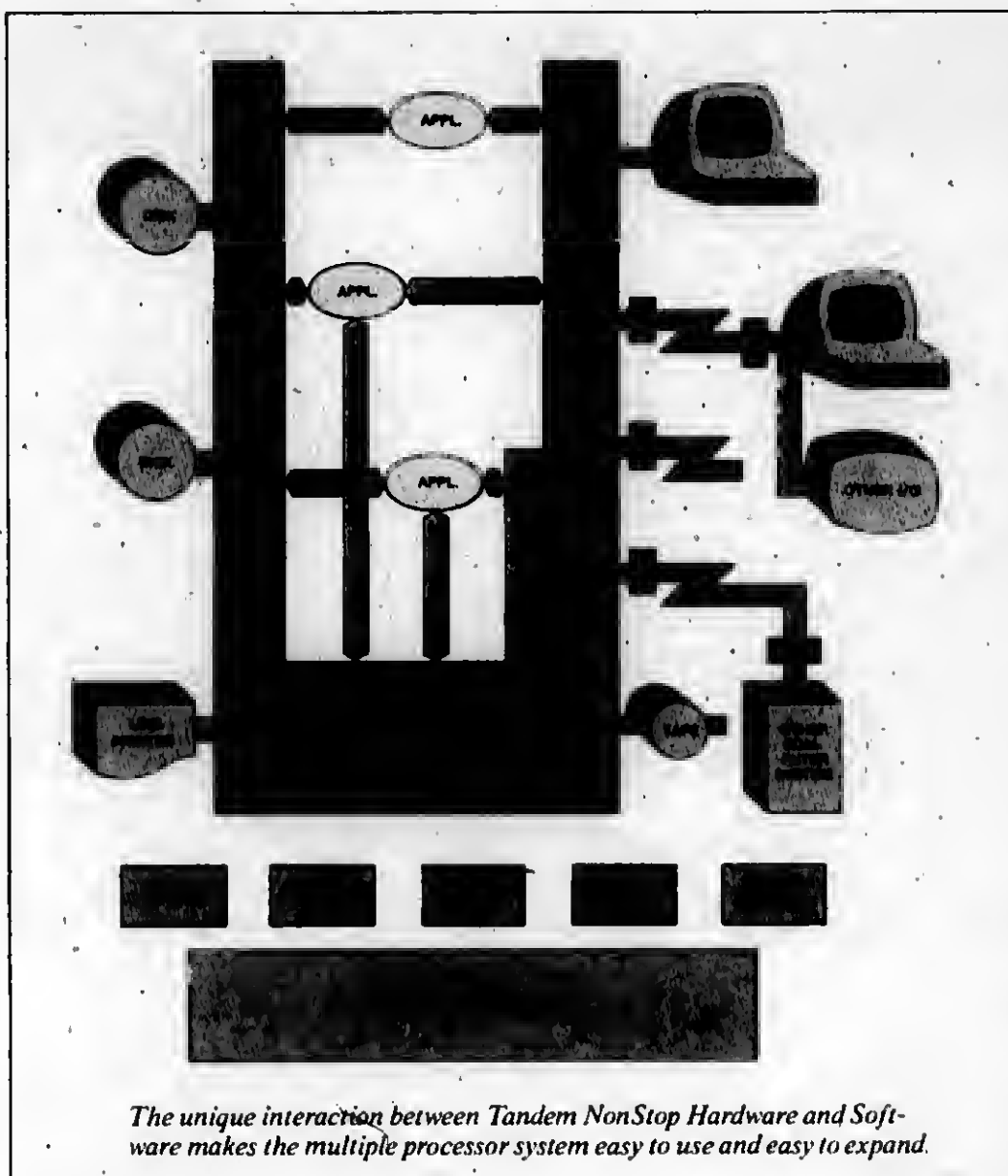
Kit Helps Keep Screens Clean

HILLSDALE, N.J. — A kit developed by the Texwipe Co. reportedly helps ensure a clear view of data displayed on a CRT or computer output microfilm (COM) terminal screen.

The kit includes 72 pre-saturated terminal wipes for cleaning a terminal. The wipes reportedly are treated with a special fast-drying, non-streaking formulation which will not harm the terminal surface. The kit also contains 150 lint-free Texwipe cleaning cloths for drying screens after applications of the terminal wipes. Also included is a static neutralizing cloth to prevent the build-up of dust-collecting static charges on the visual display screen, the firm said.

The kit costs \$16 from the Texwipe Co., Hillsdale, N.J. 07642.

standard about our COBOL.



beginning of the program to set the NonStop mode. From then on, CHECKPOINT controls passing information to the backup process at critical points. CHECKPOINTS occur automatically at any OPEN or CLOSE after the backup is established. These two simple instructions eliminate the downtime, restart, and revalidation which plague any user without the Tandem NonStop capability.

ANSI X3.23 '74 to Level 2 in Nucleus, Table Handling, Sequential I/O, Indexed I/O, and Sort-Merge right now. With Communications to Level 2 this Spring. Completely standard with CVSS and that means portability.

Compiles more than 1,000 statements per minute. And that's only average. In some benchmarks, we've topped 1,250 statements per minute. It's big system COBOL at mini-based prices. And non-stop, too. Not even the largest computers can match that.

It's working now. There are more than fifty Tandem NonStop Systems installed in a variety of applications. In banking, distribution, department stores, utilities, legal firms, hospitals, universities, steel mills, even a municipal network emergency system. Whenever downtime or a system failure means a potentially unrecoverable loss. There's only one NonStop System on the market today. It's expandable without penalty. Without reprogramming. Without one cent of loss on the original investment. And it's easy to use as COBOL. Good old standard COBOL without the operational difficulties or special expense you'd expect in an on-line multiple processor system which won't quit.

For further information, contact Tandem Computers, Inc., 19333 Vallco Parkway, Cupertino, California 95014 or Tandem Computers GmbH, Bernerstrasse 50, Frankfurt 56, West Germany.

TOLL FREE 800-538-9360 or (408) 996-6000 in California.

TANDEM

IBM SERIES/1 BASIC

Multi-terminal BASIC language and other software products for the IBM SERIES/1

GCE CO.
3 OFFICE PARK, SUITE 106
BIRMINGHAM, AL 35223
205-870-7267

INFORMATICS
INFORMATICS
INFORMATICS

Wherever it's said, however it's spelled, Informatics[®] fulfills the promise of the computer...universally!

Informatics...throughout the world, the word is synonymous with the ultimate in modern data processing. In the United States and many other countries, it means the people, products and services of Informatics Inc. One part of the ever-expanding Informatics world...our broad range of software products. We're best-known for MARK IV[®], the general-purpose implementation system installed at over 1,300 computer sites in 43 countries. But we have more to be proud of...some of these are other implementation systems like SCORE[®], and SHRINK[®]. And our communications monitors...INTERCOMM, BETACOMM, and MINICOMM...each for a specific IBM 360/370 environment. Our LIFE-COMM[®] and ISSUE-COMM[®] products for insurance applications, PRODUCTION IV[®] for manufacturing, and our ACCOUNTING IV[®]

line of products for general business accounting. Informatics Inc. ... the world's leading independent software supplier. Drop us a line on your letterhead and we'll send you a colorful brochure that tells how we can help you fulfill the promise of your computer.

SOFTWARE PRODUCTS
PROFESSIONAL SERVICES
INFORMATION PROCESSING SERVICES

informatics inc



Corporate Offices/21031 Ventura Boulevard/Woodland Hills, California 91364/(213) 887-9040/Telex 69-8473

Member SIA  Software Industry Association ©U.S. registered service marks and trademarks of Informatics Inc.

Micro-Based Terminal Controller Handles 8B1 Private-Line Systems

MAHWAH, N.J. — A microprocessor-based terminal controller capable of handling terminal speeds of 10-, 30- or 120-char./sec on private-line systems with an 8B1 protocol and offering an array of terminal diagnostics was introduced by Western Union Data Services.

A modified version of the Smarts controller, the unit employs a communications processor with 4K of memory to control terminal polling and selection by a computer in both full-duplex and half-duplex operations. The 8B1 controller is offered with a variety of station arrangements composed of the company's EDT 33, 300 and 1200 terminals.

The controller can be programmed to handle modified 8B1 protocols as well as other protocols to meet specific user requirements, the firm said.

Included as a part of every microprocessor-controlled station is a control panel mounted to the right of the terminal pedestal which provides controls for normal status and alarm indicator lamps needed by the terminal operator to determine operating conditions.

Each terminal station arrangement will provide a hardware address for both selection and polling, will respond to a roll call after receiving a message to indicate correct receipt and is configured to operate alone on a circuit or on a multiple-drop circuit, according to Western Union.

Full-Duplex Operation

For full-duplex operation, the user's CPU can interrupt terminal communications at any time to poll or select terminals. After each computer transmission, the controller issues verification of message receipt, which includes parity error checking and an answer-back check.

The controller reportedly self-tests its hardware automatically whenever power is turned on or the system reset switch is activated. These tests ensure that the controller can execute all instructions, that data is being stored in all bytes of working storage and that

the input/output channels can be written into or read out of.

In addition, a Test/Normal switch opens up the send and receive lines to the data set and busts back to the station transmitted data. In this way, the station is isolated from the line and conditioned to run local diagnostics. The switch also activates a comparison check between transmitted

and received data with a print-out indicating the results of the test, the firm said.

A typical configuration based on a Model 33 ASR teletypewriter with 8B1 controller will cost about \$167/mo on a three-year lease, a spokesman said. Western Union Data Services is at 70 McKee Drive, Mahwah, N.J. 07430.

Modem 201C-Compatible

FORT WASHINGTON, Pa. — A 2,400 bit/sec modem available from Tele-Dynamics is Bell-201C compatible and incorporates features similar to those of the Bell 201C, but is said to be more cost-effective.

The Tele-Dynamics Model 7201C is available in two configurations, one for private lines and the other for the dial network. The dial-up version is designed for direct connection to the switched network, the firm said.

The 7201C has both self-test and loopback-test capabilities.

The private-line version, the 7201-PL, costs \$765 while the FCC-registered dial-up model costs \$805. The Tele-Dynamics Division of Ambac Industries, Inc. is at 525 Virginia Ave., Fort Washington, Pa. 19034.

BUYING HARDWARE

Pros



Photo courtesy of Computerland of San Francisco

Cons



Computerland, the DP Department Store. Hazeltine on Display.

Time was, buying hardware meant dealing factory direct. Then came the distributor, or factory indirect. The phone/mail order ad reads, "15% off." 15% off what? Delivery schedule maybe. After sales service perhaps. The only real savings just might be the Toll Free number in the ad.

Now there's an alternative. Introducing Computerland, a national network of DP equipment stores, with outlets across the nation. This means you, and the DP director, programmer, general manager or purchasing agent can take a quick ride across town, try out working equipment in a user environment, make product comparisons, then drive off with the hardware of your choice. And, still be back in time for the afternoon coffee break.

Below is a sampling of the quality business information products, from more than 60 manufacturers of micro and mini-computer systems and peripherals, available for you to try out, buy or lease and take home today from Computerland.



HAZELTINE 1500

☐ 24 X 80 Display (upper/lower case) ☐ High legibility 7 X 10 dot matrix ☐ Teletypewriter format for

alphanumeric plus numeric pad ☐ Switch-selectable upper/lower case ☐ RS-232/C 20 ma. current loop interface ☐ Switch-reversible video.

ComputerLand™

1922 Republic Ave., San Leandro, CA 94577 (415) 895-9363

© Copyright Computerland 1978

ALABAMA
3020 University Dr., N.W.
Huntsville 205 539 1200

CALIFORNIA
6743 Dublin Blvd.
Dublin 415 828 8090
11074 San Pablo Ave.
El Cerrito 415 233 5010
22634 Foothill Blvd.
Hayward 415 538 8080
6840 La Cienega Blvd.
Inglewood 213 776 8080

24001 Via Fabricante, #904
Mission Viejo 714 770 0131
4233 Convey St.
San Diego 714 560 9912

42 42nd Ave.
San Mateo 415 572 8080
117 Fremont St.
San Francisco 415 546 1592
El Cid Plaza, Suite 105
Thousand Oaks 805 495 3554
104 W. First St.
Tustin 714 544 0542

COLORADO
2422 So. Colorado Blvd.
Denver 303 759 4685

CONNECTICUT
2475 Black Rock Turnpike
Fairfield 203 374 2227

DELAWARE
Astro Shopping Center
Newark 302 738 9656

GEORGIA
Cumberland Square North
Atlanta 404 953 0406

ILLINOIS
50 East Rand Road
Arlington Hts. 312 255 6488
9511 No. Milwaukee Ave.
Niles 312 967 1714

10935 S. Cicero Ave.
Oak Lawn 312 422 8080

KENTUCKY
813 B Lyndon Lane
Louisville 502 425 8308

MARYLAND
16065 Frederick Rd. (Rt. 355)
Rockville 301 948 7676

MICHIGAN
2927 28th St. S.E.
Kentwood 616 942 2931
29673 Northwestern Hwy.
Southfield 313 356 8111

NEW HAMPSHIRE
419 Amherst
Nashua 603 889 5238

NEW JERSEY
2 De Hart St.
Morristown 201 539 4077

NEW YORK
1612 Niagara Falls Blvd.
Buffalo 716 836 6511
225 Elmira Road
Ithaca 607 277 4888

OHIO
1288 SOM Center Road
Cleveland 216 461 1200

TEXAS
Shoal Creek Plaza
Austin 512 452 5701
6439 Westheimer
Houston 713 977 0909/0910

WASHINGTON
Parkway Center, Suite 12
Federal Way 206 838 9363

T-SHIRTS

Posters,
Memo Pads,
Sweatshirts, and
General Nonsense...

Free Brochure... 25
cents

**THE INCREDIBLE
SYSTEMS & T-SHIRT
COMPANY**
Box 2623
Menlo Park, CA 94025

PEP-500 Converter Linked To Tektronix Terminals

N. BRUNSWICK, N.J. — Princeton Electronic Products, Inc. has introduced a computer graphics terminal interface option for its PEP-500 image memory/scan converter. This interface is said to allow direct plug connection of the PEP-500 to Tektronix, Inc. models 4010, 4012, 4013, 4014, 4015 and similar terminals.

The PEP-500 converts graphics terminal X-Y signals into standard EIA composite video output, allowing group viewing of computer-generated engineering, statistical or scientific graphics on TV monitors and projection TV systems, or recording of graphic material on stan-

dard video tape or disk systems, the firm said.

When connected to TV monitors, the PEP-500 allows use of existing graphics terminals for black and white images, remote graphics display on video monitors and continuous display of an image for an hour or more without image refresh or rewrite.

The system can be used for display of computer-generated graphics data for business and engineering applications on CRT screens.

The device costs \$4,350 from Princeton Electronic Products, Inc., Box 101, N. Brunswick, N.J., and delivery is 50 days.

Memorex 1380 Increases Hospital Net's Flexibility

(Continued from Page 31)

be displayed at any terminal in the network. The result is accelerated reporting of X-ray results, the hospital said.

This X-ray reporting system is currently being upgraded to run on custom-built Siemens Sirep minicomputers, which will provide a multi-point binary synchronous network using Ascii protocol.

The PDP-11 in the network is used for medical laboratory analysis. Again the data is transmitted through the 1380, which handles mini-to-mainframe and mainframe-to-mini interfacing and code conversions in software without having to use pro-

grams in the mainframe itself.

The remote job entry system handles all program development by the DP staff as well as two other applications. The first is statistical work for the Department of Epidemiology. Under federal grants, the department studies the occurrence and distribution of a wide variety of diseases.

The second application involves handling patient medical records, billing and administrative tasks for the Columbia and East Baltimore Health Plans.

System Benefits

In all the applications, the 1380 processor permits intervention to switch communications lines from one main computer to the other. The earlier system in use at Johns Hopkins did not permit such switching; once a computer opened a line, it owned it.

With the 1380, line switching requires only a few keystrokes at the communications processor console, according to the user.

The 1380 console display shows what is being done and, if required, can show the contents of the communications processor memory. The system commands are said to be simpler than the complex commands required from the control panel of the previous unit.

The Johns Hopkins Hospital installation includes the low- and medium-speed line options for the processor to handle asynchronous and synchronous communications of 134.5- to 9,600 bit/sec. Additional wideband line set options can boost the speed up to 230 kbit/sec, with a total aggregate data rate of 100,000 char./sec in synchronous mode.

The 1380 can be configured to handle up to eight host computers with four computers active simultaneously. The processor stores communications control programs on its own flexible disk, eliminating the need to be loaded from the host. Processor memory can be dumped to the flexible disk and subsequently printed in hard copy.

Memory contents can be altered from the system console. The processor also makes possible the switching of all lines from one host to the other, to keep the network in operation while one computer is down or undergoing maintenance.

Before the Memorex unit was installed, failure of one mainframe brought all programs to a halt, the hospital said.

AN "OPEN LETTER" TO THE

UNDER-EMPLOYED

COMPUTER INDUSTRY PROFESSIONALS....

YOU'RE UNDER-EMPLOYED IF...

- You're selling over-priced, non-competitive products or services.
- You're designing hardware or software products that will be obsolete before they are delivered.
- You're planning products that will never be sold profitably.
- You're "fire-fighting" rather than creating.
- Your company is "following" rather than leading.
- Your company reorganizes every few months for no apparent reason.
- Your performance is rated "Outstanding" or "Excellent", but your Merit Increases barely keep you ahead of inflation.
- Your responsibilities are high and your authority is low.
- Your management routinely fails to act on your recommendations.
- Your management doesn't consider you for broader, more important responsibilities.

THESE ARE THE SYMPTOMS. UNFORTUNATELY, THE CURE—JOB HUNTING—IS TIME-CONSUMING, EXPENSIVE, RISKY, and DEMEANING...if you use the conventional techniques.

Conventional **JOB HUNTING** techniques place you, a skilled, competent professional, in a defensive position. Conventional techniques scream, "Hey, I'm unhappy with my current job. Would you, Mr. Prospective Employer, consider talking to me about opportunities in your firm?"

Even though the Prospective Employer may need you more than you need him, you, by initiating the contact are at a tremendous psychological disadvantage.

The unconventional technique, the **PROFESSIONAL REFERRAL SERVICE** technique, places prospective employers in a position of seeking you out and a position of cultivating your interest through better compensation.

The unconventional technique is not **EXPENSIVE, TIME-CONSUMING, RISKY, or DEMEANING.**

PROFESSIONAL REFERRAL SERVICE exists as a service to you, the Computer Industry Professional, and as a service to the Executive and Professional Search Firms of the nation. Our objective is to present your background, skills, and interests to these Search Firms at precisely the time they are interested in you.

The advantages you enjoy under the PRS Plan include:

THE BEST JOBS—Only those jobs worthy of Search Firm involvement are represented.

CONFIDENTIALITY—Search Firm involvement assures you that your current employer will be unaware of your activities.

NEGOTIATION LEVERAGE—Prospective employers don't look at you as a "job hunter", thus preserving your ability to negotiate a better compensation package, and...

COVERAGE—Nationwide exposure to opportunities, worthy of your consideration is provided.

if you are interested in evaluating employment opportunities in a sane, efficient, and economical manner, please contact PRS for details of our Plan. Our service is available on a "subscription basis." (\$45 for 3 months, \$75 for 6 months) to Computer Industry Professionals with 5 or more years of industry experience, earning at least \$20,000 per year. PRS is neither an employment agency nor a Search Firm, but serves you by improving communication between you and the nation's Search Firms.

Please send me information about the PRS Plan.

Name: _____

Address: _____

City: _____

State: _____ Zip: _____

PRS

PROFESSIONAL REFERRAL SERVICE, INC.

672 Silver Spur Road, Rolling Hills Estates, CA 90274

CW/1

COMPUTER/COMMUNICATION

SEMINARS OF EXCELLENCE

KLEINROCK

QUEUEING SYSTEMS

FEBRUARY 22-24, 1978 • SAN FRANCISCO (before COMCON)

ABRAMSON

SATELLITE DATA COMMUNICATIONS

MARCH 6-8, 1978 • SAN FRANCISCO (after COMCON)

KLEINROCK-FRANK-ROBERTS

JAMES MARTIN

EXPERTS ON NETWORKS (1 Day Registration Available)

MARCH 13-15, 1978 • WASHINGTON, D.C.

SEMINAR FEE: \$495

DISCOUNTS FOR PREPAYMENT, GROUPS, AND SERIES.

TECHNOLOGY

TRANSFER

INCORPORATED

P.O. Box 49765, L.A., CA 90049 (213) 476-1331

Don't you wish you were a Systems Engineer for IBM in 1950?



If you were around then, you could have been in on the ground floor of a computer company on the move. You'd have been there during the most exciting period in the company's history. You'd have played an important part in shaping its future. But take heart. Opportunity, challenge and excitement are waiting for you at Raytheon Data Systems.

Raytheon Data Systems is a dynamic organization involved in commercial computer products. We're on the move. Right now we're one of the largest manufacturers of distributed processing systems and computer terminals. We don't intend to stop there. So if you're a results oriented computer professional, you owe it to yourself to take a closer look at Raytheon Data Systems. We need talented **Systems Engineers** who want to grow along with us. For positions in Houston, Dallas and Greensboro,

N.C., contact J. R. Agee at 6065 Hillcroft Ave., Suite 603, Houston, Tx. 77022, 713-771-5851. For positions in Pittsburgh, Cleveland, St. Louis, Detroit and Minneapolis, contact Ed Duke at 1111 E. Touhy Ave., Des Plaines, Ill. 60016, 312-694-4420. For positions in Boston, New York, Albany, contact Steve Sribnik at 3000 Marcus Ave., Lake Success, New York, N.Y. 11040, 212-895-2567. Positions in Sacramento, San Francisco and Los Angeles, contact B. Wallace at 550 East Carson Plaza Drive, Suite 114, Carson, CA. 90745, 213-770-4240. If you can not reach the representative in your area, contact Paul Costello at 1-800-225-9874, or send him your resume at the address below.

Years from now we wouldn't want you to wish you had joined Raytheon Data Systems in 1978.

Intelligent Terminals, Minicomputers, and Telecommunications Systems

RAYTHEON DATA SYSTEMS

RAYTHEON

1415 BOSTON-PROVIDENCE TURNPIKE

• NORWOOD, MASSACHUSETTS 02062

An Equal Opportunity Employer M/F

Points to 30% Productivity Gain

User Operating Two Days After Installation

BOUNTIFUL, Utah — "We're in the hardware and software business too, so we know what it's like to be behind the 8 ball. When a key-to-disk system arrived a week late, no one here was particularly surprised."

"But when we started using it to communicate at 9,600 bit/sec to our service bureau less than two days later, our management was impressed," according to Fred Zickert.

Six months later, management is still impressed. The terminal system at Kenway, Inc., a leading manufacturer of automated storage and retrieval warehousing systems, is credited with increasing operator productivity by 30% and, at the same time, allowing the company to be more responsive to its own in-house users.

For Zickert, DP manager of Kenway, the 5M-byte disk system represents not only a solution to his present processing needs, but to future ones as well.

"That was one part of the problem with our older, en-

gineering-oriented systems," Zickert said, recalling the company's experience with its conventional keypunch equipment. "They just couldn't keep pace with the growth of the company."

Terminal Transactions

To add some muscle to its DP operations some years ago, Kenway switched to a service bureau in 1972, still using the in-house equipment for trial balancing. Unfortunately, the service bureau was 20 miles away in Salt Lake City.

"With 10,000 to 20,000 cards at a time, there were always errors. Even with a very low error rate," Zickert said, "several cards in a batch were always wrong." And it takes only one, he was frequently reminded, to create an abend in a production run.

To correct the data, "we'd either have to call or drive back to the plant to get the

right information." Some days, there were more than several round trips from Bountiful to Salt Lake City.

"It wasn't a matter of not recognizing remote batch at that time," Zickert said. "It

was simply a matter of convincing the service bureau that it had to change from an over-the-counter operation to a remote job entry one. That meant installing IBM 3705s.

"After that, it wasn't difficult to convince our management that with the proposed cost trade-offs, we'd not only get better service, but reduce the overall service bureau charges."

End to Keypunches

That accomplished, the company had to decide whether to simply find a remote batch terminal and continue to utilize its keypunch facility or find a multifunction data entry and batch terminal device.

The continually rising rental prices on the keypunches coupled with the growing workload (which often forced the company to keypunch the balance of its load outside the company) convinced the company to opt for the latter.

The company looked at a variety of manufacturers and then took a second look at an Eastman Kodak-leased Data 100 Corp. Keybatch system installed in Kenway's customer software support de-

partment. The system, which communicated with a similar device in Rochester, N.Y., was used to help develop Kenway software to run on a Kodak warehousing system at corporate headquarters.

"The remarkable thing about the system," Zickert said, "was that it had been installed for almost two years and required virtually no maintenance. And in Bountiful, Utah, service just isn't that easy to come by."

The Keybatch system was also the only one to support a high-speed printer for both upper and lower case printing. "That helped justify the cost of the system," he noted, "because we could not pull off the text editing printing that was being done on the service bureau's IBM 370/168 and do it on Data 100's 950 line/min printer."

The two terminals installed, Zickert and his staff began to grapple with how to operate in an IBM Time Sharing Option (TSO) environment where operators would make corrections through TSO and batch balancing would be done at the host.

"What we found," Zickert said, "was that the Keybatch system with its indexed sequential table retrieval capabilities could do much of the editing and batch balancing that we had expected of a host/TSO system. In fact, it eliminated 90% of the need for TSO."

Now, Zickert said, he feels he can satisfy all of his company's DP needs and doesn't have to go outside for assistance.

"When we originally set up productivity goals for the system," he added, "we recognized the potential retraining problems that might occur when going from keypunch to Keybatch. We assumed, therefore, that if we could increase productivity by 30% within a year, we would have met our goals."

Two and a half months later, Kenway's key-to-disk operators are producing in one day the same number of batches, under a Keybatch-formatted routine, that they formerly handled in a week, he noted. In a cash flow situation, for instance, purchase orders and invoices are now prepared within four hours, compared with the two to four days it used to take. "In fact," Zickert added, "we are rapidly moving ourselves out of a job."

There is little fear of that, however. Zickert's department is the hub of the company's financial operations, with the operators entering payroll, cost accounting and general ledger information as well as data for a financial modeling program. And the increased productivity meant Zickert and his staff could take on added responsibilities in data control to separate and distribute the appropriate documents as well as log in the various operations.

POLICE COMPUTERIZED INFORMATION SYSTEM

Interested contractors are invited to submit proposals for a computerized police information system. "Request for Proposal" may be obtained by contacting:

Robert C. Rosenberg, Jr.
State College Bureau of Police Services
State College, PA 16801
(814) 237-1411

Pre-bid Conference: 15 Feb. 1978
Bid Openings: 8 Mar. 1978

Available Immediately For

SHORT TERM LEASE

370/138 370/148 370/145

3330's and OEM 3330's

360/30 360/40 360/50 360/65's

Greyhound Phoenix ICA's

CALL US COLLECT

United States		
Austin	Ron Geil	(512) 451-0121
Boston	Tom Ryan	(617) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dave Hyland	(415) 283-8980

International		
Canada	Don Maunders (Toronto)	(416) 366-1513
Mexico	Andres Contreras	(905) 543-6850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joe Gold (Geneva)	(022) 61-27-54
Austro-Asia	John Hallmark (Dallas)	(214) 233-1818

Non-IBM:		
UNIVAC or)	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**
GREYHOUND TOWER, PHOENIX, ARIZONA 85077

Datamedia Announces CRT Compatible With Teletype

PENNSAUKEN, N.J. — A microprocessor-based, communications-oriented CRT terminal, designed to operate in a range of transaction processing and inquiry response applications, has been introduced by Datamedia Corp.

The Elite 3025A is a buffered Teletype-compatible CRT with a single-page video memory that displays 1,920 alphanumeric characters in a 24-line, 80 char./line format.

The unit offers a series of features that includes local edit, remote, batch, batch modified, format, format modified and transparent operating modes; host control of block transmit function in local or remote environments; asynchronous and optional isochronous communications interfaces; Bell 103 and 202 modem compatibility (201 modem compatibility with the isochronous interface); and

switch-selectable EIA and optional 20mA current loop interfaces, a spokesman said.

Other features included are ten user function keys to facilitate access to application programs; no memory address space required to support screen enhancements; detached keyboard; and transmission rates ranging from 15- to 9,600 bit/sec selectable from keyboard, the firm said.

The Elite 3025A accommodates a standard RS-232C or optional 20mA current loop interface and supports full- or half-duplex, two- or four-wire internally or externally clocked asynchronous communications, the spokesman said.

The terminal is priced at \$1,520 in quantities of 100. It will be available this quarter from Datamedia at 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

ATTENTION!

If you buy, lease, or operate an IBM 3032, 3033, 370 series, CDC 7600 series or other liquid cooled processor contact us.

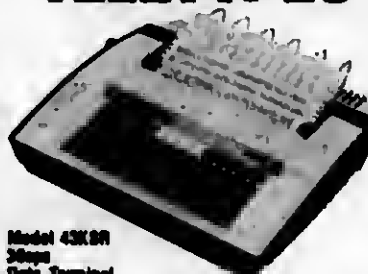
We have a cooling system for large processors that can save you up to 50% operating costs. It can outperform, and outlast anything on the market. Also it does not take up computer room space.

For further information, call or write:

**CONTROLLED
ENVIRONMENT CORP.**
640 Reynolds Ave.
Kansas City, Kansas 66101
(913) 342-3599

Over ten years experience in computer room environments.

TELETYPES®



**New and Reconditioned
Models 28 • 32 • 33 • 35
40 • 43**

FEDERAL Communications Corporation
11105 Shady Trail #107
Dallas, Texas 75229 U.S.A.
(214) 620-0644 TELEX 732211

Bits & Pieces

Also Switches Vendors User Takes Off With Upgrade

Wabash Introduces 'Universal' Tape

HUNTLEY, Ill. — A "universally adaptable" tape, designed to perform in a variety of temperatures, densities and speeds, has been introduced by the Wabash Tape Corp.

Wabash G Tape is coated 360 microinches thick and contains a lubricant that reportedly reduces static and variation in tape speed. It operates at 50°F to 110°F temperatures, at 0% to 90% relative humidity and can be stored at temperatures ranging from -10°F to 130°F, a spokesman stated.

G Tape is compatible with 556-, 800-, 1,600- and 6,250 bit/in. recording equipment, a spokesman said.

The tape is priced at approximately \$18 for a 2,400-ft reel, the firm said from Wabash Tower, Huntley, Ill. 60142.

Texwipe Cover Fits Front-Loading Disks

HILLSDALE, N.J. — A protective cover for front-loading disk cartridges has been introduced by the Texwipe Co.

The Discover is fabricated of PVC plastic designed to remain pliant and resist cracking. It has a toothless zip-lock fastener, according to a spokesman.

The disk cover costs \$2.50 from the firm at Hillsdale, N.J. 07642.

By Brad Schultz
CW Staff

ATLANTA — A large general aviation company here switched CPU vendors while engaged in a two-step upgrade from a small to a medium-scale system. The firm's upgrade followed an examination of products from three major vendors.

But the offering of all but one candidate seemed overpriced or lacking in performance or options in view of the user's special data base needs, a spokesman said.

Only Honeywell Information Systems, Inc. had the right equipment at the right price for Hangar One, Inc., according to Robert B. Welton, treasurer of the firm, which distributes Beechcraft airplanes.

"Burroughs Corp. did not have the overall capabilities and the future add-on capabilities that HIS did, and we had just been a frustrated IBM System/3 user. Besides, IBM's ideas... far surpassed HIS in pricing. They were way out in left field," Welton said.

Hangar One's unique functions led it away from the System/3 after a year's use, Welton said, noting his firm is an unusually diversified general aviation company. In addition to aircraft sales, it offers executive aircraft leasing and servicing operations.

"The problem with our



Hangar One uses 19 terminals in six cities for parts inventory, customer data and financial applications.

System/3 was that it was a canned system with prepackaged software, and it was left up to us to fill in the variables. We wanted to say, 'These are our unique needs,' and have the vendor bring us the equipment, the software and the support we needed. And that is exactly what HIS did for us," Welton said.

The first HIS system used by Hangar One — replacing the System/3 — was a 2020. It was installed in 1974, then replaced by a 64/20.

"What we have now seems like night and day compared to

1974," Welton said, "but it was all we could have asked for then. We wanted to take the most basic data and put it in the computer once, then let the computer do the rest.

"We were concerned with technical support and software. We wanted our system to be a Hangar One system, and that's what we got."

The HIS 64/20 stores the firm's general ledger information and a customer information file in an on-line real-time environment for six locations in four southeastern states.

Hangar One's aircraft servicing operations include six "fixed-base" facilities that sell gasoline and provide parts and maintenance to private and commercial aircraft. These facilities are located in Atlanta; Chattanooga, Tenn.; Orlando, Miami and Sarasota, Fla.; and Birmingham, Ala.

Employees at the fixed-based facilities use CRTs to feed information into the system daily. For example, 17 salesmen input data every day regarding customer calls and responses, resulting in an updated file on some 9,700 customers.

The 64/20 has 160K bytes of main memory and is equipped with three disk drives, one tape drive, three communications lines, one 600 card/min reader, one 300 line/min printer and seven remote printers. Twenty-three CRTs are linked to the CPU.

Hangar One uses the system to match special customer demands for equipment with what is available. Soon after equipment comes on the market, a salesman can be ready to make a presentation.

The system also facilitates wholesale parts monitoring and budget-making — as well as airplane sales — for the firm.

Hangar One is developing "full financial" and on-line data entry software packages applicable to general aviation companies that will be marketed this year, he added, noting that the data entry system is now operational and in the final testing and debugging stage.

Independent's Add-On Memory Accelerates System Implementation

Special to CW

CENTER LINE, Mich. — The Chrysler Corp. here has accelerated by more than eight months the implementation of a parts ordering system. The system, based on twin IBM mainframes, owes its fast start in part to the installation of IBM-compatible add-on memory, the user said.

The auto manufacturer's Service and Parts Division, which controls the distribution of parts to dealers as well as the distribution of Mopar equipment, Chry-

sler's over-the-counter brand of parts, recently completed a six-month "Major Dealer System" pilot program utilizing the additional memory, supplied by Intel Corp.

The system is composed of two 370/158s with multiprocessor capability linked by dial-up lines to Digital Equipment Corp. Decwriter terminals installed at the dealerships. Through this centralized data network, Chrysler runs on-line order processing, parts inquiry and order status inquiry functions on a nationwide

basis.

The system was originally designed by Chrysler DP personnel to utilize 2M bytes of add-on memory from IBM. "However, we discovered in our study of a number of add-on vendors that we could buy IBM-compatible memory at a significantly lower price," according to Dennis Barile, manager of technical services for the division.

"More memory would give us a faster response time, serve as backup to any memory failure

(Continued on Page 42)

WHERE CAN YOU GET THE BEST BUY
ON TI'S NEW 810 PRINTER?

CALL DDI,
AMERICA'S LEADING
TERMINAL SUPPLIER, NOW.



Whether you need 100 new TI 810s or just one, you'll get the best buy from DDI. Our financial strength, mass purchasing power and nationwide operation help us serve you in a way no one else can match. With DDI you get:

- A single source for DEC, TI, ADDS, DIABLO, OMNITEC, TECHTRAN.
- Full range of new products.
- Choice of rent/lease/buy plans.
- Unique Combination Savings Plan.
- Nationwide maintenance service.
- Nationwide branch network for prompt response to your needs.



Data
Dimensions,
Inc.

51 Weaver St., Greenwich, Ct. 06830
TEL: (203) 661-1700

BRANCH OFFICES: New York City (212) 667-2030 • Morris Plains, N.J. (201) 267-2311 • Philadelphia (609) 662-2833 • Washington, D.C. (202) 686-5150 • Detroit (313) 358-2600 • Chicago (312) 858-3770 • Atlanta (404) 433-2023 • Dallas (214) 387-2222 • Houston (713) 961-4711 • Los Angeles (213) 990-9200 • San Francisco (415) 349-7262



"We can help you put quality behind your nameplate."



"Our new OEM Product Selector shows you how we can do that. It's a representative cross-section of our OEM product line, and it features some of our most popular products.

"As one of the world's largest suppliers of OEM equipment, Control Data knows what your customer is looking for.

"Quality, price, performance, reliability and support service.

"Control Data products are built with high-quality components, designed with advanced technology and engineered for performance.

"But prove for yourself that Control Data quality—built into every product we manufacture—delivers price/performance advantages that give your products the competitive edge. Test. Evaluate. Compare.

"Then check our OEM Financing, Maintenance and Spare Parts—all designed to make it even easier to put our experience behind your nameplate. And to help you establish a quality marketing position for your entire line.

"So send for your OEM Product Selector today. The sooner you do, the sooner we can work together on putting our quality behind your nameplate. Write us at HQN111, P.O. Box O, Minneapolis, Minnesota 55440. Or call us at 612/853-7600."

**CD CONTROL DATA
CORPORATION**

More than a computer company

Dale C. Showers
Vice President O.E.M. Marketing

User Credits Rapid Implementation to Add-On

(Continued from Page 39)

downtime and let us avoid complex modularizing of programs," he added.

Chrysler's memory comparison showed Intel's In-7158 memory the overall winner. Features that helped sway the decision included reconfigurations capability, built-in microprocessor error tracking and upgrade flexibility, Barile said. In addition, the Intel memory system was one quarter the price of comparable IBM memory, he noted.

"At the time, we thought IBM's memory was more reliable, but not enough to justify the cost differential. Another plus for Intel was its use of Sorbus, Inc. maintenance, which we had used with our old 370/155 and like," Barile said.

Since the evaluation, IBM has significantly lowered its add-on memory prices, but Intel's fully compatible In-7158 still costs less than half that of comparable IBM memory, he pointed out.

Technicians in Tandem

Chrysler began its multiprocessor integration program in August 1976 by upgrading from the 155 to a 158 with 512K bytes of IBM standard memory and 3.5M bytes of Intel add-on. By the following Christmas, Chrysler was ready to add a second 158, the appropriate multiprocessor support package for both systems and another 1.5M byte of Intel memory.

During the Christmas and New Year holidays, IBM and Intel technicians took turns working on the two systems. During this entire period one processor was running at all times to carry on the division's normal DP functions.

"Throughout the installation time, the two teams of technicians worked well, and Intel personnel worked nights, days and holidays to speed the installation. It was quite complex, but there has been very little downtime since," Barile observed.

With the Major Dealer System ready, Chrysler spent six months of pilot projection time testing and adjusting the system.

"The benefit of twice as much add-on memory made it easier and faster for us to work with the dealer system. One visible advantage is the 1- to 2-second response time for our dealers, even at peak load time with 150 terminals around the country on-line," Barile said.

"The pilot program progressed very well, with dealer reaction very enthusiastic," he added. "Because of larger memory capability, the program is expanding as fast as we can get the terminals into the dealers' parts departments."

"Our system is designed so par-

ticipating Chrysler dealers order parts through the central CPUs here in Michigan. This centralization of order processing means any dealer in the country has access to the status of all material in the country," Barile explained.

"Previously, a dealer called the local warehouse which, in turn, key-punched the order and input via local systems to the central CPU. Then the part was located and an order sent to the nearest depot with stock available.

"At the depot, the material was picked and finally shipped to the dealer," he said.

Dealers can now place an order, check on status of parts available nationwide and check the status of a particular order (where it is and when it

should arrive) — all on-line, he added. Chrysler keeps 30 days of orders on-line for such dealer tracking.

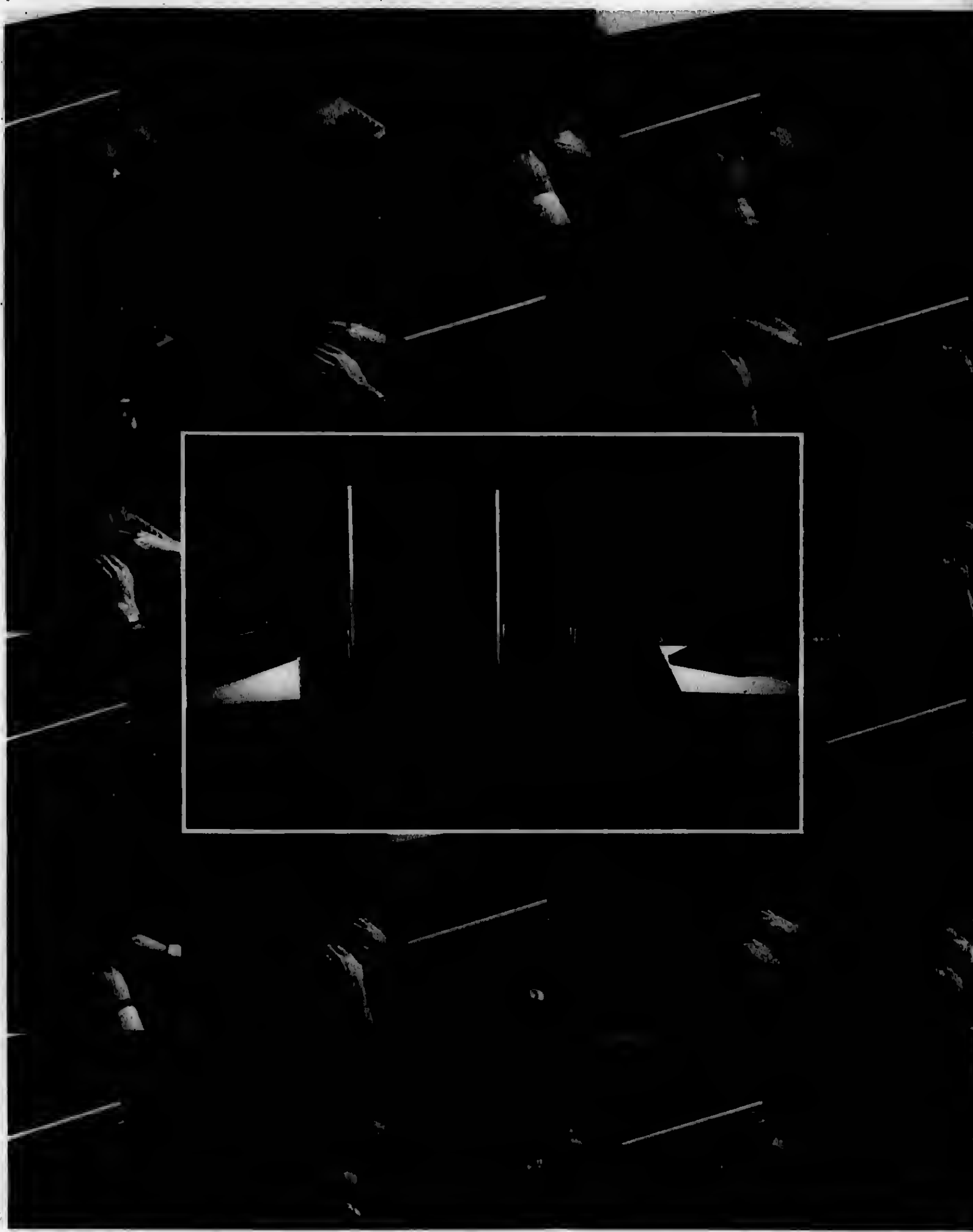
The multiprocessing CPUs also handle three other major programs for the division: order processing for the company's 20 regional warehouses — here standard stock replenishment is handled through interfaces with warehouse-located Burroughs B2700 computers; an on-line system of 270 CRT terminals that performs such functions as special handling orders, parts inquiry and material activity tracking; and a Time Sharing Option system for program development and testing by the division's DP staff.

"We're on-line from 6 in the morning until 10 p.m. and running at 85% to 90% capacity throughout the day. The

peak utilization period, 3 to 4 p.m., pushes the load to 95% capacity," according to Barile.

"With the planned expansion of the Major Dealer System, we probably will have close to 2,000 of the 4,700 domestic dealers on-line by the end of 1978," he projected. "Current memory will be adequate to support this expansion."

The two 158s are the only computer power for the entire division, but downtime from memory failure can be averted by varying the amount of memory off-line through an Intel feature that can swap to 5K to 12K of memory in and out. This is accomplished by manipulating the IBM multiprocessor support system, Barile said.



**Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3**

BEST PRICE • FAST DELIVERY
CALL TOLL FREE 800-323-2288
IN ILL CALL 312 279 1960
Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126



Woolly Tale

Researchers at Appalachian State University in Boone, N.C., predict the severity of the winter by studying the brown and black coloring patterns of woolly worms. The worms, along with researchers, are examining the maintenance console of a Univac 90/60 used to process the study data.

According to folklore, the more brown colored bands on the insects, the milder the winter.

All at once, it's Harris.

Harris now delivers the most cost/performance effective multi-use computer system in the industry.

Our new family of high performance systems—S115, S125 and S135—together with our powerful VULCAN Virtual Memory Operating System supports more than 50 terminals. Simultaneously.

This is a whole new line of medium-scale, multi-use systems with increased reliability and new state-of-the-art technology. You get greater I/O throughput. MOS memory with error correction. Powerful micro processor based CPU. Broad selection of highly reliable peripherals. And all operate with ANSI 74 COBOL, FORTRAN, RPG II, FORGO, SNOBOL, and extended BASIC.

The Harris S100 systems take on many different jobs all at the same time. Multi-stream batch processing. Multiple concurrent RJE's, both host and remote. Multiple interactive time sharing. Real-time processing. And this new generation of high performance computer systems from Harris delivers these all to you, *concurrently*.

If your need is distributed processing, time sharing, data base management, or any type of concurrent multi-use application, *benchmark our new computer system against any other system in the industry.*

Harris Computer Systems, 1200 Gateway Drive, Fort Lauderdale, Florida 33309. Telephone (305) 974-1700. Europe: Harris Intertype, Ltd., 145 Farnham Road, Slough, SL1 4XD, England.

All at once, it's Harris.



HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

Disk Exerciser Designed to Test IBM-Like Drives

FULLERTON, Calif. — Wilson Laboratories, Inc. has a disk exerciser designed to evaluate IBM-type 2315 and 5440 disk drives.

The DX-500 provides a series of switch-selectable, preprogrammed exercises that help isolate and identify data errors, format errors and seeks errors in linked systems of one to four disk drives, a spokesman said.

Functions include restore, manual seek, incrementing seek and random patterns of incrementing, he stated.

The unit is reportedly capable of stopping on an error or indicating an error has been encountered while continuing to run.

Features of the DX-500 include Alternate Set, which allows alternating between any two desired cylinder addresses; and Data Pattern, which permits writing all 0s, all 1s, 0s and 1s or scrambled 1s and 0s, the firm said.

The unit costs \$995 from Wilson Laboratories, 2536-D E. Fender Ave., Fullerton, Calif. 92631.

Milwaukee Site Of UPS Course

MILWAUKEE — A course covering the theory and design of uninterruptible power supply (UPS) systems will be presented March 13-14 at the University of Wisconsin by its Department of Engineering and Applied Science.

The seminar, featuring a workshop on UPS applications, will focus on such questions as where and when a UPS is needed, how components should be chosen, how the system is designed and what the system maintenance requirements should be, a spokesman said.

Consideration will also be given to grounding and noise problems that are associated with the operation of a UPS system, he stated.

Registration for the course costs \$135. Further information can be obtained from the program director at the University of Wisconsin-Extension, 929 N. Sixth St., Milwaukee, Wis. 53203.

MFE Expands Transport Line

SALEM, N.H.— MFE Corp. is offering a digital cassette transport that reportedly has speeds ranging from 10- to 40 in./sec and a data transfer rate of 32 kbit/sec.

The 450B incorporates a "Tachlok" speed control system that provides a 1% long-term speed accuracy without the use of a prerecorded digital clock track, a spokesman said.

The unit is Ansi/Ecma-compatible and available in two data tracks, each allowing a data storage of up to 5.9M bits (720K bytes) per cassette, he stated.

The unit also features read-after-write heads and optical end and bottom of tape, the firm said.

The 450B costs \$560. MFE is at Keewaydin Drive, Salem, N.H. 03079.

Scan, Nonscan Types Available

Improved Inks Sought for OCR Applications

SAN DIEGO — Inks used in optical character recognition (OCR) applications fall into two categories: scan and nonscan, Robert R. Green of Moore Business Forms, Inc. explained here recently, and the challenge that is facing the forms industry is to find an ink that can't be seen by the optical reader but can be seen without strain by the person filling out the form.

"This situation is further compounded by the fact that optical readers differ a great deal in the type of light used to illuminate the form in the OCR read area. Some systems read in the visible portion of the spectrum, others in the infrared portion and still others in the ultraviolet portion," he said.

Scan inks are inks that reflect little light when viewed by the scanner, thus appearing black to the scanner. Normally, black ink is used to print scannable data, since it provides sharper print contrast against the paper background. Other colors of ink may be used, although these colors must be chosen with extreme care, he cautioned.

Normally, alternate scannable ink colors contain a significant percentage of black pigment. Other designations for scan ink include nonreflective and read inks. "I prefer scan or read inks, since it's easier to keep them straight if you think in terms of how the scanner sees them," he explained.

"Nonscan inks are highly reflective and to the scanner appear the same color as the paper they are printed on, thus making them nonscannable to the optical reader and at the same time readable by the human eye. These inks are used to print guidelines or instructions that appear in the read areas of the form; they must be highly reflective so they provide little contrast with the paper background.

"Typical nonscan colors are blue and green for scanners that read in the visible portion of the spectrum; and yellow, orange and red for scanners that read the infrared (IR) portion of the spectrum," Green continued.

There are only a few scanners that

read ultraviolet, and fewer new scanners are reading in the visible portion of the spectrum. The trend is toward scanners that read in the IR or near-IR range of the spectrum, he explained.

"This trend is good because it's difficult to come up with inks for scanners that read in the visible range because the human eye and scanner are both sensitive to the same range of colors. It's difficult to find an ink that the eye can see and the scanner cannot. I'm sure some of you have been around long enough to recall the problem with nonscan blue inks. When it was dark enough for human readability, it was too dark for the scanner," he said.

Firms Offering Free Brochures

The following firms are offering free brochures:

Electronic Memories and Magnetics Corp. is offering a four-page illustrated brochure describing the compatibility of its add-on memories to IBM 370/158 and 370/168 systems. The firm is located at 3216 W. El Segundo Blvd., Hawthorne, Calif. 90250.

A pamphlet covering "Seven Reasons Why Your Company Should Own a Bell & Howell 3800 computer output microfilm (COM) system is available from that firm's COM Products Division, 1451 Quail St., Newport Beach, Calif. 92660.

A two-page bulletin discussing the series EPM Dual-Output AC/DC power supplies is offered by Intronic, Inc., 57 Chapel St., Newton, Mass. 02158.

Dot-Matrix Printers

A four-page brochure describing the DP-1000 series dot-matrix printers is available from Anadex, 9825 DeSoto Ave., Chatsworth, Calif. 91311.

A bulletin discussing the Microcommand system and its hardware/software package is being offered by the Information Control Corp., 9610 Bellanca Ave., Los Angeles, Calif. 90045.

Literature is available from the Research Products Corp. describing its line of Aprilaire humidifiers. A humidity calculation sheet is also included. The firm is at 1015 E. Washington Ave., Madison, Wis. 53701.

A six-page application brochure detailing the design of a data-acquisition system that can be constructed with four dual-in-line packages is offered by the Micro Networks Corp., 324 Clark St., Worcester, Mass. 01606.

A six-page brochure describing the features of the Verbatim TC-2000 and the TC-1200 data cartridges is available from the Information Terminals Corp., 323 Soquel Way, Sunnyvale, Calif. 94086.

A four-page data sheet discussing the internal time base, matched input filters, remote pen lift, transistor-to-transistor logic level remote control and paper alignment guides of the Model 7015B X-Y Recorder is available from the Hewlett-Packard Co., 1507 Page Mill Road, Palo Alto, Calif. 94304.

**we know
computers
and we know
leasing...**

Over \$600,000,000 worth of computer equipment presently on lease makes General Electric Credit Corporation the industry's leading leasing source and gives it the know-how required to stay in front. This experience can work to get you the computer mainframes, peripheral equipment and distributed data processing systems you need, regardless of how complex the transaction may be.

Whether it's a multi-million-dollar leveraged lease for a large scale system or a single investor lease for a small accounting installation, GECC has the ability and the people with the expertise to provide you with the best leasing alternatives. And because we have the resources, we'll be there when you want to upgrade or add-on to your GECC-leased system.

Put our resources and expertise to work for you. Complete the coupon or, better yet, call the local GECC office nearest you and experience our fast service.



Administrative Offices:
Stamford, CT 06904 • (203) 357-4597

To: Mr. John J. Canning, Marketing Mgr.,
(Equipment Leasing)
General Electric Credit Corporation
P.O. Box 8300, Stamford, CT 06904 • (203) 357-4597

Dear Mr. Canning: I would like more information about
GECC's customized leasing plans.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Telephone _____

ATLANTA (404) 451-5921, BOSTON (617) 272-8540, CHICAGO (312) 858-8650,
CLEVELAND (216) 842-6333, COLUMBIA (301) 957-4990, COLUMBUS (614) 891-7750,
DALLAS (214) 234-0648, DENVER (303) 320-3660, DETROIT (313) 356-1910,
HOUSTON (713) 661-7106, KANSAS CITY (913) 324-1080, LOS ANGELES (213) 572-5317,
MEMPHIS (901) 365-2457, MINNEAPOLIS (612) 835-5100 Ext. 216,
NEW YORK (203) 255-5911, OKLAHOMA CITY (405) 947-3300, PHILADELPHIA (609) 779-9011,
PITTSBURGH (412) 923-2520, SAN FRANCISCO (415) 327-0110, SEATTLE (206) 575-2990.

Nonprofit Group Reaps Savings in Data Entry

Special to CW

NEW YORK — The Institute of International Education (IIE) here has increased its data entry and communications efficiency while obtaining an annual cost savings of approximately \$2,500 through the use of an intelligent key-entry system.

The institute, a nonprofit organization that administers various international education exchange and related programs, requires the maintenance of large volumes of statistical data amounting to over 60,000 records each month. IIE recently installed an Inforex, Inc. Model 1303 for use with its large-scale mainframe.

The present system configuration includes a control unit, six keystations, disk and tape drives and a 400 line/min printer. The system is used for both data entry, validation and editing and for remote job entry to an IBM 370/158 mainframe at a service bureau in Connecticut. IIE is currently converting from an IBM 2780 communications protocol to IBM 3780, which offers a larger buffer and faster two-way data transfers.

The Inforex 1303 was chosen specifically for its combined data entry and remote job entry features, according to Bruce Barry, manager of systems and DP.

Transmission Errors

"Before implementing the Inforex equipment," he said, "we were experiencing anywhere from five to 10 transmission errors per month that resulted in unnecessary extra costs for communications lines and CPU time. We have reduced that rate to only one or two errors in as much as three months. I feel that this improvement in performance is a direct result of the reliability of the new equipment."

Implementation of the system was prompted by a need to increase productivity, reduce error rates, eliminate the handling problems associated with punched cards and lower the overall cost of performing routine data entry and RJE tasks.

The 1303 replaced a Data 100 Corp. Model 74 RJE station and five IBM keypunch machines.

The 1303 has been enhanced with 309E software, which provides many of the features of larger systems to 1303 users. These include up to eight program levels, improved data manipulation and error correction capabilities and a job control language (JCL) library with a capacity of 44 job stream formats and the equivalent 200 to 300 JCL cards.

All job control instructions and transmission parameters are stored on disk and called up via a few keystrokes, eliminating the need to handle JCL cards.

Greater Efficiency

The 1303 software has resulted in substantial improvements in overall efficiency. One major application for which this is true is the Scholarship Administration System (SAS). It includes comprehensive statistical data on over 25,000 scholarship grantees, including basic information such as name, date of birth, mail and home addresses and institution attended as well as financial data on tuition, textbooks, housing and related expenses.

This data constitutes 90-odd data ele-

ments which enables IIE to be responsive to sponsor-customized reports requiring both financial and statistical information.

The old keypunch equipment could accommodate only six program levels. To compensate for that constraint, IIE had to limit its grantee statistical input form to six levels. Data was keypunched, then a batch designation code had to be punched on a separate card. "Two problems resulted. First, there was always the obvious danger of dropping a batch of cards. If that happened, all of them had to be re-keyed and verified. Second, if the batch ticket card somehow got put in with the wrong set of cards, we ended up sending reports to the wrong people and not sending them to the people

who had requested them. And, of course, we had all the classic problems of cards — overflowing storage areas and cards buckling every time the humidity went up," Barry noted.

The Inforex 1303 eliminates card handling and provides up to eight program levels allowing IIE to expand the formats used on source documents to match the information needs of various end-users within the organization.

Applications on the 1303 now include, among others, a university master file and the collection and formatting of data for various publications outlining educational opportunities and cost information.

The systems and DP department does not have a coding section. Source documents for these applications are

coded in the field by non-DP personnel or the respondents to questionnaires and then sent in for data entry and processing. "Frequently the people filling in the forms will include more characters than allowed for in a given field. A feature of the Inforex software automatically signals the data entry operator when this is the case and allows him to enter an appropriate abbreviation," Barry explained.

Another feature provides for zero balancing, an important capability previously unavailable. IIE enters and processes approximately 7,000 records each month for its general accounting journals. Prior to implementation of the new system, validation runs had to be performed on the mainframe. A

(Continued on Page 48)

A new combination... To better serve your terminal needs



Data Access Systems, Inc. and International Computer Equipment, Inc. have merged to create a new nationwide network to serve your every terminal need. Our combined efforts now provide the only national company with facilities and capabilities to assure you of unparalleled equipment economies along with unmatched service. For your convenience new toll free numbers have been set up:

East 800 - 631 - 9604

West 800 - 227 - 4406

Or call your local district office.



Data Access Systems, Inc.

Corporate offices:

100 Route 46, Mountain Lakes,
N.J. 07047 • (201) 335-3322
or Toll Free (800) 631-9604

District offices:

Boston — (817) 933-8822
Washington, D.C. Area — (703) 525-2923
Phila. So. Jersey — (609) 854-0070

Chicago — (312) 298-0777
Los Angeles — (213) 538-4100
San Francisco — (415) 391-5535

ECLIPSE S/230



ECLIPSE S/130



NOVA 3



SOMEBODY HAS FINALLY DONE SOMETHING FOR THE MIDDLE CLASS. THE ECLIPSE S/130.

The ECLIPSE S/130 computer system proves it is still possible to make ends meet. Its performance, on the one hand, approaches that of our super high-speed ECLIPSE S/230. While its price is much closer to the level of our best-selling NOVA 3.

The ECLIPSE S/130 is built around the same powerful architecture as the ECLIPSE S/230. But it has its own unique character. Like our fast micro-coded floating point, efficient character string instruction set, our second-generation WCS microprogramming ability, as well as AOS, our heuristic multiprogramming advanced operating system.

All of which means that even though the ECLIPSE S/130 is in the middle of our family, it's in a class by itself when it comes to performance, features, and power for the money. And if you still think that value is a virtue, the ECLIPSE S/130 system won't let you down. Call (617) 366-8911, Ext. 4735 or write.

 **Data General**

We make computers that make sense.

*The ECLIPSE S/130 System shown includes 128K bytes of memory, floating point instruction set, clock, Dasher® terminal printer and display, 10 megabyte fixed/reinovable cartridge disc, 315K byte diskette, and all applicable controls, cabinetry, and cabling. Licensed software available on this configuration are RDOS, FORTRAN IV, optimizing FORTRAN V, and BASIC. Domestic U.S. list price \$42,040, including licensed software. OEM and volume discounts available.Data General Corporation, Westboro, MA 01581, (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61 rue de Courcelles, Paris, France, 766.51.78. Data General Australia, (03) 82-1361. Data General Ltda., Sao Paulo, Brazil, 543-0138. © Data General Corporation, 1978. ECLIPSE is a registered trademark of the Data General Corporation.

Airline Uses RJE to Speed Jobs, Reduce Errors

ANCHORAGE, Alaska — When Wien Air Alaska's bank service bureau could no longer provide it with DP services, this Anchorage-based airline implemented remote job entry to handle reservations and developed its own accounting software.

As a result, Wien reported a reduction in job turnaround from as much as a week to a few hours and a reduction in batch errors from close to 30%

to less than 5%.

Wien's service bureau had decided that, because of its own in-house workload, the airline would have to find other arrangements. Wien then examined the alternatives of going to another service bureau, installing its own CPU or using remote job entry.

Selecting the latter, the airline linked a Data 100 Corp. Keybatch system in An-

chorage via satellite to a Continental Airlines IBM 360/65 in Los Angeles.

Wien opted for Continental's time-sharing facilities on the basis of cost effectiveness and past experience with its on-line reservation system, according to Mic Lowther, Wien DP manager.

Equipment Choice

In seeking on-site equipment, the choices soon nar-

rowed to IBM, Mohawk Data Sciences Corp., and Data 100, Lowther explained, since "not everyone does business up here."

He indicated that Data 100 Keybatch was ultimately chosen for such features as error checking, table look-up, range checking, in-line tables and its Indexed Sequential Access Method (Isam).

Wien's Keybatch configuration includes a 10M byte disk,

a dual 800 bit/in. tape drive, 12 CRTs, two terminal control units and a 1,250 line/min printer.

The system has greatly facilitated such tasks as changing airline schedules, calculating flight pay and preparing post office reports on mail carrying — which Wien does to 152 Alaskan cities, according to Lowther.

Data entered in Anchorage is transmitted at 9,600 bit/sec to the Alaska Earth Station in Talkeetna and from there via RCA satellite to Point Reyes, Calif. (in the San Francisco Bay area). Next, the data is sent over land lines to Continental's IBM 360/65 in Los Angeles.

Backup Problem

One problem in Wien Air Alaska's remote location is backup sufficiency in the event of system failure, which the airline addressed by adding a secondary 10M-byte disk and software to run the system on either terminal control unit.

"While we are paying for a lot more equipment than we actually use," Lowther commented, "if we use the backup disk only five days later, it pays for itself."

Lowther also designed and implemented a system to manage Wien's tape library in Los Angeles. "It's been running a year now and we haven't lost a tape yet," he said.

Group Cuts Costs For Data Entry

(Continued from Page 45) single error could throw an entire batch out of balance, and that meant a time-consuming manual search.

The 1303 software employs six registers which allow accumulated balances to be matched against totals entered by the operator.

Although no statistics were kept on the cost or frequency of balancing errors prior to implementation of the Inforex system, Barry said. "It was certainly an annoying problem for us. By prebalancing all financial data during data entry, we've reduced our error rate to around 1% and saved a substantial amount of time and money."

TI's 745 Portable Data Terminal can make the difference between closing doors and closing deals.

Sometimes, getting back to your customers tomorrow or next week just isn't good enough. It can mean a closed door now. And more closed doors to future business.

TI's Silent 700* Model 745 Portable Data Terminal gives you all the facts and figures you need to close your sale. On the spot.

All you need is a telephone and an electrical outlet. And you're ready to send or receive information from your home office computer that's configured for remote-dialed



communications. Immediately. Plus, you get an instant printed copy of the information for your records.

TI's 745 Portable Data Terminal weighs only 13 pounds. So, you can easily take it with you wherever you go. And get virtually silent printed copies of critical orders at 30 characters-per-second. Inventory. Pricing. Deliveries. Listings. Policy analysis. And budget impact analysis.

With a TI microprocessor at the heart of the unit, the 745 is unbeatable for performance and reliability.

And with a price of only \$1995†, the 745 is several hundred dollars below



competitive models. With larger quantity discounts available, too.

So, if you're in real estate, insurance, finance, manufacturing, wholesale, retail or any other business with field operations, put our 745 to work for you. And start closing more deals.

For immediate response, contact your nearest TI office, or call Data Terminal Marketing, Texas Instruments Incorporated, at (713) 491-5115, extension 2126.

Or for more information, simply return this coupon:

TEXAS INSTRUMENTS
INCORPORATED

Yes! I am interested in the Model 745 Portable Data Terminal.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name _____

Title _____

Company _____

Phone _____

Address _____

City _____ State _____ Zip _____

Mail to: Texas Instruments Incorporated, P.O. Box 1444, M/S 784
Houston, Texas 77001

12-21-CW

*Trademark of Texas Instruments

Copyright © 1977, Texas Instruments Incorporated
†U.S. Domestic Price

TEXAS INSTRUMENTS.



(402) 392-2606

VOLUME DATA ENTRY SERVICES...
TAPE OR CARDS
"QUALITY AT A LOWER COST"
AMERICAN KEYDATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Computerworld Special Report

The Art of Applying Application Packages

IN-HOUSE
DP SKILLS

VENDOR
SUPPORT

PACKAGED
LOGIC

END USER
IDEAS

EXTERNAL
FACTORS

January 30, 1978

Edited by Don Leavitt

Pros Far Outweigh Cons

Package a Smart Alternative to In-House Unit

By Gordon Brenne
Special to CW

The design and development of computerized systems is a costly and time-consuming endeavor. Bringing in an application development effort on time and on budget can be regarded as an achievement. The ability to plan and budget a development effort with a degree of realism is yet another hallmark of achievement in the world of systems development.

The fact of the matter is that few business systems are completed on time and within budget. But this is just the tip of a cost overrun iceberg. Add

to this the mounting systems maintenance costs often encountered after system implementation for application features not included originally.

Within this scenario, "proprietary software programs" (software packages) are rapidly becoming the reasonable alternative to informed executives for successful business systems implementation.

Great Expectations

In the beginning, most internal system development efforts are greeted with enthusiasm by those who will benefit from them. Great plans are

presented and great expectations are generated that this system will do all that is required of it and then some.

Dreams which were so cherished in the beginning soon become the millstones hung on the neck of the designer, and users begin to sound like victims of an unnatural disaster. At the outset, application software packages were perhaps considered, but rejected as insufficient and unsatisfactory. Ironically, these packages are often rejected for the very reasons that make them a good solution:

- Ambitious Management Requirements — At the beginning of the project,

did the requirements seem too ambitious for a packaged solution?

- Critical Time Schedule — Did this prevent examination of the range of package alternatives?

- Insufficient Staff — Was there no staff available to review the possible alternatives?

- Insufficient Expertise — Did staff available claim to be unfamiliar with application requirements and methods for evaluating packages?

These reasons, while rather general, reflect the basic problems encountered when trying to decide if packages are an alternative to internal development. Software packages are not a new idea, nor are they the best solution for every financial system application. There is, however, a wide range of package choices for most business applications on the market today.

A careful look at advantages and disadvantages of packaged application software brings the following points to light:

Disadvantages

- Hardware Transferability — Some packages will only work on certain computers and require tinkering when installed on other computers that have different operating systems. Developed systems can be designed to be compatible with computers you own.

- System Integration — Some custom

(Continued on Page S/20)

In '77 Software Industry

DDP, Security, EFTS, Minis Gain Support

By Dennis Hamilton
Special to CW

In the aggregate, 1977 was a mildly significant year for the software industry, but the trends that surfaced may indicate many of the industry's future directions.

The activity of 1977 can be fairly neatly split into the software trends and industry trends. All of the trends and mini trends are entwined to a degree, but it's important to delineate and tag them, if only to correlate cause and effect.

Among the more significant software trends were areas such as distributed data processing (DDP), software security, Electronic Funds Transfer System (EFTS), software, integrated systems and increasingly viable minicomputer software systems.

DDP Detractors

It was once the idle fashion among the DP industry's philosophers to pronounce last rites on any new technology that happened to be heavily software-dependent. In the instance of DDP, the lament was that while the concept was enormously beneficial on paper, its practical costs were prohibitive for in-house developers. On the other hand, software vendors lacked the resources and expertise to carry off the development of DDP software and, certainly as important, the ongoing support.

But suddenly, companies such as Inforex chose to concentrate on the software end of the DDP equation. If software was going to make or break the technology, it was not going to be neglected.

At the last National Computer Conference, Four-Phase introduced Vision, a comprehensive DDP software system built after extensive field testing. The problem of supporting all of that remote equipment and software is formidable, but it apparently isn't unconquerable. Four-Phase has staked its support reputation on its ability to handle the job. The "grim reapers" notwithstanding, DDP appears to have a rosier future than it had only 12 months ago, thanks in large part to a software and support commitment.

EFTS software is part of another trend reflecting commitment. A couple of years ago, the vice-president of a Louisiana bank suggested that software vendors, removed from the EFTS battlefield (the bank data center), were

not "even remotely capable of providing EFTS software" to the banking industry.

Some of the more EFTS-oriented vendors then effected coalitions with banks, refined the software on-site — with the input of the participants — and laid to rest the idea that their systems were devised in some isolated castle tower.

Tymshare, for example, worked with the National Bank of Commerce in Lincoln, Neb., on the development of a system, then purchased the rights to it.

Thus the system being marketed is bank-developed, but refined, supported and marketed by a vendor. This appears to be the combination that will make EFTS software universally cost-effective and available.

Security Trends

Another trend involves software security. In the current travails over privacy and security (again, separate but related subjects — if you don't have security, you cannot ensure

(Continued on Page S/6)

Users Install Packages With Extra Care

By Chester Mills
Special to CW

Recent research studies in a large cross section of DP installations have found that some significant changes have occurred in the evaluation, purchase, installation and maintenance of application software packages.

The evaluations were found to be more thorough and in-depth, with much longer range systems specifications being developed and considered. End users were found to be participating in the preparation of the detailed short-term and long-term system specifications, as well as the actual evaluation of the software packages.

Benchmarks have been appearing more frequently than ever before as application software packages are being evaluated. The benchmarks have been utilized as key elements in the decision process to build or buy a particular application software system.

Among the key selection criteria which have been observed with respect to application software packages are:

- Is the package designed in a truly modular or structured (design and programming) approach?
- Does the package have current communication capabilities?
- Does the application package design and structure lend itself to ul-

timate conversion to operate in a data base environment?

- Does the vendor provide source code to allow for internal maintenance and enhancement of the package and if not, has its maintenance program proven to be satisfactory among referenced users?

Purchase Considerations

In the area of purchase considerations, many potential buyers have required the vendors to contract the specific enhancements that may not currently be in the systems but are required by the end users.

(Continued on Page S/10)

On the Inside

Package a Smart Alternative to In-House Unit	S/2
DDP, Security, EFTS, Minis Gain Support	S/2
Users Install Packages With Extra Care	S/2
Novice Users Must Take Time With Packages	S/3
'Test Driving' Packages Now a Possibility	S/3
Purchasing Software Requires Careful Planning	S/4
User Participation Vital in System Development	S/7
Experiment Successful for Package 'Guinea Pig'	S/8
Borrowed Package Revamps Hospital Inventory	S/9
Janitorial Supply Firm Cleans Up Recordkeeping	S/11
SAS Lets Bank User 'Do His Own Thing'	S/12
Vendor Upkeep Major Factor in Acquisitions	S/15
User Gives Speedy Conversion High Marks	S/16
Buyer Needs Commitment, Not Just Committees	S/17
Dental Supply House Gets 'Midas' Touch	S/19

Novice Users Must Take Time With Packages

By Stephen A. Levine
Special to CW

The first-time user working with a systems house or minicomputer manufacturer can encounter serious problems attempting to insure that his system reflects his real business needs. The use of an existing software package as a core capability is an appropriate and logical step, but invariably modifications will be required.

Modification of the software application package becomes a tug-of-war between the user and the supplier as a result of the different interests being served. This article points out a method which should help minimize these types of problems.

The sequence of events that should be followed in implementing a modified software package on a minicomputer is simple enough, as depicted in the accompanying chart.

Of course, adequate documentation, training and data conversion procedures must be added to the process

steps outlined in the chart.

The requirements analysis sets down the user's needs in terms of functional applications and transaction volumes so that an accurate yardstick is available against which to match the application software capabilities and provide estimates of the system hardware elements. The functional specifications delineate the specific system input formats, output reports, data file layouts and overall information flow and all the modifications required to each of these areas to satisfy the end user's specific needs.

Finally, the programming modifications specifications translate the functional changes required to specific programming tasks necessary to implement the new standards. The project can then flow through the remaining steps to installation without major problems.

Neither the user nor the supplier can wait until installation to determine if everyone's expectations have been met. Instead, it is recommended that



The above chart shows the steps necessary to modify a package on a minicomputer.

the functional specification be used to insure a more timely and accurate assessment of the scope of programming work required and the user's perception of the final product.

The functional specifications should be organized according to each of the areas of the user's business that are being computerized. All reports should

be presented, along with input (terminal displays, etc.) formats, data file layouts and descriptions of all information flow and processing algorithms.

The professional staff of the systems house or manufacturer should hold periodic sessions with the end user's operating and management staff to review each business area of the functional specification and incorporate all changes, additions or deletions appropriate to the user's needs. This walk-through should follow a simulated system working session so that the user's best possible perception is generated in the process.

Once performed for a single business area, the end user will recognize the kinds of information the implementor needs to understand the precise nature of each change and, consequently, less gaps will occur in the communication process. This should continue for all the remaining areas and functional specification document should be updated to reflect in writing all the changes anticipated and finally approved by the user. At this point, the document can be turned over to the programming staff for review and generation of the programming modifications specifications.

The functional specification document, coupled with the end user walk-through, removes the mystique that usually shrouds this part of the minicomputer implementation effort and avoids the catastrophic types of encounters resulting in the "That's not what I wanted!" type of reaction when the final system is delivered, or the defensive posture of "We have no more programming funds remaining on the project!"

Although the process suggested here may take additional time and effort, it is the only truly high-confidence way of implementing a minicomputer software package.

Levine is president of The EDP Corp., Newton, Mass.

'Fly Before You Buy'

'Test Driving' Packages Now a Possibility

By Stewart F. Plock Jr.
Special to CW

Would you buy a new or used car without driving it around the block? The same philosophy applies to software package purchases. If a minicomputer or software house can be found that offers its system via batch remote job entry (RJE) or remote time-sharing, such a system can be installed with no hardware investment, used for a finite trial period and evaluated during the trial for effectiveness.

This article describes examples where such a "fly before you buy" approach proved effective for two organizations: a manufacturing firm interested in implementing materials requirements planning (MRP) and a research unit seeking to install a data base management package. Both organizations used time-sharing services prior to making a package selection.

Minicomputer Application Selection

Smith Kline Instruments (SKI) in Sunnyvale, Calif., manufactures instruments and reagents for the health care industry. In the early '70s, SKI started a relationship with a local service bureau, eventually jointly developing many batch financial, sales and manufacturing systems on an IBM 360/30. Another service bureau was used for production planning.

Management became interested in developing an MRP system for SKI's Instruments Division in 1976. After a requirements definition phase, several MRP packages were identified as potential winners. In the final analysis, IBM's Ipic package was a contender as was an MRP system from a local minicomputer company, Interactive Applications, Inc. (IAI). IAI's systems were operational on HP 3000 hardware serving some 40 manufacturing firms in Northern California.

SKI decided to select IAI primarily because it could install a completely interactive (Extended Basic) MRP system in the plant while the CPU is operated at IAI's data center. During

the structured six-month trial period, SKI installed and used IAI's inventory control, bill of materials, item master, purchasing and requirements planning modules.

"At the completion of the trial, we were able to identify specific quantified savings that we can expect to achieve from full utilization of MRP's power," Dick Lymon, Instruments Division general manager, said. "We are a lot more confident that these savings are real after having gained hands-on experience with the packaged system. Another significant advantage of the trial was that we were able to identify features of IAI's package that we wish to modify prior to bringing the HP 3000 in-house." Using this conservative "fly before you

buy" approach, SKI now has scheduled delivery of the HP hardware for early this year.

In SKI's long-range systems plan, implementation of the data base or information resource management approach is expected. "Using IAI's system on a remote time-sharing basis and now bringing the system in-house was the fastest way for us to gain usage of a truly interactive system," J.B. Shah, SKI's DP manager, noted. "Yet we can already envision in the longer range transitioning from such a packaged system to a completely data base-oriented environment." The important point here is that the company is benefiting from a state-of-the-art application approach for use in future data

(Continued on Page 5/4)

Don't Let Packaged Software Box You In.

Check them all out — MSA, Software International, UCC — and when you're through check us, AMS. American Management Systems. You'll know the difference. We're doing things differently so you don't have to. After seven years of management consulting, custom, program development and researching the needs of today's management, AMS has introduced GFS, General Financial System. GFS handles all your financial applications. With GFS you define the parameters. You don't need to compromise your existing accounting procedures or reprogram interface files into predefined formats. GFS — tailored to today's needs and tomorrow's growth.

Available on DEC PDP-11 & IBM 360/370.

American Management Systems, Inc.

AMS ..Accounts Payable..General Ledger
..Accounts Receivable..Project Cost

1515 Wilson Boulevard, Arlington, VA 22209, (703) 841-6000 • New York (212) 233-1500 • San Mateo (415) 573-9481 • Chicago (312) 648-5555



User Offers Advice

Purchasing Software Requires Careful Planning

By John Saglimbeni

Special to CW

SCHENECTADY, N.Y. — Recognizing the need to replace our current antiquated applications software, and realizing we could not afford the time for in-house development because of our limited staff, Financial Computer Center of Eastern New York, Inc. pursued the path for purchasing applica-

tions software from outside sources.

Consulting *Datapro for Banking*, we found sound reasons which concurred with our thinking. They are:

- In-house software development projects generally take from a few months to several years to complete and are often subject to serious delays, whereas packaged software can usually be installed and made opera-

tional within a month or two.

- The cost of in-house software development is almost impossible to predict accurately and is often seriously underestimated, whereas packaged software is offered at a fixed price.

- Some in-house development efforts never reach completion, for a variety of reasons, whereas packaged software is generally a known quantity.

- Comprehensive documentation, often sadly neglected in in-house projects, can be demanded as a prerequisite for the sale of most software packages.

- There may be considerable resistance, in both management and technical circles, to the whole idea of purchasing applications software from outside sources. This resistance can usually be overcome by stressing the clear-cut economic advantages (if any) and the fact that the in-house staff will be relieved of the need to program mundane, commonplace applications and freed to work on more unconventional and challenging projects.

Having the problems well defined and all of the requirements determined, we proceeded to gather information about all available packages from 12 software houses. Once the survey was complete, we were able to narrow the field very quickly. Some packages were overpriced, some written in Assembler language, rather than ANS Cobol, and others were not comprehensive enough.

Detailed Analysis

We performed a detailed analysis on two top contenders: A.S. Kranzley in Cherry Hill, N.J. and Florida Software in Orlando, Fla. We used the evaluation criteria prescribed by *Datapro*. We thought it was an excellent recipe to follow. Briefly, the 14 points used for the evaluation are as follows:

- Does the basic function of the

package meet your needs?

- Will the package run on your computer system?

- What are the software requirements?

- How well do the detailed capabilities of the package match your requirements?

- Is the performance adequate for your needs?

- How flexible is the package?

- In what form is the package delivered?

- Will the package be easy to use?

- Is adequate documentation provided?

- What support will the vendor provide?

- What is the operational status of the package?

- What is the total cost of acquiring and using the package?

- What financial arrangements are offered?

Ease of installation and initial testing are very serious considerations. Although a package may be well known and thoroughly tested by the vendor, it is very desirable to use your own test data since the needs of users vary widely. The package should permit this to be done with a minimum amount of difficulty.

Vendor support should be looked at very carefully, especially during the testing phase when program bugs may turn up. It is advantageous to deal with a vendor that provides maintenance contracts. This will assure you of continued support and prevent the application from becoming out-dated.

We eventually selected Florida Software three times to meet our needs in banking application software.

John Saglimbeni is assistant vice-president and manager-programming, Financial Computer Center of Eastern New York, Inc., Schenectady, N.Y.

Users Can Try Packages Before Making Buy Decision

(Continued from Page S/3)

base design and development.

Data base package selection is often accomplished by forming a project team that proceeds to make a "paper" evaluation of several DBMS packages. The traditional steps followed in evaluating an application software package, including establishment of selection criteria, vendor and user interviews, "weighting" of various factors, etc. are employed.

Lower Risk Approach

A lower risk approach involves contracting with a number of time-sharing or RJE service bureaus to experiment with data base management software. All of the major DBMS packages (such as IMS, Total, Adabas, IDMS, System 2000) are available from national service bureaus. The research computing center of a major chemical manufacturer used three different DBMS packages over a one-year period, paying for the expense of three service bureaus, but resulting in a clear understanding of the three packages used.

Selection and implementation of a data management approach and, re-

lated software can be one of the most significant decisions made in long-range systems planning. By experimentation with various DBMS packages prior to purchase, all aspects of the package can be evaluated and compared with competitive systems.

More and more software vendors are offering their packages by the conventional purchase method and also via a nationwide remote computing service bureau. Also, specialized minicomputer software vendors are establishing time-sharing capabilities so their applications can be used in an experimental mode prior to purchase.

This very attractive manner of marketing systems gives the potential user the service while postponing purchase of software and/or minis. At the same time, the limitations of packaged systems can be clearly identified.

The "fly before you buy" approach to packaged systems is a good way to minimize the risk in minicomputers or larger mainframe packaged software selection.

Plock is director, management information systems, Smith Kline Clinical Laboratories, Inc., Palo Alto, Calif.

User Rated #1

Our customers put us right where you want us — the number 1 rated Fixed Asset System in the third annual *Datamation/Datapro* user ratings of software packages. Send the coupon below and let us show you how we earned our reputation.

We made the software—We earned our reputation!

COMPANY NAME _____

NAME _____

TITLE _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

PHONE _____

Data Design
Associates1333 Lawrence Expressway, Suite 418
Santa Clara, California 95051
(408) 985-2570NEW RESPONSE TIME
MONITOR.

MONITORS RESPONSE TIME on asynchronous and bisynchronous multidrop terminal networks.

DISPLAYS minimum, maximum, lost transaction, number of transactions and maintains running average on 4-digit LED display.

DATA RATES from 75 to 9600 baud.

TERMINAL CONNECTION via optical coupler or RS-232C bridge.

RESOLUTION is 0.1 sec. with 9.999 sec. possible.

All packed into one self-contained, self-powered monitor, the

MODEL 300

\$1500 F.O.B. Salt Lake City, Utah

Manufactured and serviced by:

QUESTRONICS, INC.

3565 South West Temple, #5
Salt Lake City, Utah 84115
(801) 262-9923HOSPITAL FINANCIAL
SOFTWARE PACKAGES

Installed and operational in major hospitals nationally. Written in ANSI-COBOL. Perpetual lease rights IBM 360-370, Burroughs, Honeywell, Univac, PDP, NCR. Fully documented with source code and users' manuals.

- Financial Management System
- General Ledger—Financial Statements
- Cost Allocation—Any basis, Multiple steps
- Trend Analysis—Statistical Unit Costing
- Budget Performance—Variable Budgeting
- Report Generator
- Patient Billing—Accounts Receivable
- Accounts Payable
- Payroll/Personnel Management
- Inventory Control
- Hospital Profile System

We install with your Team. Brochure and Price List on request.

HOSPITAL FINANCIAL SERVICES, INC.

170 Newport Center Drive, Suite 240

Newport Beach, California 92660

(714) 759-0223

INFONATIONAL

RUNS ON H P - 3000

RUNS ON DIGITAL (DEC)

RUNS ON CONTROL DATA

RUNS ON BURROUGHS

RUNS ON HONEYWELL

RUNS ON UNIVAC

RUNS ON IBM

RUNS ON NCR



**RUN WITH THE BEST
IN INTEGRATED ACCOUNTING SYSTEMS**

INFONATIONAL

THE FINANCIAL SYSTEMS COMPANY

For the most cost-effective, easy-to-operate, integrated accounting systems, call Jaynia Grace at (714) 560-7070 or mail in this coupon.

INFONATIONAL
THE FINANCIAL SYSTEMS COMPANY

A Division of Foresight Systems, Inc. —
A Subsidiary of United Computing Systems, Inc.

6626 Convoy Court
San Diego, CA 92111
(714) 560-7070



NAME: _____

TITLE: _____

COMPANY: _____

ADDRESS: _____

CITY: _____

STATE: _____

ZIP: _____

PHONE: _____

I AM INTERESTED IN:

- ☐ GENERAL LEDGER
- ☐ ACCOUNTS PAYABLE/
PURCHASE ORDER
- ☐ FIXED ASSETS
ACCOUNTING
- ☐ ACCOUNTS RECEIVABLE/
SALES ANALYSIS

Where low cost is part of our high efficiency software package.

At Argonaut Systems, we know that good packaged software requires real craftsmanship. We set high standards to make our modular software really work.

You pay one moderate price, and that's it. We are available to explain and maintain our software. Or to modify it for your system. But there's no need for enormous experts and on-line service consultation costs. That's the software security we offer at Argonaut Systems.

Well written, solidly crafted programs. If tax laws change, our Payroll Personnel System is easily updated. An accounts payable package that you can tailor to your operation. And a fastbreak taxcost package that doesn't break the bank.

Quality software modules at a low cost — that's what we call efficiency. From ARGONAUT SYSTEMS.

argonaut

Please send more information

Name _____
Company _____
Address _____
City _____ State _____ Zip _____

How do you send an important message to: two warehouses, four sales offices, corporate headquarters, three divisional controller's, and the vice president of marketing, all in a fraction of a second? The answer is

MESSENGER™

MESSENGER™ is a product developed by On-Line Software International which provides a comprehensive message preparation, distribution, and retrieval system; more commonly called a message switching system. With MESSENGER™, the user can:

PREPARE MESSAGES QUICKLY AND EASILY

DISTRIBUTE MESSAGES WITH GREAT FLEXIBILITY

RECEIVE MESSAGES AUTOMATICALLY OR BY COMMAND

• Plus many other features •

For more details on MESSENGER's features, call now for a free General Information Manual. Toll free 800-631-8374 or in N.J. 201-423-3200.

**ON
LINE**
SOFTWARE
INTERNATIONAL

The link between business and computers

SOFTWARE PLAZA ROUTE 208 HAWTHORNE, N.J. 07506

DDP, Security and Minis All Gain Support in '77

(Continued from Page S/2)

privacy), the software industry is again being sought for solutions.

Generally, software security systems are arriving as add-on packages that can be installed on any system; security enhancements for specific existing systems; new systems with security features built in (where a year or two ago they would not have been). In the New Software Products section of Interface magazine, there have been about 40 new systems introduced in the last year that could be categorized as one of the above.

There is also a move among the larger, more sophisticated companies to get away from the development of autonomous, nonintegratable systems. In their place comprehensive systems of an integrated, building block nature are being devised.

In the insurance industry, for example, Informatics' Life-Comm system takes on virtually every insurance company need. And in the manufacturing industry, Martin-Marietta's MAS-80 addresses more tasks than

system — but these are among the strongest. Their impact is certain.

Among the industry trends, it's been an interesting year, too.

On the more ominous side, there are rumblings that the systems software industry may be in for some thorny times as the vendors try to develop programs that are useful for the new IBM machines. If the secrets of its software remain IBM's, as many vendors are inclined to think they will, the industry will be relegated to selling software to the 370-and-down market, which is huge, but for how long?

The fears have caused some secret caucuses and midnight strategy sessions, but the consequences are still nebulous. There may not yet be a perceptible trend (only with IBM could there be a "trend" with but one company involved), but it is nevertheless one of the greater possibilities.

On the other side of that coin, however, is a new union between other major hardware manufacturers and the software vendors. Honeywell, for instance, has contracts with some ven-

'... The mini hardware sellers are encouraging the software vendors to participate with them... allowing each industry to develop, refine and support its respective specialty.'

any other system of its kind.

In the minicomputer software marketplace, where the problems were anticipated to be a leviathan, users are finding an increasing number of viable alternatives. International Computer Programs (ICP) currently lists more than 1,400 minicomputer software products — about 250 more than a year ago. The gravest fears of users appear to be about the flexibility of the systems and the support capabilities of the vendors, many of whom are small and somewhat constrained by resources.

However, there is a growing link between the hardware vendors and the software merchants, to the benefit of not only them but the buyer as well. The mini community is going to grow incredibly in the next half dozen years, thus sellers (of both wares) realize a viable long-term relationship is imperative. Consequently, the mini hardware sellers are encouraging the software vendors to participate with them, therefore allowing each industry to develop, refine and support its respective specialty.

Too, the software itself is becoming more user-oriented, which is vital to the non-DP-oriented mini user. Whereas only a few years ago there were only a handful of packaged solutions, many of which were inflexible and ultimately costly rather than cost-effective, the trend now — witness Logical Machine Corp.'s Adam — is to develop flexible, understandable and frequently user-manipulatable software packages.

Certainly there are other software trends — for example, the new emphasis toward on-line system scheduling as embodied in Software System Corp.'s Dimension V and Value Computing's enhanced on-line scheduling and production control

dors — among them Cincom Systems and Information Systems Consultants — wherein they will sell the vendor-supplied software along with their hardware. The hardware manufacturers have begun to understand that the software industry, with its generally better programming expertise, can do them more good than harm.

One industry "non-trend" was the consolidation that never happened. A few years ago (and even today) the more redoubtable software institutions thought that in a few brief years they would absorb all their little software brothers and the industry would be composed of five or six giants. That prophecy, it seems, is diametrically opposed to what is happening. Rather than the field becoming leaner, it has been fattened up. Certainly there has been some absorption, but its rate is less than the rate of entry by new companies.

Another notable fact of life is the European invasion. The UK's software companies, for example, are bringing their products and expertise over here and are posing more than trifling competition for the domestic vendors. MSP and Altergo have become firmly entrenched in the U.S. and have aptly demonstrated in the last year that one need not be a Yankee to enjoy Yankee profitability.

Upcoming next year is the "1st World Computing Services Industry Conference," which will be held in Barcelona, Spain. It will be a meeting of vendors from around the world, and the subject of corporate emigration to the U.S. will undoubtedly be a hot topic.

Hamilton is an editor of International Computer Programs Inc.'s Interface publications.

If Packages Aren't Used User Participation Vital in System Development

By Bill Baxter
Special to CW

There are several factors that contribute to the success of a systems development project. The most important factor, unfortunately, is the one that is often paid the least attention — the participation of the primary user. Indeed, it may be said that the success of the system is directly related to the involvement of the user.

This factor is often overlooked by management because of the highly technical nature of computer systems, which, it is believed, would prevent the user from playing an effective role in system development. This attitude by management causes them to assign the responsibility of system development to a computer specialist.

Often the computer specialist has grand notions that he knows what is best for the user and best for the company. He seems to lose sight of the fact that computer systems are not created for his pet theories on how the company should meet its information requirements. He forgets, even if he will not admit it to himself, that his job is to satisfy the user, by providing him with a useful system.

Serious Mistake

This lack of regard for the user is a serious mistake, for although computer specialists are usually competent as far as technical matters go, they seldom have the background in business to design a system that fully meets the needs of the user — much less the overall goals and policies of the company.

When the system is presented to the user, a computer specialist may go to great lengths to assure the user that the system is technically sound. He talks in so many "buzzwords" about the completeness of the algorithms and the efficiency of the pro-

grams. He then proceeds to show the user the reams of documentation that he has produced. Much to the chagrin of the specialist, the user is not impressed with his technical wizardry and promptly tells him so.

After the specialist has finally regained his composure, he sets out to convince the user that the system is ex-

actly what he needs; it is a common mistake to think that you can merely talk a user into being satisfied. The user knows what he needs and he will not be satisfied until he has it. Such a tactic only tends to aggravate the already expanding gap between the user and the computer specialist.

To overcome this gap in the development of the project,

there must be a concentrated effort by all those involved; both management and the computer specialists must realize from the outset of the project that the primary user is the most important factor in realizing the success of the system.

User participation should begin with management assigning the best qualified user as

the leader of the systems development team. However, this is not to say that the other members of the team are not essential — only that each member should perform a specific, assigned function. Above all, the user should be the leader of the team, for it is he who must be satisfied if the project is to succeed.

(Continued on Page S/16)

SYSTEM 2000 Puts your resources to work

Data is a valuable resource. When it is properly managed, it can become an efficient and profitable productivity tool for your organization.

MRI's SYSTEM 2000 is a fully integrated data base management system that puts your company's data to work for you. It can help you take the workload off those other valuable resources.

SYSTEM 2000 is a versatile data base management system designed for use on IBM, CDC, Univac, and Amdahl computers. Working with a wide variety of applications, with data bases ranging from 300,000 to more than 1.5 billion characters, with non-data processing personnel as well as highly skilled programmers, SYSTEM 2000 provides flexibility and efficiency in even the most complex environment.

To find out how hardworking your resources can be, contact our nearest marketing representative or MRI corporate headquarters. Find out how resourceful and hardworking our people are in ensuring that your needs are met. Ask about the new DOS/VS version and CONTROL 2000, MRI's data dictionary.

Put your resources to work
and take advantage of ours.

SALES/USE TAX HEADACHES?

If your company sells its products in a multi-state environment you should be using SUTAX.

SUTAX is the only automated software package which will calculate all state, county, city and local taxes throughout the U.S. without special coding requirements. SUTAX uses zip code to determine customer location and it applies the appropriate tax. SUTAX files and tax rate update service, all for less than \$100/month.

SUTAX

Write or call for information:
AV PRODUCTS, INC.
13 New Salem Street
Worcester, MA 01880
(617) 245-6980

mri

**SYSTEMS
CORPORATION**

HARDWORKING
THE DATA BASE MANAGEMENT COMPANY
12075 Research Blvd., Austin, Texas 78759, (512) 258-5171

Experiment Successful for Package 'Guinea Pig'

By Jack Silver
Special to CW

GARDENA, Calif. — Industrial Polychemical Service is a 25-year-old manufacturer of solvent-based industrial adhesives and cements. We are one of the largest independent formulators and manufacturers of cements for plastic pipe in the U.S.

We presently manufacture 70 different products packaged in a wide variety of sizes and shapes of containers. As a result, we maintain an inventory of over 800 separate items stocked and shipped from six regional warehouses. Our sales are primarily handled by commissioned manufacturing representatives located throughout the U.S. and master distributors plus an internal sales

management staff.

Our present DP system handles order entry, invoicing, inventory, accounts receivable, commissions and sales analysis. It consists of a Data General

terminal memory only sufficient for our large volume products. We did not have an order entry system and before we shipped any goods, we sent an order to the billing department where 11

other parts of the country were not being adequately covered.

We increased the number of sales representatives and opened five regional warehouses. This placed heavy demands on the small DP system, especially in providing more detailed inventory records and sales analysis. Just about all the system could do, on one shift, was accounts receivable. And sales commission and analysis reports were still being done manually.

Moreover, every time a computer operation was changed, we had to reprogram the machine. All this effort was time-consuming and costly. And demands for faster and more complete reports were increasing almost by the day.

We had several options. One was to add another shift and use the same equipment. But the machine's inventory control was limited and there was practically no way to analyze sales. And with a rapidly expanding sales force, these reports were critical.

Another option was to seek a service bureau to provide services on a contract basis. But we had no experience with these firms other than to run payroll. And over the years, our internal system had worked, even if it was slow and of limited capacity.

Gary Edwards, our assistant sales manager, asked if he could look into what was available in a minicomputer system with packaged software. His people needed pricing flexibility to meet competitive tactics, so they could "roll" with the punches when necessary. Edwards thought a new, more powerful computer could keep track of this data.

Furthermore, he recommended there be an order entry system to provide rapid inventory status reports to help in production scheduling. Such a report, he felt, could help us reduce late shipments caused by an unexpected rush of orders or by a periodic shortage of materials.

In the fall of 1976, Edwards and his staff prepared specifications for the new system. We wanted a computer that could handle at least three terminals, and be accessed by more than one operator at a time.

We also wanted a system that had dependable hardware, with no question of backup maintenance. We didn't want to buy either top-of-the-line or the cheapest equipment. We also wanted one firm to supply hardware, software and ongoing support. In other words, we insisted on single vendor responsibility.

Proposals Studied

Over several months, we talked to three minicomputer manufacturers and three independent turnkey distributors. The manufacturers lacked the type of software we wanted. However, one distributor offered Data General equipment that gave us expansion capability without the need to reprogram, thereby saving our software investment.

A total of four bids was received. Two were from "turnkey" suppliers of Data General hardware. One firm was a small, one-man operation. The other was Compusource, a packaged software developer that had just started to offer the Data General line as part of its total system concept.

(Continued on Page S/12)

'We could expect more problems and a higher risk, but we could also get more software tailored to our needs. Being adventurous by nature, I was intrigued by the proposal'

Nova computer, three video display terminals and four software packages, all supplied in a turnkey installation by Compusource Corp., El Segundo, Calif.

For five years, prior to installing our new system, we had a Phillips P358 magnetic ledger card system with in-

copies (invoice, packing slip and bills of lading) were generated on the Phillips machine.

Two years ago, we decided to beef up our marketing organization to correct some uneven sales and distribution coverage. We had strong marketing in the West and parts of the South, but

IMS and TOTAL USERS

YOUR DATA BASE

&

ASI-ST

GO TOGETHER

More IMS and TOTAL installations have chosen the ASI-ST Data Management and Reporting System to implement data base applications than any other product. ASI-ST's dominance in data base environments is easily explained:

- Operates under all IBM 360/370 versions of DOS, DOS/VS, OS and OS/VS.
- Fully supports all TOTAL, IMS and DL/1 features including TOTAL 7 and secondary indexing under IMS/VS.
- Permits creating and updating TOTAL and IMS data bases as well as retrieval.
- Allows concurrent processing of conventional data files with IMS or TOTAL data bases.
- Supported in both batch and on-line environments.

IMS users such as American Airlines, Dow Chemical, TWA, American Can, The Hartford, Union Carbide; and TOTAL users like Combustion Engineering, Northwestern Mutual Life, Anheuser-Busch, Corning Glass Works, Eli Lilly and Holiday Inns are a few who agree ASI-ST and data base belong together. In addition, ASI-ST provides an unequalled return on investment by maximizing the productivity of both man and machine. Since ASI-ST fully supports conventional data files as well as complex data bases, these benefits are not restricted to IMS and TOTAL users. To obtain more information contact:



The Software Manufacturer

APPLICATIONS SOFTWARE, INC.
Corporate Offices
21515 Hawthorne Boulevard
Torrance, California 90503
(213) 542-4381

User Cooperative Proves Value Borrowed Package Revamps Hospital Inventory

By Stephen L. Priest
Special to CW

"Your inventory is 20% over what it should be!" "Why are critical patient care items out of stock?"

Such criticisms led Brockton Hospital, a 322-bed nonprofit community hospital located in southeastern Massachusetts, to install an inventory package. It provides the purchasing and storeroom departments with accurate and current information on inventory stock status.

The hospital's auditing firm had noted that the value of the book inventory and the physical inventory were not within an acceptable range. This led to a study by the Group Systems Engineering Program (GSEP) of the Massachusetts Hospital Association which showed the hospital's inventory level to be 20% greater than hospitals of comparable size.

The GSEP study recommended numerous procedural and organizational changes to the manual inventory system. One recommendation was that computerization be considered. Thus, the hospital decided to proceed with the implementation of a computerized inventory. A Materials Management Ad Hoc Committee with members from inventory user areas was formed to oversee the implementation.

User Group Package

For previous applications the hospital had made successful use of the Cooperative Health-Care User Group (Chug) and its application catalog. Chug is composed of over 250 organizations in the health care industry that are working with NCR hardware. This valuable resource was again used and letters were sent and phone calls made to hospitals willing to share their experiences and application packages.

Two hospitals could meet the essential requirements of Brockton Hospital. Each package was then looked at with regard to documentation. Hospitals that had previously implemented the packages were also contacted. Consideration was given to data in

the master file and ease of programming changes.

The final analysis showed Mother Frances Hospital, Tyler, Texas, could provide nearly all the committee's essential needs. Modifications to the programs could be made easily and the programming and systems documentation appeared complete. The inventory package had also been

successfully implemented in at least three other hospitals.

Since Brockton Hospital is a member of Chug, Mother Frances Hospital provided the package at no charge. Brockton Hospital had developed other application packages that Mother Frances Hospital might someday wish to consider. Brockton also agreed to notify Mother Frances Hos-

pital of any deficiencies or modifications in the package and documentation.

The data system director presented the Materials Management Committee a detailed description of the format of each report. The committee evaluated the reports and made changes and additions to fit Brockton's specific needs. A detailed implemented

schedule was then prepared and approved by the committee. Thus the committee was aware of the responsibilities of each department and how that department would relate to the implementation.

Input Forms

Two of the existing source documents (purchase order, *Continued on Page S/14*)

THE COMMANDING GENERAL

Why our new General Ledger System enjoys a commanding lead over the competition.

Attention!

Our new General Ledger/Financial Analysis System, G/L PLUS, deserves a twenty-one gun salute. Because even though it's brand new, its remarkable features have promoted it into a leadership position over everything else on the market.

First of all, the system is simple to use, with a revolutionary file design that allows unsurpassed efficiency and flexibility.

Secondly, the system is easy to maintain. We made it so compact that it comprises only 18 programs instead of the typical 50 to 200.

It's also the most comprehensive system available. Because we filled it with unusual features like automatic interface to any application subsystem; extensive planning and modeling facilities; complete user-defined editing and user-controlled error recycle; and comprehensive graphic reporting.

And of course, we included features like multi-corporate processing of both accounting and statistical data; extensive capabilities for any financial reporting requirement; consolidations, cost allocation, fixed and variable budgeting, exception reporting, foreign currency translation, and more.

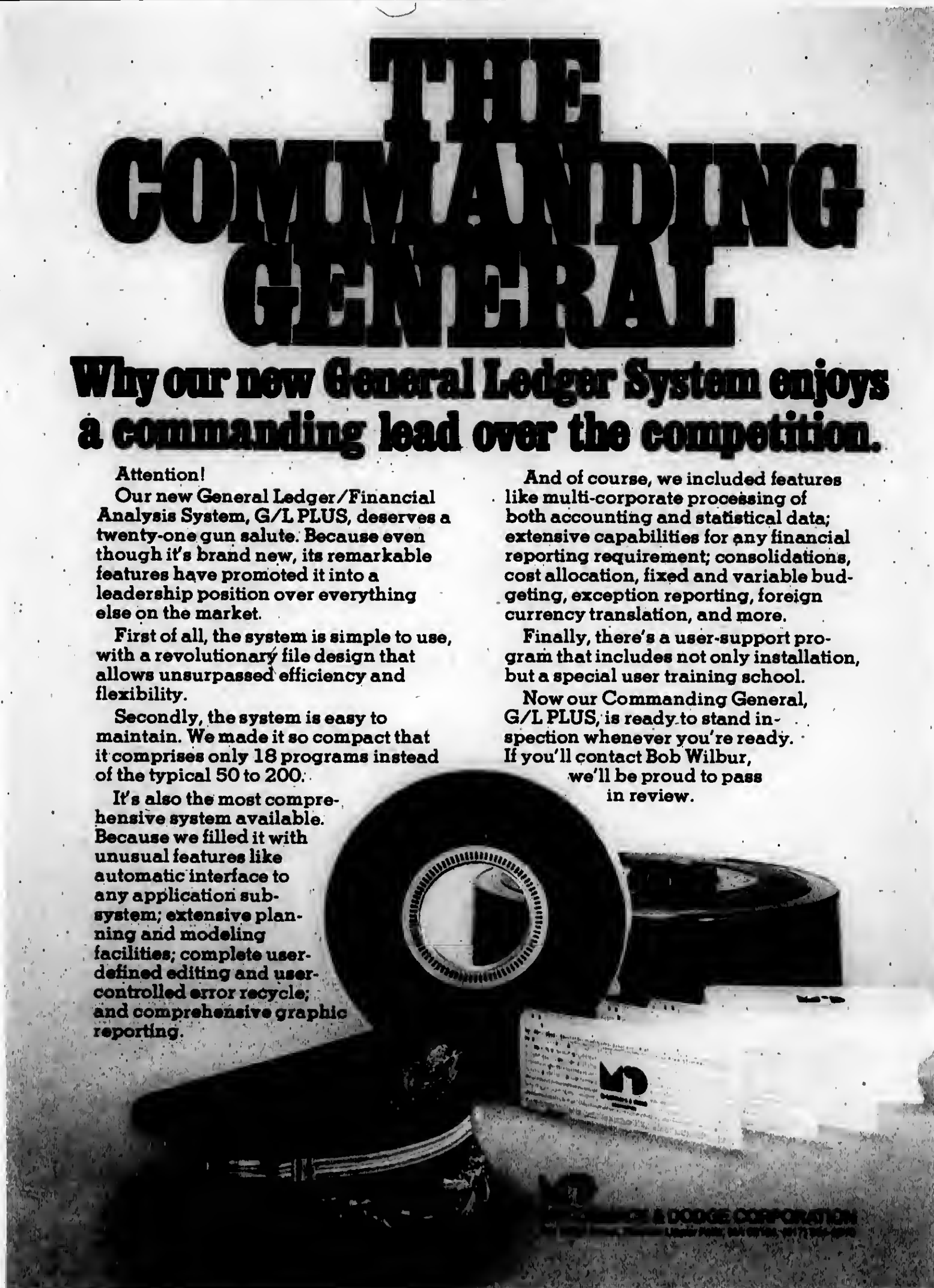
Finally, there's a user-support program that includes not only installation, but a special user training school.

Now our Commanding General, G/L PLUS, is ready to stand inspection whenever you're ready. If you'll contact Bob Wilbur, we'll be proud to pass in review.

'CONVERT' FOR LANGUAGE CONVERSIONS

- Are you considering conversion of your existing applications?
- Whether you use large processors (IBM, Honeywell) or mini computers (DEC, DG, HP) or whether you are converting software from mainframes to minis, "Convert" is your answer.
- "Convert" will translate from any language to any language, independent of hardware size, and vendor.
- Write for further information on how to save time, money and headaches.

Peter X. Yates, Vice President,
OLI Systems, Inc., Suite 909/910,
527 Madison Ave., New York,
N.Y. 10022.



Users Study, Install Packages With Extra Care

(Continued from Page S/2)

Trends toward expending as much as 20% to 25% more for application software packages than originally planned has occurred when a package has a full range of features and facilities which would be required in the long term.

Many users have also gone to software systems with purchase terms allowing them to utilize the system on a trial basis for a specified period of time and then make a subsequent evaluation as to the acquisition of the package. This technique is employed more where secondary applications are being implemented.

Users now tend to take more time for the installation of all types of application systems than historical patterns

have indicated. This is a byproduct of both experience on the part of the DP managements as well as the supplier in attempting to provide for more orderly, controlled installation of application software and to safeguard against the potential problems associated with the conversions.

The successful vendors in the marketplace have been providing extensive amounts of customer support, particularly during the installation phase, which previously was not the pattern. When successful application software programs have been implemented, this has been a major contributing factor.

As has been pointed out previously, the end user management as well as the operating staff has also been involved

very early in the implementation process and particularly during the installation of the application software. It has been observed that in many cases the end user management has assumed responsibility for implementation of the systems.

Software Maintenance

Maintenance of application software, both from the vendor and user vantage point, has seen some significant improvements over the past three years. Vendors, in large part due to their success, have found themselves in financial positions to provide much more comprehensive ongoing maintenance for existing application software, which includes enhancement programs.

The overall levels of documentation have moved from an overall rating of marginally acceptable, to good, to very good on the part of most application software users.

New forms of documentation and maintenance techniques have been provided by the vendors for internal maintenance of packages when source code is provided. Also, enhancement programs developed by the vendors have been approved by better scheduling and commitments to enhancements, as well as end user and DP management advisory councils to assist with the definition of various enhancement requirements. The last point concerning advisory or user groups has again been a key contributing factor when application software is rated very high.

Life Cycles Extended

The life cycles which have been observed for application software systems, particularly major applications, have been extended from a previous four or five years to an average of seven or eight years. This longer life expectancy is a result of improved maintenance techniques, a more thorough understanding of the initial end user requirements and, in many cases, the integration of several applications into single application processing environments. Also, the rapid expansion and utilization of on-line systems for data entry, inquiry or real-time processing have also had a tendency to expand the life cycles of major application software systems.

It has been noted in several research studies that the application software packages developed over the last five to seven years, particularly those including on-line data entry, inquiry and multiple application interfaces, have been receiving extremely high marks in all areas.

In summary, application software systems for major or secondary applications are being considered more frequently by DP management and end-user management as viable alternatives to in-house systems development. Those organizations which have had success in selecting, installing and maintaining their purchased application software systems have conducted extensive evaluations and have extremely well-stated systems objectives and goals.

The make/buy decision with respect to application software is not any easier. In fact, it has become a more difficult task. However, in many cases the overall satisfaction with purchased application software systems shows continual improvement.

Mills is president of Marketing and Sales Support Inc., a market research firm in Dallas, Texas.

Honeywell's Matchmaker Program:

It's bringing people who have application problems together with the people who have the solutions.

For over two years, Honeywell has been bringing application program buyers and sellers together through its ARI (Application Reference Index) Matchmaker Program.

This rapidly growing list of over 400 programs is saving time, talent, and money for users who have problems. And provides a return on investment to those who have solved them.

Our current listing is particularly strong in areas such as: trucking utilities, government, medical, financial management, and construction.

Here's how the Matchmaker Program works:

Application packages are listed free in Honeywell's Software Catalog.

Honeywell's Software Catalog is distributed free to customers and prospects.

Inquiries about specific packages are forwarded to the developer and all negotiation is strictly between the developer and the prospective user.

Once a transaction is completed, Honeywell receives a nominal finder's fee and the satisfaction of having served the industry as a matchmaker.

It's neat. It's simple. It's effective.
Simply fill out the coupon. And we'll try for a match.

- | | |
|--|--|
| ☐ I have an application need. | ☐ I have an application to sell. |
| ☐ Please send me your software catalog. | ☐ Please send me submission forms. |
| ☐ Have someone stop by. | ☐ Please send me your booklet on how to prepare and protect my program. |

Honeywell ARI, 151 Needham St., Newton, MA 02161

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Honeywell

PROJECT MONITOR

- Easy to Use Project Control System
- Familiar Outline Structure Reporting
- Supports Top Down Design
- Comprehensive Management Reports

For Complete Details, Call or Write:

EDP Design Consultants, Inc.
140 Weldon Pkwy., Suite 4
St. Louis, MO 63043
(314) 432-5797

With Service's Package

Janitorial Supply Firm Cleans Up Recordkeeping

LOS ANGELES — Janitorial supplies is one of the most growth-oriented businesses in the nation and National Sanitary Supply Corp. (NSS) is growing right along with the industry.

"That's why we decided it was essential to have a truly efficient computer system to handle the expansion in both the financial and recordkeeping ends of the business," Tom Lane, NSS vice-president for finance, said recently.

"We investigated many possible ways of handling this, including developing our own system. But in the end, the answer for us turned out to be Xerox Computer Services (XCS)," he said.

The XCS system used by NSS has had several dramatic effects on the company's business. For example, the master pick lists have helped cut truck loading time by 25%. Also, the firm's accounts receivable application has improved receivables by 10 days of positive cash flow, Lane noted.

Sanitary supply companies are in the business of supplying janitorial products, such as waxes, detergents and other chemical cleaning agents and paper products to institutions and industry.

"It's essentially a sales, warehousing and delivery business," Lane said, "although the larger suppliers, such as ourselves, also manufacture many of their own products. Competition is based on both price and service."

Survived Hard Times

NSS, founded in the inauspicious year of 1929, not only survived the Depression, but grew at a steady 15% to 20% a year — a growth rate that continues to the present.

"Growth is essential, but it also brings its problems," Lane said. "Keeping track of our stock, for instance, was no trick when we had half a dozen employees and a warehouse the size of a two-car garage. It's quite a different matter today, with eight

branch offices, two major distribution centers with more than a 100,000 square feet of storage and an inventory that averages well over a \$1 million."

By the late 60s, NSS recognized a need for some sort of change in its accounting system. Continued growth had made the company's old unit record equipment obsolete.

"A growth rate of 15% or 20% in a company that has only a few large customers might mean a relatively small increase in accounting functions," Lane noted. "But we have nearly 20,000 customers, so that any increase in our business produces an equivalent increase in accounting. It was just getting out of hand and we knew we had

to act."

So Lane contacted all of the major computer manufacturers. He was not fully satisfied with the solutions that were offered, however.

"They all said they could handle our problems," Lane recalled. "And I'm sure they could. But the start-up costs were substantial and, worst of all, it meant adding a DP staff. I didn't care for that idea at all."

Then Lane heard about XCS.

"Xerox had just entered the service end of the computer business," he said. "As a matter of fact, we were the first customer they had for their new interactive accounting system."

The Xerox system, Lane found out,

would operate through remote keyboard terminals located in the NSS business offices and tied by leased telephone lines into a large Xerox computer center in Los Angeles. A series of applications programs had been developed so a user could automate any part of his accounting systems. All applications would be interactive and linked, so entered data would automatically update the other applications.

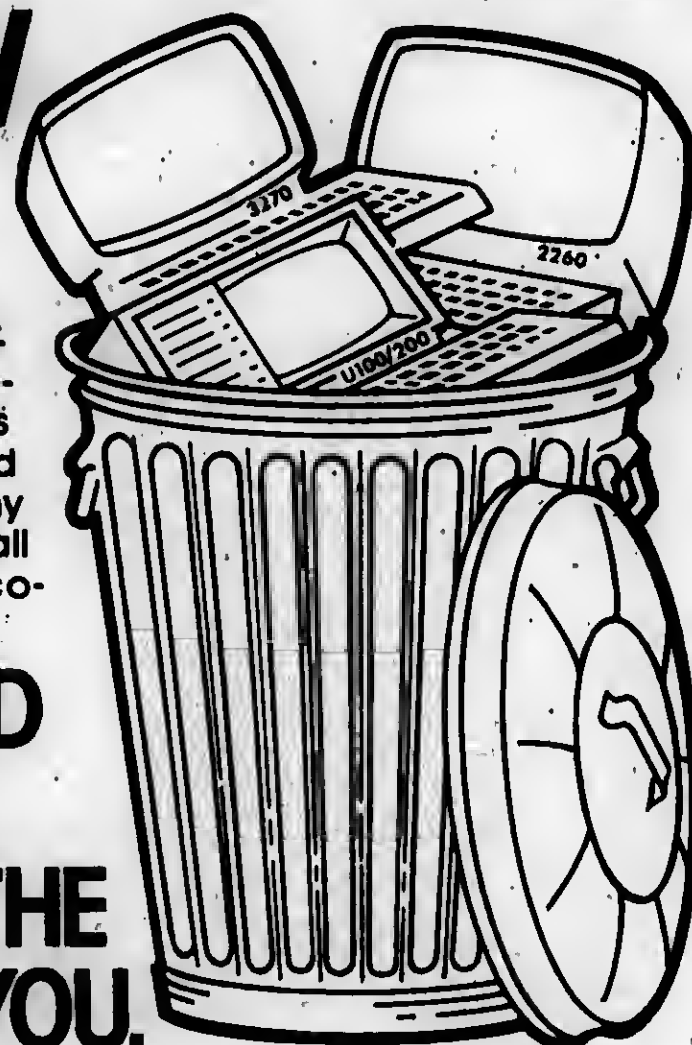
"Xerox seemed to be offering pretty much what we needed," Lane said. "We were processing several hundred invoices a day at the time — we're up to around four times that amount now —

(Continued on Page 5/20)

DON'T THROW THEM AWAY!!

We realize your first impulse will be drastic when you see our 700/UETS (Universal Emulating Terminal System) in action—but remember that other less demanding terminal users may have an application for your outdated machines. And why should you have so many different terminals when ONE UETS can do all the work—and do it better and more economically.

IF PARTING WITH OLD FRIENDS IS PAINFUL, JUST THINK WHAT THE UETS WILL DO FOR YOU.



- Communicate with numerous different host computers.
- Replace any number of different terminals with ONE machine, greatly reducing overall equipment expenditures.
- Reduce training time and enhance operator efficiency; no jumping from machine to machine and procedure to procedure.
- Reduce down time and maintenance complexity; you deal with only ONE service organization, and all spares are provided by ONE source.

No matter what your application, the MEGADATA UETS—with its 15-inch diagonal display, full-scale 12-bit microprocessor, and 126-station keyboard—will provide the right hardware plus the complete software to meet all your requirements TODAY and in the FUTURE.

Forget your old machines, and find out more about the programmable Intelligent UETS terminal.

MEGADATA CORPORATION

35 Orville Drive • Bohemia, New York 11716 / Tel. 516-589-6800 • Telex 14-4659

Central Regional Office • 2200 E. Devon Avenue • Suite 217 • Des Plaines, Illinois 60018 • Tel. 312-296-1900
Western Regional Office • 15910 Ventura Boulevard • Suite 800 • Encino, California 91316 • Tel. 213-990-9777



'It's a Pressure Valve — Let's Go If You Overload the Unit.'

SPECIALISTS KEYPUNCHING KEY-TO-DISC

- Metro N.Y. Service Leader
- Two Locations, Multi-shifts
- All Applications
- Top Quality Assurance
- 24 Hour Turn-around
- Free Pick-up & Delivery

**WE CAN SAVE
YOU DOLLARS!**

Ask Kurt Schmidt for a full
(201) 751-7070
COMMERCIAL COMPUTER
SERVICES, INC.



THE WORLD OF DIBOL APPLICATION PACKAGES AWAITS YOU

PDP-11 or LSI-11 Computer Users

Dibol is a high-level business-oriented language specifically designed for mini/micro computer systems. DEC's* famous Datasystems use this language, but the compiler and run-time systems are bundled. A wealth of proven application software in every market is available: manufacturing, insurance, distribution, legal, government, etc., on and on, and the list continues to grow.

Now, Information Access Systems has a fully compatible Dibol-11 Compiler and Run-Time System called DIBEX. DIBEX enables a Dibol program to be compiled and run on a PDP-11 or LSI-11 Computer System.



A Time-Sharing System so powerful that many existing users of Data systems have replaced DEC's time-sharing system with DIBEX. The EX in our name stands for the EXTRA's you get. Extra's like:

- Virtual Memory — enables 30% or more terminals to run on the same configuration.
- Multi-Terminal Program Development — now compile, edit, link, or run PIP, from any or all terminals concurrent with production.
- Increased Thruput — not only will you be running more programs—but they'll run faster.
- DIBEX Language Extensions — Extensions to Dibol to improve programming efficiency and execution time.
- Plus a lot more.

ONE MORE THING — The price (about 40% less)/Performance (about 50% more) of this product PUTS IT IN A WORLD BY ITSELF.



CALL TODAY —

Information Access Systems, Inc.

1140 Bloomfield Ave., West Caldwell, N.J. 07006 (201) 576-6464

*DEC, Dibol, PDP-11, LSI-11 are Trademarks of Digital Equipment Corp.

TURNKEY PACKAGES

HEWLETT-PACKARD MINICOMPUTERS

*SUCCESS-PROVEN PACKAGES INSTALLED AND MADE OPERATIONAL BY THEIR DEVELOPERS.

*FIXED PRICE AND SCHEDULE WITH HARDWARE/SOFTWARE LEASING AVAILABLE TO QUALIFIED CUSTOMERS.

*MINIMUM HARDWARE CONFIGURATION INCLUDES 50 MB DISK, 200 LPM PRINTER AND (2) TERMINALS — \$970/MONTH.

*EXPANDABLE TO 400 MB DISK STORAGE; 16 TERMINALS WITH SINGLE-PROCESSOR; 24 TERMINALS WITH DUAL PROCESSOR; RJE.

*TWO-SECOND AVERAGE RESPONSE TIME GUARANTEED FOR UP TO EIGHT ON-LINE LOCAL TERMINALS IN SINGLE-PROCESSOR CONFIGURATION.

DISTRIBUTION CONTROL

- CUSTOMER INFORMATION
- SALES ORDER RECORDING
- CREDIT VALIDATION
- REMOTE/LOCAL TERMINAL
- B/L PREPARATION
- SHIPPING CONFIRMATION
- BILLING PREPARATION

\$360.00/MO COMPLETE

MATERIAL CONTROL

- SALES ORDER ENTRY
- PARTS RECORDS
- BILLS OF MATERIAL
- PURCHASE ORDERS
- INVENTORY TRANS'NS
- MASTER SCHEDULING
- ORDER POINT PLANNING
- MATERIAL REQ'TS PLANNING (MRPI)

\$800.00/MO COMPLETE

MULTI-LOCATION INVENTORY CONTROL AND PLANNING

- PARTS LOCATION RECORDS
- PARTS PICKING
- ECONOMIC ORDERING
- P.O. PREPARATION
- PARTS CATALOG PREPARATION
- MATERIAL COST DISTRIBUTION
- CYCLE COUNTING

\$700.00/MO COMPLETE

SHOP FLOOR CONTROL

- ROUTING RECORDS
- ORDER LAUNCHING
- SHOP PACKET PREPARATION
- WIP TRACKING
- WORK-CENTER SCHEDULING
- WORK-CENTER LOADING
- LOAD PEGGING TO WORK ORDERS
- CAPACITY PLANNING REPORTS

\$1,000.00/MO COMPLETE

CALL DON WHIPPLE (213) 595-5001

DATA SYSTEMS FOR INDUSTRY

3450 E. SPRING STREET, LONG BEACH, CA 90805

SAS Lets Bank User 'Do His Own Thing'

By Benedict T. Lechowicz
Special to CW

The Cleveland Trust Co. is one of 10 affiliate banks in the Clevetrust Corp., with assets of \$4.3 billion. Cleveland Trust acquires the Statistical Analysis System (SAS) from SAS Institute Inc.

The bank first got the system as a performance measurement tool for its data management and report writing capabilities. Producing reports and plotting data from SMF, GTF, system log tapes, various data base log tapes and a hardware monitor were some of its first jobs.

With very little training, 13 other bank departments with data on the computer picked up SAS. In less time than it takes with other languages, they used SAS to write their own applications and reports.

For example, a trust officer with no programming experience searched for discrepancies in a large data base with SAS, generating a series of one-shot reports. This simple operation increased the reliability of the personal trust system and reduced customer inconvenience.

In our operations research group, a former programmer wrote a manage-

ment reporting system in SAS. Using historical data, the system reports changes in various indicators from each of the bank's departments. This system was coded and debugged in SAS in three weeks.

Yet another SAS system, written by a management trainee, evaluates key-puncher performance. Now this system is used to bill each department for keypunching.

Although I have a working knowledge of Cobol and BAL, I prefer to code in SAS for my special-purpose projects because of the superb data management facilities. Data sets can be merged, updated, concatenated — part of the human engineering in SAS that greatly simplifies programming.

SAS is concise — the classic update takes only three statements. Since SAS is free-format, all three statements can go on one card.

The freedom from tedious and error-prone detail that SAS gives us lets us concentrate on the meaning of information — not on the mechanics of getting it.

Lechowicz is system support manager at Cleveland Trust Co., Cleveland, Ohio.

Experiment Proves Success For Package 'Guinea Pig'

(Continued from Page S/8)

Its staff of 30 programmers was developing packages in our application areas and Compusource asked if we would become a pioneer of sorts. The company wanted us to act as "guinea pig" installation where it could test and check out programs. We could expect more problems and a higher risk. But we could also get more software tailored to our needs.

Being adventurous by nature, I was intrigued by this proposal. Compusource had the backup of a large programming staff, plus the depth of experience an individual programmer, working for himself, would not have. I also felt any package developer must have the financial resources and business stability to handle unexpected problems that were surely to arise. After checking several of their customers, I selected Compusource for the job, even though its price was not the lowest.

We then established a priority in which the packages were to be developed. Top effort was given to customer service programs, such as order entry, sales analysis and invoicing. All the accounting functions, such as general ledger, received lower priority. We also were willing to accept a general-purpose package to cover some functions, but insisted on highly customized programs for other tasks, such as sales analysis.

From January 1977 until July, we worked closely with Compusource to define the system, complete our research and perform system testing. We decided not to push for a rapid cutover of the old system, but to take our time and do the job right the first time. We had to renumber all 800 products, as-

sign new codes for customer accounts and reorganize both the customer and product master files.

There were also organizational problems to be solved. The existing Phillips system would continue in operation all during development of the new system and the final cutover would not be in phases, but would occur at one time. Moreover, we established a firm deadline that Compusource must meet. This was dictated in part by a dwindling supply of old invoicing forms, and printing both old and new forms would have been much too costly.

In mid-July, Compusource installed the new system and the old one was phased out. There were some problems because of misunderstandings about our requirements as they passed from one programmer to another. Fortunately, Compusource assigned a single project manager to our job for the full term. He was a solid professional who solved each problem as it arose. As of mid-December 1977, our system is 95% complete and running satisfactorily. We are now fine tuning the operation.

In all fairness to Compusource, even though our installation and checkout time was lengthy, we took our time to minimize errors, mistakes and problems. With their help, we did just that. We now have a system that is working just about the way it should, providing us with the type of management information we need to run a successful business. And Compusource developed some excellent packages as a result of Industrial Polychemical Service becoming its "guinea pig."

Silver is president of Industrial Polychemical Service, Gardena, Calif.

Why do more professionals prefer our financial and manufacturing software packages? Because they're...

- ... built with advanced data base design and on-line technology so that our software is always state-of-the-art,
- ... backed by financial and manufacturing specialists committed to the excellence of our software and the total success of your installation,
- ... highly flexible and adaptable to give users all the reports they want, when they need them, in the formats they find most useful,
- ... eliminating the cost and problems of designing and writing in-house financial software, within tight budgets!

SOFTWARE INTERNATIONAL'S PROFESSIONALS TAKE PRIDE IN PROVIDING THE MOST COMPREHENSIVE SERVICE IN THE APPLICATION SOFTWARE INDUSTRY. THAT'S WHY MORE THAN 1200 MAJOR CORPORATIONS AROUND THE WORLD LOOK TO US FOR THE BEST IN SOFTWARE IMPLEMENTATION.

Get all the facts. FREE!

Please send me my **FREE** booklets about your Professional Approach to Application Software Systems. I am particularly interested in:

Large Computer Systems

- Financial
 - ☐ General Ledger and Financial Reporting
 - ☐ Accounts Payable
 - ☐ Accounts Receivable
 - ☐ Fixed Asset Accounting
- Manufacturing
 - ☐ Material Requirements Planning
 - ☐ Master Production Scheduling
 - ☐ Capacity Planning
 - ☐ Shop Floor Control
- Comprehensive Report Generator
- ☐ FILETAB

Small Business Systems

- System/3
 - ☐ General Ledger and Financial Reporting
 - ☐ Accounts Receivable
 - ☐ Accounts Payable
- Burroughs B-1700/1800
 - ☐ General Ledger and Financial Reporting
 - ☐ Accounts Receivable

Other small computer system application products available soon. Please specify computer and need _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone _____

Computer _____

Atlanta (404) 252-9880
New York (914) 332-0040
Washington, D.C. (301) 770-6460
Philadelphia (302) 995-7101
Chicago (312) 729-7410

**SOFTWARE
INTERNATIONAL**
Elm Square, Andover, Mass. 01810 (617) 475-5040

San Diego (714) 292-9833
Toronto (416) 862-0521
Houston (713) 444-3348
Columbus, OH (614) 773-2167
San Francisco (415) 433-5797

CW3077

User Borrows Package to Overhaul Inventory

(Continued from Page S/9) issue requisition) were found to be sufficient except for completeness of data. The necessary data to satisfy computer input requirements was put on the forms as of July 1, 1977. It was decided that a receiving slip had to be developed to notify DP of additions and deliveries to inventory and the system would produce a report listing all outstanding purchase orders.

It was also necessary to design a maintenance form so that changes could be made to the master files. Additions of new inventory items, corrections and other alpha changes are examples of information that would come in on the form.

Defining all source documents before any parallel runs made it easy for purchasing to

become accustomed to completing all input forms and the data on the forms could be used in testing the system's programs.

The Mother Frances Hospital inventory package was put on Brockton's 32K NCR Century 200.

The purchasing and storeroom departments provided test input for receipts, issues, purchase orders and file maintenance transactions. Modifications in the package were made and the documentation updated.

After a satisfactory run with the test package input and output, the reports and system procedures were presented to the committee for final approval.

A physical inventory was taken September 1, 1977 and put on the computer. A

hospital-wide parallel end revealed discrepancies in the purchasing department's stock status 5 in. by 5 in. card file. Investigation showed the time delay between actual issues and posting to the card file caused many discrepancies. Also, many issue units in the storeroom did not conform to the card file issue units. Stores would issue pencils singly, for example whereas purchasing was expensing them as dozens.

On October 1, 1977, an end-of-year physical inventory was taken and purchasing's card file physically removed from the area. The computerized stock status report would now be gospel.

The second day of the "live" status revealed below zero status for many items. Investigation showed items being requisitioned were not being issued, but were being expensed to departments. Also many of the departments were signing for items not received. Again, the problems noted by the auditor and GSEP were found.

An extensive edit routine included a check to insure that ordered units agreed with the system's master file receipt units.

Output Reports

The data entry time for inventory data was set to conform to storeroom and purchasing hours. Thus, the system was run five days a week and reports are prepared overnight.

The edit report is first reviewed by purchasing to insure that all control totals balance properly. The errors are promptly located and hand corrections made to the necessary reports. If a receipt item was not accepted by the computer, for example the stock status reports would be manually adjusted to reflect the correct inventory. The corrections are submitted that evening to the computer.

The stock status report is used by the purchasing agent to provide information for ordering items and discussions with vendors. Selected items are also chosen by the purchasing agent for spot inventory checks.

The open purchase order report is used to provide status on the delivery of all items. The standing purchase orders are also designated on the report.

The lead time report provides the purchasing agent with items at or below the reorder point.

A receiving control report is used by the receiving area to acknowledge items received that day. This was one of the modifications made to the Mother Frances package. Essentially, the report shows all

open purchase orders by vendor and the report is also the input document to DP at the end of the day.

At the end of the month, an expense distribution report by department is printed. This shows the item ordered by a department, frequency of order and the total money charged to the department's budget.

On a quarterly basis a negligible activity report is printed to show items not requisitioned during the last three months. This report is used by the standards committee to determine whether the item should be deleted from inventory or substituted for another item or whether it is simply a seasonal item.

Another quarterly report, the issues and receipt report, is used by the purchasing agent to determine order quantities based on past usage.

An analysis report is generated quarterly to allow administration and purchasing to see the big money items. Controls can be applied to monitor the large expense items, whereas looser controls may be applied to the low ex-

pense items.

The system has been operational since October 1, 1977 and the physical inventories are now within acceptable levels.

The expense distribution report made many department heads open their eyes as they saw item by item what was being charged to their departments. The frequency of requisitions amazed many people. The type of items being requisitioned also was cause for concern as many were not related to the area doing the requesting.

Changes were made in the materials management department's structure and areas of responsibility. Now there is no passing the buck: all deficiencies must be accounted

(Continued on Page S/16)

LOCATE MINICOMPUTER SOFTWARE

-NOW TWO VOLUMES-

MINICOMPUTER SOFTWARE QUARTERLY

WITH
Over 500 detailed program descriptions
Indexed by: Application —
Hardware — Language

Subscription Includes:
Base Volume Set + 4 up-dates
\$85. US/Can (+5% Tax in Mass.)
\$110. Foreign (prepaid only)



INTERNATIONAL MANAGEMENT SERVICES, INC.
215 Oak Street, Dept. C, Natick, Mass. 01760

WYLE DATA SERVICES, INC.

INVENTORY MANAGEMENT CONTROL SYSTEM

- * Integrated Sales, Order Entry, Inventory Control, Purchasing, Customer Service, and Accounts Receivable.
- * Utilizes ABC Method to Maintain Inventory Levels
- * Controls Back-Orders and Partial Shipments
- * Multiple Work Stations Processing Capability
- * Remote Printing of Order Forms, Statements, Reports
- * Operates on IBM 370, DOS/VS, Using CICS

CALL OR WRITE:

WYLE DATA SERVICES, INC.

15302 Bolsa Chica Road
Huntington Beach, CA 92649
Phone: (213) 598-9555

Please forward information to me about WD's On-Line/Real Time Inventory Management Control System

WYLE DATA SERVICES, INC.
15302 Bolsa Chica Road
Huntington Beach, CA 92649
(213) 598-9555

Name: _____
Title: _____
Company: _____
Address: _____
City: _____ State: _____
Zip: _____ Phone: _____
Computer: _____
Configuration: _____

The
Computerworld
Index
Tells You
What You
Need to Know.

If you're into exporting, or about to take the plunge, this could be your market research department.



It's your guide to one of the most useful libraries in the world. And it's issued by the U.S. Commerce Department on a monthly basis. Inside, you'll find a list of reports containing a wealth of information for the overseas marketer. Spot news, timely surveys of industrial, commodity, commercial and economic conditions in more than 100 countries, in-depth market research performed by the Commerce Department or private research firms overseas; as well as reports sent in Washington by U.S. Foreign Service Officers. For a free sample, write Secretary of Commerce, U.S. Department of Commerce, BIC-10B, Washington, D.C. 20230.

Ad Council

ON-LINE BUSINESS

SOFTWARE

FOR MINI-COMPUTERS

Multi-Terminal business software available to both OEM and end users. All systems are fully integrated and include: Order Entry, Billing, Sales Analysis, Perpetual Inventory, Accounts Payable, Accounts Receivable, Purchase Orders, General Ledger and Financial Statements, Payroll and Labor Allocations, Bill-of-Materials and much more. These systems are currently operational on all Data General equipment.

The Automated Quill, Inc.

3501 S. Corona St.

Englewood, Co. 80110

303 - 761-2722

Survey of Users Finds Vendor Upkeep Major Factor in Acquisitions

By Bruce Cross
Special to CW

The fact that American business people are buying packaged software does not need to be established. Each year the number of packages reaching major sales milestones increases at an ever increasing rate, and the number of companies buying their first packaged product seems to expand at a delightfully alarming clip. Many companies are working on their second or third dozen "packaged problem solvers." All seems to be in place to assure tremendous success for this new and most significant element in the fabric of our automatable world.

Much attention was given in the early days of the software industry as to why people should buy packages. Hoards of polished peddlers hit the streets lucidly extolling the logic of shared development costs, shortened implementation periods, superior product, superior installation support and so on, ad nauseam.

However strong the message, the facts of the matter were that for each first-time software user, logic played only a secondary role in the decision-making process. The pressures of aggressive time schedules precluded the favored in-house development or the failure of the development team to meet both time and capability targets forced the use of a less than desirable but demonstrable solution in the form of a packaged product. Rational buy-

ing motives seldom surfaced in any form other than lip service during the early days of this industry.

Questionnaire Circulated

It was this background that prompted a mini survey to determine what the motivation for buying software is today. To that end a questionnaire was circulated among the participants at a recent AMR seminar entitled "How to Buy Software." We asked for input as to the basic advantages of acquiring software from the outside as an alternative to in-house development. The audience, made up predominantly of DP professionals from companies ranging in size from very small to very large, had some interesting reasons for spending their time and money in such a session. A recap of their responses might give new focus to the software industry.

Approximately 80% of the audience had specific involvement with the DP departments of their respective companies and fully 60% of them had direct involvement in acquiring packaged software in the past. The major reason for their participation in the session was to sharpen their skills in the acquisition process. They had purchased software at least once and wanted to do it again ... and again! Our question was "why?"

In the early years of proprietary software the rationale of major importance was that of time, it is easier to get

a prepackaged program up and running than to start from scratch. This still ranked very high (as one might assume), yet to those who had actually installed packaged software the number one reason was the availability of vendor-supplied support over the operational life of the program — some call it maintenance.

These respondents indicated an ever increasing percentage of their productive programming force was dedicated to the maintenance of home-grown systems and this trend was the major target for their interest in packaged software. Logic dictates this should happen as more and more systems have been brought into production, but the full impact is just now coming to light. Minimum figures indicated that fully 50% of the programming resources were committed to maintenance activities and some indicated the percentage was approaching an unthinkable 90%.

The size of the commitment to maintenance was not the only problem with in-house developed systems. Staff motivation for maintenance activities was less than positive and the "missed opportunities" for new projects because of people shortages were also key. Programmers want to be building, not fixing, and the list of applications to be installed seems to be increasing without end. The use of programming and management talent in the maintenance function seems to be a draw-

back of significant proportion.

As we trace the development of the software industry over its not too lengthy history, one of the major fears users had in stepping into the software marketplace was the fear of losing vendor support over the long haul. "What happens if you are not around to support us five years from now?"

But our questioning unearthed an interesting fact of life: the expertise and in-depth knowledge theoretically gained by in-house development has little practical residual value over an extended period of time. Can the outsider do something better? The buying motivation of this group would bear it out.

The vendor of packaged software must provide maintenance service if his product is to remain competitive in the marketplace. Additionally, this maintenance function dictates architectural characteristics for the product that make this function more economical. Combining these factors with a staff with full-time, positive involvement with the product day in and day out, attracting and retaining motivated personnel seems to be a logical by-product, where the in-house staff finds similar activities negative.

The conclusion that can be drawn from this mini study of motivation is that there is a new found interest on the total life cycle of a system. The focus goes beyond the usual com-

(Continued on Page S/20)

IS MAINTENANCE MAKING YOU sick?

PROXREF and AUTOREF will give you long-lasting relief!

Here are two products with common purpose and common sense offered by two of the finest Software and Consulting firms in the San Francisco Bay Area.

AUTOREF is the data processor's solution to source code management problems. Using source program libraries as input, **AUTOREF** scans COBOL statements and cross-references the relationships between source programs and related copy definitions, called sub-routines, and selected data names.

With **AUTOREF**, IBM and Burroughs users can assess the impact of system changes without digging through piles of source listings. If you need to know which programs might be affected when you expand the field size of a common data item, or which programs must be 're-linked' when changing a common subroutine, or which source must be 're-compiled' when a copy member is changed, **YOU NEED AUTOREF!**

Automatic and easy-to-use, **AUTOREF** is an ideal tool for the manager reviewing the scope of systems, the analyst controlling systems development activities, and the programmer modifying existing programs.

PROXREF, the OS/VS Proclib Cross-Reference System, is an effective maintenance tool and documentation package designed for use by both programming and operations groups. Extracting JCL directly from your production libraries, **PROXREF** shows complete usage of datasets, programs, sysouts and many other JCL parameters; all of this with optional symbolic substitution!

Now you can easily compare the 'before' and 'after' versions of massive JCL changes! Now you can find unused or misused sysout classes in an instant! Now you can locate every use of a program or dataset without straining your back in the library!

Why get headaches over misplaced JCL overrides and incomplete modifications when **PROXREF** can help you do it right the first time?

Want to know more?

SIEGEL SOFTWARE SERVICES, INC.
3080 Olcott Street, Suite 210d
Santa Clara, California 95050
Telephone: (408) 984-8222

Write or call us today.

★ ★ ASK ABOUT OUR **25%** DISCOUNT ★ ★

We're eager to let you know!

DATA DIRECTIONS
7700 Edgewater Drive
Oakland, California 94621
Telephone: (415) 632-4303

... for **AUTOREF** ...

... for **PROXREF** ...

User Gives Speedy Conversion High Marks

By Leilani Nye Johnson

Special to CW

SANTA CLARA, Calif. — Memorex Corp. has realized many benefits with the installation of a new automated fixed asset system. Manual journal vouchers have been reduced by a monthly average of 65%. Time to perform

maintenance transactions has decreased about 70% monthly because minimal information is required by the new system to perform transfers, adjustments, changes, etc.

The report request feature has also proven to be an excellent management tool. Reports may be selected and sequenced

in a multitude of ways and may be generated at any time without duplicating depreciation calculations.

The source documents used to update the master file are logically and aesthetically designed, thus providing ease of preparation for the user and reduction of keypunch errors for the DP department. This ease of use is critical at Memorex, where transaction volumes are currently running in excess of 5,000 a month.

When the decision was made at Memorex to upgrade its automated system, the evaluation responsibility was shared by the Property Accounting Division, Information Systems Division and the DP Department. The principal evaluation criteria was ease of use, with full accounting capability and DP efficiency, and maintainability defined as absolute requirements.

Final Selection

After extensive evaluation, the Property Information & Management Systems (Pims) from Fortex Data Corp. was

selected. Pims was implemented at corporate headquarters here during November 1976, in what was for us record-breaking time — within 12 calendar days of contract signing!

A new master file was created in less than two days. Conversion to Pims from the old automated fixed asset system was completed in eight working days. During one brief three-hour meeting, the old file layout was reviewed and the required date for conversion was selected.

User and DP education were included in the conversion period. The combined dedication and knowledge of the vendor and user are the factors that contributed to the successful and speedy installation.

An important part of the conversion was training user personnel thoroughly but as quickly as possible. The Pims documentation is very complete. Chapters are dedicated to the various transaction codes, system capabilities, report identifications and func-

tions, preparation of source documents, system tables, edits and error messages plus other important chapters.

Fortex provided exceptional technical support personnel who conducted the user education seminars. Their technical expertise enabled them to answer questions pertaining to source documents as well as system capabilities without the aid of reference manuals. As a result, user education was completed in 10 hours.

User personnel began processing Pims source documents weeks before the new master file was created. October updates were processed against the old fixed asset system, and November was processed against the new Pims master file.

The standard closing schedule was met. No loss of time was experienced due to conversion to the new system.

Johnson is manager, corporate property accounting at Memorex Corp., Santa Clara, Calif.

For the 1st time... A new ON-LINE ACCOUNTS RECEIVABLE PACKAGE with no user restrictions!

Your Accounts Receivable data can now go on-line, thanks to an ingenious new applications package from Insyte Applications Corporation. This new On-Line Accounts Receivable System, controlled by DATACOM/DC, provides "modules" for unlimited cost application variations... customer maintenance... invoicing capture... or you name it. Use our modules or we can customize modules to your exact requirements.

Permits limitless screen design plus customized register, general ledger reporting and audit trails.

This system adds a new dimension to cash management. Features include: On-Line Customer Maintenance System; On-Line inquiry for immediate cash position; On-Line debit and credit memos. Supports both open item and balance forward. Uses Cobol throughout and includes up to 16 level security safeguard. Operates on any IBM configured hardware and operating system.

Unlike other accounts receivable software, there is no need to modify accounting procedures. The system is designed to interface with all current formats. We don't impose restrictions on you. You impose requirements on us!

Heart of our new AR system is imbedded DATACOM/DB, the most efficient, cost-effective, easiest-to-use DBMS on the market. Because of DATACOM/DB, your inquiry capabilities are limitless.

Learn more about this innovative breakthrough in On-Line Accounts Receivable management. Call or write today. Ideal for corporate multi-divisional or service bureau applications.

Tell me more about your new On-Line Accounts Receivable System

Name _____ Title _____
Firm _____ Phone _____
Address _____
City _____ State _____ Zip _____

insyte applications
corporation

214/526-4280
3707 Rawlins St. Dallas, TX 75219
Boston/Chicago/Denver/San Francisco/Mexico City/Frankfurt, W. Germany,
Sydney, Australia

User Role in Development Crucial

(Continued from Page S/9)

Psychological factors also have a direct bearing on the success of the system; it is here that the user will prove to be very significant. By participating actively at the outset of the project, the user begins to feel that the system is really his, and this enthusiasm invariably rubs off on his subordinates.

It is virtually impossible to install a new computer system without making some kind of operational change in the user's area. However, the adverse effects that such changes have on the morale of the users and the acceptance of the system will be minimized by the enthusiasm that you have engendered by promoting user participation in the developmental phase of

the system and by continuing open communications with the user area.

When the project development team comes to grips with the task of uncovering the layers and layers of minute detail involved in designing a viable system, the user can once again make a worthwhile contribution. He can provide a valuable insight into the inner workings of the system, helping to make certain that no minor details are overlooked.

The user's superior insight comes from specific working experience, that the computer specialist seldom acquires.

The user can draw from his wealth of unique work experience to point out those areas that need improvements.

While we cannot assume that the user can solve all of the problems in systems development, neither can we assume that systems development should be left exclusively in the hands of the computer specialists. So don't leave the user out; he is a valuable resource that must not be wasted.

Baxter is a systems analyst at Corpus Christi Bank & Trust Co., Corpus Christi, Texas.

Borrowed Package Helps Hospital Update Inventory

(Continued from Page S/14) for. The open purchase order report revealed many purchase orders were outdated. Many order units were not compatible with those received.

Through the lead time report the minimum stock levels are being adjusted to reflect true vendor delivery times and safety stock levels. It is expected that significant decreases in the inventory level will result. The complaints of nursing as to out-of-stock items has disappeared. Good reorder points and control over all issues and receipts insures correct and useful reports.

The rewards of an accurate and timely inventory are reflected in financial savings, as

the hospital's inventory level continues to fall. In addition, the wasted man-hours necessary to deal with complaints and place hurry-up orders have been minimized.

Priest is director, data systems, at Brockton Hospital, Brockton, Mass.

M.R.P.
Material Requirements Planning
Consisting of the following systems:

Bill of Materials
Inventory Control
Purchasing
Master Production Schedule
Material Requirements Planning
The systems are written in a combination interactive and batch mode. Available in Basic, Cobol, and RPG. Price is \$39,000 installed for a single computer system. For information, write for "MRP Information" stating manufacturer and model of current system.

Manufacturing Systems
of America, Inc.
5300 So. Delaware
Littleton, CO 80120

TSGAS FOR RSTS/E CTS-500 USERS BRINGS YOUR ACCOUNTING PICTURE INTO FOCUS

You're a Financial Manager. You need a software package you can control to integrate your Payable, General Ledger and Financial Reports.

Let the Plycom People show you their solution. TSGAS (Time Shared General Accounting System) is the method to bring your accounting staff and procedures in pace of the accountant in management today to ease the burden.

— TSGAS gives you the support you need. Designed by users straightforward accounting practices not intended for complex systems.

TSGAS prepares your Accounts Payable, General Ledger Reports making your figures work for you.

TSGAS enables you to make fast and accurate needs, reconciles your checks automatically, discounts, and much more.

TSGAS is a completely On-Line interactive software.

— Complete Plycom Support
— Multi-Division/Multi-Plant Center Corporate
— Accurate Audit Trails
— Flexibility in your reporting requirements

Take advantage of TSGAS and Plycom's years of proven reliability in manufacturing, distribution and service bureau uses. TSGAS the easy solution for the hard to solve problem. Let Plycom give you a clear accounting picture.

Call or write Plycom for complete details.

Plycom services



When Looking for a Package Buyer Needs Commitment, Not Just Committees

By Chet Domoracki and Larry Chute
Special to CW

When properly implemented, application software can be of substantial benefit. But unless a major commitment is made by the using company's top management, successful implementation can be an elusive, often frustrating experience.

The technical staff of Software International Corp. has installed more than 1,300 application software packages around the world, ranging from highly complex manufacturing and financial reporting systems to relatively simple small-computer basic accounting systems. In all that work, two facts have become more and more evident.

First of all, the client must set up and use project teams if all departments — DP and users — are to utilize the system most effectively. Second, top management must be committed to backing the project team so that implementation is accomplished as quickly, smoothly and thoroughly as possible.

Without that much effort by the using organization, the value of any work by the vendor is at least jeopardized.

The project team must include a manager and a key individual, both from the user group, the latter being responsible for the ongoing operation and use of the new system. In addition, a systems analyst and programmer are required for the installation and interface design.

The project team should be kept small, no more than five individuals dedicating 100% of their time to the project. Additional personnel may be temporarily added to complete a particular task.

The project manager needs to be a senior individual within the user organization who has the full confidence of and delegated authority from top management. Even though decision-making must lie with the project manager, the commitment from top management should not be minimized.

If top management is less than strongly supportive in the project and in its choice of the project manager, the project has little likelihood of success.

Top management will require weekly progress reports from the project leader. The team's schedule of tasks, assignments and milestones should be frequently reviewed by top management. A regularly scheduled weekly progress meeting of the project team to be attended by a senior user is usually sufficient.

Tasks and Timing

The project team has to take the functional specifications and carefully define the schedule and timing to accomplish the tasks required. The key point is to plan the use of the system prior to the installation of software.

For example, accounting structures and associated computerized or manual financial systems frequently require substantial change when installing a general ledger. Less extensive change may be enough if upgrading a computerized payroll, accounts payable, accounts receivable or a cost system.

However, the change from the manual system to any computerized system is frequently traumatic, especially to the clerical help who must use it every day. The resistance to change can range from subtle to downright hostile. The project manager who is aware of the fear of change and tries early in the project to effectively deal with it can only aid himself in a successful implementation.

The easiest way to determine how to use the new system is to analyze and document the use of the current system. The analysis and documentation phase may have taken place during the decision-making period for the selec-

tion of the new system or it may have already existed. In any event, it is important to know what exists prior to designing what should exist. During this step, the tasks and time frame are identified.

Flow Chart Necessary

It is necessary then to flow chart the new system's input and output and its supporting interfaces. All the subsystems, translation tables and files that are to be used must be identified, located by data set name and means of access established.

Once the location and flow of external data into the new system has been determined, the next step is the

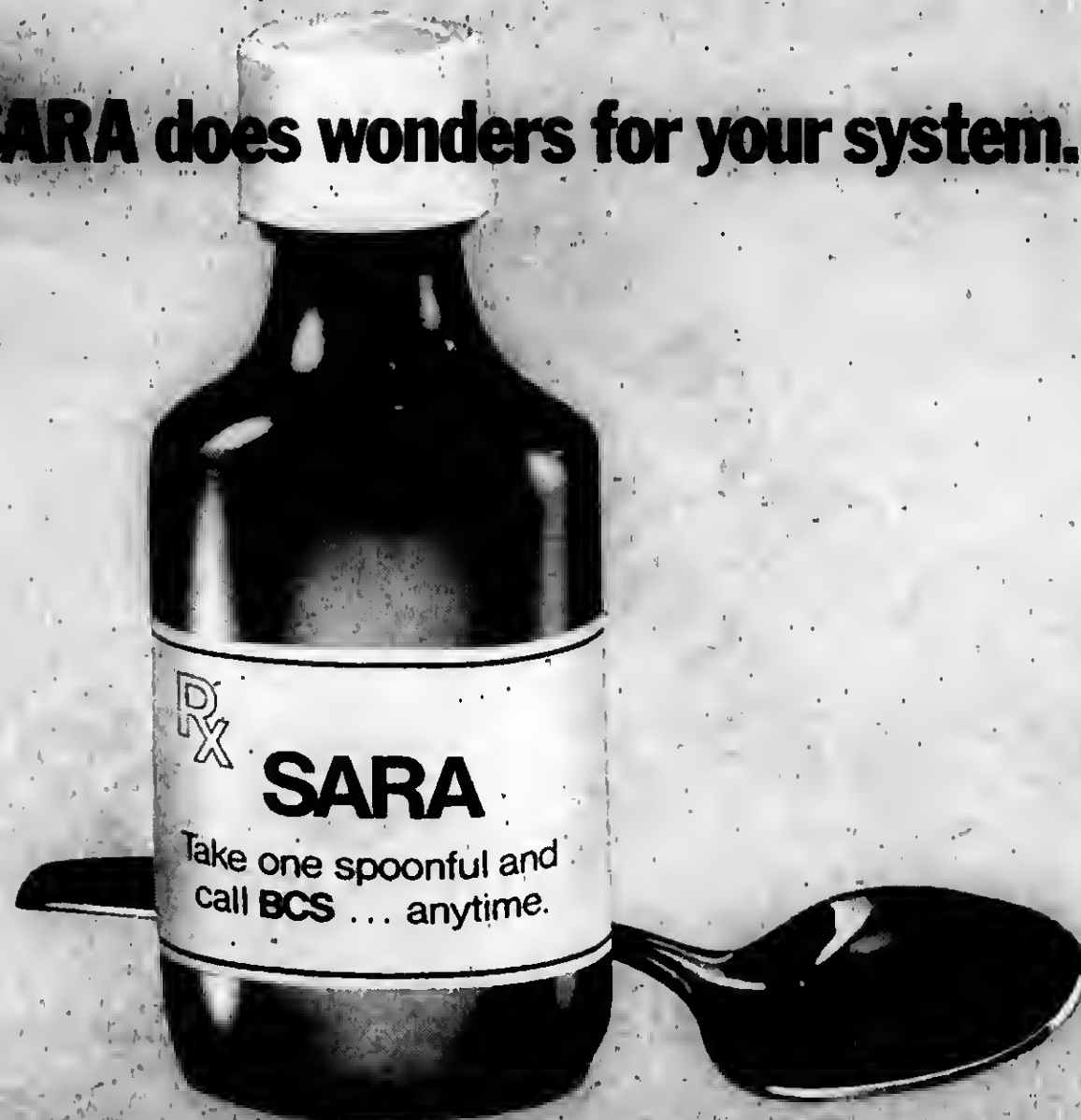
integration of the output. The questions to be answered include: What should the output record look like? What information should it contain? Where should it be stored? Should it be reformatted or translated? Should the file thus created be saved for a certain length of time? What output documents are required?

The detailed answers to these and related questions form the basis for a clear definition of the implementation tasks and the time frame for the tasks to be completed.

Any system plan has to include room for expansion whether it be numbering schemes, disk space or enlarged record

(Continued on Page S/18)

SARA does wonders for your system.



SARA (Systems Analysis and Resource Accounting) is good medicine for anybody's system. It's the most comprehensive, versatile and cost effective computer performance and accounting system ever developed. Now SARA is being offered by BCS on a 30-day trial basis for a nominal charge. This is an excellent opportunity to diagnose your entire configuration. Mail the coupon today, or for faster action, call (703) 821-6275 or (800) 336-0135 (toll free).

Boeing Computer Services, Inc.

7700 Leasing Pkwy, Suite 201 North, Falls Church, VA 22043

☐ Contact me regarding your 30-day trial.

☐ Send more information. My installation is (IBM, Honeywell, Univac, CDC) Specify _____

Name _____

Title _____

Organization _____

Type of Activity/Industry _____

Address _____

City _____

State _____

Zip _____

Commitment, Not Just Committees, Necessary

(Continued from Page S/17)

sizes. In financial systems, the planning and design of a chart of accounts, vendor master file, customer master file, employee number file or master rate tables require careful review.

It is better to extend the planning time required for a proper numbering

scheme than to dump the current files onto the new system and worry about it later even though the new system may work.

The best time to expand the chart of accounts or other master files, for example, is prior to the initial "create process" on the new system. It is

worth the additional effort and time to properly implement the new system to fit the preassigned functional objectives and their expansion implications.

Education & Training

A major requirement for successful implementation is the education and

training of all levels within the user's organization. A class on the system overview is desirable for management and all clerical help. Detail classes on all user-oriented aspects of the system from input to output are necessary for the end users, in addition to classes for the DP staff.

The clerical personnel must be included as early as possible during the detail implementation stages. Indeed, they should have been consulted prior to the formulation of the functional specifications. Their input and comments are crucial to successful installation. After all, they are the ones that will be most directly involved with using the system.

The testing and parallel running of the old system in comparison with the new system remains the best way to ascertain the integrity of the new data base.

Alternate Testing Approach

But there are conditions that sometimes make this approach impractical; such as the old system's timing in terms of cutoffs and reporting is completely different than that of the new system; new data calculations are performed on new data sets that were not performed in the old system and are complex to duplicate in the old system; or, most commonly encountered, there is insufficient personnel for a parallel run.

An often successful alternate approach is for the project team to develop a mini test data base prior to implementation to exercise the new system in a controlled manner through multiple processing cycles. Bugs will be found, interfaces will not work, data will be lost or inaccessible. Frequent system backups and restores of files will become necessary.

Running the new system in either of these modes for three months will usually identify most of the problems and allow time to make appropriate corrections to them. With proper backup and restore procedures, the dangers of losing irreplaceable files will be minimized.

Once the cutover to the new system is done, vigilance is still mandatory as there is no simple way to isolate data problems. All output has to be closely scrutinized for error messages, condition codes, edit problems and system failures. As long as the maintenance and input group is small, centrally located and trained, they will be able to carefully scrutinize all input and output.

The time to sit back and reflect upon the successful implementation of the new system is when the system has run trouble-free for several months. Then one has to determine if the new system has met all the expectation criteria.

With a good schedule and plan, proper training, hard working team personnel and sufficient testing of software, most of the expectations should have been met. The last step in the project is to find additional work for the system to do, and there will be plenty of it.

Domoracki is vice-president, small systems group, and Chute is in the research and development group at Software International Corp., Andover, Mass.

Only InSci systems address the full human resource function

Personnel
Payroll
ERISA
EEO
OSHA

Only Information Science:

- has Human Resource activities as its *only* business.
- has 50 of the Fortune 100 companies as clients.
- serves 42 of the nation's 100 largest banks.
- has worked with more than 400 major organizations with a combined workforce of over 5 million.
- has been honored by IPC for selling over \$20 million of Human Resource software.

InSci
Information Science Incorporated

Information Science, an established nationwide company is the original developer and principal supplier of Human Resource systems and services.

- Batch-oriented Human Resource Systems
- InSci IMS Payroll/Personnel System
- HRS On-line System
- Dedicated minicomputer-based HRC III

InSci Headquarters 95 Chestnut Ridge Road, Montvale, NJ 07645 201 391 1600

Memphis TN 901 761 1845 Menlo Park CA 415 854 1903 Newport Beach CA 714 752 7672 Oak Brook IL 312 986 6460 Raleigh NC 919 781 6095 San Antonio TX 512 690 0110 West Palm Beach FL 305 689 8777

Member SIA Software Industry Association

Dental Supply House Gets 'Midas' Touch

Special to CW

SUNNYVALE, Calif. — Not long ago Bill Sautter and Ron Mowrer found their 1,500-part inventory was getting out of hand. "That's how it was for quite awhile," said Mowrer, who is vice-president and co-founder of Spica, Inc. "We'd solve one problem and create another. I guess we'd have to blame it on success — as our sales grew, we just couldn't keep track of everything with our small staff.

"So we had to make a decision — add people to do more manual recordkeeping or invest in some automation. Well, we made that decision by getting our own computer, one we could time-share among a number of our employees, and now we're creating solutions instead of problems."

The company is the result of some brainstorming by Mowrer and co-founder Sautter. Five years ago, the two were distributing nitrous oxide gas valves to dentists for another company when they concluded the equipment they were selling was both over-engineered and overpriced. After analyzing the market and doing some soul searching, they decided to found their own company to produce a better type gas delivery system for dentists and to satisfy the product demand they knew was there.

No Laughing Matter

Now after five years of work, sales have climbed to about a million annually and Spica offers a line of 125 gas delivery system components. So the delivery of laughing gas has become a serious matter around Spica's plant here.

"Since we knew we should have several people inputting data for inventory control," Mowrer said, "we started by considering a time-sharing service and figured if we got time-sharing for our inventory, we might as well go all the way and enter our general ledger, accounts receivable and payable and other functions.

"Finally, we decided we wanted a software package that would do all that, but on a computer that would belong to us rather than someone else. So we started shopping for a time-sharing computer system."

The package Spica found that "did all that" — and more, as Mowrer was to later find out — was Management's Interactive Data Accounting System (Midas), software offered by DLM Enterprises of Chicago, Ill. for operation on the time-sharing system manufactured by Basic Timesharing, Inc. (BTI), also located here.

When Spica installed the BTI 4000 in December 1976, one terminal was placed in the office of the production manager, and two more were installed in the accounting department. Later, the company added a portable terminal in its engineering department. Mowrer frequently carries that terminal home for programming, which he does by dialing up the BTI 4000 at the plant.

But what about those inventory headaches that sent Spica looking for some automation in the first place?

"Before getting Midas, we had our inventory controlled by a cardex file and there was a lot of posting and

notation work to do. It took so much time, we seldom had a good idea how many parts we needed to reorder," Mowrer said. "Now our production manager easily takes care of both inventory control and purchasing on his own terminal. Once the data is entered, Midas does all the processing.

Midas also provides complete production picklists, Mowrer noted. Each list includes each component part number, description, quantity ordered for production, stocking, unit of measure and the bin location.

Other vital management information is available at the touch of a button. "We can get a statement of sales at any time or we can get a breakdown of sales by product line and product codes," Mowrer said.

"Before we got Midas, we had all our sales lumped into three categories. We now have 28 categories and we have a really good idea each month how much business we're doing in each category. Or we can get a profile of shipping through the year on any one item we make. It helps us plan future business along with how many units we need to build at what time," he said.

"With Midas," he added, "we're getting three to four times more management information. It all helps."

Self-Training

Although nobody at Spica had experience with computer programming, it wasn't long before Mowrer, trained as an electrical engineer, taught himself Basic-X and started developing cash flow and depreciation reports on the terminal he took home at night.

Prior to Midas, one person in the accounting office was employed typing statements and billing for the company's 227 customers. Now that's all gone.

"The accounting capabilities of Midas are fantastic," Mowrer said. "With umpteen different books around here — purchase registers, sales registers and so on — we had a fairly sophisticated manual bookkeeping system for a small business. But Midas handles it all.

"For instance, when our bookkeeper sits down to do accounts payable, she can flag an account by date, amount, vendor or any other classification. Then she hits a button and the system prints out all the checks."

Spica is buying the BTI 4000 and Midas software on a lease-purchase plan. That means it can use the BTI 4000 computer 24 hours a day, seven days a week. For Spica, the lease-purchase plan is much cheaper than paying a time-sharing service on a per transaction or hourly rental basis.

"Even after several months of working with Midas, we're still finding capabilities we didn't know we had," Mowrer said. "Overall, it's a little too soon to tell what the exact figures are going to be, but I can see Midas is increasing our efficiency and profits and saving on our overhead. The system allows us room for expansion, too."

Spica's president, Sautter, has a different view. "With Midas organizing things, there's a little less excitement around here," he said. "But I'm learning to live with that."

We are the first.

Computata, the first to announce a combined COBOL based operating system with application software packages for IBM Series/1. We call it COS/1.

We have developed a translator that allows Computata to offer our tested and proven extensive library of DEC based software in COBOL form for use in IBM Series/1. Our generalized and specific industry application software packages include: Order Entry and Invoicing, Bill of Material, Inventory Management, Accounts Receivable, Sales Analysis, Accounts Payable, Payroll, and General Ledger.

COS/1 With COS/1 programmers now are provided with the tools to simplify the development of application programs utilizing a multi-terminal environment.

Computata now offers the IBM Series/1 as a stand alone processor with main frame language compatibility. For those who require decentralized processing at various locations such as branches, warehouses, factories, etc., Computata can now provide you with mini processors which are compatible with main frame batch processing systems in language formats.

Computata offers a unique combination of superior computers and software systems, standard or custom, to meet your requirements whether they dictate a need for stand alone processors or interfaced to your main frame processing system. We distribute various configurations of hardware, such as DEC 300 500 Series and IBM Series/1, and provide you with the system that best suits your needs.

Why not give us a call or write for further information on how Computata can assist in solving your processing problems.

COMPUTATA
SYSTEMS, INC.

172 POST ROAD EAST • WESTPORT, CONNECTICUT 06880 • (203) 226-4791

YOU have probably
looked at some
GOOD
applications
software...
Why not
look at
THE
GREATEST!



OVER 1,500 USERS NATIONWIDE

First Net Change MRP System to achieve \$5 million in sales!

AMAPS (Advanced Manufacturing Accounting Production System)

• Material and Production (Nine Modules)

CAS III (Computerized Accounting System)

• General Ledger • Accounts Receivable • Accounts Payable

DOES (Distribution Order Entry System)

• Order Entry/Invoicing • Sales Analysis/Commissions

SLANG (Systems Language)

• Data Base Report Writer

CALL

612-854-2020

**Ted Priem
V.P. Marketing**

"The Software Leader"

comserv
CORPORATION

3050 Metro Office Park, Bloomington, MN 55420
Branch Offices: Minneapolis • Los Angeles • Boston

Package Good Alternative to In-House System

(Continued from Page S/2)

software may be required to integrate a software package solution to an application with existing systems support.

- **Imperfect Fit** — Not all design requirements may be accommodated by packages. With enough time and money, developed software will support all application requirements.

- **Nonstandard Processing Methods** — Many general-purpose application packages will have to be tailored with custom software to support processing methods not commonly used (e.g., nonstandard edits or cost allocation procedures).

- **Idle Programmer Resources** — When confronted with a make/buy

(developed vs. packaged software) decision and a programming staff that would remain underemployed if a package were purchased, the costs of the package alternatives should reflect this opportunity cost.

- **Table Conversion** — Since application software packages are designed with coding structures which work with user defined coding values (e.g., the users' chart of accounts), these code values are not delivered with the software. Rather, these code values must be converted to software package files called "Table Files." Accomplishing the installation of user code values on these files can be an extensive and time-consuming effort.

There are advantages:

- **Low Implementation Risk** — Most packages on the market have already been proven to work and come with vendor performance warranties and user education programs.

- **Speedy Implementation** — Use of a predeveloped software package eliminates development and some system testing effort.

- **More Problem Definition and Analysis Time** — Time that would otherwise be used to develop and test software can be spent profitably in systems analysis. This allows capable analysts to evaluate with users the "what" question more thoroughly, rather than the "how" question.

- **Current Applications** — Most software vendors make enhancements to packaged software available free of charge to existing users. These enhancements may be prompted by improvements in application techniques or by a user consensus on improvements. Additionally, many vendors will support ongoing maintenance to the software during installation.

- **Participation in User Communities** — Most package vendors sponsor user group meetings where users have an opportunity to share application problems and solutions.

- **Use of Generally Accepted Procedures** — Most software packages for standard financial applications incorporate generally accepted solutions to applications processing.

- **Flexible Solution** — Most software packages are developed as generalized solutions to an applications problem to give them the widest possible market appeal. The architecture of the design consequently provides wide flexibility for evolving an application after its

implementation.

- **Competitively Priced Alternatives** — A variety of software packages is available for most applications, in a variety of prices.

- **Reliable Documentation** — On the whole, software documentation for packaged software is better than documentation generated for developed software. This is a consequence of timely documentation updates distributed by software vendors when enhancements are made. Documentation usually includes management summary, application user and system user documentation.

Software packages represent a practical alternative to developed software for business applications. They can usually be implemented with a greater likelihood of success and usually at a lower cost than an in-house developed business system. Most standard business application problems can be solved with packaged software.

Trade-offs in the design of the application should be considered when choosing between a development effort and a software package. When using packaged software, these trade-offs are often offset by the cost, speed and success of package installation.

Low cost and relevant operational and management information, available soon after a need is perceived, is the proper goal of business systems implementation efforts.

Brenne is an analyst with the Washington, D.C. office of Booz, Allen & Hamilton, Inc., management consultants.

© Copyright 1978. Booz, Allen & Hamilton, Inc.

In The End It Is You...

You who must select the product and the company to meet your payables needs. That's why we suggest at the beginning you talk to those who know us best — our customers. They are the ones who can best tell you why Data Design Accounts Payable/Purchase Control is best for you. Send the coupon below and let us show you how our reputation can benefit you.

We made the software—We earned our reputation!

COMPANY NAME _____

NAME _____

TITLE _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

PHONE _____

Data Design Associates

1333 Lawrence Expressway, Suite 418
Santa Clara, California 95051
(408) 985-2570

**We'll
keep you
up to date
week,**

**after
week,**

**after
week,**

**Subscribe
Yourself.**



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Supply Firm Uses Service To Clean Up Recordkeeping

(Continued from Page S/11)

and we were anxious to get going."

In June 1970, NSS' first applications — general ledger and accounts payable — were up and running.

Other applications, such as accounts receivable and order entry, were brought into the system in the next several months. The most difficult application program turned out to be inventory, which was no surprise to Lane.

"There are more than 40,000 inventory items — about 4,000 at each location — to deal with," he said. "To work that kind of volumes into an interactive system is no small task. When we finally went on-line with inventory and it really worked, I was impressed."

Now, after seven years experience, what impressed Lane most about the system?

"I guess you'd have to say it's the

XCS personnel. First of all, they know their business. Technically they're great. And they do their homework so they know exactly what it is we need in our business," he said. "When we need something new, they're usually able to work it out. And when they can't, they always tell us so and explain why. I like that kind of frankness."

The major justification for the system, however, is the competitive edge it gives NSS, according to Lane.

"It's costly to be out of stock in the janitorial supply business," he said. "There are dozens of competing companies, many of them smaller organizations that are just looking for an opening. So if you fail to deliver because you're temporarily out of stock, you're likely not only to lose that sale, but to lose that customer — permanently."

Maintenance Major Factor

(Continued from Page S/15)

parison of development and installation activities when studying software acquisition vs. in-house development.

The costs and burdens of keeping the system alive and responsive during the entire useful life have taken their proper place of significance in the evaluation process. It appears that the

true cost of software maintenance has finally been recognized and those that have been there find packaged solutions a superior alternative.

Cross is president of B. Cross Associates, Indianapolis, Ind., and is actively engaged in seminars, client consulting and market research associated with the software industry.

THE SOFTWARE PACKAGE

The Pansophic software package is a complete solution for your business. It's the only software package that can do it all.

Whether you're a small business or a large corporation, Pansophic has the software package for you. At a time when 3000 software packages are available, Pansophic offers a complete solution for your business. Pansophic's software package is the only one that can do it all. Pansophic's software package is the only one that can do it all.

Whether you're a small business or a large corporation, Pansophic has the software package for you. At a time when 3000 software packages are available, Pansophic offers a complete solution for your business. Pansophic's software package is the only one that can do it all. Pansophic's software package is the only one that can do it all.

PANSOPHIC

709 Enterprise Drive • Oak Brook, IL 60521

East (703) 821-8370

Central (312) 986-6070

West (214) 233-0486



Executive Perspective on Human Resource Management

March 8-9, 1978
Atlanta, Georgia

To be held at...

The World's Tallest Hotel

Peacock Plaza Hotel
Atlanta, Georgia

Call Toll Free Today 800-228-3000.

Conference attendees will receive...

- Reservations for 18 Conference Sessions
- Executive Perspective Dossier
- Conference Luncheons (2)
- Human Resource Office of the Future Demonstration

Sponsored by...

WANG

Wang Laboratories, Inc.

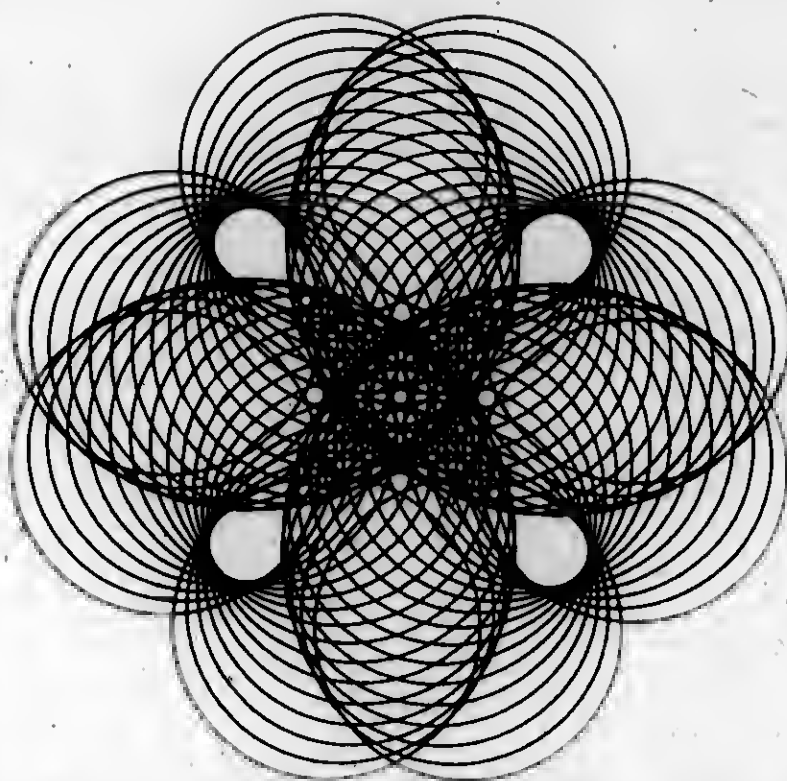
Program Products Division

To register...

Fill out and return the registration form or contact
Emlyn Griffin, Conference Registrar, at 617-841-1111
Extension 2731. Confirmation will be forwarded.

Individual Fee \$395 per person

Group Rate for
Two or More \$340 per person



**"That's what you'll get from this intensive,
on-target Human Resource Management
Conference."**



Senator Birch Bayh
Focus on
"Industry's Legal and Social
Obligations to Employees"



**Congressman
Barry M. Goldwater, Jr.**
Prepare for
"Privacy in America"

*Focus on the relevant issues facing
Human Resource Managers today and
in the next decade!*

*Preview the future of employee rights
legislation and how it affects the
corporate P&L and, most importantly,
you as a Human Resource Manager.*

*Gain a realistic perspective on future
Human Resource Management trends
and technology!*

*See the "HUMAN RESOURCE
OFFICE OF THE FUTURE" where
Wang will display computer systems
exclusively designed for the Human
Resource Manager. You'll see the
"coordinated information flow"
concept at work in a distributed
workload environment.*

Program topics include...

"National Health and Industry"

"Enforcement of ERISA"

"Benefit Trends in America"

"Equal Opportunity for Women and Minorities...
Closing the Gap between Corporate Intent and
Results"

"Future Demands of OSHA"

"Employment of the Handicapped"

"Fair Information Practice is Good Management
Practice"

"Salary Trends in the U.S."

Mrs. Marvella Bayh.

J. Vernon Ballard, Deputy Administrator of ERISA,
Department of Labor

Charles B. Jackson, President, American Benefit Plan
Administrators, Board Member, International Foundation of
Employee Benefit Plans

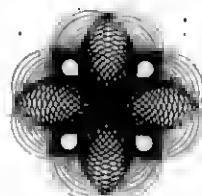
Barbara Boyle Sullivan, President, Boyle/Kirkman
Associates, Inc.; Country's foremost FORTUNE 500
Affirmative Action Consultant

Dr. Lawrence Partridge, Occupational Safety and Health
Unit Manager, Arthur D. Little, Inc.

Norman Hammond, IBM Representative to White House
Conference on Handicapped Individuals

Jane Yurow, Esq., Privacy Protection Study Commission
Project Manager for Employment and Personnel Records

Benjamin Cole, President, Cole and Associates, Inc.;
Country's Leading Compensation Analyst



Please register me for the Wang Conference,
Executive Perspective on Human Resource Management

Atlanta, Georgia
March 8-9, 1978

Name _____ Title _____
Company _____ Division _____
Street _____
City _____ State _____ Zip _____
Phone (Area Code) _____ Signature _____

Please register the following who will also be attending:

Name _____ Title _____
Name _____ Title _____
Name _____ Title _____
Name _____ Title _____

WANG

Mail to: Ms. Emlyn Griffin, Conference Registrar,
Wang Laboratories, Inc., One Industrial Avenue,
Lowell, MA 01851

Mini Bits

NCR Increases Memory On 7200 Desktop System

DAYTON, Ohio — NCR Corp. increased the memory size of its 7200 Model VI desktop system from 24K to 44K bytes as it unveiled a series of enhancements to the small system.

In addition, the firm announced users can now rent the system.

Designed for use as a "sophisticated data-entry device or as a back-office processor," the system has been enhanced to include a 128-char. Ascii set, increased from 96 characters, and to offer a 30 char./sec thermal printer and a 173 char./sec matrix printer, a spokesman said.

Previously, no printers were available for the system, he noted.

A system including a 24K processor, magnetic tape cassette, thermal printer and Basic software rents for \$327/mo or costs \$9,565 from the company headquartered in Dayton, Ohio 45479.

Speaker to Cover Mini Pitfalls

CHICAGO — Some pitfalls of minicomputers will be discussed by a consultant speaking before the Windy City Chapter of the Association for Systems Management on Feb. 14 at 5:30 p.m.

Richard Friedman, president of General Business Consultants, Inc. will present a structured method for taking the non-monetary aspects of selection into account when choosing a system, he said.

The meeting will be held at the M&M Club in the Merchandise Mart and admission will be \$10.

Information is available from Ron Goodman, CNA Insurance, CNA Plaza, Chicago, Ill. 60685.

College Offering Certificates

IOWA FALLS, Iowa — Ellsworth Community College here is offering a one-semester certificate in minicomputer operations and a one-year certificate in minicomputer and electronic accounting.

Courses offered to fulfill the one-year program include minicomputer programming, file and data base management and data processing systems.

Information is available from Ellsworth Community College, 110 College Ave., Iowa Falls, Iowa 50126.

Users Rank Minis Basic/Four Tops in Survey

DELRAN, N.J. — Datapro Research Corp. has released its user ratings of small business systems and minicomputers, and this year the survey results indicate that users of all models of Basic/Four Corp. systems are most satisfied.

The 15 respondents who had 17 Basic/Four systems gave the systems an overall satisfaction rating of 3.3 on a four-point scale ranging from "4" for excellent to "1" to poor.

Other individual systems seemed to fare as well if not better, however. Of those systems with more than 15 replies, Univac's 90/30, Hewlett-Packard Co.'s 3000 series of minis and IBM's System 3 received very high ratings. The 22 users of 25 HP 3000 series minis gave their systems an overall rating of 3.5 and IBM's System 3 models received a 3.3 rating from 119 users representing 125 machines.

Univac's 90/30 small business system was also given a 3.3 rating by the 15 users of 16 systems who responded to the Datapro survey.

The survey drew replies from 816 users of 2,362 installed minicomputers who were asked to rate 12 aspects of equipment software and vendor support, Datapro said.

Although Basic/Four came out on top in the overall satisfaction category, it was followed closely by several mini makers with replies from six or more users, the research

organization said. HP, Microdata Corp., Univac and Wang Laboratories, Inc. received overall ratings of 3.2; Datapoint, Digital Equipment Corp., Four-Phase Systems, Inc. and Interdata, Inc. were rated at 3.1; and Burroughs Corp., IBM and NCR Corp. had ratings of 3.0.

Unhappy Users

Users were not particularly happy with several other vendors' systems. Of those receiving six or more replies, Honeywell Information Systems, Inc. received a 2.9 rating, Data General Corp. a 2.8, Harris Corp. a 2.8, International Computers Ltd. a 2.6 and General Automation, Inc. a 2.3.

The venerable PDP-8 minicomputer from DEC took some knocks from 19 users with 48 minis at a 2.8 rating, and IBM's System 7 rated by 19 users with 23 systems received a grade of 2.7.

Users continued to rate the technical support and applications programs offered by their manufacturers as less than satisfactory.

Datapro pointed out that the use of minicomputers for data base management applications showed an increase since last year's survey. "The number of responding users who checked this application category jumped from 12% in 1976 to 16% for 1977. Data communications usage also increased from 22% in 1976 to 24% this year."

Teachers' Credit Union Puts Small System on Payroll Job

By Esther Surden

CW-Staff

BRISTOL, Conn. — When the old posting machine couldn't handle the workload at the Bristol Teachers Federal Credit Union here, the organization turned to a small business system and cut the time it took to perform its payroll deduction application from 2-1/2 days to 40 minutes.

"We had grown to a point where we needed an operator on the posting machine full time," manager Marty Bernard said. The union's management felt that using an operator in this way was "wasted manpower," he noted, so it "cast around for another system." Since the posting machine was a Burroughs Corp. L5000, Burroughs was a likely vendor to provide the union

with its small business system.

The B80 installed at Bristol includes a CPU with 80K bytes of memory, a 180 char./sec console printer, a 250 line/min. printer and 4.6M. bytes of disk in two removable cartridges. Programs for the system were written by Burroughs people "from scratch" working with the credit union staff, Bernard explained.

The most important application the system performs is keeping track of payroll deductions, he continued. A teacher, for example, might sign up for \$50 to be withheld from his pay every pay period, which in the case of Bristol teachers is every other week.

Since city hall handles the teachers' payroll, the city compiles a list of preap-

(Continued on Page 53)

Tired of being last on the routing list?

Subscribe yourself.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

MINI-TWO-RTD

Meet two new systems that double the power range of NCR's 8000 series.

The NCR V-8580 and V-8590.

With these two new systems at the upper end of NCR's versatile 8000 series, every computer user now has access to twice as much NCR computer power. With an NCR system, he can upgrade smoothly through the entire power range without obsoleting his software design as his requirements grow. Because NCR's migration path extends from family to family, from generation to generation, from the entry level I-8100 all the way up to these powerful new computer systems.

The new systems bring latest state-of-the-art hardware and software technologies to bear on larger-volume

processing problems. The user gets super-efficient performance at a price that fully reflects today's breakthroughs. In a smaller package. With a full complement of peripherals and terminals to meet his specific requirements.

Both systems offer VRX (Virtual Resource Executive), NCR's most sophisticated operating system software, to take full advantage of the hardware's architecture. VRX provides virtual memory operation, online program development, and the ability to function as multiple virtual machines.

Languages available with the two systems include COBOL 74, NEAT VS, FORTRAN, RPG and others.

THE FIRST POWER STEP

The V-8580 is the power step preceding the V-8590, assuring smooth transition up to the highest power level. The V-8580 is ideally suited for large online and multi-programming applications that take full advantage of the system's virtual memory.

It has distributed intelligence. The central processing unit is supported by up to seven additional processors which independently handle diagnostics, control, input/output and communications functions.



It uses multilevel pipeline processing. As each program instruction is executed, the next three instructions are simultaneously advanced toward execution to provide greater efficiency.

The V-8580 has a very high speed main processor with a cycle time of 56 nanoseconds. And its memory is substantial. Up to four megabytes in one-megabyte increments.

DOUBLE THE POWER RANGE

The V-8590 is a twin-engine system with twice the power of any earlier NCR system. It has two main processors at the center of its distributed intelligence system operating on the same transfer bus. The processors share the same workload under the efficient control of VRX, aided also by the subordinate processors.

Both 56-nanosecond processors have equal access to memory and all other system resources. Both have multilevel pipeline processing capability. The shared memory ranges from two to six megabytes in one-megabyte increments.

The V-8590 functions in a multiprocessing mode, dynamically allocating system resources as needed. This

shared-workload concept improves system thru-put and productivity.

Several of these new systems can be linked together as communicating processors in a network built around NCR's Distributed Network Architecture.

Also introduced to complement the V-8590 are two new high-performance peripherals, the 6370 tape unit and the 6540 data storage subsystem. The 6370 tape unit has dual mode capabilities—it can function in either the Phase Encoded (PE) mode at 1600 bpi or the Group Coded Recording (GCR) mode at 6250 bpi density. The 6540 has a capacity of 540 megabytes. The transfer rate of both disk and tape is an extremely fast 1.2 megabytes per second.

For a personal introduction to the V-8580 and V-8590, call your local NCR representative. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

NCR
Complete Computer Systems



"Control Data's Mass Storage System was the better business decision for us."



Each Mass Storage Cartridge holds 8 Megabytes and can be accessed in 15 seconds or less.

Charles E. Murdock, Assistant Director, Right, and Marvin J. Bates, Jr., Director of Data Processing for Southern Company Services, Inc.

Bates: "We expect almost instant access and response from our CDC Mass Storage."

We process in a demand mode. When a request is on the console, we've got to respond quickly. That's why we're taking our small data sets on tape and putting them into Mass Storage. It means that we have almost instant access and response to users.

Murdock: "With 32,000 reels of tape and a library growing 20% annually, our tape library is getting more and more difficult to handle. Mass Storage allows us to maintain control of our data sets, without increasing our facilities, manpower or equipment. For us, it means a cost-effective way to provide good customer service."

Bates: "We want to process user jobs without personal or physical intervention. Mass Storage permits us to do this."

By converting data to Control Data Mass Storage, Southern Company Services expects to eliminate errors from pulling, handling or refiling tapes.

They will be able to supply user data in seconds for their customers - their parent company, The Southern Company, and four affiliated electric utilities. And they will eliminate waste of valuable host computer time.

Control Data's Mass Storage System saves space, too. The System holds 16 billion bytes in less floor space than a row of disk drives.

Perhaps you should investigate some of the reasons our MSS is the better business decision for you. Call us at 612-853-7600. Or write us at HQN111, P.O. Box O, Minneapolis, Minnesota 55440.

CD CONTROL DATA CORPORATION

More than a computer company

Talking to Mini Makers — Part 4

In Case of System Failure, Where to Turn?

By Esther Surden
CW Staff

You have a problem, but you don't know what's causing it. So you call your maintenance people. It takes them a couple of hours to arrive, but after working on it for a few hours they say "Sorry, it's a software problem."

So you call your software support representative and tell him what's going on. He comes down and tries to fix the problem, but you have already wasted many hours with the hardware person who came and went without fixing it.

That scenario is all too familiar to some users. So CW asked a random sampling of minicomputer and small system vendors who their users turn to when there is an undetermined hardware/software problem.

Most of the vendors contacted offered a single source for the user to contact.

At Digital Equipment Corp., user calls are "an extremely important part of our field activity, and we will try our best" to get back to the user as soon as possible. Secretaries in the offices are trained to ask questions that will lead to the right technical person to solve the problem, the spokesman said.

Microdata Corp.'s users first go to their dealer, but the firm says it can help a user determine a software bottleneck or problem because it can re-

motely access its users' systems. "We can walk a user through the system by dialing up the troubleshooter group here; we can look at the way they've put the code together," a spokesman said.

Basic/Four Options

According to a spokesman for Basic/Four Corp., the user with an undefined problem has a series of options as to whom he should contact. If a problem is not clearly defined, the Basic/Four systems staff help the user isolate the problem into either hardware or software, but if the user at all suspects it is a hardware problem, he should call Sorbus directly. Sorbus maintains the Basic/Four equipment, the spokesman noted.

If a software vendor is involved, the user may have developed more confidence in that firm and may call it when a problem arises. To sum up, "there is no one way for the customer to proceed," he said.

Noting that "there are a whole range of crashes in which it is difficult to determine if a hardware or software problem is responsible," a spokesman for Tandem Computers, Inc. said, "we designed our system so that the surviving processor tells us what happened."

In the event of a hardware or software problem that is undefined, a Datapoint Corp. user can contact the firm's customer service organization,

which then isolates the problem, a spokesman from Datapoint stated.

At Data General Corp., the field engineer is able to determine whether the crash is hardware or software related "through diagnostic tests," a

spokesman for that company said.

Operating system failures and hardware failures are closely related and difficult to identify, a spokesman for Hewlett-Packard Co. noted. Customer engineers are called to make the determination, he added.

System Handles Deductions For Teachers' Credit Union

(Continued from Page 49)

proved deductions and sends it to the credit union. Since the data base of those who normally take such deductions is already in the system's memory, "all we do is separate any exceptions" and enter them into the system, he said.

The B80 also takes care of distributing funds to various optional "clubs" such as vacation accounts or Christmas accounts or for loan payments.

The organization's management receives a number of reports to keep it up to date on the direction the credit union is taking, Bernard explained. Membership statistics, age statistics, dollar volumes by age groups and borrowing by age groups are some of the reports available on demand. In addition, "we have daily update capability and can have a trial balance any time we want," he noted.

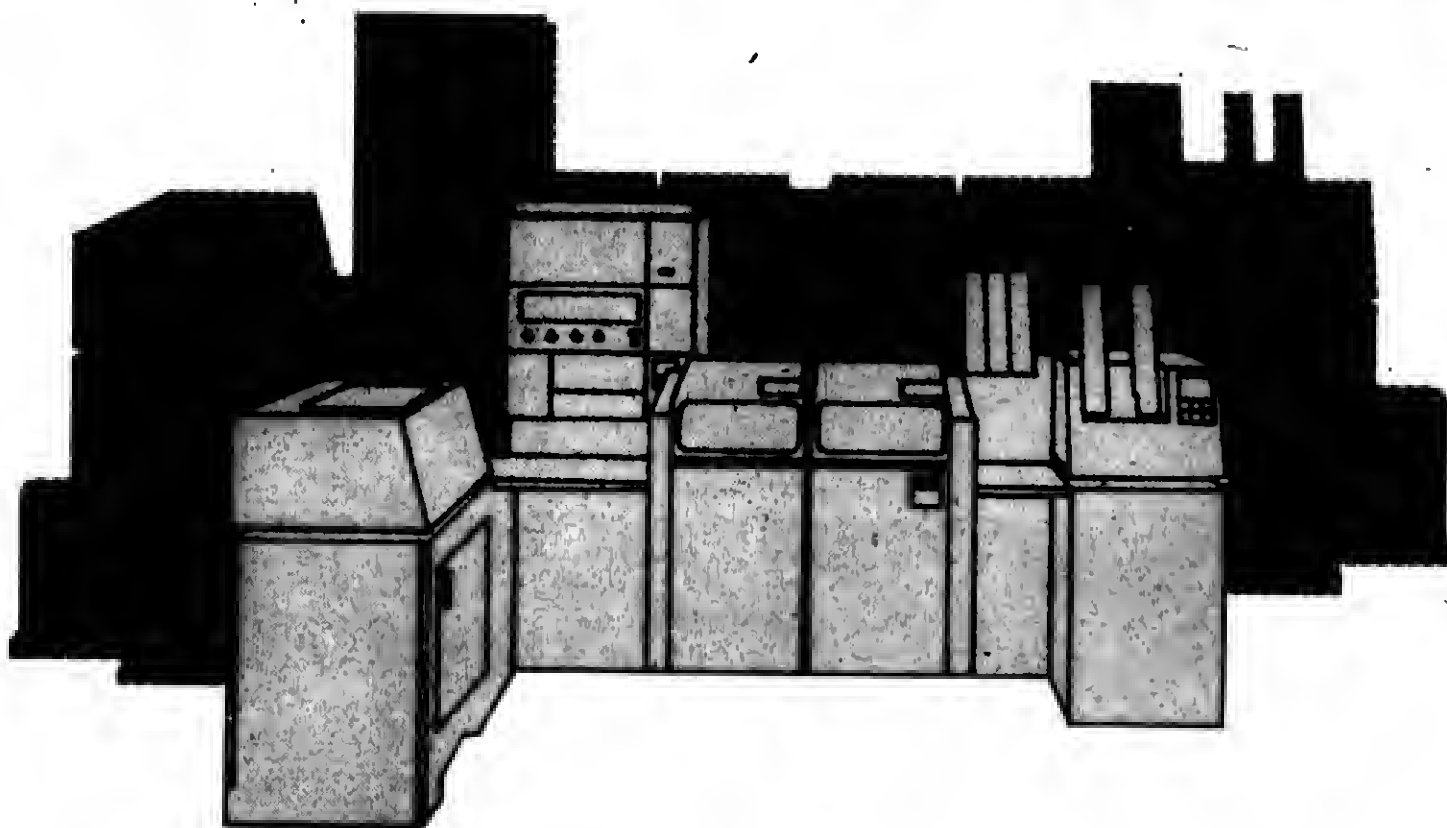
Another program that will be run-

ning shortly on the system will print statements for members and do the organization's 1099 forms, he said. The system can produce labels for mailings of promotional materials or for use in mass advertising campaigns, such as for vacation "packages."

Teachers also have the option to sign up for insurance with a company in Bristol. The insurance company supplies the credit union with a quarterly listing of those who are taking advantage of the offer. The credit union can then access the teachers' accounts to pay the insurance, he explained.

As a manager, Bernard said he is satisfied with the system because the management reports the union gets are "excellent." But he does have some reservations. "It's not a simple system," he noted. "I have one person who is a super expert" on it now, but as yet "no backup." Bernard plans to train someone else in the operation.

More System/3 for the same money!



easy to implement...
easy to upgrade leasing...

All IBM Hardware & Service. Amplicon leases only IBM equipment. All equipment refurbished to new equipment specifications. IBM provides all maintenance.

No Conditional Sales Contract Lock-In. Amplicon gives you true leasing flexibility. Upgrading is easier with an Amplicon lease than with an IBM contract.

Nationwide Specialists. Amplicon has System/3 specialists in most major U.S. cities. They can structure leases to meet your data processing, financial, and upgrading needs.

AMPlicon INCORPORATED

505 North Tustin Avenue, Santa Ana, California 92705

(800) 854-0217, or (800) 854-0218

Economical and Flexible Alternatives from...

Expedites Invoicing

Oil Firm Using Series/1 to Monitor Loading

SAVANNAH, Ga. — Colonial Oil Industries, Inc. here gets invoice data into its small business system overnight, instead of in two to three days, by using a minicomputer.

The firm is using an IBM Series/1 mini with a multiuser operating system to monitor industrial fuel oil loading. The system controls the loading of petroleum products at the distribution terminal.

Before getting the mini, the firm performed the petroleum product loading application manually, according to Robert Demere Jr., assistant vice-president.

When a bill of lading was issued, it had to be manually checked against

the inventory, and the checker had to make sure all the bills of lading were in the correct numerical order. Another worker had to code the bill of lading and then the information had to be keypunched so that it could be finally processed by the firm's System/3, he explained. It took the company two or three days to get the information into the computer for invoicing, Demere stated.

With the Series/1, "the invoices can be processed the next day," saving the company a "considerable amount of money."

The mini, which operates 24-hours a day, seven days a week, first receives data about a truck when the gate guard

inserts a magnetically encoded badge into a badge reader. After performing a credit check, the mini notifies the dispatchers of the arrival through a set of Hazeltine Corp. 1510 CRTs. A dispatcher then assigns the truck to a loading platform.

The system monitors the flow of oil into the truck and shuts off the pumps when any one of several boundary conditions is met.

When the gate guard again inserts the departing driver's badge into the badge reader, a bill of lading is printed in the guard house. At the end of each day, a billing information diskette is written for processing by Colonial's IBM 3.

Graham Computer Enterprises, Inc. of Birmingham, Ala. programmed the system for Colonial using the multi-user version of its Basic/1. Each major function in the system is treated as a different user. Information is passed from user to user through a resident common area or through shared disk files. Graham also added some assembly language routines to process the badge readers and oil pumps.

Local Service Available

Colonial chose the Series/1 for the oil loading application for several reasons, according to Demere. "We have another automated system across the road," he related, and the firm has some trouble with this non-IBM system. Since it is a paper-tape-oriented system it is "very expensive" to change it. In addition, there was no local service for it.

IBM had a service representative in Savannah, he pointed out and that was important because when a system is installed for this type of application, a company begins to rely on it. When it's down, a firm could get hurt, he said. Also, "we can modify programs ourselves," he noted.

Colonial hopes to be able to market the system to other users in its industry and thinks the IBM name would be easy to sell. Furthermore, "they were cheap" in comparison with other systems the firm examined, he continued.

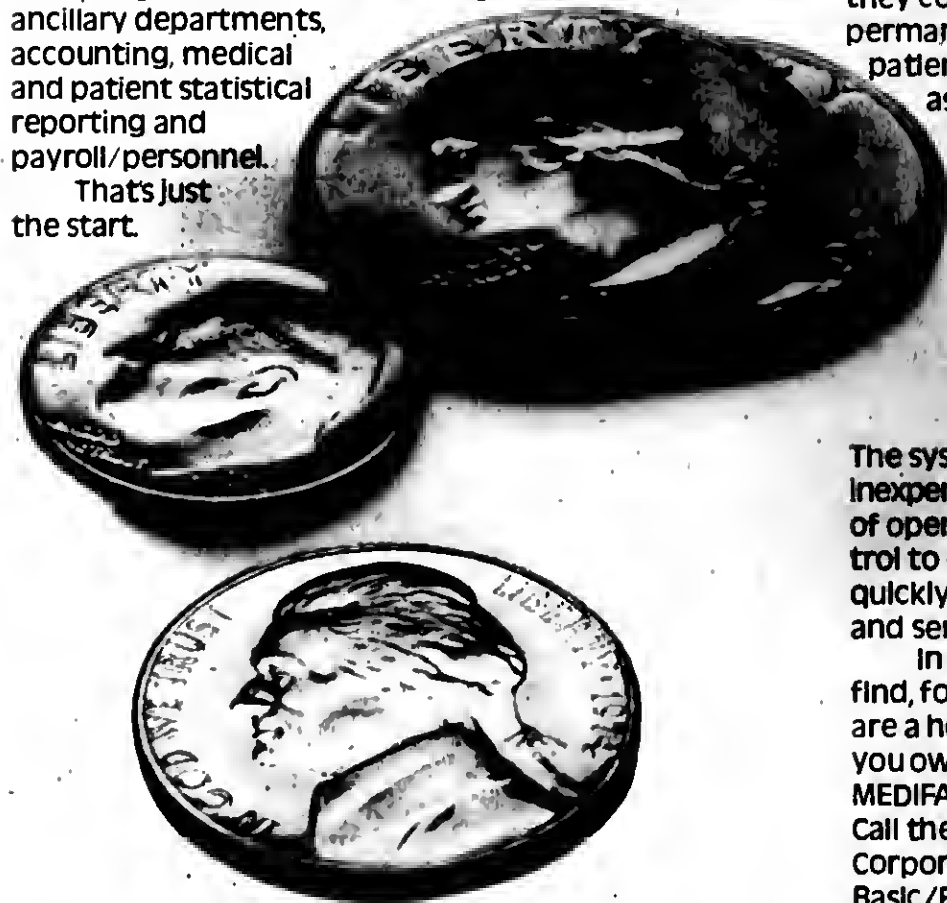
What to look for in your hospital business computer system

Basic/Four Medifacs™

Basic/Four Corporation offers MEDIFACS, the most powerful hospital financial accounting system available, for 50-beds and up. At surprisingly low cost.

The cost is so low because MEDIFACS does so much. It's a total system, hardware and software, especially designed to take care of all "paperwork" for admitting, business office, nursing stations, controller, ancillary departments, accounting, medical and patient statistical reporting and payroll/personnel.

That's just the start.



Government reporting

With Basic/Four MEDIFACS at work for you, you'll actually stay abreast of government reporting.

The system keeps track of each Medicare and Medicaid claim, processes them all, and prints the right forms. It performs insurance proration—for both direct and patient billing. And automatically adjusts a patient's financial classification—simultaneously updating all records!

Cost effectiveness

MEDIFACS also helps optimize your cash flow. With MEDIFACS on the job you immediately reduce lost charges. Once entered they constitute a permanent part of patient records. In this, as in all other functions, an

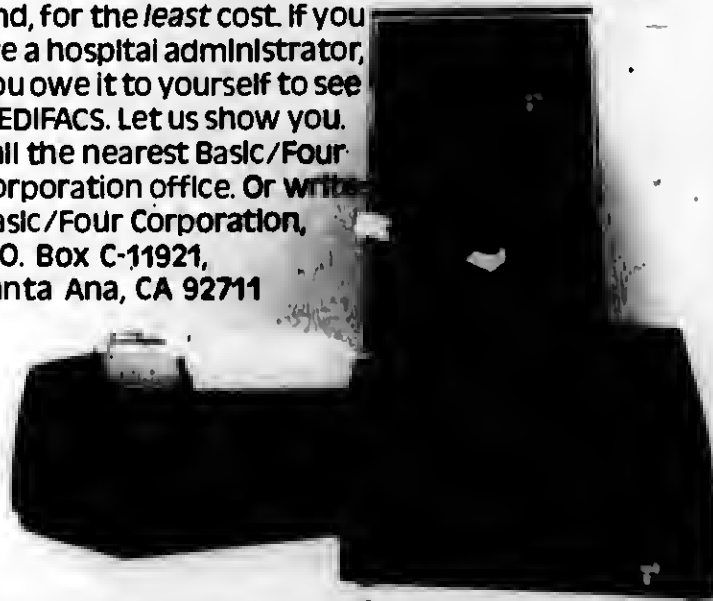
instantly available and retrievable audit trail is established. The computer offers total internal audit controls—visually on the VDT, internally in the system and externally, on command, as printouts.

You are in total control as never before!

Design for growth

The system is modular, which means it can easily and inexpensively expand with your needs. And the simplicity of operation means you never need to surrender control to outsiders; a clerk can learn to run MEDIFACS quickly. What's more, you can call on us for support and service 24 hours a day, if needed.

In all, it's the most complete system you can find, for the least cost. If you are a hospital administrator, you owe it to yourself to see MEDIFACS. Let us show you. Call the nearest Basic/Four Corporation office. Or write Basic/Four Corporation, P.O. Box C-11921, Santa Ana, CA 92711



basic / four corporation
an **MAI** company

Albuquerque • Anchorage • Atlanta • Baltimore/Washington • Birmingham • Boise • Boston • Buffalo • Charlotte • Chattanooga • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fresno • Grand Rapids • Hartford • Honolulu • Houston • Kansas City • Indianapolis • Las Vegas • Los Angeles • Lubbock • Madison • Memphis • Miami • Milwaukee • Minneapolis/St. Paul • Nashville • New Jersey • New Orleans • New York • Orange County • Philadelphia • Phoenix/Tucson • Pittsburgh • Portland • Richmond • Sacramento • Salt Lake City • San Antonio • San Diego • San Francisco • San Juan • Seattle/Tacoma • St. Louis • Syracuse

Basic/Four Systems are also marketed in more than 30 foreign countries.

Extender Board Fits DEC Units

LAGUNA HILLS, Calif.— A dual height extender board for use with most Digital Equipment Corp. backplanes is available from Southwest Systems here.

The extender board can be used with DEC PDP-11 and PDP-8 minis, LSI-11 and LSI-11/2 microcomputers, Heath's H-11 and the MDB Systems, Inc. MLSI-BPA84 backplane/cardguide, according to a spokesman for the firm.

The unit provides access to both sides of the board outside the card cage, making all test points available to aid diagnostics and trouble-shooting. Tagged at \$60, it is available from Southwest, which can be reached through Box 2808, Laguna Hills, Calif. 92653.

CalComp.
Zeta.
The
Performance
Plotters.



Zeta Research

2301 Marwell Dr., San Jose, CA 95128

(415) 671-1111

Club Swings Savings With Modular Machine

WICHITA, Kan. — The Wichita Country Club decided it needed a computer system to handle its sports, entertainment and business accounts, and that decision is saving the club money and manpower, according to Donna Fowler, office manager.

In order to evaluate the feasibility of automating, the club organized a selection committee, which in turn directed some certified public accountants to draft requests for proposals.

The requests were submitted to several vendors, including IBM, NCR and Wang Laboratories. The returned proposals were evaluated and several manufacturers were selected to give demonstrations and oral presentations, Fowler said.

Since the staff would be directly involved with the operation of the equipment, it also participated in the decision. It attended oral presentations and demonstrations given by the vendors and gave its opinions to the selection committee and the club's board of directors.

The final selection of equipment was predicated on the following criteria:

- Equipment had to provide a flexible growth potential.
- Computer language had to be commonly understood.
- The office staff should be able to operate the equipment without excessive training.
- Support for the equipment should be available locally.
- Cost factors had to be competitive.

The committee finally selected Wang Laboratories for the hardware because it seemed to offer the best price and the best service, Fowler said.

A local software group was retained to provide the necessary programming. Programming considerations favored the local effort because no "package" applications were presented which resolved the needs of club operations, she said.

Difficult Application

One of the applications developed for the system was payroll, which needed the capability to handle high volume part-time help, seasonal fluctuations, salaried and hourly rates of pay, meals and other considerations such as employee benefit qualifications — all within a multiple-level accounting structure in which certain employees were allocated to more than one level.

Currently, payroll operations occupy about six hours, as opposed to three days previously, Fowler said. When the club staff expands to 120 employees in the busy summer season, 220 W-2 forms have to be prepared. This year-end work, which previously required approximately three-and-a-half man weeks, is now completed in one-and-a-half hours, she added.

Accounts receivable required the monthly computation of various classes of dues with the appropriate general ledger notation, member charges for all activities, including pro shop purchases, and rendering of statements and acceptance of payments.

In the area of accounts payable there were only minor deviations from "standard" to provide adequate general ledger accounting. Though by no means unique, the general ledger financial reporting system did need to prepare reports for and support each

activity center.

Originally each item was handled a minimum of three times. First, it was classified and posted to expense; next the check was written (250 per month); and finally the check was properly posted to the ledgers.

With the Wang system the classifications and subsequent entry into the system is all that is required, Fowler noted. The computer prepares the checks, registers and appropriate expense account postings.

The club has a membership of 820, plus reciprocal memberships and a tennis and golf pro shop. Last year 23,500 rounds of golf were played with the usual amount of cart rentals and bag storage costs; a typical round of golf may result in four tickets of

charges.

All the billings for the activities, services and merchandise are handled by the system, Fowler said.

System Benefits

One of the benefits the system has generated is its ability to reduce or eliminate the continual balancing and rebalancing which accompanies non-automated methods, Fowler said. Time savings have been in segments of several hours or days in the various areas of application, she claimed.

This has resulted in special reviews and analysis being available which were not previously possible, she added. For example, financial statements for all 12 activity centers are now normally available by the 10th working

day; member statements were previously rarely available before the 10th of the month and, of course, financials could not be started before member statements were finalized, Fowler said.

Club members' acceptance of the system was an original concern and, as was expected, a certain amount of confusion resulted from the first statements. A format change in the statements was presented which resolved most of the confusion, according to Fowler.

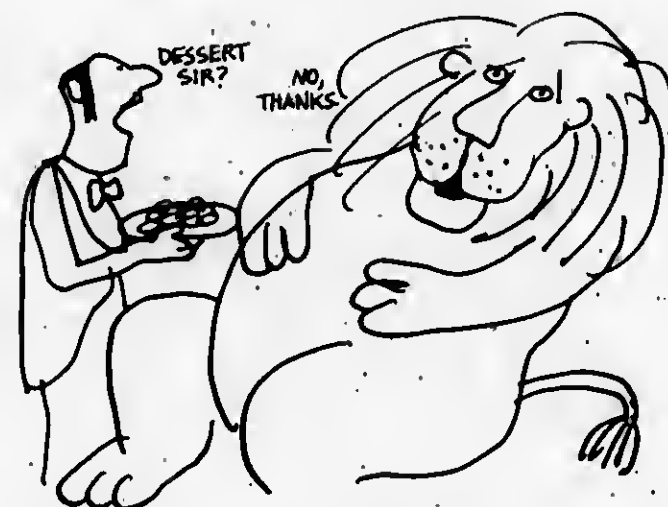
"We bought equipment which represented mid-range hardware for the vendor. We could have started smaller, but now we have the time and capacity for growth by simply adding modularly to our existing equipment," Fowler said.

Everybody Wins!

with  The SYNERGIST™ Business Systems



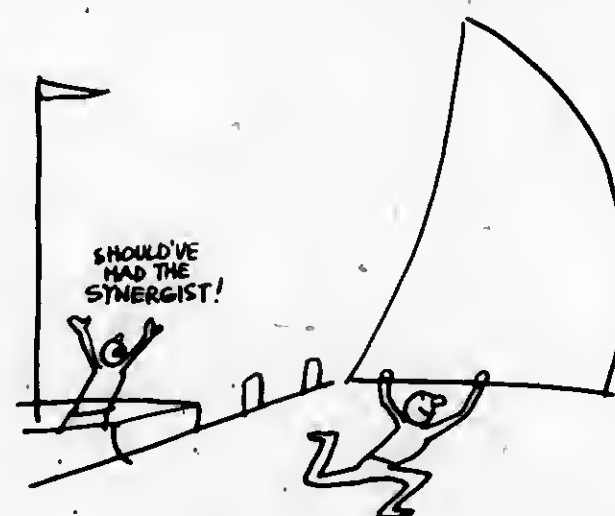
Become a Synergist Dealer. Everybody Wins! With the right system at an affordable price. Whether it's a one user stand-alone, a 4 to 8 user midi, or a 32 user giant, DCC has it. The Synergist. A comprehensive family of integrated business computer systems.



A Full Line of mainframes, disc drives, terminals, printers, and workstations—tested to work together. With operating systems, Business Application Libraries, text retrieval systems that scale up without expensive reprogramming. And with plain English requests for on-the-spot management information.



Sell with Confidence. Backed by Data General, one of the largest computer companies. With over 40,000 computers already installed. With software support, dealer training programs and nationwide repair service.



Don't Ever Lose a Sale Again because your customer needed something larger, smaller, or more flexible. Join the select group of the best managed, business system dealers in the industry. Sell The Synergist. Write or call Ronald S. Harvey, Business Systems Sales Manager, (201) 575-9100.

 **DIGITAL COMPUTER CONTROLS INC**

A subsidiary of Data General Corporation
23 Just Road, Fairfield, New Jersey 07006
Phone: (201) 575-9100, TWX 710-734-4310

System Conveys Savings to Supplier of Belts

By Jason R. Taylor

Special to CW

ENGLEWOOD, N.J. — Using a minicomputer to keep track of a constantly moving inventory and a complex pricing scheme has brought savings to Siegling America here, a supplier of belting used in conveyor belts.

Siegling America is a subsidiary of Siegling, a worldwide organization with headquarters in Hanover, West Germany. It supplies belting to users in the U.S. via salesmen, sales representatives and about 70 distributors.

About 10 years ago, when the business began to expand rapidly, the firm investigated systems that could be used for order entry accounting as well as for various engineering calculations.

"We expected the system

would be free about half the time for technical usage," Kenneth Tsunoda, president, recalled.

The company's needs were satisfied, but not in the proportion anticipated.

Accounting and general business applications now are run six hours a day, five days a week and engineering problems are taken care of after 5 p.m. and on Saturdays.

Direct Approach

The hardware system used is a Digital Equipment Corp. PDP-8/E with a CRT terminal, high-speed line printer and disk storage. The software, developed by Symbolic Systems, Inc. of Summit, N.J., consists of a series of integrated programs performing invoicing, accounts receivable, accounts payable, general

ledger, sales analyses, salesmen's commissions, belt usage and inventory.

"We talked to DEC and it recommended Symbolic Systems as a software consultant," Tsunoda said. "The software vendor supplied us with a list of names of recent clients it served; we talked to them and received very favorable reports."

"The other factor that impressed us was the vendor's direct approach. Many other vendors had tried to sell us 'a lot for a little investment' and you'd have to be quite naive to believe a sales pitch like that," he added.

While Siegling America's accounts payable and accounts receivable functions are pretty standard, we inventory several different size rolls and over 100 different belt styles; some belts may be irregularly shaped or have pieces removed," Nathan Rosen, technical liaison, pointed out. "This necessitates a very complex, nonstandard inventory control system."

Somewhat fewer than 1,000 orders are processed each month. When an order is received by telephone or mail, the customer's name (for new customers) or number, belt dimensions, type of belt and quantity are entered into the system.

As order entry is made, status report information is stored and can be recalled at any time. An order status report can be printed on a daily basis, listing date shipped or expected shipping date.

Orders are printed and sent to the shop for processing. Following shipment, the order is returned to the office and invoiced. Invoices, complete with the latest pricing on each belt type, then printed and mailed to each customer. As this is done, the system removes the belt from "stock" status to "usage" status.

"We can tell a great deal from what we ship," Rosen claimed. "For example, if we're importing large shipments of 10-inch-wide belting from Germany but shipping large quantities of eight-inch wide belting, the printout tells us to alter our orders. In this way we save the man-hours and dollars associated with cutting and slitting of 10-inch rolls."

Siegling's system generates several belt usage reports which post current information on what is being sold, where and by whom. Usage reports contain exactly what each of Siegling's distributors use during recent quarters or year-to-date periods. Included are customer, belt usage by type width, and category with a four-quarter moving average.

The reports enable Siegling to observe trends and analyze its distributors' orders.

Each month the system calculates commissions and produces printouts of sales volume and commissions for every sales representative and distributor, including a tabulation of credits and returns. This information is later used in corporate overview reports.

Engineering Problems

Engineering problems which are cumbersome to tackle on a desk calculator are run on the PDP-8/E. The system can be used to answer problematical questions, such as what will happen to a belt of given stiffness running with a certain speed over a pulley of specified diameter. If the belt flexes and if the pulley is too small or the speed too fast, the belt will fail.

Experimentally gathered data under a series of such conditions is fit to a curve by the technique of linear regression so failure predictions can be made for a variety of conditions.

Losses Cut

Siegling uses a very complicated pricing system; prior to acquisition of its hardware/software system, pricing was calculated and checked on a desk calculator. Customers regularly complained of overcharges and undercharges.

The undercharging complaints originated most often from large companies that used computer systems of their own, which automatically flagged any discrepancy.

"We found overcharge com-

plaints outnumbered undercharge complaints by about 10 to 1," Tsunoda recounted.

"Our inevitable conclusion was that the majority of undercharged customers never complained."

The estimated losses from this single source over only one year were nearly equivalent to the total dollars invested in the entire computerized system, Tsunoda said. "Our system has essentially cost-justified itself in only one year based solely on eliminating these pricing errors," he added.

DG Eclipse On-Line Cobol?

Better yet, CFOR, a business programming language preprocessor, is now available for your ECLIPSE. CFOR is easy to learn and implement and is translated to DG's fast-executing FORTRAN 5. Intelligible control flow and rational syntactic cosmetics lead to "GOTO-less" structured programs which are easy to write, read, debug and modify. A commercial field variable data type extends CFOR to data processing environments while retaining the computational, multi-tasking, interactive qualities of FORTRAN.

Contact David N. Langley

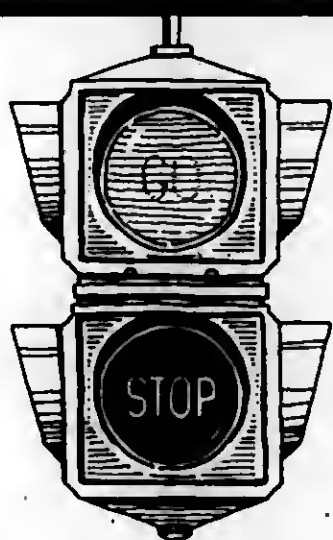
FINNING

FINNING COMPUTER SERVICES LTD.

555 Great Northern Way, Vancouver, B.C., V5T 1E2, (604) 872-7474

Introducing Shockwatch*

It works like this:



Red means stop. And the Shockwatch impact detector turns brilliant red when subjected to a potentially damaging shock.

Attached to a disk pack, Shockwatch can identify damaged media before insertion into a drive. And that can reduce head crash probability by as much as 50%.

Get head crash protection that's as simple and effective as the corner stoplight. Ask your disk supplier about Shockwatch. Or call us at 214-350-5725. We're Detectors, Inc., a division of Media Recovery, 2550 Electronic Lane, Dallas, Texas 75229.

Internationally, call your field engineering sales manager at the local Burroughs subsidiary head office.

SHOCKWATCH
Protection.
Pure and simple.

*Patent Pending

DECprinter I's

For Sale

• LA180

BEST PRICE • FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-270-1960

Data Equipment Group, Inc.

172 N. CHICAGO

EMERYVILLE, OHIO 44002

CalComp. Zeta.

Super Plotters.
Tough Choice.



Zeta Research

2311 Stanwell Dr., Concord, CA 94520

(916) 621-0600

the Computer Store

Offers

— A Unique

Profit Opportunity

For

Software Companies

Systems Houses

Computer Retailers

The computer Store's Dealer Affiliate Distributor Program features the Data General microNOVA® computer line and established professional business applications software for resale to the explosive small business computer market. Sales and technical training included. Call for details:

Paul Conover

the Computer Store, Inc.

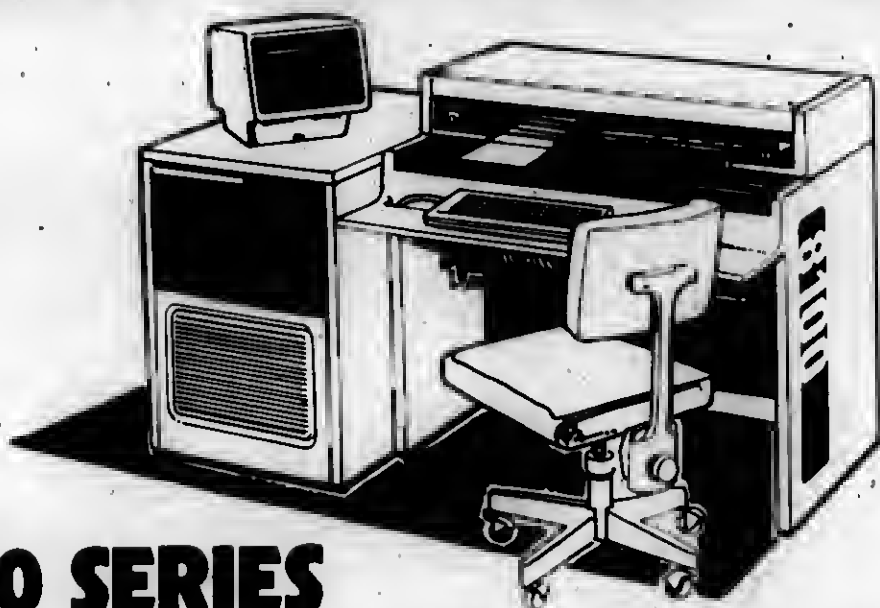
120 Cambridge Street
Burlington, MA 01803

(617) 272-8770

NOVA is a registered trademark of the Data General Corporation

COMPUTER DEVELOPERS

**WE ARE ONE OF THE KEY LEADERS TODAY,
HELP US BECOME "THE LEADER" TOMORROW...**



NCR 8100 SERIES

NCR Corporation has just developed a powerful family of computer products that offers smaller businesses hardware and solution-oriented application software at a readily affordable cost. The 8100 System is just a part of the advancement and involvement of NCR in solving mankind's problems for today and tomorrow.

Our current involvement at the Data Processing Division of NCR in Wichita in the 8100 series requires experienced and knowledgeable personnel to work on future and similar development.

These positions offer excellent income commensurate with your experience, a liberal benefits program and unusual and challenging opportunities for both professional advancement and personal growth with NCR Data Processing Division.

ARCHITECTURE DESIGNER

We need you to define and design processors and their interface for operating systems. Such a challenge requires a thorough knowledge of various design approaches. It also requires the ability to effectively interface with peers and management. Minimum qualifications are a CS degree and 5 years design experience in compilers and work utilities.

UTILITY DEVELOPERS

You are needed to develop utility programs in high level or assembly languages. Example programs are SORT/MERGE, Media Copies and Media/Memory Printouts, Dynamic File Inquiry, etc. You must have a CS or Scientific degree and a knowledge of assembly level programming and utility design.

COMPILER DESIGNERS/ANALYSTS

Would you like to lead or serve on one of our teams in Compiler Design from definition through programming and systems test? Do you know high level programming languages, assembly level languages, and PASCAL based languages? If your answer is "yes" and you have a BS degree or better with 3 to 5 years experience, we are interested in you.

SENIOR SYSTEMS ENGINEER

You will be responsible for the development of small business systems architecture. Special applications will be in the area of distributive processing and communications. EE or CS degree plus a minimum of 8 years experience needed.

DESIGN ENGINEERS

We challenge you to be responsible for logic and firmware design for micro processor based EDP systems. Specific experience with Peripheral Controllers desired with an EE and a minimum of 3 years experience.

SOFTWARE DEVELOPMENT DESIGNERS

You'll be responsible for operating system software design and implementation. Micro processor assembly language experience desired. Your assignments will be in Logical I/O, Physical I/O (including communications), systems internals and generation. CS plus 3 years experience required.

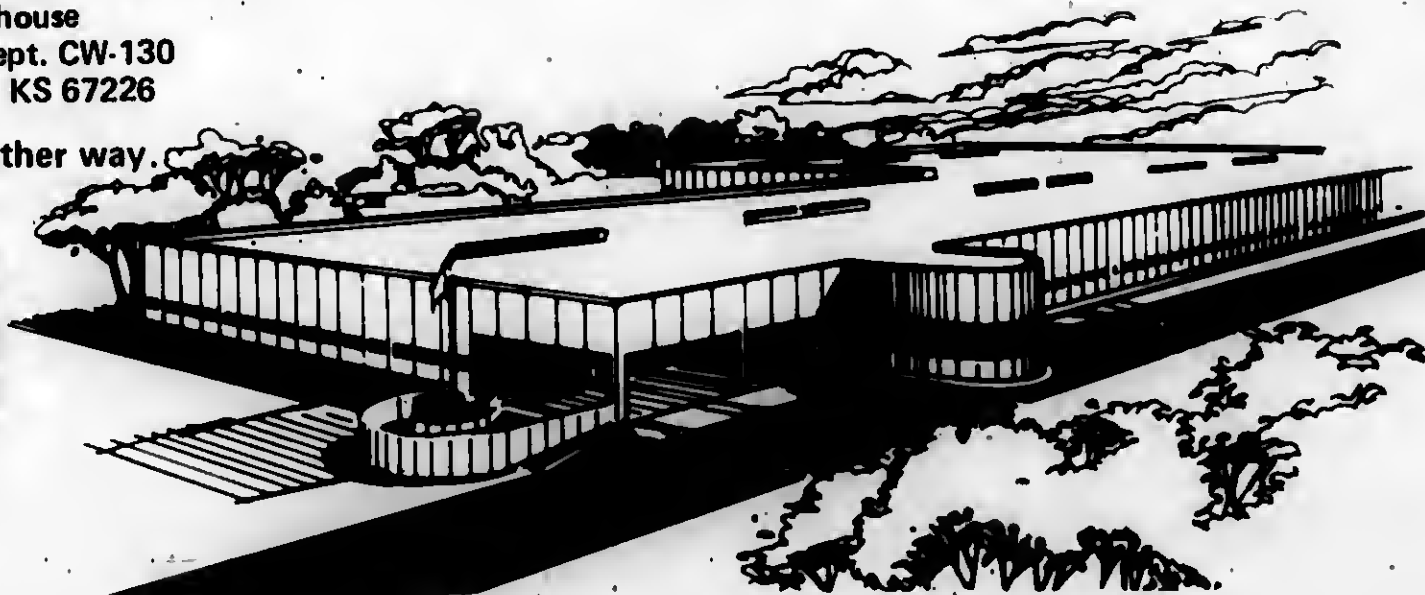
Please call (316) 687-5551 or send your resume to:
Ms. Dee Walker or Mr. Rick Veldhouse
Professional Placement Office, Dept. CW-130
3718 North Rock Road, Wichita, KS 67226

You'll get complete details either way.

NCR

Data Processing Division

An Equal Opportunity Employer



Canadian Hotel Gains Control of Back Office

By Esther Surden
CW Staff

MONTREAL — A small business system lodged at the Queen Elizabeth Hotel here has provided this 1,200-room hotel with control over back-office functions, according to Robert Bennet, director of data services.

Managed by Hilton International, the hotel had been running its payroll on a service bureau machine and its

general ledger and accounts payable on a posting machine before sending out a request for proposals for a small business system in December 1976.

The hotel took bids from several vendors including Basic/Four Corp., Four-Phase Systems, Inc., NCR Corp. and IBM, but settled on a Micos system from Mini-Computer Systems, Inc.

The Micos system was sold

through Acom Computer Systems of Montreal, a turnkey vendor with experience in the hospitality industry; the hotel "felt the Micos operating system as well as the program development aids meant Acom could do the job quickly," Bennett said.

"We knew we would have to make a lot of changes," he added.

The installed system includes a CPU with a 64K

memory — soon to be expanded to 96K, two 40M-byte disk drives, four CRTs and a 300 line/min printer.

The system was originally purchased to automate the general ledger, payroll and accounts payable functions, but the hotel is now adding an inventory package to the system and will continue to add functions, he indicated.

The applications development is being handled by the

turnkey vendor, which "will do all the programming on an ongoing basis," he said.

In the future, Hilton expects to expand the use of the small business system to other hotels it manages. Since all of the applications development will have been done at the first site, the cost of installing the other systems will be minimal, Bennett said.

"Disk drives on the systems will be compatible so we can share software development," he pointed out.

The hotel employs about 1,400 people at any one time, 1,200 of them permanent employees and another 200 as required. Over the course of a year, about 4,000 people are employed to provide manual, administrative and executive services.

The system runs 12 payrolls a month, with a total of about 5,000 checks. This process was adequately served by the service bureau, but the bureau produced none of the analytical documents required by the home office.

With the small business system, the hotel gets about 40 custom-designed reports printed out.

Reader/Punch Offers Parallel

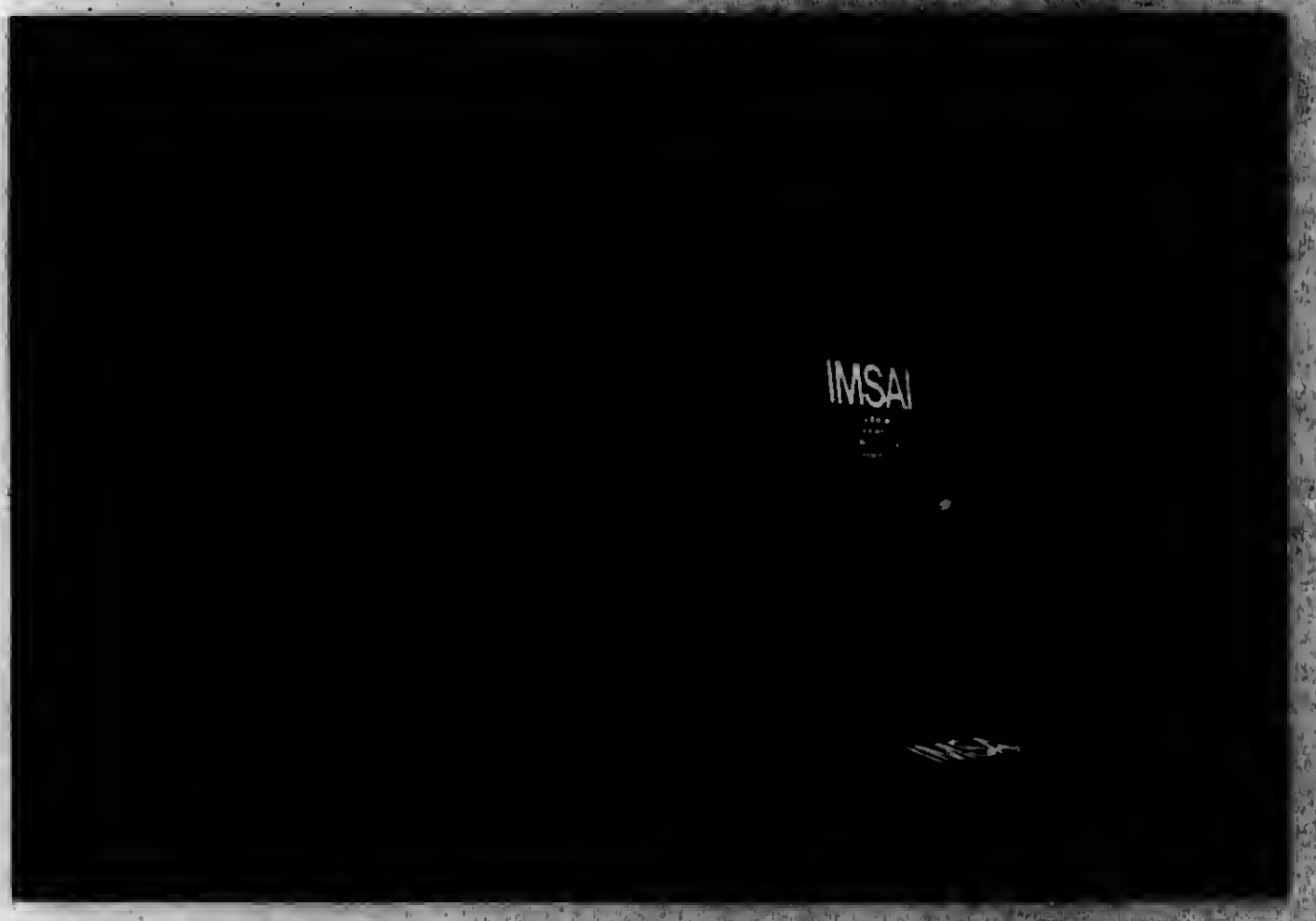
Or Serial Links

NORTHBROOK, Ill. — Data Specialties, Inc. has introduced a paper tape reader/punch combination unit that has either a parallel or serial RS-232 interface.

Operating at speeds up to 75 char./sec for the punch and reading at up to 300 char./sec, the SRP-3075 features a punch mechanism the vendor said is guaranteed to perforate a minimum of 1 million feet of paper tape.

The unit can punch mylar, mylar laminates, oiled, un-oiled, rolled and folded tapes without modification, the vendor stated. It costs \$2,335 from the company at 3455 Commercial Ave., Northbrook, Ill. 60062.

Price/Performance no one else has put together.



IMSAI Introduces the PCS-80/30 Integrated Video Computer

- ☐ 3 mHz microcomputer
- ☐ 3K ROM monitor
- ☐ 2K RAM
- ☐ 8 expansion slots
- ☐ 14 mHz integrated intelligent CRT (24 x 80)
- ☐ Intelligent Keyboard
- ☐ Parallel interface
- ☐ 2 serial interfaces
- ☐ Graphic and edit CRT functions
- ☐ 28 amp power supply
- ☐ All for \$1499* assembled and tested.

Software:

ASSEMBLER, DOS, TTY and ACR BASIC, Commercial/Scientific BASIC, FORTRAN IV and more.

Memory Options:

4, 16, 32 and 64K RAM memory boards.

Peripherals:

Printers, floppies—mix and match; standard, mini and high performance double density floppy disks on the same system (an industry first), 1/2" magnetic tape drive, CRT and TV monitors.

Send today for your copy of the 250-page IMSAI PCS-80/30 User Manual. Price \$5.00. The cost of the manual may be applied towards your purchase of a PCS-80/30 Integrated Video Computer. Use the coupon provided.



Guarantee:
Send me the IMSAI PCS-80/30 User Manual, price \$5.00. I understand that the \$5.00 may be applied towards the purchase of a PCS-80/30 Video computer system.

Check/Money Order enclosed. Amt. \$
Charge my ☐ BAC ☐ M/C

_____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____

State/Zip _____

IMSAI 14000 Wicks Blvd. San Leandro, CA 94577

IMSAI®

The Standard of Excellence
in Microcomputer Systems

IMSAI Manufacturing Corporation
14000 Wicks Blvd. San Leandro, CA 94577
(415) 483-2083 TWX 910-366 7287

*U.S. domestic price only. PCS-80/30 kit available. Other PCS-80 kits start at \$999. Prices and specifications subject to change without notice.

CalComp. Zeta.

Decisions. Decisions.



Zeta Research

31 Serrano Dr. Concord, CA 94020
(415) 671-0800

Attendees Largely Novices

D.C. Expo Features Lesser Known Gear

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Snow and ice kept down crowds on the first day of the Personal & Small Business Computer Expo here recently, but clearer roads on the second day brought out the uninitiated into the world of small-scale computing — in force.

What these newcomers found at the Washington Hilton ranged from a Creative Computing game called "Computer Rage," T-shirts featuring the "Bionic Toad" and books urging them to *Take a Chance With Your Calculator* to all manner of micro-based CPU and CRT kits, turnkey microcomputer systems and Univac's BC/7 small business system.

Univac and Basic/Four Corp. looked somewhat out of place at a show dominated by distributors of personal computing gear and attendees who were mostly novices.

What visitors to this show didn't see were the major manufacturers in the microcomputing field, according to Harold Weinberg of Marketline Systems. Seals Electronics, Inc. exhibited its Peripheral Universal Processor (PUP-1) microcomputer, but Altair, Cromenco, Southwest Technical Products and Imsai were absent, he noted.

The chief kit makers won't be seen at shows in the eastern U.S., Weinberg predicted, until the Atlantic City Personal Computing Exposition, scheduled for the end of August.

Hobby Market 'Limited'

The component makers and kit distributors who lined the booths of this show aimed their wares more at the small businessman than the hobbyist, in Weinberg's view. "They want to attract the \$1 million sales company and the sophisticated retailer because the hobby market is somewhat limited," he said.

One of the show's 38 exhibitors, Jade Computer Products, which generally sells to hobbyists with its X-80 CPU kit, 8K static random-access memory and CRT interface kits, had a \$2,650 Info 2000 disk system on display for the first time.

"The market is moving toward small businesses and complete systems," Jade's Gregg Puckett said. "Most hobbyists couldn't afford the Info 2000 memory."

While it's "hard to keep up with the knowledge required to sell and service complete devices or systems, there's more money in these higher ticket items," Puckett stated.

Despite this trend by distributors, Puckett believes hobbyists "definitely aren't dying out." Building a micro-based computer system is "still the cheapest way to get a thinking machine bigger than a calculator," he said.

While the hobbyist might continue to frequent computer shops even though those shops are shifting their attention to the small businessman, the owner of a store called Intelligent Business Machines believes businessmen will turn directly to manufacturers of microcomputer systems if the shops can't repair what they sell.

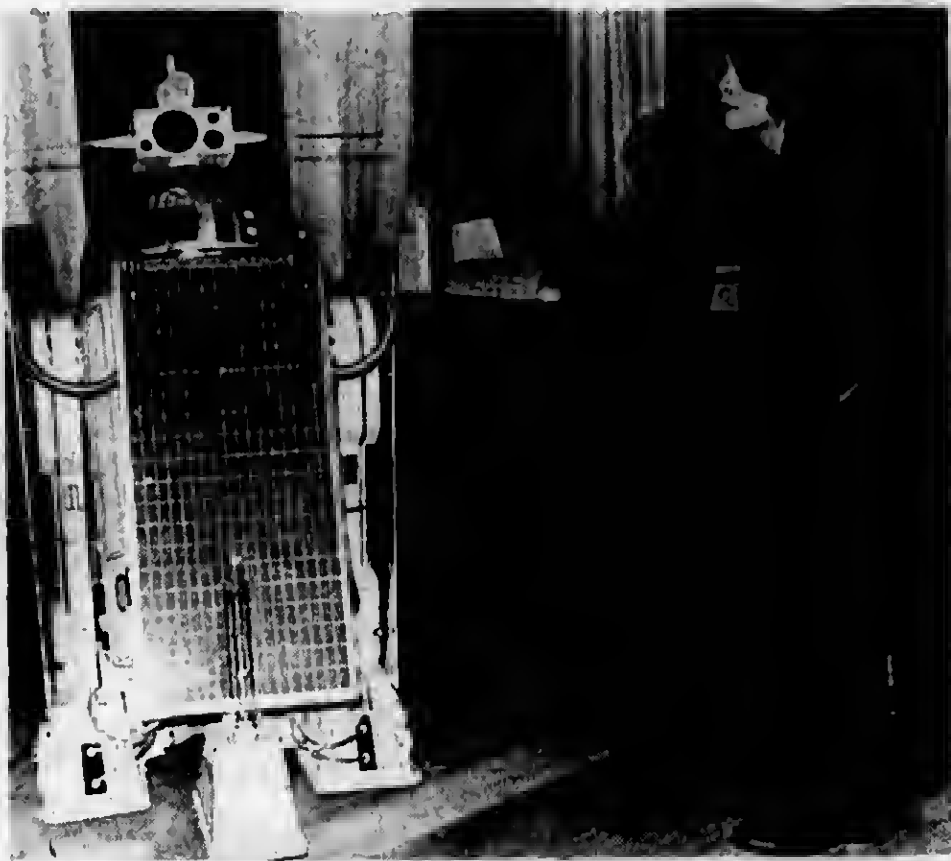
"The computer shop per se is dead as an outlet for small businesses in search of a computer system," according to Dr. Jerald Jay Zeger. The small businessman doesn't want a \$10,000 system to do the payroll for 20 employees; he wants a system, tailored to his business through customized software, that will help him decide what product lines to add and which ones to cancel, he added.

The computer store that wants to survive must be willing to repair that system when something goes wrong as well as to fine-tune it to the business' needs, Zeger stated.

Meanwhile, computer novices rather than interested businessmen or dedicated hobbyists filled the aisles of the show, produced by Felsburg Associates, Inc. of Bowie, Md.

Among the most popular attractions for these attendees were a computer store's replica of the robot R2-D2 from "Star Wars" and games such as Lunar Landing, Football and Star Trek, available on an IBM 5100 minicomputer. The desktop unit was displayed by an IBM-sponsored Boy Scout Explorer post.

The robot, named RX-1 by its creator, Computers Plus, rolled up and down one aisle, blinking its lights and talking electronic gibberish to passers-by. Adults and children alike were entranced by RX-1 — all except for three-year-old Marsha, who demanded to know where the machine's hands were.



CW Photos by E. Holmes

A "snow day" left school-age hobbyists free for a trip to the show, where a replica of the robot R2-D2 and retailers' displays captured their interest.

Percom Floppy Disk System Offers Compatibility With 6800

GARLAND, Texas — A minifloppy disk system that utilizes the Shugart SA-400 drive, has a capacity for 3K bytes of programmable read-only memory (Prom) and is compatible with the SS-50 bus of Southwest Technical Products Corp.'s 6800 micro has been introduced by Percom Data Co., Inc.

The LFD-400 comes in one- or two-drive configurations and includes a controller printed circuit board, disk operating system, disk drives, two minidiskettes, a power supply and interconnecting cable, a spokesman said.

The controller board includes voltage-drop regulators, a proprietary "bit shifting" compensation circuit and an inactivity time-out circuit, he added.

Disk speed of the unit is 300 rev/min with a data transfer rate of 125 kbit/sec. The read/write head is stepped from track to track at 40 msec/step and the drive system features a media interlock device, Percom said.

The LFD-400 storage media is a 10-sectored minifloppy diskette that accommodates 89.6K bytes of data on 35 tracks. Recording is performed in a Bi-phase-M or double frequency mode, the firm said.

The program for the disk operating system includes load-and-save routines and is contained in an erasable Prom bootstrap, the spokesman added.

The price of the system, in single- and

double-disk configurations, is \$549.50 and \$924.50, respectively. Percom is located at 318 Barnes, Garland, Texas 75042.

Super Basic Update Allows Serial I/O

PRINCETON, N.J. — Technical Design Labs (TDL) has upgraded its Version 2.1 of Super Basic with the introduction of Version 3.0, a 12K Basic interpreter.

Version 3.0 provides programmable error handling that allows the user to specify error routines without aborting a program, according to a spokesman.

It also allows serial data I/O from controlled and noncontrolled read/punch devices and provides an end-of-file detection routine, he stated, noting variable addressing and load/save specifications have been included.

The software package occupies 12K of core memory, is relocatable and was designed to run on Z-80 based systems, the firm said. It comes on a diskette (Software Package A) consisting of Version 3.0, Macro Assembler 2.2, Z-Tel text-editing language and the Text Output Processor.

The package costs \$249 from Technical Design Labs, Building H, Research Park, 1101 State Road, Princeton, N.J. 08540.

MICROCOMPUTING

G

GARBAGE — A slang computer term for unwanted and meaningless information carried in memory or storage. Also referred to as hash.

GENERAL-PURPOSE COMPUTER — A computer designed to solve a large variety of problems, e.g., a stored program computer which may be adapted to any of a very large class of applications.

GIGA — A prefix signifying one billion, or 10^9 .

H

HALF-DUPLEX OPERATION — A duplex communication system which can operate in either direction, but not in both simultaneously.

HALT — A condition which occurs when the sequence of operations in a program stops. This can be done to a halt operation being met or due to some unexpected halt or interrupt. The program can normally continue after a halt unless it is a drop dead halt.

HARD COPY — Typewritten or printed characters on paper produced by a computer at the same time the information is copied or converted into machine language that is not easily read by a human.

HARDWARE — Refers to the metallic or "hard" components of a computer system in contrast to the "soft" or programming components. The components of circuits may be active, passive or both.

ROM (Read-Only Memory) — Often consists of programmable read-only memories (Prom) that plug into simulation boards, enabling the prototype to assemble its own programs.

HARDWARE INTERRUPT FACILITY — A hardware interrupt facility permits input/output operations to be scheduled under interrupt control. The interrupt facility may be selectively enabled or disabled under program control. When the interrupt facility is enabled, a device generates a processor interrupt each time it is ready to receive or transmit data. Use of the interrupt facility enables input/output operations to be performed simultaneously with computing.

HARD-WIRE LOGIC — Refers to logic designs for control or problem solutions that require interconnection of numerous integrated circuits formed or wired for specific purposes and relatively unalterable. A hand-wired diode matrix is hard-wired logic whereas a random-access memory (RAM), read-only memory (ROM) or CPU can be reprogrammed with little difficulty to change the purpose of operations.

HEADER — The initial portion of a message containing any information, control codes and so on that are not part of the text (e.g., routing, destination, addressee and time of origination).

LEARNERS LEXICON

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc., 207 Kenyon Road, Champagne, Ill. 61820.



COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

Radio Shack TRS-80 Microcomputer System Evaluation and Survey of Applications by user (community college professor). Includes printed text and cassette tape narration. \$9.95. Also, Programming in BASIC course. 4 cassette tapes coordinated with 4 printed texts. \$19.95. Checks accepted. Tape'n Text, Williamsville Publishing Company, Inc., Box 237, Williamsville, N.Y. 14221.

For Sale: IBM 5100 Computer 32K, Basic, Aux Tape Unit, 5103 Printer (80 cps.). Please call Tony Schray (618) 544-9230.

IBM 1052/1053 SELECTRIC PRINTERS designed for DP applications. Heavier duty than Selectric typewriters; interface included. Guaranteed. \$500 for 1053, \$625 for 1052. ABACUS, (414) 693-8404.

TAXES SOFTWARE: Computes Form 1040 & 5 schedules. See if you can itemize, income average, etc. BASIC, 10 K min. Tarbell, Sol. Northstar, call about others. Cassette, \$20, Disk, \$26. DICOMP, 2053 Manzanita Dr., Oakland, Ca. 94811. (415) 434-4767.

COMPUTER IMAGE OF KING TUT Now you may order a computer image of famous Egyptian King Tutankhamun printed on heavy 8 1/2" X 11" poster stock. To order this excellent art, created from a computer, send \$1.50 postpaid to: Ball Data Systems, PO Box 114, Monroe, N.Y. 10950.

THE COMPUTER SHOP, a full service store in STATE COLLEGE, PA. (814) 238-7711. Closed Wednesdays.

FOR SALE: IBM 5100 COMPUTER. 64K APL, Printer, Aux Tape, Excellent for Colleges, etc. LCS, Box 44, Banning, CA 92220 (714) 849-6758.

Microsoft ("Altair") BASIC for 8080/Z80/6502 and FORTRAN IV for 8080/Z80 now available to OEMs, end users. 8080/Z80 BASIC has random, sequential files; double precision; IF ... THEN ... ELSE and more. FORTRAN produces optimized relocatable code, meets ANSI66 except complex. CP/M and ISIS-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 San Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 262-1486.

LEARN MICROCOMPUTER PROGRAMMING. At home. At your own pace. Complete course consisting of 10 lessons, problems, solutions, practical examples in 8080, 8085 assembly language. \$49.95. Write or call Pat for FREE BROCHURE. Logical Services, Inc., 711M Starlin Road, Mountain View, Calif. 94043. (415) 965-8365.

WANTED: Applications software in Basic for the Data General microNOVA with 28K and dual floppies. Outright purchase or royalty negotiable. Box 1415, 797 Washington St., Newton, MA 02160.

Computer Store Manager — \$20K plus for a new store to open in the Washington, D.C. area this spring. Computer sales experience and customer relations background necessary. Earnings unlimited with generous incentive plan and fringes. Reply in confidence to CW Box 1414, 797 Washington St., Newton, MA 02160.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02160. I have read the rules, and would like to place my ads as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (_____) _____

Apple II, Printer Linked

HERMOSA BEACH, Calif. — Microproducts has announced an interface for use between Apple Computers' Apple II microcomputer and Southwest Technical Products Corp. PR-40 printer.

The interface board plugs directly into Slot 3 of the Apple II. The printer, when connected, will print one line at a time, list the entire program without stopping as the screen scrolls up one line at a time or print

the entire contents of the CRT screen, a spokesman explained.

The operating software, included on a cassette, permits printer operation in either Basic or Assembly language, he added.

The board, interconnecting cable and programmed audio cassette costs \$49.95 from Microproducts, 1024 17th St., Hermosa Beach, Calif. 90265.

Lear Adds Peripheral Duo

ANAHEIM, Calif. — Lear Siegler, Inc. has introduced a CRT/printer package that includes the company's ADM-3A dumb terminal, Model 210 Ballistic printer and interconnecting cable.

The Dumb Connection Peripheral Package features 59 data entry keys, a 24-line, 12 in. screen and 1,920 characters, a spokesman said. It has 33 switches allowing the user to operate at 11 different transmission rates from 75 bit/sec to 19.2 kbit/sec, he added.



Lear Siegler Peripheral Package

Bidirectional Printing

The printer portion operates bidirectionally at rates of 75 line/min for 132 characters; 120 line/min for 80 characters; and more than 900 line/min for one character line, the firm stated.

Other printer options include fully

buffered input, upper and lower case plus underlining, a ribbon reinking system and single and multipart form printing, the firm said.

The package costs \$3,890 from the firm at 714 N. Brookhurst St., Anaheim, Calif. 92803.

For North Star

Disk System Gets Software

SPRINGFIELD, Ill. — The Diskette Utility Package (DUP), compatible with the North Star disk operating system with 6K to 16K of memory, is available from Business Computer Systems.

The DUP contains four statements — COMPRESS, which reduces Basic programs by removing unnecessary spaces; DISKCOPY, which allows copying of diskettes on a single drive system; FREEBLKS, which minimizes the number of blocks allocated to Basic programs to the actual number needed; and SORTDIRA, which sorts the directory by alphabetic file name and stores it on the back of the diskette, a spokesman said.

I/O Via Calls

All I/O is performed through calls to the disk operating system; the programs are in object form on the diskette, assembled to user specifications at the time of order, the firm added.

Price of the package on diskette and with documentation is \$25 from Business Computer Systems, 216 Collier Drive, Springfield, Ill. 62704.

Program Matrix Features Diodes

MAMARONECK, N.Y. — A program matrix board that incorporates diode pins for the sequential selection of functions has been announced by Sealectro Corp.

The Mini Promm matrix can be mounted on a printed circuit board on 100 centers. Changes in programs can be accomplished by moving the various programming pins, a spokesman said.

The unit is available in kit form. It costs \$37.50 from Sealectro's Programming Devices Division in Mamaroneck, N.Y. 10543.

Nortronics Offering Bulk Cassette Eraser

MINNEAPOLIS — A cassette bulk eraser that is said to require no alternating current or battery power source for operation has been introduced by Nortronics Co., Inc.

Erasure is accomplished by passing the cassette through a magnetic field created by built-in ceramic magnets, a spokesman explained.

The QM-230 is a hand-held unit and has applications in word processing, dictation security and other office operations, the firm stated.

Price of the eraser is \$24 from the firm at 8101 Tenth Ave. North, Minneapolis, Minn. 55427.

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.

NCR	Control Data	IBM	Intel Corporation	Sperry Univac
Varian Graphics	Datapro	General Computer	Peripheral Products	Terminal Rentals
Informatics	Printtronix	Allan Research	Applied Digital Data	Applied Data Communications
National Semiconductor	Codex	Telefile Computer Products	Epic Data	Data Forms Company
Dalamation	Lear Siegler	General Electric	Sykes Datatronics	Imperial Technology
Communication News	E & M	Qume	Cummins Allison	Mathematica
McCormack & Dodge	The Morley Company	Moore Business Forms	American Microprocessor	Rianda Electronics
Data Rentals	Varier Graphics	DataMedia	International Data Corp	Computer Corp of America
Computer Sales International	Total Typography	Texas Instruments	Programs, Inc	AT&T
Intel	Wang Labs	Computerworld	Beehive International	Cullinane
Electronic Ventures	Computer Devices	NCI	Interlec Data Systems	Hewlett Packard
Computer Roomers	Ann Arbor Terminals	Deltak	Software AG	Pansophic Systems
Customer Priorities	Datapro Research	Kodak	Creative Engineering	General DataComm Industries
Computer Software Solutions	Inforex	BASF	Graphic Controls	Continental Peripherals
Systems Marketing	Perkin-Elmer	Western Union	Mini-Computer Systems	Computer Associates
S.E.A.	Telcon Industries	Anderson Jacobson	Tandem Computer	Oantel
Tri-Data	Versalec	Computer Input Services	PCC/Perlec	Diablo Systems
Midwest Marketing	Computer Performance	Paradyne	Computrend	Marketechs
Logabax	Advanced Systems	ComData	Extel	Racal-Milgo
AAA Chicago Computer	Delta Data Systems	Genesis One	Mentel	Data Systems Specialists
Intelligent Systems	Infomer	Data Processing Sciences	Sycor	Key Tronic
Shasta	Computer Decisions	Applied Computer Systems	Digitronics	Administrative Management
Mostek	Infosystems	Agile	Computer Services	Small Systems World
DIVA	T-Bar	Woodford Systems	Datamart	American Terminal Leasing
SBC Magazine	Corporate Systems	American Used Computer	Courier Terminals	Journal Systems Management
Tele-dynamics	Dynatech	Business Forms Service	Trac/Hughes & Bomac	Optical Business Machines

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

For complete information on how the 1978 Computer Expo can work for you, use the coupon below or call Kim Wichert, toll free 800-225-4242. In Massachusetts, (617) 964-4550 (collect).



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
- ☐ Have Sales Representative call me
- ☐ Send Reservation Agreement
- ☐ Send Copy of 1977 Attendee Analysis

Southern California Computer Expo	Anaheim/LA	March 21-23
Northwest Computer Expo	San Francisco	March 28-30
Southwestern Computer Expo	Houston	April 11-13
Southeastern Computer Expo	Atlanta	April 18-20
Gateway Computer Expo	St. Louis	April 25-27
Midwestern Computer Expo	Chicago	May 2-4
Mid-Atlantic Computer Expo	New York	May 9-11
Great Lakes Computer Expo	Detroit	May 23-25
New England Computer Expo	Boston	May 30-June 1

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (____) _____

When the Name of the Game is Subsystem Cost Per Byte, We Have the Only Game in Town.

Ampex and MSC. Masterminds of more for less.

Over there is where you are going to put your snazzy, new, super-sophisticated minicomputer. Your PDP-11, HP3000 or 21MX. That Nova, Eclipse or the latest miracle from Interdata or Microdata. And over here, the space you've reserved for the disk subsystem to best meet your mass storage needs. The space where much of your computer's promise is going to spring to life. And the space where many of its potential problems might also be born.

It's to talk to you about that space that we've purchased this space. We are Microcomputer Systems, a company that among other things makes disk controllers. Together with Ampex, a company that among other things makes disk drives, we are offering disk subsystem packages that meet your top line performance requirements while you meet your bottom line cost objectives. Disk drives from Ampex's justifiably respected family of storage modules combined with our Series 1000 disk controller, a product of advanced microprocessor-based technology that has been field-proven to be the most reliable and maintainable in the business.

In short, not only do we think we can fill that subsystem space for you, we think we can fill it with the best subsystem at the lowest cost per byte.

Ampex. A familiar name in disk drive quality...and innovation.

What's in a name? Obviously more than Romeo thought when he uttered that now famous line. In the mass storage market, what is in a name — or behind it — can help open a door or close a sale. The name Ampex, for instance, implies credentials that are generously delivered by its product line. Performance. Reliability. Maintainability. Quality control. Innovative engineering

technology. And distinguished manufacturing techniques.

More specifically, that part of the Ampex product line that helps make up the MSC disk subsystem packages — the DM940, DM980, DM9100, DM9200 and DM9300 — offers a full range of capacities from 40 to 300 megabytes and the kind of feature list you would expect from a company like Ampex. Total family plug compatibility. Standard and custom interfaces. Variable sector formatting. Variable length record format. Double density upgrade on the 940 and 9100. Dual port upgrade. Simplified maintenance design. Changeable logical unit address. And, of course, any number of options to meet any number of needs.

Speaking up for the silent partner. The MSC Series 1000 Disk Controller.

The controller half of our subsystem packages is not as well known as our disk drive partner. But as a happily growing number of customers and a painfully groaning number of competitors are learning, Microcomputer Systems is a name to be reckoned with.

And little wonder. The Series 1000 is the consummate controller. With software support for all popular minicomputer operating systems. Micro-programmed controller architecture. Full ECC error correction. And operator-oriented self-testing capability. To be direct, the MSC Series 1000 is the most flexible, efficient, functional, maintainable, reliable, feature-filled and affordable intelligent controller on the market today.

Be the bottom line hero in your company. Buy the top line subsystem from ours.

This is the part of the ad where most companies trying to sell you a disk subsystem would take a lot of features and a lot of dollars, wrap them into one seemingly irresistible package, tie it all vaguely together with several smart sounding terms like "maximum cost efficiency" and "price/performance ratios," then run it up the flagpole.

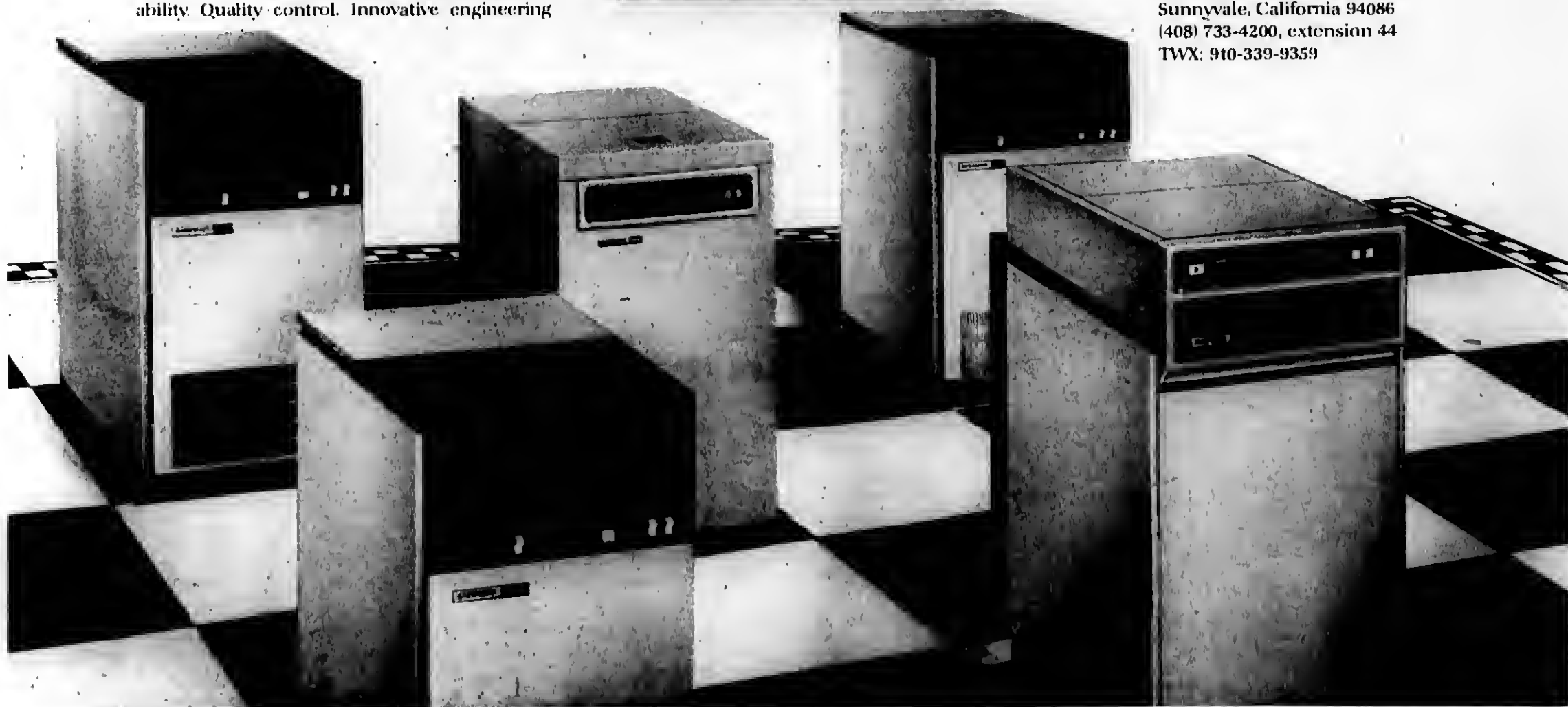
We'd prefer to put it more bluntly. Yes, we think the MSC/Ampex subsystems are, feature for feature, the best that you can buy anywhere today. But, with some estimable competition out there, the most important fact is that the MSC/Ampex subsystems deliver the lowest subsystem cost per byte. Period. Lower than Systems Industries. Lower than CalComp.

Doubt it? Pick up the phone, call (408) 733-4200, extension 44 and check it. After all, this is a game we're both playing for keeps.



**microcomputer
systems
corporation**

440 Oakmead Parkway
Sunnyvale, California 94086
(408) 733-4200, extension 44
TWX: 910-339-9359



Consultant Predicts Floppy Drive Sales to Grow 41%/Year

By Jeffry Beeler

CW Staff

MOUNTAIN VIEW, Calif. — Worldwide sales of floppy disk drives totaled \$277.8 million last year and will grow an average of 41.8% annually to surpass \$635.3 million by 1980, according to a market study released here recently by independent consultant James N. Porter.

In his 81-page study, Porter said U.S. manufacturers in 1977 accounted for 80% of the worldwide revenues from floppy disk drives, but he predicted that share would dip slightly to 76% during the next three years.

Last year, American sales of flexible disk drives totaled \$222 million, with the captive market accounting for \$140 million of that figure and the balance going to the noncaptive market. By 1980, U.S. revenues from the peripherals will near \$486 million, with the captive and noncaptive markets totaling \$343.8 million and \$142.1 million respectively, the report estimated.

Among non-U.S. companies, total floppy disk drive shipments approached \$56 million in 1977. Three years from now, foreign revenues in the industry will exceed \$149 million — \$107 million for the captive market and the remaining \$41.8 million for the noncaptive market, the study predicted.

Of the 19 firms currently constituting the domestic floppy disk drive industry, IBM accounted for the largest market share, with

1977 revenues totaling \$96.8 million, or 35% of all sales. By 1980, the company's hold on the floppy disk drive market will weaken to 32%, though its sales will rise to more than \$205 million, the report forecast.

In the captive sector, IBM proved even more dominant than in the floppy disk drive market as a whole. During 1976, the firm claimed 88% of domestic sales, with most of the remaining portions of the total \$88.8 million market divided among Sycon, Inc., Control Data Corp. and Datapoint Corp., Porter noted.

In the OEM market, however, a very different sales picture emerged. There, Shugart Associates ruled the roost in 1976 with a "commanding" 34.4% share of the total \$41.9 million market. Leading challengers to Shugart's dominance included California Computer Products, Inc. with an 18.1% market share and CDC with 14.3%, the study added.

Last year, Shugart maintained its lead in the OEM sector, while CDC took over second place from Calcomp, which Porter says suffered from Digital Equipment Corp.'s internal manufacturing program.

As a whole, the OEM sector accounted for about 70% of the 384,000 units sold worldwide last year, although it represented only 34% of total revenues. By 1980, OEM sales will constitute 65.5% of worldwide floppy disk drive shipments and 29% of

total revenues, the report estimated.

Despite a dwindling share of the world market, OEM sales of floppy disk drives will continue to expand, both in revenues and volume of units shipped, Porter added. Last year, sales totaled \$93. million, of which the U.S. contributed \$82 million, and unit volume fell just short of 270,000.

In 1980, worldwide OEM revenues from the products will rise to \$183.9 million, including domestic sales of \$142.1 million, and shipments will more than triple to 886,000 units, the study predicted.

Analyzing floppy disk drive market trends by product class, the report noted that 8-in. one-sided units accounted for 99.7% of global sales in 1976 when revenues and shipment totaled \$165.6 million and 198,000, respectively. In 1977, the product category's share of total revenues fell to 85.5% and its share of total shipments slipped to 83.7%, even though sales rose to \$237.4 million and unit volume jumped to 322,200.

By 1980, revenues from 8-in., one-sided units will constitute 29.1% of all floppy disk drive shipments for a total volume of 258,000 products. At the same time, revenues will top \$198 million for a 31.2% share of total floppy disk drive sales, Porter found.

In the 8-in., two-sided drive sector, shipments in 1977 totaled 5,700 units or 5.7% of total floppy disk drive volume. Revenues, meanwhile, exceeded \$31 million, which represented 11.2% of total 1977 sales in the floppy disk drive market.

Three years from now, shipments of the 8-in., two-sided products will account for 46.2% of worldwide floppy disk drive volume and 59.4% of total revenues.

Smaller Drives

In the 5.25-in. drive sector, shipments numbered 40,600 units and sales totaled \$9.3 million — figures that, respectively, represented a 10.6% and 3.3% share of the worldwide floppy disk drive market, the study noted. By 1980, the 5.25-in. drive's share of the total floppy disk drive shipments will rise to 24.7% and its share of total revenues will nearly triple to 9.4%.

Revenues from the 5.25-in. units will near \$60 million in three years, and shipments will total 219,000 units, the report added.

As expected, Porter found that U.S. manufacturers dominated sales of all three floppy disk drive categories. Last year, domestic revenues from 8-in., one-sided drives accounted for 76% of the worldwide market. During the next three years, that market share is not expected to change much, even though U.S. shipments will shrink from 182,100 to 152,400 units.

IBM Reportedly Slating 3032s For People's Bank of China

HONG KONG — IBM is planning to ship at least two 3032 systems to the Hong Kong branch of the People's Bank of China, according to *EDP Japan Report*, a newsletter by International Data Corp. Japan.

But an IBM spokesman would neither confirm nor deny that report. He did say "I can confirm that we have been having business discussions with the Bank of China in Hong Kong over a period of time, but we prefer not to disclose details since we consider the discussions confidential."

Recently, Chairman Frank T. Cary and a number of other IBMers visited China after attending a board meeting in Tokyo. Prior to departing for China, Cary stated: "We simply want to learn more about the People's Republic of China's cultural and industrial development, its data processing requirements and the opportunity for trade there," according to the report in *EDP Japan Report*.

Apparently the 3032s will be used for on-line processing of foreign exchange transac-

tions by the bank. The bank is planning on a system whose total value is about \$20 million: \$10 million for dual CPUs and \$10 million for terminals, *EDP Japan Report* indicated.

Banking terminals from Nixdorf Computer will be installed at 800 sites — either branches or other banks affiliated with the People's Bank.

Six persons from China, including those involved with the on-line banking program at the People's Bank, visited the Yasu plant of IBM Japan where the 3032 is currently being produced. The group also visited major commercial banks that have developed advanced, on-line banking systems, the report continued.

The group was interested in problems associated with operating a network in which the CPU and terminals are from different manufacturers; the amount of system software and its memory requirements; maintenance operations and ways of coping with system failure, the report said.

**No printer company has
more service locations worldwide
than Centronics.**

And no one can give you a more cost effective service contract for your Centronics printers. For full details call today. Toll free: 1-800-258-1952. Or write Centronics Data Computer Corp., Hudson, NH 03051.

CENTRONICS® SERVICE

Simply Better

COMPUTER INDUSTRY

Buoyed by Outright Sales

IBM Earnings Set Record for Year, Quarter

ARMONK, N.Y. — Buoyed by a high rate of outright sales of DP equipment, IBM's earnings set records in both the quarter and year, rising 18.3% for the quarter and 13.4% for the year ended Dec. 31.

Revenues, including adjustments for foreign currency, rose 11.5% in the quarter and 11.2% for the year.

High worldwide levels of outright purchases of DP equipment resulted in a "record level for the year, with the fourth quarter higher than any previous quarter," Chairman Frank T. Cary said.

"Outright purchases of DP equipment are expected to continue at high levels. However, it is unlikely that the strong rate of increase experienced in 1977 will continue in 1978. If it does not, period-to-period earnings comparisons will not be as favorable as they were in 1977," he stated.

For the year, earnings totaled \$2.719 billion or \$18.30 a share compared with year-ago figures of \$2.398 billion or \$15.94 a share.

Contributing to the year's earnings was a \$28 million

gain in foreign currency exchange. Other income totaled \$475.2 million, down 3.9% from \$494.469 million last year.

Revenues for 1977 totaled \$18.133 billion, up 11.2% compared with \$16.304 billion

stantially ahead of 1976. This contributed to a year-end backlog well in excess of last year, even though 1977 shipments exceeded the high levels achieved during the previous year," he continued.

During the quarter, earnings

spokesman attributed the decline, both for the year and the quarter, to the firm's use of cash and marketable securities in purchasing its own shares.

Fourth-quarter revenues totaled \$5.038 billion, up 11.5% from \$4.518 billion in the same period last year. The increases in sales and rentals and services were similar to those for the year.

Sales rose 19.1% to \$2.197 billion from \$1.845 billion. Rentals and services rose 6.3% to \$2.841 billion from \$2.674 billion in the year-ago period.

For the year, operations outside the U.S. contributed revenues of \$9.125 million compared with \$8.154 million in 1976, while earnings were \$1.228 million compared with \$1.057 million in 1976, which was restated on a comparable basis, Cary said.

Financial News

in the previous year. Outright sales rose 19% to \$7.09 billion from \$5.959 billion last year, while rental and services revenues rose only 6.7% to \$11.043 billion from \$10.345 billion last year.

"The relatively low increase in 1977 continues to reflect the heavy purchase activity which took place during the past two years," Cary added.

"Incoming orders were sub-

rose 18.3% to \$797.4 million or \$5.38 a share compared with nearly \$674 million or \$4.47 a share in the same period last year.

IBM posted a gain from foreign currency exchange of \$64 million in the fourth quarter.

Other income declined 10.3% to \$123.4 million compared with \$137.6 million in the same period last year. An IBM

Telenet Offer Yields \$8.3 Million

WASHINGTON, D.C. — Although many firms avoid going to the public for funds, Telenet Corp.'s offer of 951,087 shares of common stock yielded the firm \$8.3 million in equity financing.

The offering, at \$9 a share, was oversubscribed. Of the total, 625,000 shares were sold to the public and 951,087 were sold direct to the firm's six

largest stockholders for \$2.7 million. More than half the \$2.7 million amount is to be paid by the surrender of promissory notes of Telenet by the stockholders.

Plans for Expansion

Proceeds will be used primarily for expansion of the firm's data communications network and marketing, the

support of higher speed terminals and the introduction of new message services.

Bolt Beranek and Newman, Inc., which formed Telenet in 1972, purchased 133,313 Telenet shares for about \$1.1 million and said it will, as a result, own an approximate 29% interest in Telenet, which operates a packet-switched data network.

If you own a TI Silent 700®



get sensitive.

For what you pay for thermal paper, you should get consistent imaging and quick delivery. No maybe's. We say you can. And pay less. Come to the Sensitive Paper People. Try our paper. Free.



GRAPHIC CONTROLS
COATED PRODUCTS DIVISION

Silent 700® is a trademark of Texas Instruments

sensitivity coupon

Send one free roll for Texas Instruments Silent 700®

Annual Usage _____ rolls Paper Number _____

Name _____ Phone _____

Firm _____

Address _____

City _____ State _____ Zip _____

Mail to Coated Products Division, Graphic Controls Corporation,
P O Box 1309, Buffalo, NY 14240

Or call toll free 800-828-7978.
(In New York State, call 716-847-7500)

CW-TI-1

Nickels & Dimes

Applied Data Research (ADR) expects 1977 results will set records with total revenues of about \$20 million, President John R. Bennett indicated. The firm's recent sale of its Communications Systems Division to Communications Group, Inc. allows ADR to devote full attention to expansion of its software operations, he added.

\$\$\$

Dividend time: Anacomp, Indianapolis-based service and facility management firm, declared a quarterly cash dividend of 5 cents a share on common stock payable Feb. 10 to holders of record Jan. 18.

National CSS will pay 6 cents a share March 7 to holders of record Feb. 15, the firm's seventh consecutive quarterly dividend.

\$\$\$

Quantor has doubled its line of credit since January 1976 to \$17 million through Crocker National Bank.

\$\$\$

Functional Automation, Nashua, N.H., has received investment from the Palmer Organization. Functional Automation plans to introduce a 64-bit system directed at

specialized preprocessing applications.

\$\$\$

Data Terminal Systems shareholders have some goodies coming to them. First is a 3:1 stock split in the form of a dividend payable Jan. 31 to holders of record Jan. 20.

The total number of authorized shares has been raised to 15 million from 2.25 million.

In addition, the firm announced its first cash dividend, a year-end distribution of 30 cents a share before the split or 10 cents a share post split.



NCR Chalks Up 50% Rise in Earnings for 1977

DAYTON, Ohio — NCR Corp. wound up 1977 with a whopping 50% rise in earnings on a 9% increase in revenues, marking its second consecutive record year.

Fourth quarter results also showed a hefty increase in earnings, 52%, on an 8% rise in revenues.

NCR Chairman William S. Anderson said the increased profitability of the firm's U.S. operations was the principal

factor in the earnings improvement but that international earnings also showed a strong gain over the prior year.

"Better margins resulted from a number of actions taken in recent years to improve the productivity and efficiency of our manufacturing, marketing and service operations," he said. "We expect this favorable trend to continue."

For the year, NCR's earnings totaled \$143.6 million or \$5.09 a share compared with \$95.6

reached \$59.3 million or \$2.07 a share compared with \$38.9 million or \$1.41 a share in the

totalled \$118.1 million, an increase of 25% over \$94.3 million the previous year.

"We are anticipating continued growth in demand in our major markets and a favorable business climate in most countries. These factors, in combination, with our many new products and continuing emphasis on cost control, should produce very satisfactory progress in 1978," Anderson commented.

NCR's board of directors raised its quarterly dividend rate 25% to 25 cents a share and declared a dividend at the higher rate payable to shareholders of record March 17.

Financial News

million or \$3.60 a share in 1976.

Revenues totaled \$2.521 billion compared with \$2.313 billion a year ago.

For the quarter, earnings

same period last year.

Fourth quarter revenues amounted to \$774.3 million compared with \$715.8 million in the year-ago period.

During the year, the firm reduced its long-term debt by \$112 million. Working capital was increased from \$775 million to about \$865 million.

In 1977, the firm's product development expenditures

Earnings Rise 16%, Revenues 12% For Burroughs in Record Year

DETROIT — Burroughs Corp. was among those turning in record performances in the fourth quarter and in 1977.

For the year, earnings rose 16% while revenues grew 12%.

In 1977, revenue from worldwide operations totaled \$2.127 billion compared with \$1.902 billion in 1976. Rental and service revenue increased 14%, and revenue from the outright sale of products increased 10%.

Earnings for the year totaled \$215.2 million or \$5.31 a share compared with \$185.9 million or \$4.62 a share in 1976.

Fourth-quarter revenues rose 15% to \$679.1 million compared with \$589 million in the year-ago period.

Earnings for the quarter also rose 15% to \$94.1 million or \$2.32 a share compared with nearly \$82 million or \$2.04 a share in the 1976 fourth quarter.

Worldwide incoming orders during 1977 increased 12% over those of 1976, with orders in the fourth quarter showing a continuation of the improvement trend recorded in the second and third quarters, according to Chairman Paul S. Mirabito. Worldwide backlogs at year-end increased 15% over year-end 1976, he said.

During the year, the firm reduced its total debt to a level of less than \$400 million.

Memorex Net Higher Than Ever

SANTA CLARA, Calif. — Memorex Corp. reported record earnings and revenues for 1977.

Revenues rose 31% to \$450.1 million compared with \$344.6 million in 1976. Earnings for the firm rose to \$56.3 million, or \$8.87 a share, including a tax credit of \$22.2 million, compared with \$40.1 million or \$7.10 a share last year when there was a tax credit of \$15.2 million.

Results also rose for the fourth quarter, when revenues totaled \$124 million, up 24% over the \$100.1 million in the comparable 1976 period.

Earnings for the quarter totaled \$15.4 million or \$2.37 a share, including \$5.9 million from tax credits.

Memorex and the Bank of America revised their financial agreement regarding senior debt to permit reborrowing of any voluntary prepayments.

By the end of the year, the firm had made prepayments of \$26 million, reducing senior debt to \$42 million.

Largely as a result of these prepayments, cash and temporary investments were reduced from \$43.8 million at year-end 1976 to \$12 million at year-end 1977, the firm

said.

Total indebtedness, including Memorex's 5.25% convertible subordinated debentures, due 1990, has been reduced by \$45 million to \$113 million at year-end.

Profits Down At Microdata

IRVINE, Calif. — Microdata Corp.'s first-quarter earnings declined compared with those of the year-ago period, but profit margins on product sales increased.

The firm earned \$640,000 or 29 cents a share compared with year-ago figures of \$687,000 or 31 cents a share for the period ended Nov. 30.

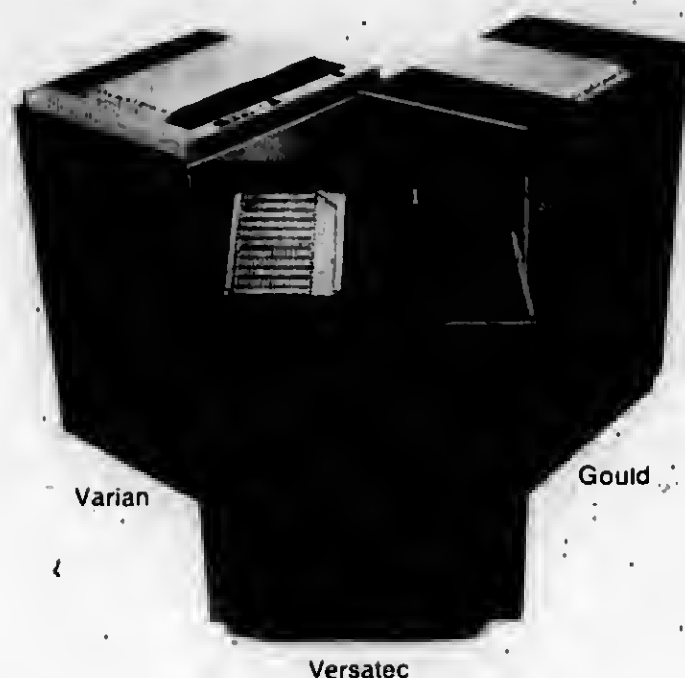
Revenues dropped to \$9.4 million from \$9.6 million in the same quarter last year.

Product sales were down to \$7.5 million from \$8.5 million in the year-ago period, but services and other revenues almost doubled to \$1.9 million from \$958,000.

Microdata said its profit margins on product sales rose to 45% from 38% in the fourth quarter of fiscal 1977. The firm's consolidated tax rate declined to 20% from 43% because of increased Puerto Rico profits, the firm indicated.

Service revenues rose 113% over the first quarter of 1977 and the firm's backlog, as of Nov. 30 was about \$19 million.

If you own one of these



get sensitive.

You pay plenty for electrostatic paper. You should know about our new paper that makes brighter images and costs less. Try a roll free. Come with the Sensitive Paper People.

GRAPHIC CONTROLS
COATED PRODUCTS DIVISION

sensitivity coupon

Send one free roll or fanfold to fit:
☐ Gould, ☐ Varian, ☐ Versatec

Annual Usage: _____ rolls Paper Number: _____

Name: _____ Phone: _____

Firm: _____

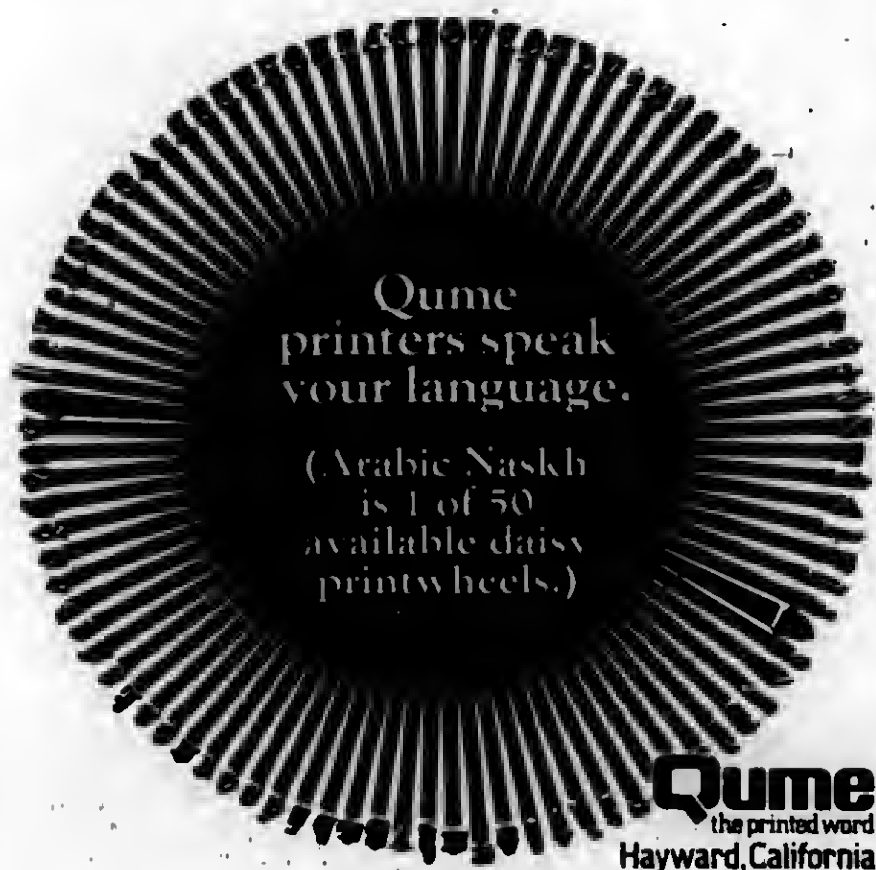
Address: _____

City: _____ State: _____ Zip: _____

Mail to Coated Products Division, Graphic Controls Corporation, P.O. Box 1309, Buffalo, NY 14240

Or call toll free 800-828-7878.
(In New York State, call 716-847-7500.)

CW-E-1



Qume
printers speak
your language.

(Arabic Naskh
is 1 of 50
available daisy
printwheels.)

Qume
the printed word
Hayward, California

Bubble Memory Sales Seen Thriving by '80s

WELLESLEY, Mass. — Starting from a few sample shipments in 1977, sales of magnetic bubble memory systems will grow to \$3.38 million by the end of the year and to \$231 million by 1983, according to an industry marketing report published recently by Venture Development Corp. (VDC).

By the mid-1980s, the market for bubble memories could exceed \$1 billion if manufacturers can make the products cost-competitive with moving head disks, the market research firm added.

Bubbles vs. Disk

Almost 90% of the sales magnetic bubble memories are expected to generate during the next five years will come at the expense of rotating disk

drives, especially the fixed-head disk variety. "Whether in telephone central stations and PBXs, airborne computers or industrial and commercial fixed-head disks, bubble memories provide the same virtues as the head-per-track disk, but in greater degree — faster access, greater ruggedness and reliability — at a comparable cost," the VDC report concluded.

Superiority

Because of this functional superiority, the emerging bubble technology will have a "devastating" effect on the fixed head disk business, the study added.

Damage to the floppy disk industry will prove much less serious. "Bubble memories will encroach on floppies

only in applications for which floppies would be a doubtful choice, either because removal of the diskette itself for archival storage is not contemplated or because the environment — temperature, atmospheric conditions or mechanical stress — are beyond the floppies' capability," VDC said.

Up 33%

Annual growth in the floppy disk drive industry will average 33% during the next five years, the report predicted.

Bubble domain memory offers several advantages over alternative data storage technologies, the study noted:

- It needs no maintenance and has no parts that can fail mechanically.

- It will provide long-term stability and reliability two orders of magnitude greater than the performance of the best disks. Some scientists have credited bubble memory systems with error rates of less than one in 100 trillion bits and with the capacity to retain stored data for 100 years.

- It will offer much higher data density, be much smaller and lighter and prove much more rugged than disk drives.

Only in data transfer rate will disk drives outperform bubble memory systems, and the newer technology will compensate for that disadvantage by providing superior access time, the study asserted.

Major Applications

Partly because of these capabilities, bubble memory systems will prove especially well suited for use in industry, data processing, the aerospace field and other nontelephone applications, VDC continued. In fact, these areas will account for about 56% of all bubble memory revenues in 1983.

The remaining systems will probably go into telecommunications networks, where a high premium is placed on reliability and freedom from mechanical defects. One likely telecommunications application for magnetic bubble memories is as replacements for the fixed head disks that telephone companies use in large quantities in their central switching offices, the study predicted.

Voice Uses

In fact, such systems are already in use at a Detroit telephone office for recording voice announcements, and they will eventually become commonplace as components in private PBXs as well, VDC forecast.

Magnetic bubble memories will also find extensive telecommunications applications as satellite recorders, airborne computers and other military and space equipment requiring high data accuracy rates and large storage capacities, the report added.

Telecommunications

Bubble memory systems will prove so useful in telecommunications hardware primarily because, unlike fixed head disk drives which rotate continuously, they contain no moving parts except "bubbles" of reverse magnetization that flow along loops of permalloy tracks in a garnet layer. Hence, they incorporate no components to go "out of whack," VDC explained.

Bubbles' Place

In the spectrum of magnetic data storage products, bubble memories occupy a place somewhere between very fast random-access memories and relatively slow disk drives. For short-term storage of moderate quantities of data, semiconductor technologies like charge-coupled devices will prove more practical because of their faster access, high data transfer rates and simpler interfacing requirements.

"But where nonvolatility and exceptional reliability are required, the bubble domain memory is the logical choice," VDC concluded. The firm is located at One Washington St., Wellesley, Mass. 02181.

Register now for DataComm 78!



Call 800-225-4242*

Don't miss the one Data Communications Industry Conference and Exposition held in the city where DataComm: policy and regulation are established!

Profit from vital information, insight, ideas brought to you by nationally known data-communications experts! Be there in person. Don't get DataComm secondhand!

Call 800-225-4242

Take part in panels and sessions that let you ask your questions, share experiences, express your needs.

Make DataComm your personal conference, choosing your options each day — ranging from tutorials for the beginner to advanced networking panels for the sophisticated user.

Call 800-225-4242

And register for one, two, or all three action-packed days, including:

Keynote Speaker—Richard Wiley, former chairman of the FCC • 19 Vendor/User Rap Sessions • 3 Special Management Sessions • 6 Network Tutorials and Panels • All Day Government Miniconference and MORE!

FREE! The Exposition at DataComm 78 will feature exhibits from manufacturers all over the country. Discuss your needs and plans with key representatives in a quiet-paced, informative atmosphere.

Call 800-225-4242

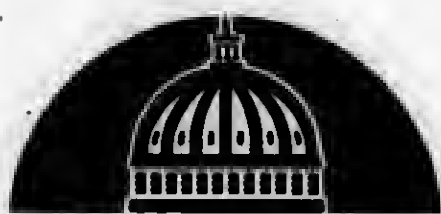
REGISTER NOW!

If this is the first news you've learned about DataComm 78, don't miss this chance to attend.

AFFORDABLE:

UNMISSABLE! Just \$115 for the whole DataComm Conference, or \$50 each for single days.

Don't delay! Master Charge, American Express, Visa/BankAmericard accepted. Call our toll-free number now to arrange your attendance at DataComm 78—the ONE conference you don't want to read about later and be sorry you missed.



DataComm

78

CONFERENCE AND EXPOSITION

February 21-23, Washington, D.C.

*Inside Massachusetts, call collect: (617) 964-4550. Or write DataComm 78 Registration.

The Conference Company

60 Austin Street, Newton, MA 02160

DeCastro Cites Economic Reasons DG Planning More Expansion Outside Mass.

BOSTON — Data General Corp., which has been expanding at a vigorous rate in areas outside of Massachusetts, intends to adhere to that pattern for the immediate future, according to President Edson D. deCastro.

In explaining to stockholders the reasons for DG's selection of out-of-state sites, he said, "We continue to view the state as uneconomical for further major expansion of our operations aside from the necessary enlargement of our headquarters and administrative activities."

"The climate for industrial growth shows little improvement in substance, despite increased attention paid to the problem by many of the state's leaders," he continued.

"Our experience in expanding in other states has justified our original reasons in locating there. We have found a more cordial and cooperative attitude on the part of local and state officials in working with industry."

"And the lower per capita tax burden at these locations has proved more attractive for employees, both direct labor and professional."

"As in any high-technology company, DG largely depends upon the skills and brains of our employees and our ability to attract new ones in considerable numbers," he remarked.

"The Boston area, because of its fine educational institutions, has long been a center for such people, but it no

longer has a monopoly. Many other areas now develop and attract these people. And many of these areas have more attractive living standards and better tax structures."

DG has "no intention of curtailing our operations here or moving large numbers of employees to other states as other industries have done. And we intend to work within the state to improve its economic circumstances as best we can. However, we have concluded that our future expansion lies largely elsewhere for now," he said.

DG's facilities in other states include a 134,000 sq-ft assembly plant in Westbrook, Maine, a 105,000 sq-ft facility in Portsmouth, N.H., and two

sites in North Carolina. These include a 58,000 sq-ft R&D facility and a 135,000 sq-ft manufacturing facility scheduled to be in operation in March.

DG has a semiconductor facility in California and the firm plans to build a 150,000 sq-ft building for assembly and product development work in Austin, Texas.

In addition, the firm has assembly and packaging operations in the Far East.

During the year, the company expects to add another 666,000 sq ft to its 1.6 million sq ft of plant, an increase of over 42%, according to Paul Stein, vice-president of manufacturing.

Banks Barred From Providing DP Services

CINCINNATI — Federal home loan banks cannot provide DP services, according to a decision by the U.S. Court of Appeals, Sixth Circuit.

The 3-0 decision came in the four-year-old case brought by the Association of Data Processing Service Organizations (Adapso) and United Data Processing, Inc. against the Federal Home Loan Bank Board (FHLBB). Five districts intervened in the case on behalf of the FHLBB.

The original ruling was handed down by Federal District Judge Carl B. Rubin.

The Appeals Court ordered the district court to hold a hearing concerning the divestiture of the banks' DP services. The FHLBB said it will not take the issue to a higher court.

Adapso had filed the case against the FHLBB because banks were providing DP services to savings and loan institutions.

Adapso contended that the federal home banks' exemption from taxation "constitutes a form of unfair competition."

Rubin ruled that the "providing of data processing services to member institutions is not an express power granted to the federal home loan banks or Federal Home Loan Bank Board" by the 1932 act.

Telecredit, TRW Make Settlement

LOS ANGELES — TRW, Inc. and Telecredit, Inc. said they have settled out of court Telecredit's patent infringement suit against TRW and TRW's counterclaims.

Telecredit will seek a reissue from the Patent Office of two of its patents in the credit-checking field and TRW has an option for a nonexclusive, paid-up license on each of these patents for \$200,000 each.

In addition, TRW has an option to take a similar license of Telecredit's magnetic strip patents for another \$200,000. Both firms agreed TRW does not currently have a product that infringes these patents.

"We have not yet begun to distribute."

A Special Report on Distributed Data Processing in our February 27th Issue

According to independent studies by Becker Research, Inc., only 20% of *Computerworld* subscribers' organizations "currently use a distributed approach to data processing," so the buzzword of the late 70's has yet to become a byword.

On the other hand, 27% of *Computerworld* subscribers say their organizations are now "planning to use a distributed approach to data processing" — which indicates a substantial current interest in what some have called the wave of the future.

Of course, there are still wide differences on just what is meant by distributed data processing. And that's one of the topics to be covered in our February 27th Special Report.

Edited by Esther Surden, this report will gather opinions on what DDP is from several sources, including mainframe manufacturers and users.

It will also give some practical help to DDP users and prospective users — with articles on configuring networks, distributing data bases, and selecting and maintaining equipment.

"Distributed Data Processing" will also report on users' experiences with DDP — both pro and con.

If you're into DDP, planning to be into it, or thinking about it at all; this report is the place to be when our February 27th issue reaches your desk. Closing date is February 10th.

And if you're marketing products or services in the DDP field, make sure your ad is there. Contact your *Computerworld* salesman, or call Terry Williams at (617) 965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486

Show and Tell.

To learn more about computers at any level, you have to hear. Discuss. Ask questions. Share ideas. Watch things work.

Computer shows dot the map every year. But Computer Expo 78 is different. An exhibit showing you all that's new: A conference telling you about new ways to use it.

The Show.

The Exposition. Your chance to hold a one-to-one consultation with hundreds of representatives in the know from the nation's top manufacturers. You don't have to travel all over. They're coming soon to a city near you.

And the Show is free! Including exhibitor seminars and demonstrations of the latest developments in:

Data Communications Terminals • Software • Minicomputers • Data Input Equipment • Computer Output Equipment • Supplies • Magnetic Media • Modems • DP Education • Small Business Computer Systems • Flexible Disk Drives • Data Communications Interconnect Equipment • Mini-peripherals • Magnetic Tape Transports • Cassette Systems • Power Supplies • Printer Terminals • Keyboards. And more.

Ask your questions. State your needs. Discuss your plans. This low-key atmosphere is your chance of the year to compare what's on the market, all in one place. As sophisticated or as simple a show as you need. You're the center of attention, whatever your level.

You're important enough to bring top people from all over the country to you. Find your show dates here:

ANAHEIM Southern California Computer Expo	March 21, 22, 23 Disneyland Hotel
SAN FRANCISCO Northwestern Computer Expo	March 28, 29, 30 San Francisco Civic Auditorium
HOUSTON Southwestern Computer Expo	April 11, 12, 13 Astrohall
ATLANTA Southeastern Computer Expo	April 18, 19, 20 World Congress Center
ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

COMPUTER CARAVAN'S



Save time!

To register, to get more information or for your free advance tickets to the Exposition, call TOLL FREE: 800-225-4242. (In Massachusetts, call collect: 617-964-4550.)

The Tell.

The Conference. Computer Expo's Conference takes place from 9 AM to 1 PM, leaving your afternoons free for the Exposition. The Conference includes keynote speeches, case studies, presentations, panel discussions and workshops. All put together by experienced conference planners, making this the most respected conference in the country. Well-known authorities—consultants and users—will share experiences, ideas, insights and foresights with you.

These are days that will bring you facts you need now, to put to practical use now. No frills, no fluff.

Whatever your level, you'll find at least one of these days a must:

Tuesday

For you on the executive level, dealing with data processing personnel, problems, payments, plans.

The Executive Briefing.

A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing. Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday—Simultaneous Double-Conference

For you who are bringing in a first computer system for a small company, or are involved in light inhouse computer use—maybe about to trade up—or just thinking about your own system.

Small Business Systems.

A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

For you who interface with computer personnel on a day-to-day basis and need to anticipate, communicate, elicit their best work.

Managing People Problems.

A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Thursday

For you, the manager or technician whose organization is thinking of distributing its computer resources to regional offices and plants.

Distributed Data Processing.

A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Take one, two, or all three days.
Send yourself. Send your key personnel.
The Exposition is free.
The Conference is just \$55 per single day, only \$135 for all three days.
Register now.
For the Show.
And for the Tell.

Write to
Conference Chairman
Computer Expo 78
60 Austin Street
Newton, MA 02160

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION ANNOUNCE- MENTS



WHY EDP SEARCH?

Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833



DATA PROCESSING PROFESSIONALS be with the best, be with BECHTEL

We're one of the international world leaders in the field of engineering and construction management. If you're looking for an innovative and active professional career in data processing, we offer outstanding opportunities. If you have a minimum of two years experience in the following areas we'd like to talk to you:

- SENIOR SYSTEMS ANALYSTS
- BUSINESS PROGRAMMER/ANALYSTS
- ENGINEERING PROGRAMMER/ANALYSTS
- SENIOR SYSTEMS PROGRAMMERS

Write or call in confidence:
Mr. K. David Bates (415)
768-5942 collect. Bechtel
Corporation, Employment
Dept. 8-6A-8, P.O. Box 3965,
San Francisco, CA 94119.



An Equal Opportunity Employer M/F

Engineering

Software
Designers

Telecommunications can place a new perspective on your Career Thinking!

CALL TOLL FREE, SUNDAY

(800) 323-1966

In Illinois (800) 942-0491

Monday thru Friday from 8 am to 5 pm cst

Consider applying the latest advances in complex systems to a field larger than any business computer network... the highly visible opportunities on the design team who will make major breakthroughs in large scale telephony process control. The perspective opens new horizons... greater depth and breadth of opportunity for early responsibility, and professional advancement. If you have qualifications that match some of the areas below, take a closer look at GTE Automatic Electric Laboratories.

SOFTWARE DESIGN ENGINEER

Responsible for the specification, design and testing of telephone systems support software, network and control software, or maintenance and diagnostics software. Prefer a minimum of 3 years' experience in structured design, coding, testing and documentation of programs; development with large data base on multi-file computers and real-time systems. HIPO design documentation, TSO usage and software simulation techniques. Requires a BS or MS in Computer Science or Electrical Engineering and specialized study in the use of PL/1, Fortran, Assembler, Intel 8080 and PDP-11 programming languages.

DATA BASE DESIGN

This position requires a minimum of 5 years' experience in the planning development, design and implementation of data base software, including data base management systems administration. Your primary responsibilities will be the development of data base system for a large on-going project including the implementation, support and administration of systems.

TELETRAFFIC & PLANNING ENGINEER

Responsible for the analysis of teletraffic probability and queuing problems on digital and analog switching and the development of computer programs for switching systems. Perform control and route reliability studies, define and analyze problems for future systems features and their applications. Prefer a minimum of 3 years' experience in real-time control systems teletraffic problems, systems equipment quantities specification, and exposure to switching system specification. Requires a BS or MS in Electrical Engineering, Computer Science or Math and a strong statistical background and experience in PL/1 or Fortran programming and model simulation.

MINI-COMPUTER PROGRAMMERS

We have specific assignments available on project development teams responsible for the design implementation of various telecommunication processing systems utilizing minicomputers as the processing element. Responsibilities will include the development of software programs for real-time operating systems as well as unique hardware elements incorporated into the systems.

If you have in-depth expertise in one or more of these areas, a BS, MS or PhD in Electrical Engineering, Computer Science, Math or other appropriate engineering discipline and have an interest in moving forward with one of the challenging new frontiers in computer technology, talk with us.

If unable to call send resume including recent salary history to:

Manager of Technical Employment, Dept. 471 A6

**GTE AUTOMATIC ELECTRIC
LABORATORIES**

400 N. Wolf Road
Northlake, IL 60164.

Make the
Switch!

An Equal Opportunity Employer M/F

SCIENTIFIC COMPUTER ANALYST

FMC, a Fortune 100 company is seeking a Scientific Computer Analyst for its Princeton, N.J. Research & Development Center.

Requirements include a BS or MS degree in physical science or engineering, 3 years minimum experience with broad computer exposure, time sharing, batch, mini-computers. Experience in FORTRAN, basic APL data base techniques and packages. Familiarity with PDP-11, RSX-11-M preferred.

Duties will be to assist scientific/engineering users of varying computer knowledge or write complex programs for them. Consult on data base applications. Position applications oriented.

Excellent starting salary and comprehensive benefits package. Interested candidates should send resume to: Mr. A.J. Reid, FMC CORPORATION, P.O. Box 8, Princeton, N.J. 08540. An equal opportunity employer, M/F.

FMC

DP professionals project leaders programmer/analysts

ARBAT SYSTEMS seeks qualified data processing professionals who wish to work in an innovative and progressive environment. ARBAT supplies sophisticated mini-computer systems to the international banking industry on an ever-increasing scale. For an opportunity to participate in a challenging and rewarding environment, please send your confidential resume to.

ARBAT SYSTEMS LTD.
61 Broadway,
New York, N.Y. 10006
212/943-1300

Equal Opportunity employer

position announcements

position announcements

position announcements

position announcements

position announcements

HOUSTON, TEXAS NEEDS YOU! ALL SKILLS ALL INDUSTRIES

The DPCenter
Data Processing Careers
4815 SW Freeway, Suite 900E
Houston, Texas 77027 • (713) 960-1102
Personnel Consultants

SOFTWARE SALES

We're looking for highly motivated systems software salesmen with experience selling to the IBM DO5 and DO5/V5 marketplace. If you want to increase your income potential with a broad and diversified product line, call Bert Parsloe at (203) 792-5100. Universal Software, Inc. Brookfield Office Park, Brookfield, CT 06804.

PROGRAMMERS... ANALYSTS... SOFTWARE.

Exciting and rewarding careers offered via the nation's leading intercity E.D.P. search network. Our resident associates are located in over 90 market places nationwide, including:

ATLANTA	NEW YORK
BOSTON	NEW ORLEANS
CHICAGO	PHILADELPHIA
DENVER	SAN DIEGO
HOUSTON	SAN FRANCISCO
JACKSONVILLE	WASHINGTON

Client companies represent all industries and assume all costs. For immediate consideration forward a resume in confidence.



**THE
ACCESS
GROUP, INC.**
Suite 302 37 Lewis Street
Hartford, Connecticut 06103
(203) 527-9107

New! 1978 Computer Salary Survey



Call for your Free copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

This comprehensive free report also gives you expert advice on a variety of important career topics such as: when you should consider a job change; what you need to do to break into management; how to make sure you're getting the proper exposure; why timing is so crucial in your long range career development; how you can avoid stagnation... and much more.

The 1978 Computer Salary Survey has been compiled by Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

For your Free copy, call the Source Edp office nearest you.

East:
Boston
617/482-7613
Hartford
203/522-6590
New York City
212/736-7445
Philadelphia
215/665-1717
Stamford CT
203/329-8411
Union NJ
201/687-8700
Washington DC
703/790-5610
Wellesley MA
617/237-3120

Midwest:
Chicago
312/782-0857
Cleveland
216/771-2070
Detroit
313/963-0510
Kansas City
816/474-3393
Minneapolis
612/544-3600
Northfield IL
312/446-8395
Oak Brook IL
312/986-0422
Rolling Meadows IL
312/392-0244
Southfield MI
313/352-6520

St. Louis
314/862-3800
St. Paul
612/771-0544
South/Southwest:
Atlanta
404/325-8370
Dallas
214/387-1600
Denver
303/773-3700
Fort Worth
817/338-9300
Houston
713/628-8705
New Orleans
504/561-6000

West Coast:
Encino CA
213/995-8866
Irvine CA
714/833-1730
Los Angeles
213/388-5500
Oakland
415/444-5955
Palo Alto
415/328-7155
San Francisco
415/434-2410
Seattle
206/454-6400
Torrence CA
213/540-7500
Canada:
Toronto
416/364-2919

source edp

If unable to call, write: Source Edp, Department C3
721 Enterprise Drive, Oak Brook, Illinois 60521
(When writing, please be sure to use home address and indicate position title.)

TEAMWORK MAKES INCOTERM SPECIAL

You won't be working at INCOTERM for a long time before you discover that our successes are team successes - that we work together - sharing ideas to make better products in more profitable ways. The kind of comraderie and feeling of belonging is very special and we'd like to share its quality of being special with you.

INCOTERM intelligent terminals are being used in the railroad, airline, insurance, banking, freight, trucking and financial industries and by government, too. They touch all of our lives. They got that way by being good products, programmed by the best in the business and maintained by people who care. If you are good at what you do and care about the quality of your work, you could be an INCOTERM team member and we would like to talk with you about your possible contributions to our team efforts.

Currently available positions are for:

Systems Programmers

Exciting state-of-the-art development opportunities are available for systems programmers who want in-depth insight into the workings of our systems. Areas in which you will be involved are cross-assembler development, macro-processor development and the general development and enhancement of Programming Development Systems. These positions require a minimum of 3-5 years system experience and familiarity with the PDP-11/70. Exposure to the UNIX Operating System is highly desirable.

Diagnostic Programmers

You will be responsible for the development of comprehensive diagnostic routine for a variety of processors; peripheral devices and applications for our current product line and new product development. Software will include off-line diagnostics, micro-diagnostics, test operating systems, fault detection monitor and special purpose test bed program. Experience with LSI and semi-conductor devices and working knowledge of assembly language required.

Applications Programmers

You will be heavily involved in the development of customer software for areas such as banking systems, data entry, airline reservations and other similar real-time terminal applications. 3 years real-time assembly language with minicomputer experience required. Communications, teleprocessing, remote batch, IBM 3270, Burroughs TD820, Uniscope 100 300, VIP 7700 exposure helpful.

Compiler Development

The ideal candidate will have a BS or MS in Computer Science and at least one year experience in compiler development. He or she will know at least one block structured language (ALGOL, PL/I, PASCAL, BLISS). Some assembly language programming experience, particularly on minicomputers, is desirable. Most important, a penchant for producing clear, well-documented and thoroughly checked out codes and ability to work with others and to contribute to a group effort is essential.

Software Writer

Your assignment will be to research, write and edit technical publications such as programmer reference manuals, user manuals and other product documentation. A programming background will be an asset to the ideal candidate as our software documentation assignment involves close contact with our programming staff. An understanding of the applications of digital related equipment and the ability to effectively communicate this to others required.

We offer advanced, diversified assignments, competitive salaries, superior benefit package and a people-oriented attitude that permeates our entire corporation.

Please send your resume to:
F. Joseph Dugan
Manager, Employee Resources

INCOTERM
CORPORATION

65 Walnut Street
Wellesley Hills, MA 02181
an equal opportunity employer m f

position announcements

position announcements

position announcements

position announcements

position announcements

RELOCATE

PACIFIC NORTHWEST

System Analysts 17-20K

3 plus yrs. exp., much user

contact COBOL, DOS or OS.

Prog Analysts 14-19K

1 plus yrs. exp; Financial, Mfg.

Ins., Retail, Medical, COBOL

end/or RPG II.

System Progs 18-20K

DOS/VS, CICS end communi-

cations.

The above represents a sam-

pling of the excellent positions

available to you in the North-

west.

All inquiries will be held in

strictest confidence. All fees

employer paid.

House: Martin,

Mortis & Assoc.

12061 455-9600

1821-114th S.E., Suite 210

Bellevue, WA 98004

FACULTY POSITION
IN COMPUTER SCIENCE

Applications are invited for a faculty position (Assistant Professor) in the Department of Computer Science starting in August, 1978. Candidates should have a Ph.D. in Computer Science but applicants with a Master's Degree in Computer Science will also be considered. Experience working with mini-computers, micro-computers, operating systems, and data structures is desirable. Duties will include teaching undergraduate Computer Science courses, committee work and some research. A Master's program in Computer Science is currently under consideration.

Salary dependent upon qualifications and experience, and other benefits will be competitive. Applications should be received by March 1, 1978.

The University of North Dakota is an Equal Opportunity/Affirmative Action Employer.

Send resume to:
Dr. Mok Tokko, Chairman
Computer Science Dept.
University of North Dakota
Box 8181, University Station
Grand Forks, N.D. 58201

Production
Control
Manager

An Iowa-based firm is actively seeking candidates for a production control management position. Candidates should have a B.S. in either Mathematics or Computer Science, and knowledge/experience in computer operations. A minimum of 3 years' experience in related areas such as production control, customer service, production and computer scheduling systems, and manpower and computer forecasting is also essential. The successful candidate will be able to communicate well in both written and verbal form, possess demonstrated management abilities and experience, and quickly grasp and assume this key management position. Salary range for this position is \$18,000-\$22,000 per year.

Interested qualified candidates should contact Mr. Dave Seibel of the Job Service of Iowa, 1810 Lower Muscatine Road, Iowa City, Iowa 52240.

An Equal Opportunity Employer

EDP
OPPORTUNITIES

FOCUS/Ramis financial modeling
Fortran/Cobol CMS \$25K+
TECH Writer computer/electro
mechanical manuals \$20K+
OS COBOL 370/158 CMS TSO-
learn IMS \$21K
SR SYSTEMS Anal-graphics, new
applicants design 370 CICS

\$27-29K
DOS/VS CICS DL1 370/138-
major new application expansion \$23-26K

PROJ Ldr financial syst product
profitability ROI 370/158 OS
IMS \$26K

PAYROLL reqrite DOS CICS-
TOTAL \$23-25K
SOFTWARE OS/VS 1 VM-CMS

\$28K+

FINCL SYST ANAL-PDP 11/35

BASIC/FORTRAN, MBA Quant.

discipl. \$27-33K+

PROJ MGR - staff 20+ automated
project control, structured, tech-
niques etc. \$32K+

Bill Borrelli (212) 349-3610

William Harris Assoc.

150 Broadway NY 10038

agency

others talk about it — we've got it

GROW...
with Mini-Computer Operations!SYSTEMS SOFTWARE
DEVELOPMENT

As a leader in the world of mini-computers, Sperry Univac will double in size within the next year.

New Systems Research and Development projects are starting now...

- State-of-the-art Operating Systems for Interactive, Real-time, and batch environments.
- Distributed Data Base Management Systems.

- On-line System Diagnostics.
- Sustain and Enhance Present Software.
- High Performance Business and Scientific Compilers.

- Advanced Data Communications Software.

Data Communications
Analysts

Design software and be responsible for the implementation of asynchronous and synchronous protocols. Design transaction oriented systems, Distributive Communications Architecture, and front-end processors. Project Management opportunities. Direct assembly language experience required.

Data Communications
Analysts

Estimate time and cost of Data Communications software for customers. Evaluate customer software RFQ/RFP's, design creative solutions for customer's needs, and provide state-of-the-art technical leadership.

Diagnostics Analysts

Individuals will be members of hardware/software design team involved in mini-computer test systems development. Positions will include project responsibility for all phases of assembly language and microprogramming language implemented programs and development of system level testing and fault-isolation software.

Custom Applications
Analysts

Position responsibilities will include industrial automation, distributed processing networks, assembly and high level language, on-line transaction systems, Data Base Management Systems, proposal writing, specification design and project management.

Special Software
Design Analysts

Provide real-time systems programming, special interfaces/device drivers, diagnostic hardware/software, project control, cost estimates and assembler languages.

Performance
Measurements Analysts

Establish procedures and develop necessary tools to perform the system measurements of our on-line transaction oriented system and analytic and simulation modeling.

Software Applications
Analysts

Conduct pre/post sales software support for Mini-Computer Operations products, including benchmarks, performance analysis and competitive analysis. Requires direct experience in Operating Systems, Data Base design and high level languages.

Operating Systems
Analysts

Design and development of data communications software for operating systems development, DBMS design/implementation, use of DBMS in distributed environments, on-line teleprocessing and line and network protocols.

Software Sustaining
Analysts

Provide enhancement and support of operating systems, Telecommunications systems and Fortran Compilers.

We offer competitive salaries and a comprehensive benefits package that includes dental insurance. We invite you to send your resume to the address below, or call 714/833-2400 for more information.

SPERRY  UNIVAC

MINI-COMPUTER OPERATIONS
2722 Michelson Drive, Irvine, CA 92713
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

ENGINEERS AND PROGRAMMERS

Lockheed Electronics Company is seeking qualified applicants for immediate positions at NASA's Johnson Space Center in Houston, Texas. These positions are in support of the Space Shuttle and Earth Resource Programs and require applicants experienced in the following areas:

PUBLICATIONS SPECIALIST:

To originate scientific/engineering publications and coordinate efforts of editors and proofreaders. Prefer applicants with a minimum of eight years experience.

DIGITAL DESIGN ENGINEERS:

With experience in design and development of digital/analog equipment including computer interface, display, control and signal conditioning hardware.

MECHANICAL/AEROSPACE ENGINEERS:

Responsible for structural, thermal or environmental control systems analysis. Applicants should have knowledge of FORTRAN computer programming, math modeling, and be capable of using large scale digital computers in the analysis of engineering problems.

SIMULATION APPLICATIONS:

Required to support dynamics simulation development and operations. Experience required in realtime, digital, analog and hybrid computer program development and operation of large man-in-the-loop simulations. Prefer applicants who have worked with spacecraft/aircraft GUIDANCE and CONTROL systems.

COMPUTER MAINTENANCE ENGINEERS:

To be cross-trained to support a large, diverse simulation laboratory. Facility includes analog computers, mini-computers and second and third generation medium-to-large scale systems manufactured by several companies.

CONTROL SYSTEMS ENGINEERS:

With experience in flight controls; guidance, navigation and controls; digital design; computer interface, and data systems programming experience on HP 2100 computers.

PROGRAMMING ANALYSTS:

Responsible for performing analysis and developing appropriate computer models. Experience in FORTRAN IV and ASSEMBLY language required. Some positions require UNIVAC 1108 programming experience.

COMMERCIAL/BUSINESS APPLICATIONS

PROGRAMMERS:

With experience in design, development of financial, accounting and control systems using COBOL, FORTRAN, or ASSEMBLY languages.

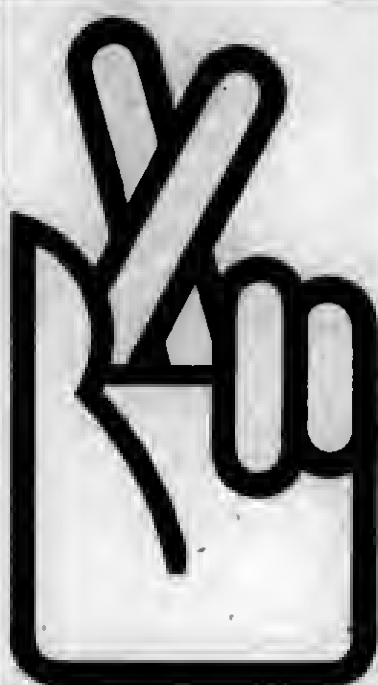
STATISTICIANS:

With advanced degree and experience in pattern recognition, clustering, feature selection, discriminant or multivariate analysis.

Send resume in confidence to Bill Jancha at Lockheed Electronics Company, Dept. C-20-8, 1830 NASA Road #1, Houston, Texas 77058.

LOCKHEED
ELECTRONICS COMPANY INC

An Equal Opportunity Employer, Male/Female



Computer Professionals is this your grand strategy for your career development?

We are seeking qualified individuals for the following positions:

- Computer Programmer
- Systems Analyst
- Database Administrator
- Network Administrator
- Software Engineer
- Hardware Engineer
- Quality Assurance
- Technical Support
- Project Manager
- Business Development
- Marketing
- Finance
- Human Resources
- Operations
- Logistics
- Manufacturing
- Research & Development
- Product Development
- Customer Service
- Public Relations
- Legal
- Compliance
- Environmental
- Safety
- Security
- Facilities
- Information Systems
- Telecommunications
- Energy
- Transportation
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare
- Education
- Government
- Non-Profit
- Media
- Entertainment
- Food & Beverage
- Retail
- Wholesale
- Construction
- Real Estate
- Insurance
- Banking
- Finance
- Investment
- Consulting
- Engineering
- Architecture
- Design
- Art
- Music
- Dance
- Theater
- Film
- Television
- Radio
- News
- Journalism
- Public Affairs
- Community Development
- Social Services
- Healthcare</

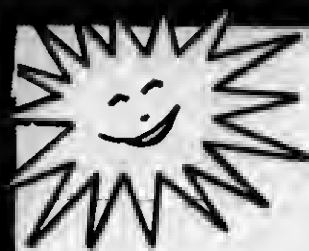
position announcements

position announcements

position announcements

position announcements

position announcements



SUN BELT
OPPORTUNITIES

Systems Programmers

Software Development
Software Test
Software Support

As the leader in dispersed data processing, Datapoint Corporation continues to grow. We have openings in the Software Operations at corporate headquarters in San Antonio, Texas for qualified systems programmers. Applicants should have a minimum of two years experience in software development or support environment in at least one of the following areas: operating systems, data communications, or language systems. These positions offer excellent compensation and fringe benefits, good opportunity for advancement and a stimulating work setting.

San Antonio is the westernmost hub of the Texas Golden Triangle and along with Houston and Dallas is the center of a thriving electronics industry. The progressive business climate is further stimulated by favorable tax policies (no state or city income taxes). San Antonio offers an excellent year round climate, fine schools, and outstanding residential areas. Plus it's only a short drive away from the famed Texas Gulf Coast and its numerous resorts, and from sunny Mexico and its many vacation spots.

So if you're a qualified candidate, come to where the action and the good living are. Send your resume and salary history in confidence to Mr. Charles Zeleny, Operations Personnel Manager, Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284.

An Affirmative Action Employer Committed to Equal Opportunity

DATAPoint CORPORATION



The leader in dispersed data processing
and communications management™

PROGRAMMERS AND SYSTEMS ANALYSTS

Put Your Experience To Work For You
In Building A Better Career Opportunity

Sperry Univac has a variety of challenging opportunities waiting for you at one of our Minneapolis locations. These openings exist within our Airline Industry Development Center which designs and supports applications such as reservations, ticketing, cargo, departure control, message switching, check-in, hotel and fare quote. We are searching for candidates with 2 to 8 years experience in the following disciplines:

- Design, implementation and support of real time applications.
- Acceptance testing of application programs.
- Technical support in the customer environment.

In addition to requiring experience within the areas mentioned above, it is also desirable to have a background in FORTRAN, and/or general UNIVAC 1100 series exposure.

We offer highly competitive starting salary, a comprehensive benefits program and outstanding professional and personal growth opportunities.

FOR IMMEDIATE ATTENTION,
PLEASE CALL COLLECT OR
DIRECT YOUR RESUME TO:
P.Y. Peterson

SPERRY UNIVAC

Univac Park
P.O. Box 3525, M.S. U1F28
St. Paul, MN 55165
(612) 456-2309
An Equal Opportunity Employer M/F

San Diego opportunity in SOFTWARE SYSTEMS DEVELOPMENT

Want to combine the ideal career opportunity with your favorite lifestyle? NCR Systems Engineering/Torrey Pines needs your help now in developing advanced, high-technology, EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, La Jolla and downtown San Diego. You can live in the setting of your choice — beach, valley, mountain, country, small-town or urban — and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too — from mild coast to dry desert. San Diego is a place of extraordinary choices — and right now the choice is yours.

COMPUTER PROGRAMMERS

The Systems Engineering/Torrey Pines Division has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and future programs require top people with experience in any of the following areas:

- Telecommunications Software
- File Processing
- Network Development
- Large Mainframe, Mini and Micro Processor
- Operating Systems
- COBOL Applications
- Assembly Language

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems; both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.

NCR

Thom Harris, Employment Specialist
SYSTEMS ENGINEERING/TORREY PINES
4046 Sorrento Valley Blvd., San Diego, CA. 92121
An Equal Opportunity Employer

FIELD SERVICE

370/360, H-200
SYSTEMS XDS, Univac, CDC
All Large & Medium
CPU's
MINI's PDP, NOVA, G.A.
HP, etc. All Mini
Systems
I/O STC, TELEX, CDC,
ITEL, CALCOMP,
etc. All Peripheral Ex-
perience

MTTR

(312) 547-6682
MTTR ASSOCIATES
1107 Mannheim Road \$12-30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fee To Applicants

DATA PROCESSING PROFESSIONALS

IMS DB/DC

We seek systems and applications professionals to develop and install large integrated systems. Experience in one or more of the following is desirable.

- IMS
- Teleprocessing
- COBOL
- Supervisory responsibilities

These are growth positions in a professional environment. Excellent salary and benefits package. Send resume and salary requirements to:

**BLUE CROSS &
BLUE SHIELD of RI**

444 Westminster Mall
Providence, RI 02901
An Equal Opportunity
Affirmative
Action Employer M-F



metromation, inc.

PROCESS CONTROL/CHEMICAL ENGINEERS

- 2+ years experience using digital computers in the petrochemical field.

PRODUCT SPECIALIST

- Will provide marketing and post sales support for microcomputer real time basic process control systems. Process control and/or real time computing experience is preferred.

REAL TIME PROGRAMMERS

- Process control communications experience or related areas. Background in FORTRAN and/or BASIC languages.

PROJECT MANAGER

- 5+ years of project management or supervision of hardware/software engineers on process control projects. Will be responsible for projects which include budgets and customer interface.

We are seeking professionals with a desire to work in a progressive, innovative environment. Metromation, Inc. supplies the petroleum and chemical industries with sophisticated mini-computer systems on an ever-increasing scale. We offer you, commensurate salaries and a comprehensive benefit package. If you would like the opportunity of participating in such a challenging environment, send your resume in confidence to: Metromation, Inc., 1101 State Road, Princeton, N.J. 08540 Attention: Employee Relations Department.
An Equal Opportunity Employer

COMPUTER PERSONNEL PROGRAMMER/ANALYSTS

Business Applications, Scientific Applications

Real time processing systems experience desired. Software development support duties. Degree in Computer Science with three to five years experience preferred, although some entry level positions are available.

We have been engaged by our client companies to fill the above positions.

These and other key opportunities are fee paid. Please send resumes for consideration to:



TVN ASSOCIATES
P.O. BOX 602
MARBLEHEAD
MASSACHUSETTS 01945

Representing America's Foremost Companies
For Over Fifteen Years

position announcements

position announcements

position announcements

position announcements

position announcements

MARKETING REPRESENTATIVE

Control Data Corporation has two outstanding opportunities for experienced sales people to sell their complete line of IBM plug compatible peripheral products and peripheral subsystems.

These positions (located in Chicago and St. Louis) require 3-5 years selling experience in computer related products.

As a Control Data Marketing Representative, you will represent the leader in the peripheral products market. Control Data is the only company offering a total line of memory, disk (including Winchester technology), tapes, mass storage, printers, and plug compatible CPU's.

In addition to a growing established territory, Control Data offers a competitive salary plus incentive, a comprehensive benefit package, relocation assistance, and advancement opportunities.

For immediate consideration, please send your resume including salary history to:

Pat Vincelli

CD CONTROL DATA CORPORATION

5001 West 80th Street
Minneapolis, Minnesota 55437

An Affirmative Action Employer M/F

RPG/CCP EASTERN MASS 17-23K

We have been retained by a rapidly expanding leader in the manufacture of bio-medical instruments offering excellent job opportunities for data processing professionals. You will assist in developing sophisticated systems on their IBM System 3 Model 15D computer with over 30 terminals.

Responsibilities

RPG II

Programmer/Analyst

Design, program and implement large scale manufacturing systems utilizing BOM, and MRP with emphasis on Inventory Control with systems design.

CCP Programmer

Design, program, and implement an array of in-house multi-functional CCP/CRT applications (eg., Order Entry, Marketing, Financial, etc.).

General Requirements

B.S. or equivalent preferred, minimum 2-4 years programming experience, possess excellent knowledge of RPG II.

Suburban location, with evening or weekend appointments arranged for your convenience.

SEND RESUME OR CALL
IMMEDIATELY: (617) 273-1740

15 New England Executive Park
Burlington, Massachusetts 01803



Management Advisory Services, Inc.

An Equal Opportunity Employer. All Fees,
Relocation Paid by Our Client

SOFTWARE ENGINEERS SYSTEMS ANALYSTS PROGRAMMER ANALYSTS

Well known leader in public policy research & experimentation has multiple openings at all levels of systems design & implementation including SOFTWARE ENGINEERS, SYSTEMS ANALYSTS & PROGRAMMER ANALYSTS.

Project assignments & desirable qualifications cover a broad range of computer science & systems application experience. Positions require ability to apply computer technology to design & implementation of data processing & computer system support within inter-disciplinary projects. Projects include large scale innovations in administrative automation for public welfare programs in several states.

We are looking for people who can make creative contributions & will respond to, and grow with, challenging opportunities. Range of desirable qualifications:

- broad background in computer technology, including hardware analysis, operating systems, communications, on-line environments.
- experience in systems development, including design of processing flows, file management & file design
- experience with minicomputer hardware, operating systems & programming languages; experience with UNIX/C language desirable
- solid analytical experience with commonly used high level programming languages
- computer science or other relevant degree desirable

Candidates can expect salaries, assignments & growth dependent on their contribution & qualifications. Competitive benefits. Positions available in Princeton, New Jersey, Denver, Colorado, and Montpelier, Vermont.

Please supply resume, salary history and locational preference to CW Box 1411, 797 Washington St., Newton, Mass. 02160.
equal opportunity/affirmative action employer m/f

Career Openings in Information Systems

Public Service Company of New Mexico has immediate openings with excellent opportunity to participate in the design, development and installation of state-of-the-art business end engineering systems.

SUPERVISOR, TECHNICAL SUPPORT

Successful applicant will direct a small staff providing hardware/software support of a Honeywell L6640 system. Minimum requirements are:

- 3-5 years large Honeywell systems experience
- 2-3 years experience at GCOS level
- heavy FMS, IDS, TDS, COBOL experience plus
- supervisory experience desired
- degree or equivalent

SYSTEMS ANALYST

Successful candidate must have good analytical skills and a solid background in systems analysis. Background requirements are as follows:

- Bachelor's degree (preferably in business, math, computer science or accounting)
- minimum of 2 years COBOL and/or FORTRAN experience
- minimum of 3 years analysis experience
- experience in development and installation of large business applications a plus

SUPERVISOR- SYSTEMS ANALYSTS

Successful candidate will direct activities of a staff involved in the development and installation of business and engineering applications. Minimum requirements are:

- Bachelor's degree (preferably in business or accounting)
- 2 years programming experience in COBOL and/or FORTRAN
- 2-3 years experience in systems analysis
- 2-3 years supervisory experience
- good communications skills
- project management experience a plus

COBOL PROGRAMMERS

Candidates must be experienced in COBOL programmers. Background requirements are as follows:

- Bachelor's degree preferred
- minimum 3 years COBOL application programming experience
- ability to develop and document procedures (including JCL)
- knowledge of Honeywell IDS and TDS is a plus
- experience in development and installation of large business applications a plus

METHODS AND PROCEDURES ANALYST

Successful candidate will participate in design of management information systems at the points of external interface to insure that manual procedures are designed properly. Background requirements are as follows:

- Bachelor's degree (preferably in business or management)
- 2-3 years experience in work methods, forms, work flow and procedure development
- must be familiar with development of automated and manual systems

PNM has a Honeywell 66/40 system with 384K, TDS, MDS, NPS supporting batch, time-sharing and many interactive applications. Send resume with salary requirements to:

Personnel Department

Public Service Company of New Mexico

P.O. Box 2267

Albuquerque, NM 87103

PNM

PUBLIC SERVICE COMPANY OF NEW MEXICO

Equal Opportunity Employer

ASSOCIATE DIRECTOR COMPUTING CENTER

The Computing Services Division (CSD) of the University of Wisconsin-Milwaukee (UWM) is seeking an Associate Director. With its 25,000 student enrollment, UWM is a doctoral degree granting institution, whose multi-faceted mission includes service to the urban area. CSD, with a staff of 67 persons, is a service agency providing a full range of computing services to both the academic and administrative areas.

A new commitment to campus computing in both personnel and resources generates a challenging environment requiring broad administrative planning and analytical skills. Currently operating on an IBM 360/50 and a Univac 1106, CSD will be moving to a combined academic and administrative operation on a Univac 1100/80.

Along with assisting in the day to day operations, the Associate Director will be responsible for developing long range plans, formulating policy, writing position papers, modeling alternatives and determining organizational thrust. A minimum of a Bachelor's degree, a sufficient number of years of relevant experience, and a good knowledge of computing is essential. The position requires a high level of communication skills, the ability to think problems through and to analyze thoroughly. Clear and effective writing are highly prized. Experience in managing computer services in a university environment and a high degree of administrative competency are desirable. As the Director's alter ego, a broad grasp of university computing must be acquired if not present. The successful candidate must be able to work independently with a minimum of supervision. Sensitivity, tact, and appreciation of a professional environment are required.

Salary commensurate with ability and experience. This is an administrative position reporting to the Director. Please send resume, including salary requirements, by February 15, 1978, in confidence to: Director's Screening Committee, University of Wisconsin-Milwaukee, Computing Services Division, P.O. Box 413, Milwaukee, Wisconsin 53201. An Equal Opportunity/Affirmative Action Employer.

DATA PROCESSING PROFESSIONALS

With offices and openings in Chicago, Milwaukee, Houston and Dallas, SPR is actively seeking professional technical representatives to augment its rapidly expanding staff.

Through our incredible performance record, SPR has emerged as a leading provider of human resources to the data processing community.

Several positions are available in all 4 SPR locations:

- PROGRAMMERS
With at least 5 years COBOL or BAL experience.
- PROGRAMMER/ANALYSTS
With CICS or IMS experience.

SPR has firmly established a people-oriented reputation, as evidenced by one of the lowest turnover rates in the industry. Systems and Programming Resources:

- Pays for Overtime
- Has Paid Vacation and Holidays
- Provides Comprehensive Life/Health/Disability Insurance
- Provides State-of-the-Art Education
- Provides a Liberal Moving and Relocation Allowance
- Pays Performance Bonuses

If you're career expectations haven't quite been met, if challenging and diversified project assignments appeal to you, and if recognition for professional performance is desirable join the leader - SPR.

CALL (312) 654-4188

or send a resume in confidence to:

SYSTEMS & PROGRAMMING RESOURCES, INC.

1211 West 22nd Street - Room 600

Oak Brook, Illinois 60521

An Equal Opportunity Employer M/F



position announcements

position announcements

position announcements

position announcements

position announcements

WANG Needs Professionals

FOR OUR OPERATIONS IN:
GREATER LOWELL

Software Technical Writers

Experienced technical writers to participate in the documentation of a major new computer and word processing system. The successful candidates should have at least 1-3 years experience in systems software documentation or a related field. (Programmers with an interest in writing are invited to apply.) Knowledge of high level programming language a must. Knowledge of an assembler level language a definite plus.

BURLINGTON

Systems Programmer

State-of-the-art data center is seeking a systems programmer to support our IBM 370/158 running under VS2 (SVS). This position requires 1-2 years experience with OS or VS modifications or maintenance. Degree in computer science with emphasis in operating system design may be substituted for experience. Assembler language is required; experience in any of the following areas is a plus: HASP, JES2, WYLBUR. Opportunity to get into MVS.

Excellent salaries and earning potential plus superior company benefits. Please send resume including academic background and salary history and requirements to:

Linda G. O'Connor
Career Opportunities
(617) 851-4111

WANG LABORATORIES, INC.

One Industrial Ave., Lowell, MA 01851
We are an affirmative action/equal opportunity employer.

Change to Something Different.

Join the new Victors. A progressive manufacturer is the electronic business equipment field. You'll find a different and exciting DP environment where innovative ideas are encouraged and recognized. We're pushing forward with new applications and systems, backed by strong support from new management. We're working with the latest in Data Base and Telecommunications (DL 1 and CICS) in an IBM 370/148, DOS/VS installation. The MIS demand is at an all time high - new openings are available for the following:

- SOFTWARE SYSTEMS PROGRAMMER
- PROGRAMMERS (COBOL)

Positions require financial, general business and/or manufacturing applications experience.

If you're ready to make a change - find out about the differences that a Victor career has to offer. Send resume, including salary history and requirements to: Staffing Department 840, Victor Business Products, 3900 N. Rockwell St., Chicago, IL 60618.

An Equal Opportunity Employer M/F

VICTOR BUSINESS PRODUCTS

Subsidiary of Waller Kidde & Company, Inc.
KIDDE

Computer Science

Three faculty teaching positions will be available beginning September, 1978 or January, 1979. One of these positions requires the teaching of applied Computer Science courses with a particular emphasis on Business Data Processing, the two others require teaching undergraduate Computer Science courses. All three positions are eligible to be on the tenure track.

At least one position requires a PhD in the area of Computer Science. Individuals holding an appropriate terminal degree with Computer Science as a major component in the program, or Individuals with a Master's degree in the area of Computer Science and with significant experience in a computer related field are also encouraged to apply.

Salary, rank and type of appointment will be commensurate with experience and credentials. Send resumes and a list of all graduate courses taken, postmarked by March 7, 1978 to: Edward Michael Staman, Christopher Newport College, PO Box 6070, Newport News, Virginia 23606. Christopher Newport College is an AA/EO Employer.

Making Machines Do More So Man Can Do More

SPERRY UNIVAC a world leader in the computer industry, has career opportunities for individuals with experience in the areas of:

Data Base Management

(DBMS, DMS 1100, System 2000, etc.)

Transaction Oriented Systems

(IMS) TIP 1100, etc.)

Applicants should have 1-3 years systems experience. Positions are available in the middle Atlantic, New York Metropolitan and Northeast areas of the U.S.

For immediate consideration, submit your resume in strict confidence to:

SPERRY UNIVAC

Professional Employment
480 Swedesford Road
Wayne, Pennsylvania 19087

An Equal Opportunity Employer M/F

FEDERAL EXPRESS

Americas
Airline
for Packages

SYSTEMS ANALYSTS

Expansion of our Systems and Programming Department has created the need for two additional systems analysts to work on REVENUE ACCOUNTING SYSTEMS. Experience required: COBOL language, large scale computer system, revenue accounting systems with very large customer base. DMSII knowledge preferred, but not required.

We offer excellent advancement potential, salary, and benefits package. If you possess the qualifications listed above and desire to demonstrate your capabilities in a creative, rapid-growth environment, please apply directly to:

Kay Coop
Personnel Specialist (CW)
FEDERAL EXPRESS CORPORATION
AMF Box 30167
Memphis, TN. 38130
1-800-238-5592

Equal Opportunity Employer M/F

FACULTY POSITION IN COMPUTER SYSTEMS FIELD

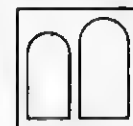
Available at

BENTLEY COLLEGE WALTHAM, MASSACHUSETTS

Persons who are committed to excellence in teaching and who would appreciate being affiliated with a thriving, independent, accredited, coeducational institution that offers a variety of specializations in business-related disciplines at the baccalaureate and master's levels are invited to apply.

Openings exist for Assistant or Associate Professors with a knowledge of at least two of the following areas: business systems analysis, COBOL, FORTRAN, DBMS, MIS, data communication, and information systems for management. Applicants are expected to present a doctorate in computer systems or a cognate field; however, full consideration will be given to ABD's and master's degree holders with an impressive record of achievement in business, industry or government.

Applicants are urged to send a current resume, evidences of effective teaching (if available), and the names and addresses, and telephone numbers of three references prior to March 15, 1978, to Vice President for Academic Affairs.



Bentley College

Beaver & Forest Sts.
Waltham, Ma 02154/(617) 891-2000
An Equal Opportunity, Affirmative Action Employer

PROGRAMMER PROGRAMMER ANALYST

Career opportunities are available for individuals who desire to participate in the design, programming and implementation of new and existing business systems.

A solid, experienced background with COBOL is essential. Experience with POS systems, on-line credit systems and NCR Century computers would be a plus but not essential.

This is an excellent opportunity to develop your career with a growing company. Your ability will be well compensated.

Send your confidential resume to the Director of Data Processing or call 313 965-7900 ext. 341.

HUGHES & HATCHER
1300 Rosa Parks Blvd
Detroit, Mich 48216

Senior Firmware Specialist

Join INCOTERM at the right time! We are in the process of fast, smooth growth. This is a ground floor opportunity in our Special Systems Department for an experienced micro/minor assembly language programmer. Communication protocol (BI-SYNC, 3270, SDLC etc.) exposure is desirable. The applicant should have an innovative and self-starting personality.

We offer competitive salaries, superior benefit package and a people-oriented attitude that permeates our entire corporation.

Please send your resume to:
F. Joseph Dugan
Manager, Employee Resources

INCOTERM CORPORATION

...the international computer terminals people

65 Walnut Street, Wellesley Hills, MA 02181

an equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

**PROGRAMMER
ANALYST**

Administrative data processing, minimum two years as PL/1 or Cobol programmer with considerable progressive responsible programming experience. Considerable knowledge of systems procedures and techniques, associate degree or equivalent combination of education and experience. Salary range \$12,950-\$18,130. Please apply by February 10, 1978, Personnel Office, 110 Nisbet Building, Michigan State University, East Lansing, MI 48824. An Equal Opportunity Employer.

**COMPUTER CENTER DIRECTOR
WESTERN CAROLINA UNIVERSITY**

Twelve-month position as director available June 1, 1978. Experience in academic computing and administrative experience as director or assistant director of a computer center is required. Faculty status possible if criteria of an academic department are met. The salary will be commensurate with qualifications and experience. Complete resume and names of three references must be received by March 15, 1978. Apply to: Dr. Charles Martin, Chairman, Computer Director Search Committee, Western Carolina University, Cullowhee, NC 28723 (704) 293-7245. An Affirmative Action/Equal Opportunity Employer.

**PROGRAMMING
PROJECT MANAGER**

Extensive application programming including systems design. Prior supervision of technical staff of no less than five persons with multiple application responsibility. Must understand various random file access methods and structures. Direct involvement with user departments in an on-line environment involving a large data base. Programming in Cobol using Burroughs medium systems useful. Fairfield County headquarters. Please send detail resume to CW Box No. 1413, 797 Washington St., Newton, Mass. 02160.

**PROGRAMMER/ANALYST
C.C.I. EXPANDS
INFORMATION PROCESSING**

Dynamic direct mail service organization located in Lower Bucks Co. needs talented individuals. Self-starters only! Qualified IBM, Assembler and COBOL Analysts to design and implement complex user systems and "package" software products. (Unduplication, Generalized Utilities, Laser, etc.). Salary, benefits and potential excellent.

CALL OR SEND RESUME
Communication Concepts, Inc.
V.P. Information Processing
1044 Pulinski Dr.
Wyndham, PA 18974
(215) 672-6900, Ext. 19

West
Los Angeles Area
San Francisco Bay Area
Seattle
Denver
Kansas City
Minneapolis/St. Paul
Chicago
St. Louis
Shreveport
San Antonio
Houston
Dallas
Salt Lake City
Albuquerque
El Paso
Milwaukee

There could be a Tektronix career in your backyard.

Or, maybe you want a
Tektronix career and a
new backyard.

Whichever, you have a choice. Stay where you are and advance your career with us, or move to another Tektronix area.

Our expansion is making it possible for even more professionals to join our winning ranks. As the undisputed leader in computer graphic terminals and computer graphic systems, Tektronix not only manufactures, sells and services the best line in the industry, we know how to care for our people.

If it's been a long, long time since you got a promotion, or a raise AND a pat on the back, or even recognized by the office receptionist, then you're ready for Tektronix. Match your career goals, interest and area of choice with what we have listed here. Then give us a call. Let's get together and YOU decide for a change just what it is you want, and where it is you want to live. It really can be that easy.

District Sales Managers OEM Sales Engineers Sales Engineers

Let's get together.

(800) 227-8340 Outside California
(800) 638-1915 Inside California

If you are ready for a Tektronix career, whether it be your present backyard, or one of our other openings, let's hear from you. Forward your resume or summary sheet or call one of the above TOLL FREE numbers, listing your area of preference. Address your inquiry to M.D. Westhoff, TEKTRONIX, INC., 3200 Coronado Drive, Santa Clara, California 95051. An equal opportunity employer m/f/h.

Tektronix
COMMITTED TO EXCELLENCE

East
Rochester, N.Y.
Syracuse, N.Y.
Philadelphia
Charleston, W.Va.
Richmond, Va.
Baltimore
Rockville, Md.
Detroit
Boston
Rhode Island
Springfield, Ill.
Long Island, N.Y.
Cleveland
Atlanta
Orlando

PROGRAMMING OPPORTUNITIES

Colorado Springs, Colorado

We are currently seeking individuals for the following career opportunities:

MINICOMPUTER ANALYST/PROGRAMMER

To participate in the development of real-time data acquisition and telecommunications, Microprocessors. Send resumes to below address, ATTN: RS.

SYSTEMS ANALYST

Proven ability to plan, design and implement large computer based information systems. Experience in supply/logistics and production/manufacturing systems desirable. Send resume to below address, ATTN: TA.

PROGRAMMER

To participate in programming interactive, terminal-oriented minicomputer systems. Desire medical clinic or hospital data processing experience and data base management systems experience. Send resume to below address, ATTN: TH.

We offer excellent company benefits. Send resume in confidence to: Kaman Sciences Corporation, P.O. Box 7463, Colorado Springs, Colorado 80933.

**KAMAN SCIENCES
CORPORATION**

Colorado Springs, Colo.

An Equal Opportunity Employer M/F

SENIOR PROGRAMMER

Leading educational services organization, located in the Midwest, needs experienced Programmer to provide technical data processing related support to a major division. Candidates should have experience with some of the following components of a computer programmer or systems analyst functions: Programming and COBOL, assembler, or BASIC languages; use of IBM utilities; statistical background including a working knowledge of SPSS; familiarity with IBM 370, OS JCL, and CICS operating specifications.

We offer competitive salary, excellent benefit program, paid moving expenses. Send resume, including salary history to: Personnel Director, THE AMERICAN COLLEGE TESTING PROGRAM, INC., P.O. Box 168, Iowa City, Iowa 52240. ACT is an equal opportunity employer M/F

INTERNATIONAL SALES

IPS Computer Marketing Corp. is a major international dealer in used IBM computer equipment. We are looking for a marketing representative for international sales, working out of our offices in Fort Lee, New Jersey (suburb of New York City). At least five years sales experience required, with minimum of two years experience in international market. Previous sales experience should be in data-processing-related area. Prefer someone now living in New York City area. High earning potential through commissions. Some international travel required. Please send resume (no telephone calls) to G.H. Hellborn, President.

IPS

MIS-SYSTEMS ANALYST

With Sverdrup/ARO, Inc. in middle Tn. near Tullahoma requires Bachelors Degree and 10 years EDP experience in management applications (Financial, personnel, inventory systems), COBOL, systems planning and design, data base and data communications, IBM 370/OS, oral and written communications skills, and feasibility studies. Experience preferred in SYSTEM 2000, data base administration, graphics terminals, project planning, project management. Contact R.S. Shanks.

ARO, INC.
Arnold AFS, Tn. 37289
(615) 455-2611 Ext. 529

An Equal Opportunity Employer M/F

COMPUTER PROFESSIONALS

Rapidly growing computer Division of a national direct mail organization currently has challenging positions available in Falls Church, Virginia.

SENIOR PROGRAMMER/PROGRAMMER

We seek 2.5 years ALC/BAL programming experience on IBM 360 or 370 DOS systems. Direct Mail or job shop experience an asset. The selected professionals will be responsible for interpreting management problems into DP solutions.

Our expanding operation offers excellent company benefits, growth opportunity and a convenient suburban location in the Washington, D.C. area. We also offer a company-paid relocation program. If you desire consideration for one of these results-oriented positions, send resume and complete salary history to:

Mr. Larry Brown
**Richard A. Viguerie
Company, Incorporated**

7777 Leesburg Pike
Falls Church, Virginia 22043
An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS DEVELOPMENT OPPORTUNITIES

As the international data processing subsidiary of a major financial institution, Interactive Data Corporation's record of success has resulted in dynamic growth... and growth means opportunity. Installation of our second IBM System 370/168 has created some unique career opportunities in our Software Department.

SYSTEMS PROGRAMMERS OPERATING SYSTEMS

- 2-5 years' programming experience using IBM BAL.
- Familiarity with timesharing or teleprocessing systems.
- Operating systems design and implementation experience.

SYSTEMS PROGRAMMERS DATA BASE

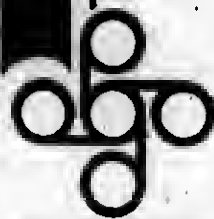
- 2-5 years' programming experience using COBOL.
- Experience with large data bases.
- Experience with IBM BAL preferred.

SYSTEMS PROGRAMMERS COMMUNICATIONS

- 2-3 years' experience in minicomputer assembly language.
- Familiarity with communication network protocol.

Please send resume in complete confidence to Personnel Director.

486 Totten Pond Road
Waltham, Massachusetts 02154



Interactive Data Corporation

An Equal Opportunity Employer M/F

PRODUCT SUPPORT ENGINEERS

EMM's Computer Products Division, the leading supplier of add-on memory systems and enhancements for IBM 360/370 computers, is expanding its Product Support Group and has immediate openings for Product Support Engineers.

These positions require individuals with good communicative and administrative abilities and a high degree of technical skill. Will be responsible for technical support to our Service Organizations, Manufacturing, Engineering, Publications and Training. Travel required.

Requires a minimum of 1 year experience in a technical support capacity on medium or large scale computers. Please forward resume complete with salary history to:

Industrial Relations Dept.



**ELECTRONIC MEMORIES
& MAGNETICS CORPORATION**

2311 W. El Segundo Bl.

Hawthorne, CA 90250

Equal opportunity employer M/F

PROGRAMMER

If you have college training and a minimum of 2 years NEAT/3 or COBOL experience on NCR Century we would like to talk to you. We are an international chemical manufacturer with executive offices in downtown Cincinnati. Full range employee benefit program. Please forward complete resume outlining experience, education, and salary history to:

Director of Employee Relations
DUBOIS CHEMICALS

Dubois Tower
Cincinnati, Ohio 45202
An Equal Opportunity Employer M/F

THE SEARCH IS ON AT HONEYWELL PHOENIX

We are seeking first rate designers and implementers to augment our top software teams expanding to meet tomorrow's technical challenges.

We offer interesting work in an exciting and challenging environment and a total commitment to creating the best software on the market. Our pace is fast but for the qualified, the career rewards are great.

We are looking for exceptional talent with experience in the following fields:

- ADVANCED OPERATING SYSTEM DESIGN AND DEVELOPMENT (GCOS, MULTICS, etc.)
- DATA BASE AND FILE MANAGEMENT SYSTEMS
- UNIFIED FILE ACCESS SYSTEM (LOGICAL I/O)
- INTEGRATED DATA STORE II: A DATA BASE MANAGEMENT SYSTEM BASED UPON CODASYL SPECIFICATIONS
- UTILITY SYSTEMS DEVELOPMENT AND TEST
- DISTRIBUTED PROCESSING AND NETWORKING
- PROGRAMMING LANGUAGES, COMPILERS & SUPPORTING SOFTWARE
- LANGUAGE SYSTEMS DEVELOPMENT
- APPLICATION DEVELOPMENT SYSTEMS
- COMMUNICATIONS SYSTEM SOFTWARE
- TRANSACTION DRIVEN SYSTEMS
- SOFTWARE SYSTEM TESTING
- TECHNICAL WRITING
- INTERNAL BUSINESS SYSTEMS

In addition to unparalleled career opportunities, our location offers a living environment equal to the work environment... hard to beat!

**The future is now and
Engineering is the key.**

Please send your resume with salary history to:

Manager, Recruitment & Placement
Mail Station Y-130
Large Information Systems Division
P.O. Box 6000
Phoenix, AZ 85005



An Equal Opportunity Employer M/F

DIRECTOR OF ACADEMIC COMPUTING

Applications are sought for Director of Academic Computing, Office of Computing Activities, University of Virginia. The position heads a Center providing computer support for research and instructional programs of the University and for other institutions of higher education in the Commonwealth. Primary hardware includes a CDC CYBER 172 and dual HP2000 ACCESS systems. Full-time staff numbers 33. The successful candidate will have an advanced degree in Computer Science or related field, at least two years experience in computer center management, and a record demonstrating technical expertise, administrative skills, and an ability to work effectively with a wide variety of computer users, preferably in an academic environment. Send resume stating salary requirement and names of three references by February 10 to the Director of Computing Activities, University of Virginia, P.O. Box 3856, Charlottesville, Va. 22903. An EEO/AA Employer.

DIRECTOR, OFFICE OF INFORMATION SYSTEMS UNIVERSITY OF KANSAS MEDICAL CENTER KANSAS CITY, KANSAS

The Director is responsible for management of an IBM 370/158 (2M), systems development/maintenance, operations/production, and DOS to OS conversion in a DL/I, CICS, CAI, and teleprocessing network environment. The Office of Information Systems supports Medical Center campuses in Wichita and Kansas City (including a 500+ bed hospital).

Require minimum of Bachelor's degree, ten years data processing experience; three years as a director or the senior executive in a large complex information systems installation; experience in management of telecommunications software, networking, data management systems, and three-shift computer operations; candidates must also have effective communication skills, experience in dealing with senior management and users, and demonstrable management and technical skills. Advanced degree, medical center or hospital information systems management desirable. Salary to \$32,000. Start April, 1978. Applications due February 15, 1978. Send resume with salary history to Dr. Richard L. Mann, University Director of Institutional Research/Information Systems, 223 Strong Hall, Lawrence, Kansas 66045.

An equal opportunity employer. Qualified men and women of all races and persons with disabilities are encouraged to apply.

position announcements

position announcements

position announcements

position announcements

position announcements

Data Processing System Architect/ Project Manager

MANAGEMENT CONSULTING DEPARTMENT OF INTERNATIONAL FIRM OF CERTIFIED PUBLIC ACCOUNTANTS is expending design, development and implementation services to encompass a broad range of generalized data processing systems for private and public sector clients. Positions are available in several U.S. locations.

WE ARE SEEKING INDIVIDUALS WHO CAN TRANSLATE REQUIREMENTS and conceptual designs into transferable, state-of-the-art systems for a wide range of technological, environments. The successful candidate will possess the ability to work with clients, have good oral and written communications skills and a sound technical data processing background. Undergraduate college degree required (Master's degree desirable). Ate college degree required (Master's degree desirable).

Please submit resume including salary history and requirements along with geographic preferences (or limitations) to:

Mr. Ralph Diekmann, 38th Floor,
38th Floor,
345 Park Ave., New York, New York 10022
An equal opportunity employer, M/F

DP Professionals San Francisco

Apply your expertise to our young, expanding Statewide Bank in the design and implementation of innovative DP programs throughout our Operations — utilizing TOTAL/7 Data Base Management Systems. Excellent growth opportunities exist for aggressive Professionals experienced on IBM 370/145 DOS/VS equipment.

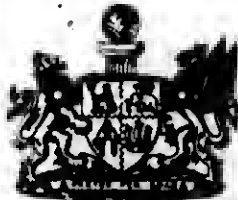
PROGRAMMER

Conceive and write programs for new applications covering the full spectrum of Bank activities. You must have a min. of 1 yr. exp. as a COBOL programmer in a DOS environment.

PROGRAMMER/ANALYST

Become involved in the design and programming of several leading edge systems for our expanding operations throughout California. You must have approximately 3 yrs. exp. to include at least 1 yr. as a Programmer/Analyst; prior financial systems and/or DBMS design exp helpful. Good communications skills essential as you will be interfacing with all levels of management.

We offer unusual challenge, excellent benefits and a progressive DP environment. Please send your resume, including salary history, to M. Tanner, Dept. 96, The Chartered Bank of London, 100 Montgomery St., San Francisco, CA 94104.



**The Chartered Bank
of London**

An equal opportunity employer M/F/H

SEE OUR FULL PAGE AD FOR SYSTEMS ENGINEERS ON PAGE 37

Intelligent Terminals, Minicomputers, and Telecommunications Systems

RAYTHEON DATA SYSTEMS



1415 BOSTON PROVIDENCE TURNPIKE • NORWOOD MASSACHUSETTS 02062
An Equal Opportunity Employer M/F

INFORMATION SYSTEMS DIRECTOR

State of Minnesota needs EDP professional to manage comprehensive EDP processing system. Involves 380 employees, 12M annual budget, average 17,000 jobs per month. Requires extensive EDP management experience, direction of systems programming and operation functions of large scale multi-processing, multi-vendor installations with communications-based, real-time and large batch-processing systems. Salary \$28,084-35,400/year. Send inquires to:

Mn. Dept. of Personnel
444 Lafayette Road
St. Paul, Mn. 55101
(612) 296-2616

An Equal Opportunity Employer

THE SEARCH IS ON AT HONEYWELL - PHOENIX

We are seeking first rate hardware engineering talent to augment our top professional teams expanding to meet tomorrow's challenges.

We offer interesting work in an exciting and challenging environment and a total commitment to creating the best product on the market. Our pace is fast, but for the qualified, the career rewards are great.

- SYSTEMS AVAILABILITY ENGINEERING
- SR. DIAGNOSTIC ENGINEERS CONVERSANT WITH FAULT SIMULATION TECHNIQUES
- DISTRIBUTED PROCESSING AND NETWORKING
- LARGE SCALE COMPUTER SYSTEMS DESIGN AND TESTING
- MICROPACKAGING ENGINEERING — THIN FILM OR THICK FILM HYBRID
- COMPUTER SYSTEMS PERFORMANCE ANALYSIS
- LARGE SCALE CPU AND I/O LOGIC — DIGITAL DESIGN
- LSI BIPOLAR CIRCUIT CHIPS DESIGN AND DEVELOPMENT
- PROCESS CONTROL ENGINEERING
- COMPUTER HARDWARE AND SYSTEM QUALIFICATION ENGINEERING

In addition to unparalleled career opportunities, our location offers a living environment which is hard to beat.

THE FUTURE IS NOW ENGINEERING IS THE KEY

Please send your resume with salary history to:

Manager, Recruitment & Placement
Mail Station Y-110
Large Information Systems Division
P.O. Box 6000
Phoenix, Ariz. 85005



Honeywell

An Equal Opportunity Employer M/F

Philadelphia Retail

Seasoned RETAIL SYS & PROCESSES pro reqd for hi visibility position w/OelVal based chain. Excel WRITTEN & ORAL COMMUNICATOR w/innovative approach to development of daily store policy & procedures essential. Also respon for updating of CORP MANUAL OF OPERATIONS. Any finl bkgd highly prfd. Depending upon exp, salary to \$22K.

ROBERT HALF
PERSONNEL AGENCIES
2 Penn Center, Suite 706
Philadelphia, PA 19102
(215) 568-4580

COMPUTER LEASING SALESMAN

IPS Computer Marketing Corp. is a major dealer and lessor of used IBM computer equipment. We are looking for an experienced leasing salesman for our office in Fort Lee, New Jersey. Will have responsibility for leases in present portfolio, lease brokerage, and leasing of new IBM processors. At least five years successful sales experience required, with minimum of two years in leasing field. Prefer someone now living in New York City area. High earnings potential through commissions. Please send resume (no telephone calls) to G.H. Heilborn, President.



EDP AUDITOR Professional Advancement

Gerber Products Company has an immediate opening on its Internal Audit Staff for an EDP Auditor. First consideration will be given to those candidates with the following qualifications.

- Degree in accounting with minor in computer science
- Ability to program in one or more of the following: COBOL, RPG, Fortran, Basic.
- Minimum of 3 years EDP Auditing, Systems Design or Data Processing Administration experience with a major computer installation.

This opening is at Corporate Headquarters in Fremont, Michigan. The company utilizes a 370/148 in communication with computers at plants throughout the United States.

Please send your resume in complete confidence to Edward T. Guzik, Manager-Employment and Compensation.



**Gerber Products
Company**

445 State Street
Fremont, Michigan 49413
An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

Corporate Product/ Software Evaluation

NCR Corporation, a major manufacturer of computers and terminals, is seeking career-minded individuals with proven performance records to function as staff members in Corporate Market and Product Evaluation in NCR's World Headquarters, Dayton, Ohio.

In this highly visible position you will:

- Interface with and serve as a consultant to Marketing, Design Engineering, Product and Software Development, and Pricing.
- Collect, monitor, and evaluate hardware/software information.
- Be responsible for assuring, coordinated, effective and documented evaluations of products and/or software from a competitive or user-sensitive viewpoint.

Likely candidates will possess a college degree and related hardware and/or software experience obtained from one or more of the following: EDP sales experience, EDP software experience from applications or operating software development, EDP product management, or development.

Position offers excellent growth and salary, along with excellent benefits including medical and pension plus stock purchase, paid relocation, recreational facilities and others.

Send resume in complete confidence along with salary history to:

NCR
Complete Computer Systems

Mr. Max Anderson
Corporate Executive and
Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

SENIOR BUSINESS SYSTEMS ANALYST

Duties include feasibility studies, definition of user requirements, development of functional system's specifications, documentation of mainframe/micro-computer systems, and responsibility for engineering systems development and implementation.

Two to five years direct experience with engineering applications required. BSEE/BSCIS preferred, MS or MBA a plus. Experience with data base systems concepts and a working knowledge of engineering change effectivity desired. Good oral and written communications skills and a sound technical background are essential.

Salary commensurate with experience. Excellent company benefits. Send resume and salary history to:

Mr. R. E. Goolsby
Ranco Controls Division
601 West Fifth Avenue
Columbus, Ohio 43201

R
RANCO

An equal opportunity employer

systems engineers achieving greater heights

At Northrop Defense Systems Division, our ambitions and accomplishments are constantly preparing us for achieving new heights in the research, development and manufacturing of sophisticated Electronic Countermeasures. And, as a leader in the state-of-the-art, we are constantly expanding our renowned, dynamic Systems Engineering team.

If you aspire to achieving greater personal and professional goals and wish to apply your creativity to problem solving situations, you can find the challenges through a career with Northrop.

We are currently seeking qualified professionals in the following areas, to join our renowned team of Systems Engineers:

SENIOR ENGINEERS

MSEE and a minimum of 3 years experience in hardware or systems design and good written communications skills required. Microwave background necessary.

PROJECT ENGINEERS

A minimum of 5 years experience in EW hardware, software, systems design and analysis (active and/or passive), necessary. Microwave experience required.

ENGINEERS

Experience in active and passive electronic warfare systems and strong software and/or hardware background necessary.

In addition to outstanding opportunities for career advancement, we offer an excellent salary/benefits package. Qualified individuals are invited to send brief letter or resume, in confidence, to:

Director—Systems Engineering
Department C 130
NORTHROP CORPORATION
Defense Systems Division
690 Hicks Road, Rolling Meadows, Illinois 60008
An equal opportunity employer m/f

NORTHROP

THE SEARCH IS ON AT HONEYWELL'S LOS ANGELES DEVELOPMENT CENTER

Analysts/Operating System Development - Responsible for the design, coding, testing, documentation, and follow-on support of a multi-use main frame Operating System.

Analysts/Data Base Management - Responsible for the definition, design, implementation, testing, and documentation of data base management, query/retrieval and reporting software. (RPGII, SORT, MERGE, ANS 77 FORTRAN, and TEXT Editor system implementation languages).

Technical Writers - Create programmer reference manuals and users guides for operating systems and user languages. Work from programmer notes, source listings, and previous documentation. Programming experience highly desirable.

Engineers, System Test - System testing, measurement, and analysis in support of software system development. Design and implementation of test tools and measurement techniques.

Programming applicants should have degree in Computer Science or equivalent. Experience with higher level implementation languages is desirable as is experience on Honeywell or Xerox large systems.

Please send resume and salary history to:

Martha L. Andreani
Manager, Administration
Honeywell Information Systems
Los Angeles Development Center
5250 W. Century Blvd.
Los Angeles, CA 90045

HONEYWELL

An Equal Opportunity Employer M/F/H

position announcements

position announcements

position announcements

position announcements

position announcements

WE'RE NOT NECESSARILY LOOKING FOR SAINTS OR SINNERS - JUST GOOD PROGRAMMERS -



That's right, we don't claim to be a theological institution - we view ourselves as simply a group of diversified individuals - each a top notch specialist in his or her particular field.

We tackle programming and consulting tasks for major companies and institutions everywhere. Since each project is different, it gives everybody a chance to continually grow and expand their expertise. Over the years, Allen Services has developed one of the best compensation plans in the industry. It manages to combine security with almost heavenly benefits (worthy of devilishly clever talent). It includes:

- Excellent salaries
- Per Diem allowance
- Paid Vacations & Holidays
- Company-paid major medical insurance
- Life insurance for you and your family

... So if you're looking for a new position or even thinking about looking - give us a call and chat with us about your special areas of interest and expertise.

Feel free to use our TOLL FREE NUMBER Monday thru Saturday (800) 543-7583

ALLEN SERVICES CORP.

DAYTON AIRPORT OFFICE
212 West National Road
Vandalia, Ohio 45377
In Ohio call (collect)
(513) 890-1200



An Equal Opportunity Employer M/F

SAN FRANCISCO

Visiting the San Francisco Bay Area?
Combine a job search with your vacation.

EDP AUDITORS

Our clients want professionals with good track records in design/programming plus EDP Audit exp.

RPG II PROGRAMMERS

Sr. Progr./Analysts and small shop mgrs. are sought by our clients located in small communities near SF.

CONSULTANTS PROGRAMMER/ANALYSTS

The in-house consultant div. of a prestige firm seeks COBOL programmer/analysts/project ldrs. to implement bus. systems in 370/IMS environment.

SYSTEMS PROGRAMMERS

Several openings for IBM 370/OS/IMS systems-software programmer/analysts.

Jerry Anderson

ROBERT HALF PERSONNEL AGENCIES

111 Pine Street
San Francisco, Ca. 94111
(415) 434-1900

BUSINESS SYSTEMS ANALYST

We have several openings for high quality business systems analysts. Desirable qualifications include: a strong business orientation with a computer background. Experience in the food industry, wholesale and/or retail. An ability to communicate effectively with our users and project management expertise within a formal process. We offer: a dynamic and challenging environment, an aggressive company and very competitive salary and benefits. Please forward resume in confidence to:

Kenneth Podd
Mgr. of Systems Development
Peter J. Schmitt Company

678 Bailey Ave.
Buffalo, N.Y. 14206

PROGRAMMER/ ANALYSTS

370/168 OS/VS

Leading publisher of chemical information services needs experienced assembler language Programmer/Analysts. IBM 370 and/or PDP-11 experience is desirable.

We are a large installation operating chemical information and associated business information systems in both batch on-line modes. State of the art environment includes:

- * ON-LINE INTERACTIVE PROGRAMMING
- * STRUCTURED PROGRAMMING
- * DISTRIBUTED PROCESSING
- * DATA BASE MANAGEMENT SYSTEMS

We need successful people with proven skills. A college degree or equivalent experience is required. We offer competitive salary, a professional environment, good growth potential and an attractive benefit package which includes paid dental insurance, continuing education program, flexible working hours, and liberal vacations. If you qualify please write to:

CHEMICAL ABSTRACTS SERVICE

P.O. Box 3012
Columbus, Ohio 43210

An Affirmative Action Employer M/F

THE SEARCH IS ON AT HONEYWELL-PHOENIX FOR CENTRAL SYSTEMS AND COMMUNICATIONS ANALYSTS

Strong background in computer system measurements or modeling to aid in the design of our future high performance computer systems and distributed processing networks. Ideal experience will include:

- Development of H/W and S/W monitoring methodology.
- Application of H/W and S/W monitors to performance evaluation of current and future products.
- Analysis of H/W and S/W architecture in relation to system performance.
- Design, implementation and application of mathematical and simulation models of proposed system architecture features to provide performance evaluations of design alternatives.

If you have experience in one or more of these areas send your resume and salary history to:

Manager, Recruitment & Placement
Mail Station Y79
Honeywell Information Systems
P.O. Box 6000
Phoenix, AZ 85005

Honeywell

An Equal Opportunity Employer M/F



position announcements

position announcements

position announcements

position announcements

position announcements

DATA PROCESSING CAREER OPPORTUNITIES

Each select position is being offered by the
leading U.S. specialists in data processing placement

SYSTEMS ANALYST to \$35,000. To become MIS Director. Manage N.E. computer operations. Contact FOX-MORRIS, 1500 Chestnut, Phila., PA 19102 (215) 561-6300.

MIS DIRECTOR to \$35,000. Oelware Valley Corp. seeks individual to direct entire EDP organization. Contact FOX-MORRIS, 1500 Chestnut, Phila., PA (215) 561-6300.

MGR. BUS. SYSTEMS DEV. to \$30,000. Sup'v. 4. Marketing, Fin'l & Mfg. exp. Contact ABC EMPLOYMENT SERVICE, 401 Second Ave. S., Minneapolis, MN 55401 (612) 339-1453.

SYSTEMS ENGINEERS to \$26,000. BS. Network analysis & design. Product eval., market analy., research. Contact ATLAS AGENCY, 412 W. 6th, Los Angeles, CA 90014 (213) 627-9611.

SYS-AN. - SR/O/S \$25,000. Data Base + 5 yrs exp. banking, credit card or manuf. Contact FRAN ROGERS, 25 S. Service Rd., Jericho, NY 11753 (516) 997-4373.

SOFTWARE SUPPORT Mid-\$20's. Generate/maintain OS/VS shops. 3+ yrs exp. Contact FOX-MORRIS, 47 Perimeter Center East, NE, Atlanta, GA 30346 (404) 393-0933.

Q.C. & STAFF ENGRS. \$18-26K. 2+ yrs exp. in Micro-Electronic, Thick Film, Semi-Conductor, E/M Prod. HALLORAN AGENCY, Brisbane Bldg., Buffalo, NY 14203 (716) 856-3170.

DATA BASE DESIGN \$18-25K. Prog. firms with expanding D.P. 3+ yrs intensive data base. Contact FOX-MORRIS, 47 Perimeter Center East, NE, Atlanta, GA 30346 (404) 393-0933.

SYSTEMS ANALYSTS & PROGRAMMERS \$15,000-\$25,000. Immed. PA, Nat'l openings. Commer. scient. applic'ns. Contact WIER PERSONNEL SER., (emp. agcy), 535 Court St., Reading, PA 19603 (215) 376-8486.

SYSTEMS ANALYST to \$20K. Central Penna mfg. or fin. applications exp. on 370. MECK ASSOC. (emp. agcy), 1517 Cedar Cliff, Camp Hill, PA 17011 (717) 761-4777.

MICRO/MINI PRGM'RS. \$16,000-\$23,000. Formulation micro sys. hardware diagnostics. Deg. C/S - Eng - equiv. ARTHUR EOP, 8 Forest, Caldwell, NJ 07006 (201) 226-4555.

All positions offered by full
professional partners in



**NATIONAL PERSONNEL
CONSULTANTS**

A Division of J.D. Edwards, Inc.

PROGRAMMERS/ANALYSTS

First and Merchants Corporation has several openings for qualified programmers and analysts in its Corporate Systems Division. These individuals will be assigned to major system projects underway which support F&M's retail banking operations.

Qualifications sought include 1-3 years of application systems programming and experience with large scale IBM Operating Systems and associated job control language. Teleprocessing and supervisory experience are pluses.

We offer challenging assignments in a dynamic business with fully supportive computer resources, an excellent working environment, competitive salaries and a complete package of fringe benefits. Please submit resume in complete confidence, listing all pertinent date and salary requirements to:

D.T. Leonard

FIRST & MERCHANTS CORP.

P.O. Box 27025
Richmond, Virginia 23261

An Equal Opportunity Employer

PROGRAMMER ANALYSTS

The 9th largest independent telephone co. in the USA is currently expanding its staff, seeking responsible career-minded individuals to perform in a small shop, hands-on environment. We are located in beautiful Central Fla. near Disney World. Excellent fringe benefit pkg. Excellent working conditions with a dedicated and respected staff. A minimum of 3 yrs. COBOL exp. in an on-line OOS environment is required. OL-1 database and CICS background is desired. Salary commensurate with exp. and ability. IBM 370/148 1 meg. CPU with 3270 network of 50 terminals ODS/VS /// POWER/VS /// CICS/VS /// DL-1 /// SPM /// If this sounds like your kind of shop and you would enjoy living in America's vacationland, please fwd. resume with salary history to:



Winter Park Telephone Co.

P.O. Box 3000,
Altamonte Springs, FL 32701

Attn: Personnel Director

An Equal Opportunity Employer M/F

WANTED: COMPUTER SALES PROFESSIONALS

High caliber sales professionals who have the desire and motivation will find they have the opportunity to move quickly into sales management.

CALL OUR CORPORATE SALES MANAGERS,
TUESDAY OR WEDNESDAY 6 PM - 9 PM (EST) at

800-225-9228 or 800-225-9229*

REWARDS:

- Financial growth through career development
- Opportunity to use your industry expertise to the fullest
- The opening to a future in sales management, marketing, sales training, product development and other areas
- A company that rewards excellent account management as well as the ability to develop new business
- An environment where the team is to assist your fellow salesperson
- Excellent products complete with pre and post sales support
- Comprehensive benefits package including a dental plan

TERRITORY: Continental U.S.

MARKETS:

- Industrial
- Commercial
- Laboratory
- Telecommunications
- Graphic Arts
- OEM
- Large Computers
- Banking, Exchange
- Insurance
- Terminals
- Education
- Miscellaneous

If unable to reach us at this time, call Bob Nephew, at 800-225-9228, Monday-Friday 9-5 (est) or send your resume to him at NORAM Central Employment, Digital Equipment Corporation, 129 Parker Street, Dept. H0130 3807 Maynard, Mass. 01754. We are an equal opportunity employer, m/f.

digital

DATA PROCESSING Systems Analysts

SAN FRANCISCO

Dynamic growth for Decimus Corporation, leaders in supplying Data Processing services to the Financial Industry, has opened several positions for responsible individuals to serve as Systems Analysts.

Responsibilities include identifying short and long-term requirements, developing plans for systems applications and implementations, planning for and monitoring system conversions, and serving as a liaison between diverse areas.

You must have at least 3 years COBOL, OS and JCL experience in developing systems applications, have a solid grasp of structured design techniques, and an appreciation of the need to be a programmer first. Knowledge of Librarian, Panvalat, and experience in RPG II, Assembler, and Banking/Financial Systems would be extremely helpful.

Work in a State-of-the-Art environment with 370/155, 168, 195, SYS 3 (Mod 15), SYS 32, and various minicomputers, under OS, MVS, DOS, IMS, CMS/VM. Decimus offers salaries commensurate with your expertise/contribution and outstanding benefits.

Send your resume with salary history/requirements in confidence to D.B. Michaels, Suite 320, 1700 Montgomery St., San Francisco, CA. 94233, or call (415) 622-2030, EOE, M/F/H.

Join The Proud People At

DECIMUS

A Bank America Company

We're growing. How about you?

Aggressive, growing nine-year-old developer and manufacturer of a complete line of high-quality, moderately priced general-purpose CRT terminals and related equipment seeks career-oriented individuals to help us achieve our ambitious goals. We offer an opportunity to contribute and gain personal satisfaction working in a success-oriented environment with a people-oriented management team.

We have the following positions available:

Sales — Managers and Representatives

We're looking for experienced, aggressive individuals with a record of success in data processing and/or data communications equipment sales. If you're a self-starter who can call on major end users and OEM accounts, we offer an opportunity for above-average earnings through a combination of salary, commission, and bonuses. Respond to Dept. S-102.

Senior Digital Design Engineer

This important position requires 3-5 years experience in digital design. Additional experience with microprocessor-based devices and analog design extremely helpful. Pleasant Southern New Jersey location working with a solid, creative engineering team. Respond to Dept. E-131.

To be considered for the above positions, forward resume with earnings history and requirements in strictest confidence to:

**Datamedia
Corporation**

7300 N. Crescent Boulevard
Pennsauken, NJ 08110
(no agencies please)

An equal opportunity employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SOFTWARE SPECIALISTS

Data processing organization of a Fortune 500 Company has several growth positions:

MVS

Involves providing technical guidance and assistance to several large data centers in a full scale conversion from OS/MVT to MVS. Requires strong technical background in both systems. Additionally, should have participated in an OS to MVS conversion.

IMS

Involves a migration from current DB/DC systems to IMS in several large company data centers. Requires in-depth knowledge of IMS and extensive experience using this system. Also requires experience in converting an existing application to IMS.

DATA ENTRY

Involves establishing company standards for data entry and providing technical support to organizations performing data entry functions. Requires experience in full range of data entry equipment and procedures (e.g., key-to-disc, word processing, OCR, etc.)

All candidates should be degree, BBA in Information Sciences or BS in Computer Science is desirable. Minimum two years experience in one of the above areas is required for all positions. Facility located in North New Jersey area. Travel within the U.S. is required. Please send detailed resume including salary history, clearly indicating position of interest to

CW Box 1416
797 Washington St.
Newton, Mass. 02160

We are an equal opportunity employer

ITEL

Corporation, Business Systems Division,
is looking for...

Marketing Representatives and Systems Engineers

- who are self-motivated, require little direction and are willing to travel,
- who have a talent for recognizing opportunities and creating solutions,
- who have an in-depth knowledge of on-line services and/or minicomputer systems,
- to assist ITEL customers in planning hardware and software acquisitions and installations, and to anticipate their future needs,
- to work in the following major metropolitan areas: San Francisco, Los Angeles, New York, Boston, Philadelphia, Chicago, Pittsburgh, Cleveland, and Dallas.

If you're the Marketing Representative or Systems Engineer we're looking for, send your resume to:

ITEL CORPORATION

Business Systems Division
3 Corporate Park Drive
White Plains, New York 10604
Attention: D.J. Van Den Berg
Vice President, Marketing

ITel Corporation is an equal opportunity/affirmative action employer—M/F/H.

PROGRAMMER/ANALYST

IBM 370, DOS/VS, COBOL, RPG II

Standard Plastic Products, a subsidiary of Mattel Inc., the world's leading toy manufacturer, seeks a talented programmer/analyst to join our expanding department.

The successful candidate should possess at least 4 years of systems/programming experience; thorough knowledge of COBOL, BAL, RPG II and DOS/VS with the ability to apply that knowledge to IBM 370 and/or Systems III, Model 15D. Knowledge of Teleprocessing (3740 series) desirable, but not mandatory.

You will be involved in all aspects of project development as well as assisting in systems design, evaluating hardware/software requirements, interfacing with user departments and creating documentation.

We offer competitive salaries and attractive benefits package. Interested applicants are invited to send resume with salary history/requirements to: Steve Hoffman.



STANDARD PLASTIC PRODUCTS, INC.

A Subsidiary of Mattel, Inc.
450 Oak Tree Avenue
South Plainfield, N.J. 07080
an equal opportunity employer m/f

CSC

Computer PROFESSIONALS

THE CHOICE CAREERS

See Them At The Applied Technology Division of Computer Sciences Corporation

The Computer Sciences Corporation team of over 9,000 professionals will testify to the truth of our challenging assignments, excellent income offers, and growth careers.

CSC Applied Technology Division provides a full range of information systems technology programs to government agencies and private industry and offers you every opportunity to develop your professional skills and to meet both personal and professional challenges on one of our support projects.

SELECT YOUR IDEAL LOCATION...

☐ NASA KENNEDY SPACE CENTER, FLORIDA

Programmer/Analysts with H6000 COBOL, Fortran, GMAP or GCOS experience.

☐ SAN DIEGO, CALIFORNIA

Programmer/Analysts with Fortran or systems experience on NOVA or HP minicomputers to work at our Naval Ocean Systems Center.

☐ JACKSONVILLE, FLORIDA

Programmer/Analysts with U1100 COBOL experience for the Navy's Data Processing Service Center (DPSC) program.

☐ SEABROOK, MARYLAND

Programmer/Analysts with IBM 360/370 experience in COBOL, Fortran, JCL, ALC, PL1, or TSO. Systems Programmers using DBMS, OS, VS1, VS2, MVS, and MVT to work on our NASA Goddard Space Flight Center program.

☐ RIDGECREST, CALIFORNIA

Programmer/Analysts with U1108 COBOL EXEC 8 experience for our Naval Weapons Center program.

Along with choice locations, CSC offers you competitive salaries and a fully paid company benefits package.

For immediate consideration, please send resume with salary history to:

Gus Siekierka
Director, Industrial Relations

COMPUTER SCIENCES CORPORATION

Applied Technology Division
6565 Arlington Boulevard
Falls Church, Virginia 22046

Major Offices and Facilities throughout the World
Equal Opportunity Employer M/F

Director of Data Processing

Major health care company. Over 100 in data processing area. Requires a director with superior management skills, one who has a track record of achievements and prior health care or insurance experience. IBM 370/OS/VS shop with high volume of transactions. Eastern Seaboard (Not NYC). \$37,000. FEE PAID

ROBERT HALF PERSONNEL AGENCIES
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

PROGRAMMER

To High Teens

Excellent family and recreation area offers outstanding opportunity. IBM 135/136 exp and P.L.I. or DOS/VS variations. Background in mfg. operations.

PROGRAMMER/ANALYST

Low \$20's

Degree in Business Administration or computer science. Minimum of 4 yrs. exp. OS/COBOL, FORTRAN, PL1 and Mfg. data base.

Contact: Art Tohl, (312) 665-4455, S-H-S INTERNATIONAL, 1818 E. Roosevelt Rd., Wheaton, IL 60187. (pvt. empl. agcy).

Programmer/Analysts & Programmers Cobol

Several excellent opportunities are available with major, multi-line insurance company. We are seeking individuals with 2-3 years' experience utilizing OS/VS1 370/158, 3270, 3350 on-line facilities. These positions provide good salaries and excellent company paid benefits.

Qualified candidates should submit resume including salary history and requirements to: Mrs. Helene Haber



EMPIRE MUTUAL INSURANCE GROUP
1965 BROADWAY, NEW YORK, N.Y. 10023

SR. PROGRAMMER/ANALYST

Eugene, Oregon heavy equipment mfg. seeks degreed person with minimum two (2) years experience with manufacturing information system and project leader level.

Familiarity with RSTS/E, Basic Plus and Basic Plus II, PDP 11/45 hardware, total (DBMS), and/or MRP is strongly desired.

Excellent fringe benefit package, salary negotiable. Forward resume to:

P.O. Box 607
Eugene, OR 97440
An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

**COMPUTER SCIENCE
FACULTY POSITION**

Anticipated for Fall 1978 at State University College at Geneseo, New York. Salary \$13,000-\$17,000. Minimum requirement of a Master's degree in Computer Science or related area (or equivalent professional computer experience). Emphasis on teaching. Applicant should have a broad background in computers, knowledge of at least two major higher-level languages, and some special area of competence (such as computer business applications, databases, hardware, etc.). Application deadline: March 1, 1978. Apply with resume to: Mr. Stacey Edgar, Search Committee, Computer Science, State University College, Geneseo, N.Y. 14454. An Equal Opportunity/Affirmative Action Employer.

**SYSTEMS
PROGRAMMER II**

The University of New Mexico Computer Center has an opening for an experienced OS Systems Programmer II. Configuration: IBM S/360 Model 67, 2046K. Running OS-MBT with HASP. Major job responsibilities: Generate, Maintain, Modify, Document, and Consult (all on OS). Requirements: Bachelors Degree, at least three years programming experience, (one year of which consists of working with an OS Systems Programmer). Knowledge of 360 architecture, Assembler Language, and two high level languages. Starting salary range: \$15,413-\$18,928 per year. Send resume and salary requirements to:

Director, Computer Center
**University
of New Mexico**
Albuquerque, NM 87131
equal opportunity employer

PHILADELPHIA
Step Up Into Mgmt.
SR. PROGRAMMER, SR.
ANALYST or PROJ. LOR
EXP. qualifies you to move
into this career position
w/prominent CONSUMER
GOODS MFR. Sm shop reqs
PHILA AREA shrlsive pro
w/proficiency in COBOL &/or
BASIC from MINI COMPUT
environ. Depending upon exp.
salary to \$24K. For confiden-
tial attention, call or send re-
sume to:

ROBERT HALF
PERSONNEL AGENCIES
2 Penn Center, Suite 708
Philadelphia, PA 19102
(215) 568-4580

Consider an Educational Career in the Computer Industry...

If you're looking to broaden your career horizons, the wide exposure, technical challenge, and excellent growth potential of one of the largest training organizations in the computer industry is for you!

Consider Phyllis' Experience . . .

After teaching math in a local community college and working as a systems analyst/programmer, Phyllis joined Digital in 1973. As a software instructor, Phyllis taught courses at Digital training centers in Maynard and Marlboro, as well as at customer sites in North America and Europe. In 1976, she became Supervisor for PDP-11 customer and software support training in the Real-Time and Communication areas. "Digital gave me the opportunity to combine my programming and teaching backgrounds", says Phyllis. She found Educational Services to be the ideal place for her to broaden her background and to learn about the wide range of Digital products.



Course Developers and Instructors

Responsible for providing technical training to Digital customers and employees, the Educational Service Group is seeking professionals with a solid technical knowledge and a desire to teach or to become involved in course development work. We currently need individuals to instruct and develop a broad range of advanced software course material required for the support of both current and future products.

If you have a background in Systems Analysis, Systems Programming, Operating Systems Support, Telecommunications, Programming Languages, Diagnostic Program-

ming, Data Base Management, or Software Course Development and Teaching, we would like you to consider this unique opportunity to broaden your technical background while communicating your expertise.

Please forward your resume to Mary Ann Joyce, Digital Equipment Corporation, Dept. H130 3807, 129 Parker Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.

digital

PROGRAMMERS THIS TITLE MAY BE HOLDING YOU BACK? 15.5-25.5K

Caught in this game of semantics, where your job is nothing like the title implies? Duties are of a much more diverse nature? Then you should avail yourself of our service, "not to change jobs", just to find out where you stand in the game. You may be shocked to find out that your current position in the market place is worth much more to you in dollars than your present salary. If you would like to determine if your title and salary match what others are getting, our data base is available for you to make that determination. "NOT TO CHANGE JOBS". For more input call collect in Boston (617) 423-1900, in Houston (713) 961-5500 or in San Francisco (415) 981-7000.

MANAGEMENT CONSULTANTS IN D.P.
ALL REPLIES HELD IN STRICTEST CONFIDENCE.

NAME _____	ZIP _____
ADDRESS _____	
HOME PHONE _____	
COMPANY _____	TITLE _____

RETURN TO:
PERRI-WHITE ASSOC.
50 FRANKLIN ST.
BOSTON, MASS. 02110
(617) 423-1900
ATTN: CHARLIE WILKINS

PERRI-WHITE & ASSOC., INC.
5373 W. ALABAMA PLACE
HOUSTON, TEXAS 77056
(713) 961-5500
ATTN: TOM MEEHAN

PERRI-WHITE & ASSOC., INC.
44 MONTGOMERY ST.
SAN FRANCISCO, CAL. 94104
(415) 381-7000
ATTN: TERRY MC MAHON

DEC PROGRAMMER/ANALYST

Dynamic, upstate New York marketing organization is looking for a Programmer/Analyst with at least two years experience with DEC RSTS Basic-Plus System; preferably on 11/70. Commercial background desired in order processing, inventory control, and accounting applications. Ability to deal with user groups is essential.

We can offer you a friendly working environment, good starting salary, excellent benefits and profit sharing. Send resume and salary history in confidence to CW Box 1366, 797 Washington St., Newton, MA. 02160.

EQUAL OPPORTUNITY EMPLOYER

COMPUTER SALES

ALL POSITIONS
FREE PAID BY
CLIENT COMPANIES
BEAT THE COLD WEATHER!!!
WORK AND LIVE
IN SUNNY FLORIDA!!!

Our client companies are the leaders in the field. If you have 2-4 years of sales with terminals, CPU's or Mini's calling on OEM, Industrial, or Scientific Area, Degree (prefer any technical degree ie: BSEE, CHE, ETC.) Salary, Car, Expenses, Commission, and full benefits package leads to high 1st year earning and management potential. Send resumes in strict confidence to:

Al Snyder
Dunhill
of Greater Miami, Inc.
633 N.E. 167th St.
Suite 515
North Miami Beach, FL 33162
(305) 853-2535

SYSTEMS PROGRAMMER II

For computing facility at National Center for Atmospheric Research in Boulder, Colorado. Involves maintenance/consulting activities on existing MODCOMP II RJE system, writing necessary protocol code for network control computers (NCC) telephone satellite links and helping with the connection of satellites to these links. Performs all functions of digital computer programming applicable to system software design and maintenance. Requirements: BS in Computer Science, Mathematics, Electrical Engineering or applicable field plus 3-4 years experience in above areas. Also required is knowledge of one or more of following minicomputers: MODCOMP II, SEL 32/55, DEC 11 plus experience with digital data links via telephone lines. Salary range \$14,300 to \$17,900 annually plus fringe benefits. Send resume to: Tim Schnick, NCAR, P.O. Box 3000, Boulder, Colo. 80307. Equal Opportunity Employer M/F.

NEW OPPORTUNITIES IN DATA PROCESSING SYSTEMS SUPERVISOR

Design, implementation and supervision of large systems, exposure to data base. 5-7 years experience.

SYSTEMS ANALYST

3-5 years experience

PROGRAMMER ANALYST

2-3 years experience

PROGRAMMER

1-2 years experience

REQUIREMENTS

COBOL or Fortran language,
IBM 370, OS/ICL, Degree preferred

Michigan Consolidated Gas Company, a member of the American Natural Resources System and a leading in the energy field, is seeking qualified individuals to join our growing Information Systems staff.

We offer a competitive salary plus an excellent benefit package. Reply by letter or resume with salary history, to:

Employment & Placement (BBD), Michigan Consolidated Gas Company, One Woodward Avenue, Detroit, Michigan 48226. An Equal Opportunity Employer M/F.



**MICHIGAN
CONSOLIDATED
GAS COMPANY**

position announcements

position announcements

position announcements

position announcements

position announcements

Data Processing Professionals

Here's how we can help the job you're looking for find you.

If you're looking to explore career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS • SOFTWARE SPECIALISTS and SALES REPRESENTATIVES for companies nationwide, at no cost to the applicant.

Here's how our service works. After we receive your resume, we (1) can make it instantaneously available, via computer, to our network of CYBERSEARCH® placement offices in major cities across the country. (2) Trained placement consultants at each office can then refer your resume to companies seeking EDP professionals with your qualifications. So instead of one office and one consultant, you can have all the offices of CYBERSEARCH searching the data processing job market for you. To protect your identity, your name and present employer's name are not included in the computer file.

When interest is expressed, your personal CYBERSEARCH consultant will contact you and arrange an interview. This service is available without cost to you now, or upon hire. All fees are paid by the employer. To put your resume into circulation fast, call or write the EDP Dept. at the CYBERSEARCH office nearest you.

CONTROL DATA CYBERSEARCH INC.

a subsidiary of
CONTROL DATA CORPORATION

CHICAGO, IL 214 North Michigan 60601 312-454-8490	LOS ANGELES, CA 8616 La Tijera Boulevard 90045 213-642-2462
DALLAS, TX 8585 Stemmons Freeway 75247 214-688-5810	MINNEAPOLIS, MN 6800 France Ave. South 55435 612-830-6850
HOUSTON, TX 2000 West Loop South 77027 713-965-5500	PHILADELPHIA, PA Two Balacynwyd Plaza 19104 215-667-2400
IRVINE, CA 17744 Sky Park Boulevard 92714 714-754-7701	SAN JOSE, CA 2025 Gateway Place 95110 408-866-3186

IMMEDIATE OPENING

IBM 370 specialist 3135 and/or 3145

Salary \$32,000-Plus!

Other positions open for trained 370 CE top pay and benefits.

Call Immediately

(312)843-0630

Circle Computer.

920 Remington
Schaumburg, ILL 60195

Grow With A Fast Growing And Extremely Innovative Leasing Company

O.P.M. Leasing Services, Inc. is expanding its operations throughout the United States, Canada and Europe and is looking for dynamic marketing representatives with experience in system/370 leverage leasing combined with knowledge in the remarketing of data processing equipment. Minimum two years experience.

Excellent salary top benefits provided. For personal interview write:

O.P.M.

Mr. Michael C. Iacona, National Sales Director
O.P.M. Leasing Services, Inc.
9601 Wilshire Blvd., Beverly Hills, CA 90210
Tel: (213) 278-4117
THE CUSTOM LEASING PEOPLE

The Pros of working and living in Houston



- Dynamic Business Community
- Attractive Cost of Living
- Warm Climate

Our client is currently scheduling expense paid interview for qualified applicants during the next several months.

If you are degreed and have expertise in each of the following:

- Programmers/Systems Analysts/Project Leaders
- Business or Scientific Applications
- COBOL, PL-1, or FORTRAN
- 370/OS

Send us your resume, or call us collect (station-to-station) at (713) 621-9811 and we will appraise your chances.

Scientific Placement, Inc.

EMPLOYMENT SERVICE 2700 SOUTH
POST OAK ROAD Dept. 44
HOUSTON TEX 77056 713 621-9811

PROJECT LEADER OS/2000

\$24,000-\$27,000

Exeter Associates

Executive Recruiters

Bruce A. Montville
P.O. Box 623
Computer Park
Hampton, N.H. 03842
(603) 926-6712

DIR. SYSTEMS PLANNING

New Eng. insurer seeks indiv. with extensive business planning exp. to provide Presidents offices with long range support. Excellent visible position with movement into total D.P. resp. Salary to \$33,000. Fee Paid. Contact Stan Durbas.

ROBERT HALF PERSONNEL AGENCIES

111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

Positions Available Nationwide
Call Toll Free
800-426-0342

Assured Confidentiality
and Employer Retained

SALES REPS. 25-30K
4 years experience in DP field (including time sharing and/or remote batch processing).

SYS. PROGR. 20-24K
Experience with OS systems, dumps and CICS/VS. Client moving to MVS & TSO.

T.P. SPEC. 22-25K
B.S. or M.S. in E.E. desirable. Northwest firm looking for individual to install T.P. Network with Front end processor.

SOFT. SUPVR. 26-30K
Software development experience on large scale systems. B.S. in Math, Physics or Eng.

PROGRAMMERS 17-20K
Experience in financial/insurance/mfg. areas desirable. Openings on both Coasts and in the Midwest.

PARKER PAGE ASSOC.
P.O. Box 12308
Seattle, WA 98111
Offices in Wash. D.C., Chicago, Atlanta, Portland, Or.

System Manager, Programmer

The college of Idaho, near Boise, Idaho has an opening for a system manager/programmer. Appropriate degree and experience with Dec-11 RSTS AND BASIC preferred. Duties include installation and maintenance of accounting programs, assisting students and faculty with programming problems, etc. Salary range 10K-12K. Equal Opportunity Employer. Send resume to Christian H. Eismann, Dean of the College.

The College of Idaho
Caldwell, Idaho 83605

SOFTWARE ENGINEERS

The Boeing Company In Seattle, Washington is seeking computer professionals for a variety of important assignments on a wide range of systems including:

**Energy Management/Control Systems
Military Command/Control Systems
Military & Space Avionics Systems
Surface Transportation Systems**

Challenging opportunities exist in the following areas:

OPERATIONAL SOFTWARE DEVELOPMENT

Design and develop software for simulators, operational systems, automatic test equipment and other special-purpose or realtime applications.

SOFTWARE/COMPUTING SYSTEM DESIGN AND ANALYSIS

Analyze system hardware, software and operator requirements to support establishment of a system architecture.

Perform systems analyses and trade studies to support design concepts, new business acquisition and proposal activities.

SOFTWARE AND COMPUTER SYSTEM TEST AND EVALUATION

Design and develop hardware and software test concepts and environments to support operational software and computer systems test.

Conduct software tests.

Candidates for these opportunities must have a BS degree or higher in Engineering or Computer Science and be a U.S. citizen.

Attractive salary, fringe benefits and moving allowances will be offered selected candidates. And living is a pleasure in the unspoiled Northwest with its many recreational and sports activities and relaxed life-styles.

Look into these opportunities.

Send your résumé to The Boeing Company, P.O. Box 3707-LLK, Seattle, WA 98124.

An equal opportunity employer.

BOEING
Getting people together.

SYSTEMS PROGRAMMERS

- Assembler Language
- New Systems development
- Business applications
- Requires 1-4 years' experience with major operating systems
- Competitive salaries, benefits
- Maryland countryside location

Principals only, please. All inquiries confidential.

Mr. W.T. Myers
Director of Personnel Management
Executive Plaza IV
Hunt Valley, Maryland 21031
301/667-9211

An Equal Opportunity Employer M/F

insight
DISPLAY DATA CORPORATION

position announcements

position announcements

position announcements

position announcements

position announcements

UNIVERSITY OF NEW HAMPSHIRE**DEC system 10**

The University of New Hampshire (conveniently located near mountains, lakes, seashore, and Boston) has immediate openings for experienced computer professionals. The Office of Computer Services, with its centrally located dual-KL DECsystem10, provides both batch and timesharing services to the entire University System network (comprising 5 remote stations and over 150 interactive terminals) for administrative, instructional, and research applications.

SYSTEMS PROGRAMMERS

Challenging projects currently underway include: design and implementation of mini-based distributed network, investigation and feasibility studies of array and floating-point processors. Responsibilities include: monitor generation and maintenance, performance analysis, and operation system modification.

Minimum qualifications - Computer Specialist III: Bachelor's degree or equivalent experience plus 3 years experience on large-scale timesharing systems, 1 year of which must be in operating systems work. Salary range: \$11,616 to \$18,048.

DATA BASE SOFTWARE SPECIALIST

Develop and maintain software for on-line data entry and data base update systems. Install and maintain data base management software. Provide technical assistance to applications teams in the use of OBMS software and MIS data base design.

Minimum qualifications - Computer Specialist III: Bachelor's degree or equivalent experience plus 3 years experience on large-scale timesharing systems. Salary range: \$12,780 to \$19,824.

PROGRAMMER ANALYST-AUXILIARY SERVICES

Collaborate with team leaders and other team members in designing, developing, and implementing computer applications in the auxiliary services area (inventory, order entry, and purchasing). Multilingual background (especially COBOL) and data base experience desirable.

Minimum qualifications - Computer Specialist III: Bachelor's degree or equivalent experience plus 3 years experience on large-scale timesharing systems. Salary range: \$12,780 to \$19,824.

Resumes should be submitted no later than February 10, 1978 to:

Mr. Bill Vasiliou, Director
University of New Hampshire
Computer Services, Kingsbury Hall
Durham, N.H. 03824

An Affirmative Action/Equal Opportunity Employer

**SOFTWARE
EVALUATION****FOR FINANCIAL TERMINAL
SYSTEMS**

Engineering & Manufacturing-Dayton develops and produces financial terminal products. Opportunities currently exist in Quality Assurance for Software Evaluation Analysts to perform design analysis and Q.A. certification on a project basis for financial terminal systems. Must be familiar with multi-tasking O.S. concepts and have the ability to design and code test software in 8080 Assembly language or COBOL. An understanding of banking systems would be helpful.

These positions are located at NCR's Engineering & Manufacturing Division in Dayton, Ohio. If you are a self-motivated professional and believe you qualify, please submit your resume and salary requirements to:

Mrs. J.E. Chorazewitz
Employment, CW-130
Engineering & Manufacturing-Dayton
NCR Corporation
Dayton, Ohio 45479

NCR
Complete Computer Systems

An Equal Opportunity Employer

Deputy Project Director

The National Center for State Courts is seeking a Senior level professional familiar with court information systems and project management. This individual will assist in establishing procedures and standards for assessment of Judicial Information Systems and grant review activities, coordinating project deliverables, and performing other activities as required. The position requires a highly capable individual with three years of experience in court administration or a related criminal justice field. Additional qualifications include bachelor degree from an accredited college or university and knowledge of judicial information systems, statistics, and system analysis techniques. Graduate degree in law, public, or business administration preferred. Salary dependent on background, experience, and other qualifications. Send resume to

State Judicial Information System Project
National Center for State Courts
300 Newport Avenue, Williamsburg, Virginia 23185
E.O.E.

CADILLAC EDP OPPORTUNITIES

ALL FEE PAID NATIONWIDE COVERAGE
CONFIDENTIAL

CADILLAC offers you assistance in finding a position that meets your objectives. . . NATIONWIDE or in your present locality. For 45 years CADILLAC has been helping professional people find new positions that offer greater growth more responsibility, new experience, relocation, higher salary, etc. . . we'll make every effort to do the same for you. Just send your resume, or a note outlining your experience. . . no cost or obligation to you.

Sys Prog (Tech Support)	\$20-30	Prog (Applications)	\$14-20
Sr. Anal/Proj Mgrs	\$22-30	Prog (MINI, PDP, etc)	\$16-23
System Anal	\$20-25	EDP Auditors	\$18-22
Prog/Anal	\$16-22	Managers IBM Sys/3	\$16-23



Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601

(312) 346-9400

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

**SYSTEMS CAREERS
FOR
SYSTEMS PROFESSIONALS**

Service Merchandise Co., a leader in the Catalog Showroom industry, will approximate \$350 million in total sales this year. Presently we operate 51 showrooms in 14 states. Our 5 year projection calls for an anticipated volume of \$1 billion and 100 showrooms. To maintain this rapid expansion we need:

**PROJECT LEADERS/
EOP AND MANUAL SYSTEMS**

Plan, schedule and control major projects. Responsibility for all phases, both EOP and Manual Systems. High visibility, multiple, project assignments. Should possess strong communications skills.

SENIOR PROGRAMMERS

Responsibilities including development and implementation of new programs including batch and inter-active systems.

SENIOR SYSTEMS ANALYSTS

Design new state of the art systems in coordination with progressive management. Conduct feasibility studies, reoptimization of existing systems, and interface with all levels of management.

PROCEDURES ANALYSTS

Developing systems, writing procedures, and designing forms are but a few of the responsibilities. Others include micrographics, facilities management, communications.

Our environment is centered around a large main frame computer, over 30 Mini-Computers for distributive processing and independent systems, a telecommunications network across 14 states, and numerous inter-active applications using CRT's. Previous experience in inventory control, financial, distribution, or retail systems helpful.

We offer a competitive salary and a people-oriented climate in which to grow. Our Benefits package is comprehensive and includes hospitalization, major-medical, dental, vacations, and much more. These positions are located in beautiful Middle Tennessee.

Please send your resume to arrange for a confidential interview.



Charles T. Noll
1-800-251-8459 Ext. 437
Service Merchandise Co. Inc.
2968 Foster Creighton
Nashville, TN 37204

An equal opportunity employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Assistant Director Data Processing

Insurance Background Essential

Major, multi-line insurance organization has an excellent career opportunity available. The individual we seek must have 4-6 years' experience with a property and casualty insurance company having a premium volume of \$100 Million. Must also have a thorough background in data processing which should include 370/158 OS/VS1 1 meg 3350 mass storage, 3270 on-line system or equivalent. Good verbal and written communication skills are necessary.

Qualified candidates should submit resume with salary history and requirements in confidence to:

Mrs. Helene Haber



**EMPIRE MUTUAL
INSURANCE GROUP**

1965 BROADWAY NEW YORK, N.Y. 10023

An Equal Opportunity Employer. Male/Female

TECHNICAL SUPPORT OPPORTUNITIES

We have recently reorganized and expanded our corporate information systems function, creating several challenging career opportunities. These positions include technical support responsibilities for an organization involved in shifting the emphasis of its activities from a large-scale IBM batch environment to an online/interactive environment based on large mini-computers networked with the IBM system.

INFORMATION SYSTEMS TECHNOLOGIST Responsibilities include providing technical support for the data processing activities of corporate staff, including evaluation and implementation of software engineering developments and other computer technology advancements, education and training, standard and consulting.

SYSTEMS PROGRAMMERS: Responsibilities include operating software systems programming support for the online/interactive environment, development and use of configuration and network measurement and management tools, performance of periodic capacity planning reviews, etc.

Applicants should have a broad background in areas relating to computer technology and systems development, including hardware, operating systems, communications, online/interactive environments, several high level programming languages, compilers and interpreters, etc. Computer Science Degree and minicomputer exposure are desirable.

Please send resume and salary history and requirements in confidence to:

**HUMAN RELATIONS DEPARTMENT
TRW, INC.**

23555 Euclid Avenue
Cleveland, Ohio 44117

An Equal Opportunity Employer, M/F/H.

TRW

SYSTEMS SOFTWARE PROGRAMMER

Resulting from the upgrade of our Corporate Computer System, we have an opening for an experienced VM and VS/1 Systems Software Programmer. Position responsibilities include implementation and maintenance of system software, an online data base management system, and training and education of data processing personnel. A thorough understanding of BAL and a degree in Computer Science are preferred.

We offer an attractive starting salary, comprehensive benefits and a solid potential for future growth. Send resume with salary history to:

RAND McNALLY & CO.

Mrs. Byers—Personnel Dept.
P.O. Box 7600

Chicago, IL 60680

800-323-4070 Ext. 477

An Equal Opportunity Employer M/F
Minority and Female Applicants Encouraged

DATA PROCESSING

MKSAC

MORRISON-KNUDSEN SAUDI ARABIA CONSORTIUM (MKSAC) has positions in the U.S. and Saudi Arabia (single status) to develop many new applications required to support the construction of an entire city in Saudi Arabia.

PROGRAMMER ANALYSTS/SR. PROGRAMMER

ANALYSTS — \$17,000-\$20,500 U.S. Base. COBOL a must; DL/1, CICS desirable.

SYSTEMS ANALYSTS — \$22,500 U.S. Base. Inventory, Construction Project Management.

SYSTEMS PROGRAMMERS — IBM 370. Experience in one or more of the following areas: MVS, TSO, DL/1, CICS, Communications.

TIMESHARING ANALYSTS — Extensive user contact and experience with TSO and one or more of the following: COBOL, FORTRAN, BASIC. FORESIGHT modeling experience helpful.

DOCUMENTATION PERSONNEL — Two to five years experience in establishing systems and overall data processing documentation and standards. Succinct and usable documentation will be created from the ground up.

FACILITIES ANALYST — Experience in design and specification of small and large-scale data processing facilities to include DP equipment environmental control hardware analysis, floor layouts for equipment and personnel. Must be familiar with large-scale IBM 370 systems utilizing communications.

Demanding work, financial reward, and international travel await successful applicants. Only self-starting, independent individuals need apply. Send resume to:

MKSAC

Dept. DPCW-3, Box 189
Columbia, Maryland 21045

An Equal Opportunity Employer M/F

PROGRAMMER/ ANALYST \$30,000 COMMUNICATIONS

4+ yrs Real Time Computer Programming experience, may qualify you for a career opportunity with one of the strongest competitors in the communications industry. We are also seeking a person with mini-computer packet or message switching experience. Knowledge of computer communications networks and line protocol.

Call or Send Resume to:

ACCURATE PERSONNEL

(212)233-7770

150 Bway, Room 1802
New York, NY 10038

PROGRAMMER ANALYST

Immediate opening for a Programmer Analyst to continue development of an administrative Data Base in a congenial academic atmosphere. Should have a degree and at least 3 years experience using COBOL or RPG. Salary range \$18,000-\$20,000 with additional compensation for teaching possibly available if desired. Excellent fringe benefits including 4-1/2 weeks of vacation annually. Call (313) 973-3497 for application or write Office of Employee Relations, Washtenaw Community College, Ann Arbor, MI. 48106. An Affirmative Action/Equal Opportunity Employer.

Systems Analyst

For the national scope State Judicial Information System (SJIS) Project of the National Center for State Courts. Applicants should have bachelor's degree or higher and three years experience in information systems evaluation and analysis techniques. Judicial end/or criminal justice information systems experience desirable. Knowledge of PROMIS, SJIS, OBTS/CCH, and Cost/Benefit Analysis preferred. Responsibilities include SJIS assessment, system documentation, information transfer, and technical assistance activities. Good writing, communication, and analytical skills required.

Position involves some travel throughout the United States. Salary dependent on knowledge, experience, and other qualifications. Full time position begins January, 1978 in Williamsburg, Virginia. Send resume, salary history, and salary desired to:

National Center for State Courts

300 Newport Avenue
Williamsburg, Virginia 23185
EOE

\$ Project Leader \$

Wright Investors' Service is a leading national investment advisory firm using sophisticated computer generated financial analysis. We are looking for a COBOL and FORTRAN experienced individual capable of leading a group of four programmers and assuming full responsibility for both maintenance and new development of this application area. We operate a large IBM 360 under EDOS and with ADABAS as our data base manager.

We are a small company in which individual achievement is recognized. Salary commensurate with experience. Relocation assistance. For prompt consideration, please forward resume in confidence to:

Personnel Department

WRIGHT INVESTORS' SERVICE

500 State St., Bridgeport, Conn. 06604
An Equal Opportunity Employer M/F/H

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

a new subscription

new address

new title

new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



797 Washington Street
Newton MA 02160

position announcements

position announcements

position announcements

position announcements

position announcements



Business Expansion Creates Brand-New Career Opportunities

Programmers—Analysts—Project leaders 2-5 years experience

During the fourth quarter of 1977, DASD Corporation—a rapidly growing national consulting firm specializing in software development, customized programming and system design—expanded full-service operations into three more new locations: Minneapolis, Omaha, and Los Angeles. Many of our people relocated to play big roles in this expansion, creating some exciting new career opportunities in the Chicago Office.

Our professionals must be energetic, creative and get great satisfaction in developing new business systems and applications. Responsibilities include providing guidance and support to clients as they develop unfamiliar applications and approach new hardware and software environments. We offer salaries to \$20,000 per year for those who qualify.

If you would like the challenge of a new and rewarding career, please forward your resume or a letter describing your experience to:



DASD CORPORATION
SUITE 251

2720 DES PLAINES AVENUE
DES PLAINES, ILLINOIS 60018

An Equal Opportunity Employer M/F

REAL-TIME PROGRAMMERS

NCR's Engineering and Manufacturing Division in Millsboro, Delaware is a high volume manufacturing facility concerned with the design and production of POS terminals. We are currently experiencing substantial increases in Engineering activity and as a result have immediate needs for programmers interested in growth opportunities.

Desired Experience

Systems

- I/O Drivers
- Diagnostics
- Operating Systems

Applications

- Vocationally oriented to the Retail Market
- Peripheral development to include scanners, communications, data collection, etc.

Basic Qualifications

- 1-3 years experience in Assembly language with mini or microcomputers 8080 experience a plus
- BS in CS, EE or Math

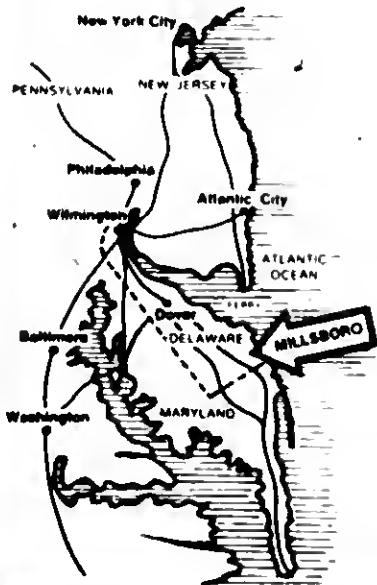
In addition to excellent career opportunities with NCR, our Millsboro location is right in the heart of the Delmarva Peninsula, better known as the "land of Pleasant Living." We're just minutes from marine recreational areas, wildlife preserves, and the nation's finest beaches.

Please send resume with salary requirements:

Ron Tull, Dept. C-130
Engineering & Manufacturing-Millsboro
NCR Corporation
P.O. Box 607
Millsboro, DE 19966

NCR

An Equal Opportunity Employer



SYSTEMS ANALYST

We are seeking a strong EDP Analyst with a minimum of 2 years of solid design experience in a business environment. The successful candidate will also have a B.S. in Business/Computer Science.

Your efforts will interface with a Data Processing operation using a 1 meg. 370/138 under DOS/VS, in an on-line/batch environment using IBM 3277 CRT'S under CICS.

You will be conducting feasibility studies, providing cost/benefit analysis and presenting your findings/recommendations both orally and in writing to the user departments.

If you don't recognize our name, we are among the largest manufacturing and mail order companies distributing business forms and office supplies to small business firms throughout the United States.

We offer opportunity and challenge with a salary/benefits package (including Profit Sharing) that is more than competitive. If you are interested, please send a resume (including salary expectations) to Mr. A. Hancewicz, Personnel Manager.



NEW ENGLAND BUSINESS SERVICE, INC.
SOUTH STREET
TOWNSEND, MASSACHUSETTS 01470

An Equal Opportunity Employer

SOFTWARE SALES REPRESENTATIVE

If you're a self-starter, highly motivated, and have sales experience in financial software, then we've got an offer you can't refuse.

The fringe benefits are excellent, not to mention the opportunity to live in Florida; plus you'll have the distinction of working with the nation's largest supplier of automated financial systems.

Please send resume in confidence to Florida Software Services, Inc., P.O. Box 2269, Orlando, Florida 32802.

BUY SELL SWAP

For Immediate Lease or Sale

138's, 148's,
3203-4's
3033 (11/78), (2/79)

(Lease Only)



**BARRETT
CAPITAL
& LEASING
CORPORATION**

14 Redwood Road
White Plains, N.Y. 10605
(914) 761-0070

IMMEDIATE REQUIREMENT FOR SERVICE BUREAU PERSONNEL IN SAUDI ARABIA

MANAGING DIRECTOR - Assume full responsibility for all facets of Service Bureau operations in AlKhobar/Dammam, Saudi Arabia. Engineering, Project Control, and Service Bureau experience desirable. IBM 1130 experience a plus.

CUSTOMER ENGINEER/PROGRAMMER - Responsible for maintenance of hardware and software. Experience on discs, tapes, printers, and CPU's required. Some programming in FORTRAN desirable.

Excellent compensation package including salary, incentive, and bonus plans, including expatriot premium. A two year contract with completion bonus is included.

Ground floor opportunity for qualified individuals. Reply in confidence to CW Box 1412, 797 Washington St., Newton, Mass. 02160

3803-1/3420-7

AVAILABLE FOR
SALE OR LEASE

IPS can supply 3420-7 systems of any size from inventory. Controllers with or without switching features. Attractive sale or lease terms available. CALL ED JOSEPH for an immediate quote.

IPS COMPUTER MARKETING
2460 Lemoine Ave.
Fort Lee, N.J.
(201) 947-4200

BUY • SELL • LEASE

026 - \$ 850	085 - \$ 750
029 - 1850	088 - 2500
059 - 1375	129 - 3350
082 - 800	514 - 800
083 - 1800	548 - 1500
084 - 2500	552 - 900
	557 - 2800

MOHAWK-6401-6403 NCR-735
Want to buy IBM 029's, 129's, 3741's, 3742's

COMPLETE LINE BUSTERS, SHREDDERS, COLLATORS AND BINDERS

ECONOMICAL LEASE PURCHASE PLANS

CALL **DP SERVICE INC.**
STANPELO or NATALIE REYES

312-774-2556

5505 N. MENARD AVENUE, CHICAGO, ILLINOIS 60630

Lessor Wanted

User has a 3052 APU coming in a 2/78 time frame. Will consider short term lease (to 2 years) on the 3052. ITC Lessee or Lessor. Can guarantee release date if required.

Interested parties
contact:

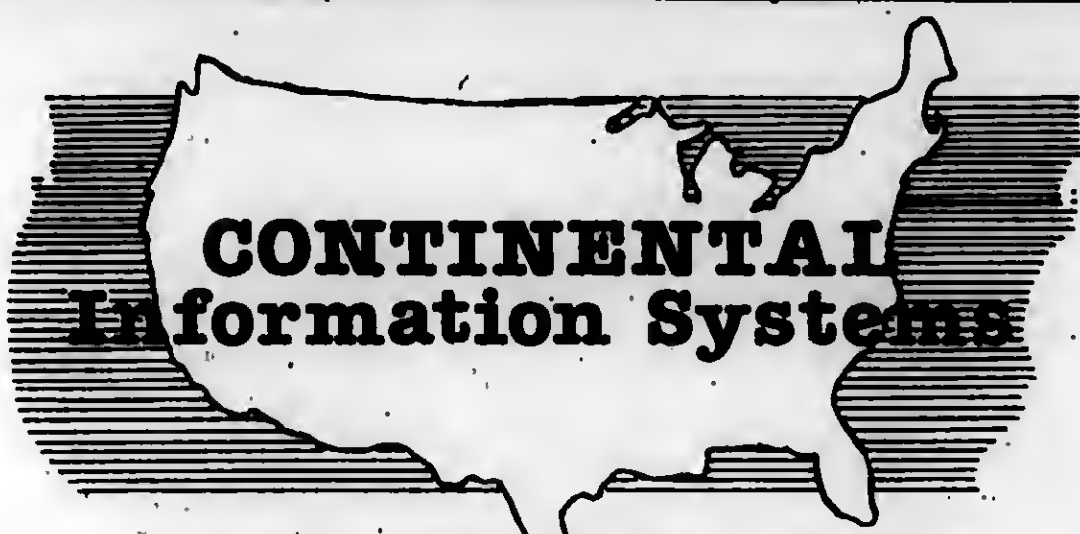
Mr. Goode
AT&T Long Lines
Room 5CT88
Bedminster, N.J. 07921
(201) 234-6269

FOR SALE

G.A. 1830-32K - 2 20MB Century Disk Driver, Card Reader, 600 CPM - Printer 600 LPI, Best Offer - Will Not Divide - Under Maint K.

519 Reproducer - 2 Boards and Pins, Asking \$900.00.

Located Chicago Suburbs
Contact Michael Hansen
(312) 335-0600

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
MINICOMPUTERS & SYSTEMS Don't waste company time or money. Check with us before you buy or sell. New DEC Equipment Immediate Delivery RK11-RK05 Disk Systems - \$8500 PDP 11/04s and 11/34s - 20% off list DZ 11 DEC Station 78 New DG Equipment Immediate Delivery DG 10 Mbyte Disk Systems from \$7500 DASHERS - 15% to 25% off list Nova 3/12 or 3D - 20% off list Immediate delivery for MOSI! Inventory Clearance call us for free brochure MINICOMPUTER EXCHANGE (408) 733-4400 TWX 910-339-9272	 CONTINENTAL Information Systems BUY, SELL, LEASE, SUBLEASE, AND TRADE NEW AND PRE-OWNED IBM EQUIPMENT			PDP-11 Available for immediate delivery: DS357 11/34 64K, 2-RK06, LA180 1-VT52 CTS300 11T34-AA 11/34 64K, LA36, 2-RK05s, RSX11-M 11/03-KA PDP11/03.16K with Power Supply MM11-DP 16K Core PR11 High Speed Paper Tape Reader DU11-DA Synch. Interface KD11-P LSI 11 Board Minicomputer Sales Corp. 14 W. 40th St. New York, N.Y. 10018 (212) 221-7270

DEC HARDWARE
PDP 11 PDP 8
Processors Peripherals Memories
 VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
 (516) 585-0800

FOR SALE OR LEASE
(2) 3330-11
 t-4 Years
 Available 2/15/78
(2) 1403/2821
 600 or 1100 LPM-UCS
 Available 2/1-4/78
2501-B1/B2
 Available 2/1-4/78
(3) 3420-3 Wanted
SYSCOMP
 2150 Crestview Drive
 Excelsior, MN 55331
 (612) 474-8873

WERE YOU A WINNER IN THE IBM LOTTERY?

IF NOT, CIS is having a supplementary drawing for winning alternatives to the 3031, 3032, and 3033. We can deliver the following IBM 370 equipment to meet your needs:

Jan. 78	155-DAT available 165-DAT available 158-New, ITC qualifying 168-New, ITC qualifying	Mar 78	158 158-New, ITC qualifying 168-New, ITC qualifying
Feb 78	158 158-New, ITC qualifying 165-DAT available 168-New, ITC qualifying	Apr 78	155-DAT available 158-New, ITC qualifying 168-New, ITC qualifying

Several 370 systems available beyond April, 1978.

If you hold a winner in the IBM lottery, we will buy your currently installed IBM equipment from you.

Call Us!



CIS Corp.
 600 MONY Plaza
 Syracuse, NY 13202

315-425-1900

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115
370/125

 **ECONOCOM**
 1255 LYNNFIELD ROAD
 P.O. BOX 17825
 MEMPHIS, TENNESSEE 38117
 901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

TAPES & DISKS & CORE
FOR ALL
360'S, 370'S &
SYSTEMS 3'S

selling
Leasing Purchasing

214/630-6700
 Pioneer Computer Marketing
 1165 Empire Central Place Dallas, Texas 75247

BUY SELL LEASE BROKERAGE

FOR SALE BY OWNER
BURRDUIGHS B-1714
50% OFF
 Priced for Immediate Sale
 System Under Full Burroughs Maintenance
 Parent Corporation is Consolidating EDP Operations: Complete System Includes:
 B1714 Central Processor
 49 KB Main Memory
 A9340 Console Printer
 A 9419-2 96 Col. Card Reader
 A 9245-6 Drum Line Printer (300 LPM)
 2-A 9480-2 Disk Cartridge Drives
 4 Drawers (10 MB Capacity)
 Principals Only Contact:
COMPUTER SYSTEMS CENTRE
 Subsidiary of Queker Business Assoc., Inc.
 234 N. Sixth St.
 Reading, PA 19601
 (215) 373-5148

digital Factory Refurbished Equipment

All quality tested and warranted by the people who made them.

- Complete systems
- Processors
- Peripherals
- Accessories
- Complete Documentation

Digital Equipment Corporation
 Traditional Products
 125 Northeastern Boulevard
 Nashua, New Hampshire 03060

☐ Please send your complete product listing.

☐ Please call, I'm specifically interested in: _____

Name _____

Address _____

City _____

State _____

ZIP _____

Phone _____

CW1308

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SHORT TERM LEASE

370/158 K 5 Channels, ISC, Madrids & 3213-1
Available February 1, 1978 - Any Term

370/158 U34 5 Channels, ISC, Madrids & 3213-1
Available February 1, 1978 -Any Term

370/145 I2, 1421, 4660, 6982, 6983,
7855, 8810, 8100, & 3215
Available Immediately — Any Term

370/168 U34 ISC, Madrids, 4525, 3855, 3066-2,
3067-3, 2860-3, 2870-1, 2880-1, (2) 2880-2
Available February 1, 1978 — Any Term to 48 Months

WE WILL MIX OR CHANGE CONFIGURATIONS AS REQUIRED

FOR SALE OR LEASE

360/50 H - 2 Channels
Available Now - Any Term

A/P For 3158
Available Now

512 K Intel
370/145 Memory
Available Now

FOR SALE

Block Mutliplexer Channel —
(1435) for 370/155

Contact:

George Prussin or Dave Wygoda

OPM

O.P.M. Leasing Services, Inc.
99 Wall Street New York, New York 10005
(212) 747-0220
out of state call (800) 221-2674

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap



INDEPENDENT

**WE BUY-SELL-
INSTALL & REPAIR**
AT REASONABLE PRICES

**HONEYWELL USED
SERIES 200 EQUIPMENT**
COMPUTER SYSTEMS
PARTS — PERIPHERALS

Now in stock

2040-64K M7-32K M9
120-1250 — TAPE DRIVES
READERS, PRINTERS, PUNCHES
3200-131K Avail. 6/78

CALL NOW

Wilson Grabill (513) 874-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati, Ohio 45246

Sale or Lease

- 3271/002
CONTROLLER (w/
minimum of
6 CRT's)
 - 3410/3411
TAPE & CONTROL
 - 360/30 F
Lo speed I/O
 - 129-3 Key
Punches
IFA
- 3033 8Meg Sys
Fall '78**



383 LAFAYETTE ST. N.Y. 10003
212 673-9100

CMI BUY LINES

BUY-SELL-LEASE-TRADE

3031/3032/3033

(Lease Only)

John Mills
(313) 642-8000

3420 3803

3333 3830

3330 3340

Darryl Hastings
(313) 642-8000

360

30/40/50/65

Gary Smith
(313) 642-8000

370/165 370/168

Bob Van Hellemont
(313) 642-8000

370/158

Ron Baker
(313) 642-8000

370/155

Gary Smith
(313) 642-8000

370

148/145/138/135

Pam Hoban
(313) 642-8000

1403 2821

2501 1442

1443

If you rent any of these and
are returning them to IBM call
me. I'll show you how to
make money using your rental
credits. We buy and sell all of
these units.

Kathy Housey
(313) 642-8000

370/115/125

Bob Southwell
(313) 642-8000

System/3

Model 15
Jerry Roberts
(313) 642-8000

3742

3741

5496

Jerry Sharon
(313) 642-8000

360/20

1130

Jim Carleton
(313) 642-8000

IN CANADA IBM 360 370

System / 3
Don DuPuis
CMI Company
P.O. Box 893
Windsor, Ont.
N9A 6P2
(519) 258-8910



The IBM Specialists

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000

Member
Computer Dealers
Association

BUY-SELL-TRADE IBM EQUIPMENT

**360/65 or 65 MP CORE
1.5 Megabytes For Sale**

Independent memory in single cabinet. Great savings
on floor space, power, air conditioning and maintenance.
5th port available. Priced right. Internem.

CALL DICK BAKER (305) 561-5207



Intracoastal Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207



(3) I.B.M. 360-40 -DOS;OS

360-40 (128K)

360-40 (128K)

360-40 (256K)

(15) 2401-6 (180KB); D.D.
(8) 2311-1 Disk Drives
(2) 2401-2 (7 Track)

(16) 2314 Disk Drives
(3) 1403-N1 (1100 L.P.M.)

Babbage Systems, Inc.

345 Park Ave. N.Y. 10022
(212) 688-1111 Mr. Kay

SALE ALL
IBM Unit Record
Equipment
129 & 029's
East Coast
(717) 564-8870
West Coast
(415) 332-6265
Unit Record
Leasing Company
110 Hivista Road
Sausalito, Calif.

LEASE

FORSYTHE/McARTHUR ASSOCIATES, INC.
919 North Michigan Ave., Chicago, IL 60611

370/135

Available for
lease or saleWill configure
to meet your
requirements

Call

FORSYTHE
McARTHUR

Wanted To Buy
**3672-Memorex storage
control unit**

3673-Memorex disc controller
3670-Memorex disc module
3675-Memorex disc module

Contact:

Harry Blair 713-524-1401

BUY-SELL-SWAP

PDP 11'S & NOVA'S

Systems and Peripherals at very
attractive prices
New and Used

ICS

Computer Equipment Sales

408-735 7360

PAUL PEREZ

408-735 7361

3032 and/or 3033

WANTED

User Wants To
Lease System(s)
For 3rd Quarter 78
Installation (or earlier)
For RFP contact:

R. Goode

AT&T-Long Lines
Room 5C160

Bedminster, N.J. 07921
201-234-6270

call... **the
Match
makers**

BUYING • SELLING • LEASING • TRADING

1-800-654-9179

TOLL FREE!

**CSI COMPUTER
SALES INTERNATIONAL, INC.**



buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

IBM PROCESSORS & PERIPHERALS

PROCESSORS PERIPHERALS

SELLING:

3145
3165
3155

3420-3
3340-A2

LEASING:

3165-4 MEG
7 Channels-Now
3155K02-Feb.

3420-6
Avail. Now
3330-1, 11

BUYING:

3158
3168

3340A2, B2
3420-8

The Logical Choice
COMDISCO

9701 W. Higgins Rd. Rosemont, Ill. 60018
(312) 698-3000

San Francisco
415 944-1111

Fort Worth
917 534-1774

Atlanta
404 256-5956

Minneapolis
612 854-8107

New York
201 568-9666

Paris, France
374-1130

FOR SALE OR LEASE

Immediately Available

IBM 3330/001's

IBM 3330/011's

IBM 3333/011's

with features #8150

Contact: Harry Blair 713-524-8249

efm computer
leasing, inc.

LEASE • BUY • SELL

360/370 CPU's & PERIF.



3000 marcus avenue
lake success, ny 11040
(516) 488-7876

ATTRACTIVE LEASES ON

360/40 360/65

360/50 370/135

303X

Leasing

Large industrial corporation wishes to purchase and lease back to substantial corporations IBM 303X Systems. We will only deal with end users and equipment must be scheduled for delivery in 1978.

CW Box 1410
797 Washington St.
Newton, Mass. 02160

For Sale

HONEYWELL H-200-2 64K

4-444KC Tapes; 1-950 LPM Printer; 1-800 CPM Card Reader; 3-259 Disk Drives (9.2M); 1-Typewriter Console Under Honeywell maintenance Complete system Immediate delivery \$20,000

Will consider lease American Heritage Life Insurance Co. Attn: Hal Womersley 11 E. Forsyth St. Jacksonville, Fla. 32202 (904) 354-1776 Ext. 245

PREVIOUSLY OWNED EQUIPMENT & SYSTEMS

N.C.R. & BURROUGHS

N.C.R. 31, 32 & 151 & 152 Teller Units
735/735 & 745 Mag. Tape Enc. & Line Printers
N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S
Also B-700 Thru B-4700 Systems w/wo Peripherals

WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS

BUYING OR SELLING-CALL US FIRST.

KEY-EXIMPORT CORP.

256 LIVINGSTON ST. (P.O. BOX 129) NORTHVALE, N.J. 07647
TELE. N.J. (201) 767-3444 N.Y.C. (212) 736-7736
TELEX 120149 CABLE KEYEXIMP NORTHVALE NJ

WE'RE

#1 IN DEC

Our new catalog lists more Digital Equipment Items than any catalog, flyer or advertisement ever published in the secondary market.

WRITE FOR YOUR FREE COPY TO:

NEWMAN COMPUTER EXCHANGE

1250 North Main Street, Dept. CW8
P.O. Box 8610 Ann Arbor, MI 48107
(313) 994-3200

Sale or Lease
370/145-12

Serial #11192

Available 3/1/78

Combination 3145 interim to 3031, lease

Plans also available.

Will make configuration changes to meet your needs

Contact Jim Jamieson



(804) 643-9123

Commonwealth Computer Advisers, Inc.
707 East Main St. Suite 1650
Richmond, Virginia 23219



DEC HARDWARE SALE

DEC CPU's

11/34-HE	(New)	20% off
11/04-HH	(New)	30% off
11/05-NC	(Used)	50% off
WS-78	(New)	20% off
VT-78	(New)	20% off
11/40-CA	(Used)	50% off

PARITY CORE

MM11-DP	(New)	25% off
MF11-UP	(New)	50% off
MM11-UP	(New)	50% off

NEW TERMINALS

LA36-DE	Quantity (1)	\$1,325.00
LA36-DE	Quantity (5)	\$1,275.00
VT52-AE	Quantity (1)	\$1,375.00

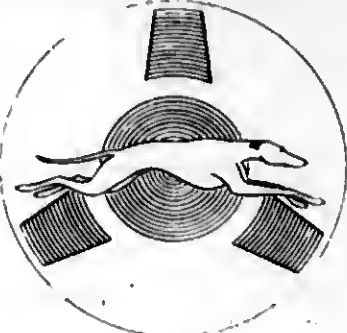
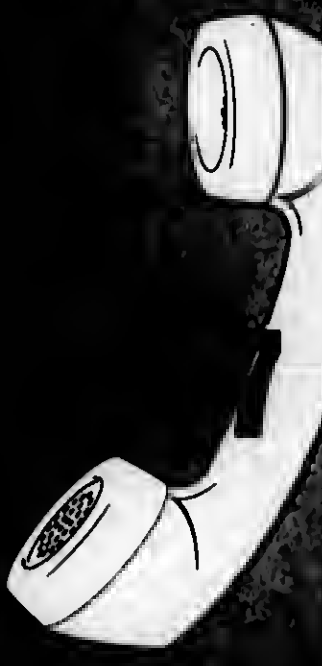
MISCELLANEOUS ITEMS

DX11-BA	(Used)	90% off
TA11-AA	(Used)	50% off
RS03-AA	(Used)	80% off

LS08 - Controller & Centronix Printer - 80% off

Write or Call Gordon @

SCHERER'S MINI COMPUTER MART
4175 Carnation Drive, Westerville, Ohio 43081
(614) 889-0810

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap												
 GO GREYHOUND When you plan to Buy or Sell your Computer Equipment For complete information call the Greyhound Representative in your area. FOR SALE 3145-HO 360/65J WANT TO BUY 3340-A2 & 3340-B2 3135 w/4655, 6981, 6982, 7855, 7861 <table border="0"> <tr> <td>U.S.</td> <td>Home Office New York Chicago Dallas San Francisco</td> <td>T.A. Takash Dick Ventola Pete Ahern M.W. "Bill" Tucker Henry Paulson</td> <td>602-248-6037 914-949-1515 312-298-3910 214-233-1818 415-283-8980</td> </tr> <tr> <td>INTERNATIONAL</td> <td>Canada U.K./Europe Mexico Austro-Asia Eurasia</td> <td>Don Maunder Joe Gold Andres Contreras John Hallmark Don Haworth</td> <td>416-366-1513 022-61-27-54 905-543-6850 214-233-1818 214-233-1818</td> </tr> <tr> <td>NON IBM</td> <td>Dallas</td> <td>John Hallmark</td> <td>214-233-1818</td> </tr> </table>	U.S.	Home Office New York Chicago Dallas San Francisco	T.A. Takash Dick Ventola Pete Ahern M.W. "Bill" Tucker Henry Paulson	602-248-6037 914-949-1515 312-298-3910 214-233-1818 415-283-8980	INTERNATIONAL	Canada U.K./Europe Mexico Austro-Asia Eurasia	Don Maunder Joe Gold Andres Contreras John Hallmark Don Haworth	416-366-1513 022-61-27-54 905-543-6850 214-233-1818 214-233-1818	NON IBM	Dallas	John Hallmark	214-233-1818	SALE or short or long-term LEASE IBM 3271s, 3272s, 3277s write or call METROPLEX COMPUTER COMPANY, INC. Suite 1208 Honeywell Bldg. 1111 W. Mockingbird Lane Dallas, Texas 75247 TWX 910-861-4171 (214) 634-2760	BUY-SELL-TRADE IBM EQUIPMENT IBM 370 Memory-Buy & Sell For Sale Now 370/135 Memory: IBM FE to GF (96K to 192K) 370/135 Memory: INTEL 96K to 320K 370/135 Memory: AMS 192K to 320K 370/135 Memory: AMS 240K to 384K 370/135 Memory: AMS 256K to 384K 370/135 Memory: INTEL - any 256K increment 370/135 Memory: AMS - any 512K increment 370/145 Memory: INTEL - any 256K increment 370/145 Memory: AMS - any 512K increment 370/158 Memory: INTEL 1 Megabyte - For lease CALL DICK BAKER (305) 561-5207 dataware Incorporated Intracoastal Building 3000 NE 30th Place, Suite 309 Fort Lauderdale, Florida 33306 Telephone (305) 561-5207 MEMBER CDA	BUY • SELL TELETYPE MODELS 43 • 33 • 32 NATIONAL TELETYPEWRITER CORP. 207 Newtown Rd. Plainview, N.Y. 11803 (516) 293-0444	UNIVERSITY OF GUELPH Guelph, Ontario, Canada SD423 FOR SALE BY TENDER 1 - IBM 370/155 MODEL J CENTRAL PROCESSOR includes the following: 4 Selector Channels - 1 Multiplex Channel 3215 Console Cambridge Memory with 2 megabytes and excellerator DAT box on order SD424 FOR SALE BY TENDER 2 - 2314 DISK SYSTEMS MODEL 001 includes nine spindles each. Sealed tenders will be received by the undersigned until Tuesday, February 28, 1978, 2:00 p.m. on the above items. The University reserves the right to open tenders privately and to refuse any or all tenders. The highest tender will not necessarily be accepted. For further information, inspection and Bid Forms contact University of Guelph, Guelph, Ontario, Surplus Sales, Ms. K.M. Swackhamer, phone (519) 824-4120, ext. 2105.
U.S.	Home Office New York Chicago Dallas San Francisco	T.A. Takash Dick Ventola Pete Ahern M.W. "Bill" Tucker Henry Paulson	602-248-6037 914-949-1515 312-298-3910 214-233-1818 415-283-8980													
INTERNATIONAL	Canada U.K./Europe Mexico Austro-Asia Eurasia	Don Maunder Joe Gold Andres Contreras John Hallmark Don Haworth	416-366-1513 022-61-27-54 905-543-6850 214-233-1818 214-233-1818													
NON IBM	Dallas	John Hallmark	214-233-1818													
dataserv buy • sell • lease • trade	PROFESSIONAL DEALER/LESSOR OF IBM COMPUTER SYSTEMS Bob Russell Jack Emery Dave Hepburn Paul Baillie															
370 115 and 125 Steve Lacny 800-328-2406	For Sale or Lease Any 115/125 configuration Sending 115/125 Back to IBM Call us! We'll show you how to make money using your rental credits.	BUY-SELL TRADE For Computer Call Action Write CAC P.O. Box 80572 404/458-4425 Atlanta, Ga. 30366														
370 135 through 168 Dave Miller 616-637-8481	For Sale or Lease 135 - 145 - 155 CPUs - Peripherals - Memory 370/138 MEMORY I-J For Sale or Lease Available in January	FOR SALE CALCOMP GRAPHIC SYSTEM 925 CONTROLLER 1036 PLOTTER CCC LEASING CORP. 946 Main St. Hackensack, N.J. 07601 (201) 343-3760														
370 Peripherals 800-328-2406	For Sale or Lease 3211/3811 3340/A2.B2 3272/3277 3410/3411 3330/3333 3420/3803 STOP! Before you send any of the above machines back to IBM call us. We'll show you how to make money.	FOR SALE by owner 370/135 256K, 2 channels with 3046 and 3215 available February 1978 CW Box 1382 797 Washington St. Newton, MA. 02160														
360 CPUs and Peripherals Neal Johnson 800-328-2406	For Sale or Lease 360/30 - 40 - 50 - 65s CPU - Peripherals - Memory We'll Buy Any 360 CPU IBM Peripheral Non-IBM Perph/Memory	WANTED DEALERS SYSTEM HOUSES To sell and use our: * DISK CARTRIDGES * DISK REPAIRS VR DATA CORPORATION 777 HENDERSON BLVD. FOLCROFT, PA. 19032 (215) 583-6101														
Sys/3 CPUs and Peripherals 800-328-2406	For Sale or Lease 5406 - 5410 - 5412 - 5415 CPUs - Peripherals - Memory We'll Buy Your 5406/5410 5415 - Rental credit machines Peripherals - Memory															
Call Toll Free 800-328-2406 or 612-544-0335 Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd. P.O. Box 9488, Minneapolis, MN 55440																

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Mini-Computers

BUY-SELL-TRADE-LEASE

FOR SALE**D.E.C. CPU'S**

11/04-DC \$ 3,800.00
 11/40-BK \$ 9,500.00
 PDP-8E 8K \$ 3,800.00
 11T34BA New & Used \$28,000.00

D.E.C. DISCS

RP04AA \$20,000.00
 RP04 & Controller \$28,000.00
 RP03 \$11,000.00
 RK05J \$ 3,500.00
 RK11D & 2nd RK05J \$ 8,900.00

D.E.C. CRT'S

VT05 \$ 1,100.00
 VT50HA \$ 1,000.00

Hundreds of Miscellaneous Modules & Cables Available

CALL FOR OTHER COMPONENTS IN STOCK

DATALEASE

700 North Valley Street, Anaheim, CA 92801
 (714)533-3920 (800)854-0350

GREYHOUND COMPUTER CORPORATION

For Sale or Lease

Univac 494 CPU with 131K Memory
 Full I/O CRT Console

Univac FH1782 Drums Type 6015-00

Direct Drive Hard Surface

Call:

John Hallmark

Don Haworth

(214)233-1818

**We are
 buying,
 selling,
 & leasing!**

Buying: 3830, 3420
 Selling: 360/65, 360/40
 Leasing: 370/155, 360/65

Please contact:

Linda Vaughn / (415) 955-0220

Tommy Talbot / (415) 955-0238

ITEL
CORPORATION

IPS
 201-947-4200

WANT TO BUY

370/168, 165, 158,
 155's; IBM 3420
 Tape Drives; IBM
 3330 & 3340 Disk
 Drives; All 370
 Memories and Per-
 ipharals.

IPS Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024**FOR SALE**

165-KII
 Dated, up to 4 megabyte
 For Sale or Lease

155-J

available now with or
 without new DAT

145-I2

available now with ISC

3420-3,5&7

available now with
 controllers

I/O Sets

all combinations available
 for Sale or Lease

360/65-I

Priced to move now

FOR LEASE**145-10**

available, immedi-
 ately for sale or
 short term lease

125's

We will purchase and
 lease-back your 125
 system. Save rent
 starting today. Call
 for a quote.

IBM RENTAL CREDITS

We will pay for your
 rental credits on
 FTP, ETP and MAC
 machines. Call us be-
 fore sending your
 machines back to
 IBM.

Member
Computer Industry
Association**SALE OR LEASE**

1130-2D CPU
 1133 Model 1
 1403 Model 2
 1442 Model 7

RETROPLEX COMPUTER COMPANY, INC.
 Suite 1208 Honeywell Bldg.
 1111 W. Modelling Lane
 Dallas, Texas 75247 TWX 910-861-4171
 (214) 634-2750

**DIABLO HYTERM II*****MODEL 1620****I/O TERMINALS**

BRAND NEW W/WARRANTEE
 only \$2,595 ea.

COMTERM

Box 41

Orange Cove, CA 93646
 call (209) 332-2332

quantity price available

*Hyterm II is a registered Trade-
mark of the Diablo Corp.**FOR LEASE****3032 (4 MEG)**

JUNE 78

CONTACT
 BOB RUSSELL

SYSTEMS MARKETING, INC.
 200 E. Thomas Road
 Phoenix, AZ 85012
 (602) 264-5600 TLX 667-334

3033**Purchase/Leaseback**

Lessor wanted for our
 on-order system-
 June delivery.

For RFP contact

R. Gooda

AT&T-Long Lines

Room 5C160

Bedminster, N.J. 07921

201-234-6270

FOR SALE OR LEASE**3148 J**

WITH 2150, 4660,
 6111, 8075

3047-1

3286-1

3203-4

AVAILABLE 2/1/78

\$800,000.00

CONTACT

COMPUTER WHOLESALE CORPORATION

504/581-7741

370/165

For

Sale or Lease

- We Configure to your needs
- Immediately Available
- DAT Available
- Short-term or interim lease available to 30XX System

ALANTHUS CORPORATION
 111 High Ridge Road
 Stamford, Connecticut 06905
 203 348 4820

ALANTHUS CORPORATION

111 High Ridge Road

Stamford, Connecticut 06905

203 348 4820

**BEFORE YOU BUY, SELL, OR LEASE,
 TAKE A 'SECOND' LOOK!**

FOR SALE

3505-B1 and 3525 P3
 3135-GF -- Fully Loaded
 3155-J with Dat Box

WANT TO BUY

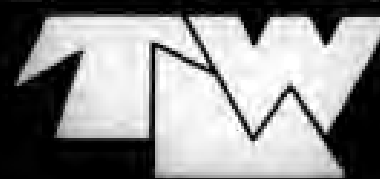
370/145 IBM Mem. I2-J2

370/135 IBM Mem. GF-H

3-1403 N 1

1442 N 1

3420-5 Single Density

**COMPUTER INDUSTRIES INC.**

3570 American Drive • Atlanta, Georgia 30366
 404/451-1895 • TWX 810/757-3654

CHICAGO 312 298 1650
 WASHINGTON 703 525 1074
 LOS ANGELES 213 370 4844

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

BROKER IN DEC COMPUTER SYSTEMS AND COMPONENTS

C.D. SMITH
730 N. Post Oak Road
301
Houston, Texas 77024
(713) 686-9405

For Sale
XEROX
DISK SYSTEM
MODEL 7275
Controller
W/86 MB Disks
Call
Telefile
(714) 557-6660
Ask for
Mrs. Weddle

In Canada... let us
quote a custom-configured
IBM computer system in
new condition, with quick
delivery, at big savings
under IBM factory prices.

Don Dupuis
Windsor, Ont.
(519) 258-8910

Jacques Dagenais
Montreal, Que.
(514) 374-5920

Ron Ridding
Toronto, Ont.
(416) 683-3704

CMI —
Remember the name
CMI COMPANY

1446 S.O.M. CENTER ROAD
CLEVELAND, OHIO 44124
216-473-0868
**DATA
HARDWARE**

BUY
LEASE
SELL

UNIVAC

Key Items For Sale

8425 Disc Control
(3) 12-C Tapes w/Control
262K 9400 Memory
0768-99 1600 L.P.M.
Printer
2 x 6 8440 Disc
DCS-1 and DCS-4

Inexpensive System

9300 w/32K, (4) V1-C
Tapes + 1 x 2 8414 Disc

FOR SALE

3271-2	Feb. 1
3272-2	Feb. 1
8 x 3277-2	Feb. 1
2 x 3288-2	Feb. 1
ALL WITH APL FEATURE	
3704-A1	Jan. 27
3705-A1	Feb. 15
3705-E1	Apr. 1
3705-B1	Feb. 1
3706-B1	Feb. 1

CONTACT
COMPUTER WHOLESALE CORP.
(504) 581-7741

For Sale

System 3, Model 10
8K CPU
500 CPM MFCU
Fast access disk
Attachment for 2nd drive
300 LPM printer

Available about Feb. 1
Contact Doug Beauchamp
Arnold E. Gfeller & Co.
(913) 762-3100

FOR SALE
IBM SYSTEM 32
Model B32, including 5.4
megabyte disk, 16K, 64
character set, 120 lpm.

\$30,000
Available immediately
City of Pocatello
P.O. Box 4169
Pocatello, Id. 83201
(208) 232-4311

CHANCELOR

FOR A CUSTOM TAILORED LEASE ON YOUR
30XX SYSTEM OR ON YOUR CURRENTLY IN-
STALLED CPU AND/OR I/O

BUYING

370/135's
370/145's
3340's
1403 N1's
2501's
1442's
3420's
3803's
3830's

SELLING

2501's
2-3340 B2's
6-3330/11
2-3333/11
3350's (new)
1403-N1
2821/2
1442-N1

LEASING

138 J #20321
ICA
IFA
avail. 2/78
158/3 2 Megs
5 chan
avail. 7/78

BOB SCOVILLE **(617) 482-8726**CHERI HARING
31 Milk St., Boston, Mass. 02109

REPLACING YOUR 370/158?

We have requirements
for several 158's
**WE WILL SUBLEASE
OR PURCHASE**

Call

**FORSYTHE
McARTHUR**

FORSYTHE McARTHUR ASSOCIATES, INC.
915 North Michigan Ave. Chicago, IL 60611



For Sale Or Lease System 3/15 Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.
Also complete inventory tapes — disks.
Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

LEASE

3031-3032

3033

**SHORT
AND LONG
TERMS**

**ATTRACTIVE
RATES**

360/ 30,40,50,65
CPU 138,148,158,168/

370/ 125,135,
145,155

**DISK-
TAPES**

BUY

SELL

National Computer Rental
415 Madison Avenue
New York, New York 10017
Tel. No. (212) 532-1500

Member of Tiger Leasing Group Member of Computer Lessors Assoc.

FOR SALE 370/115 G00

FEATURES:
4650 3203 Printer Attach.
4675 Mag. Tape Adapt.
5248 Byte Multiplexor

CONTACT:
AL ORTLIEB-Mgr. DP
B.C. ZIEGLER & CO.
215 N. Main St.
West Bend, WI 53095
Ph. (414) 334-5521

FOR SALE PDP 11/34

(2) RK05J'S
RSTS/E
96K bytes

IMMEDIATE DELIVERY

\$24,500

CALL M.E. CONGDON
EDUCOMP QUODATA
(203) 728-6777

RANDOLPH NEEDS:
3340-A2 DISKS
3420-3,4 & 8
MODEL TAPE DRIVES
CALL: MIKE SEEKINGS
TOLL FREE
800-243-5308

buy sell swap		buy sell swap		buy sell swap		buy sell swap		buy sell swap																																																																																												
SPECIAL SALE FLOPPY DISKS New IBM Compatible Flexible Diskettes. Satisfaction Guaranteed. 100% Error-Free. Our quantity prices are: 10-90 \$3.50 ea. 100-490 3.00 ea. 500-990 2.90 ea. 1000+ 2.80 ea. The diskettes are packaged in quantities of 10 per box. For your order please call or write to Donna. (312) 428-4444. TRI, 10 South River St., Dundee, Illinois 60118.					370/125's For Sale* Lease* Purchase *Purchase Leaseback Specialists in 125 Systems 3410's and 3411's Also Available  CORPORATE COMPUTERS, INC. (203) 661-1500 115 Mason St., Greenwich, CT 06830					FOR SALE IBM System 3/15 5415-B18 CPU 64K Direct Attach Feature 3277-01 Console 3340-A02 DASD 1403-002 Printer 600 LPM 5421 Printer Control Available February Dana Loconto (205) 442-7620 Loconto-Associates Gadsden, Alabama																																																																																										
IBM UNIT RECORD EQUIPMENT <table border="1"> <thead> <tr> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> </tr> </thead> <tbody> <tr> <td>024</td> <td>\$ 300</td> <td>\$20/Mo.</td> <td>082</td> <td>\$ 850</td> <td>\$ 35/Mo.</td> <td>407</td> <td>\$1800</td> <td>\$ 80/Mo.</td> </tr> <tr> <td>026</td> <td>\$ 900</td> <td>\$35/Mo.</td> <td>083</td> <td>\$1800</td> <td>\$ 60/Mo.</td> <td>514</td> <td>\$ 800</td> <td>\$ 45/Mo.</td> </tr> <tr> <td>029</td> <td>\$1200</td> <td>\$35/Mo.</td> <td>084</td> <td>\$2500</td> <td>\$100/Mo.</td> <td>519</td> <td>\$1000</td> <td>\$ 55/Mo.</td> </tr> <tr> <td>046</td> <td>\$1200</td> <td>\$35/Mo.</td> <td>085</td> <td>\$1200</td> <td>\$ 60/Mo.</td> <td>526</td> <td>\$1400</td> <td>\$ 70/Mo.</td> </tr> <tr> <td>047</td> <td>\$1500</td> <td>\$50/Mo.</td> <td>088</td> <td>\$2500</td> <td>\$175/Mo.</td> <td>548</td> <td>\$1600</td> <td>\$ 60/Mo.</td> </tr> <tr> <td>056</td> <td>\$ 250</td> <td>\$15/Mo.</td> <td>129</td> <td>\$3400</td> <td>\$105/Mo.</td> <td>552</td> <td>\$1000</td> <td>\$ 40/Mo.</td> </tr> <tr> <td>059</td> <td>\$1400</td> <td>\$50/Mo.</td> <td>402</td> <td>\$1200</td> <td>\$ 60/Mo.</td> <td>557</td> <td>\$3000</td> <td>\$100/Mo.</td> </tr> <tr> <td>077</td> <td>\$ 450</td> <td>\$25/Mo.</td> <td>403</td> <td>\$1500</td> <td>\$ 70/Mo.</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> THOMAS COMPUTER CORPORATION 600 N. McClurg Court - Suite 4202 Chicago, Illinois 60611 (312) 944-1401 115 Harbor Island Rd. Newport Beach, CA 92660 (714) 675-2810					MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE	024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.	026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.	029	\$1200	\$35/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.	046	\$1200	\$35/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.	047	\$1500	\$50/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.	056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.	059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.	077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.				FOR SALE INTERDATA 7/32 192K Processor Tape Drive 20 Megabyte Disks Cabinet & Console NEW LARGE DISCOUNT CONTACT: D.P. Mc Nicholas P.O. Box 900 Youngstown, Ohio 44501 (216) 758-6411 X197					For Sale Univac 9200 System 400 cpm Reader 250 1pm Printer Card Punch 1001 Card Controller \$4,750.00 Write or Phone Harry Turner & Assoc., Inc. 1801 Gage Blvd. Topeka, Kansas 66604 (913) 272-5000					SOFTWARE MU Basic RT-11 Proven Programs DEC PDP 1103, 1104 and 1134 Complete General Ledger Program Complete Payroll Program DATAPAK (505)266-4207 416 Fontana Pl., N.E. Albuquerque, N.M. 87108				
MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE																																																																																												
024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.																																																																																												
026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.																																																																																												
029	\$1200	\$35/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.																																																																																												
046	\$1200	\$35/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.																																																																																												
047	\$1500	\$50/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.																																																																																												
056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.																																																																																												
059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.																																																																																												
077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.																																																																																															
FOR SALE RJPO4 RP04 IMMEDIATE DELIVERY CONTACT Jerry Bender 216-687-0100 LEASING DYNAMICS INC.					Fully accrued systems 3 model 10 disk system, \$203 300 LPM printer, \$410 16K processor, \$424 model A2 multifunction card unit, \$444 model A02 disk drive 4.9 mm bytes (2). Fully available for immediate lease back or purchase. Expect to release equipment within 60-90 days. Currently on rent from IBM. Contact John Murray Semperit of America, Inc. 156 Ludlow Ave. Northvale, N.J. 07647					12 Month Lease On Your Owned or Leased 370/158-168 (Term & Rate based on acquisition cost)  Computer Capital Corporation 1351 Washington Boulevard Stamford, Connecticut 06902 Tel 203 357 9663					PAYROLL PERSONNEL SUPER/PAY ONLY \$960 ANS COBOL 60+ USERS Users on IBM, Burroughs, Univac and minis such as NCR, DG, & Four Phase Easy to Use 30 Day Trial Occidental Computer Systems 10202 Riverside Drive No. Hollywood, Calif. 91602 (213) 763-5144																																																																																					
WANTED ALL 360/370 SYSTEMS AND SYSTEM/3 AND PERIPHERALS WE BUY • SELL • LEASE • TRADE  transdata P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647					For Sale IBM System 32 13.7 MEG Disk, 24K, 64 Character Set, 265 LPM Printer. \$37,750 Available 5/78 Bill Bissell Forney's Inc., Route 18 So. Wampum, PA. 16157 (412) 535-4341					WANTED TO ACQUIRE SERVICE BUREAU If you are ON-LINE service bureau, we have an interest in a merger with or acquisition of your company. Let's pursue this possibility. All inquiries held in strict confidence. CW Box 1409 797 Washington St. Newton, Mass. 02160																																																																																										
FOR SALE DEC Disk Drives 22 Million Bytes Each Two RPR02 Disk Drives & Controller • RPR11-AA (RP Controller with one RPR02-AM) • RPR02-AM Under Full DEC Maintenance \$15,000 THE FIRST NATIONAL BANK OF SAINT PAUL STEVE STEDMAN (612) 291-5306					FOR SALE System 32 285 LPM Printer 13.7 MB Disk 32K \$40,000.00 (312) 489-2700					WANTED TO BUY IBM 370/155 with or without DAT Contact: Harry Blair (713) 524-8249																																																																																										
SALE OR LEASE 1419 MICR (will take 1255 in trade) 3410-2 Tape Dr. S.D. WANTED • 3803-3 • 3277-2 • 3330-11 • 3420-S					Contact: Bernie Gest 215-635-1700 Computer Marketing Inc. 7704 Seminole Ave Melrose Park, Pa 19126  Member Computer Dealers Assoc.					For Sale Univac 90/30 Processor with 131KB Core Memory with Discs, Meg Tape, Card Reader, Line Printer. \$165,000. CONTACT: Clyde Fink Norman Bowne TRC 125 Silas Deane Highway Wethersfield, Conn. 06109 (203) 563-1431					088 COLLATOR MODEL 2 UNDER IBM MAINTENANCE \$5,000 IMMEDIATE AVAILABILITY (201) 256-4960 1090 AND 7421 FEATURES																																																																																					
FOR SALE One Basic Four 600 Mini-Computer including 48K Memory, 20 Megabytes of Disk 2 Video Display Terminals, and a 300LPM Drum-Type Printer This mini is used for stand-alone processing of purchasing/accounting/payroll applications and as part of a distributed network communicating with a large Burroughs computer. The system originally cost \$100K, eighteen months ago. It has been kept in excellent condition and operated in an ideal environment. Maintenance has been provided by SORBUS on a regular basis. If interested call D. Beach (202) 477-4367					BUY Surplus DEC And Data General Hardware For Sale PHIL THOMAS Thomas Business Systems, Inc. (305) 272-8753					WANTED STUDENT LOAN SYSTEM Call: Dave Lamb (Collect) (203) 758-2452 First of Boston Computeristics, Inc. Oxford Management & Research Center Middlebury, CT 06749																																																																																										

software for sale

software for sale

software for sale

time & services

time & services

SOFTWARE

SAVE

RPG/RPG II TO COBOL TRANSLATOR

This package accepts all types of RPG and produces ANS COBOL while approaching 100% error free conversion. The resulting COBOL program is modular in design and easy to read and maintain. Several client service options are available: Perpetual Lease, Conversion only, Clean Compile and full implementation including production JCL, test and installation. Over 100 satisfied customers.

For Prompt Reply Write or Call Us Today

DASD
CORPORATION

Park Ridge, Illinois 60068, Suite 315
1480 Renaissance Dr., (312) 299-5005

RSTS/E Communications

The HASPBOX(tm) is a communications front-end processor for DEC RSTS/E

- 360/370 communications via HASP protocol
- Block compression (increasing line throughput up to 35%)
- Supports line speeds up to 19.2 KB
- Automatic input queuing facility
- Allows remote RSTS printers and card readers
- Supports RSTS to RSTS systems communication

Contact
Software Results Corporation
455 West Seventh Ave.
Columbus, Ohio 43201
(614) 421-2094

TSO 3

The only TSO for VS1

Redesigned to eliminate TCAM and the staggering overhead of user swapping

ISP

(Intersystem Spool)
Processor

System-to-System
Communication for VS1

(Write or phone for details)

TSO
Software Corp.

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

RSTS/E

SOFTWARE PACKAGES

- KDSS, a multi-terminal key-to-disk data entry system.
- TAM, a multi-terminal transaction-processing "front-end."
- FSORT3, a new, very fast sort. Directly sorts RSTS/E files containing up to 16 million keys or records. Up to 70 times as fast as the RSTS-11 Sort package in CPU time.

(All three are implemented in assembly language as run-time systems for efficiency.)

Evans Griffiths & Hart Inc.

55 Waltham St.
Lexington, MA 02173
(617) 861-0670

RPG II SYSTEMS

- A/R-OPEN ITEM OR B/F
- ACCOUNTS PAYABLE
- GENERAL LEDGER
- PAYROLL AND LABOR DIST.
- INVENTORY
- "CREDIT UNION" MAILING, ETC

Extensive Documentation Provided
Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

ACCOUNTS PAYABLE

- Many system features including:
- Auto. discount calculation
 - Cost center reporting
 - G/L interface tape
 - Check reconciliation
 - Written in COBOL
 - Single data base
 - Audit trail & file control
 - 3 manuals & 3 yr. warranty
 - Batch mint or main frame
 - Low purchase price or rent.

Write or call for more information
LEGLER SYSTEMS COMPANY
23 Charles Hill Road
Orinda, CA 94563
(Est. 1972) (415) 254-1264

ACCOUNTING SOFTWARE FOR DEC RSTS/E OR CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Completely on-line, interactive systems available for ACCOUNTS-PAYABLE, GENERAL-LEDGER, FINANCIAL-REPORTING, ACCOUNTS-RECEIVABLE and PAYROLL applications.

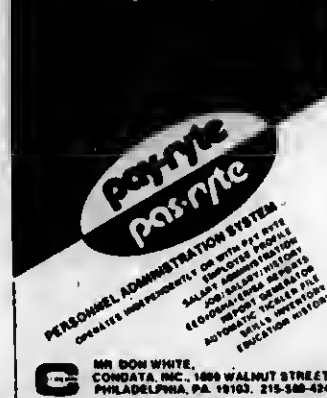
These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

If you are installing or have installed a Digital Equipment Corporation RSTS/E or CTS-500 system, contact us for cost-effective solutions to your core accounting problems.

Plycom services, Inc.

(219) 836-2183
P.O. Box 160
Plymouth, IN 46863

the ryle systems



MR. DON WHITE,
CONDATA, INC., 1800 WALNUT STREET,
PHILADELPHIA, PA. 19103, 215-548-4200

SOFTWARE WANTED

**PLANNING A NEW
COMPUTER SYSTEM?
HAVING PROBLEMS
WITH AN
EXISTING SYSTEM?**
Project Systems, Inc.
Specialist in general purpose computer systems with emphasis on IBM SYSTEM 3 and SYSTEM 32
We'll evaluate your needs and present you with the solution
For Further Information Contact:
Project Systems, Inc.
1156 Ave. of the Americas
New York, N.Y. 10036
(212) 869-3875

TIME & SERVICES

**TIME AVAILABLE
370/135
DOS/VS**
Up to 8 hours 2nd shift - some first shift available.
Attractive Rates
192K, 2-3420,
5-3330, 2-1403 N1
Commonwealth Avenue
Across from Armory
Contact:
Jo-Ann Fanti
(617) 738-6410

COMPUTER TIME

RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 15511
360/30
• COM-OMR FACILITIES
• EXCELLENT RATES
• CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

IMS SERVICES 370/165-2

Systems Engineering Computer Co.

announces the availability of:
CHICAGO DATA CENTER
With Nationwide Network

Contact: Robert Chomko
(312) 298-0997

SEC SYSTEMS ENGINEERING COMPUTER CO.

2500 East Devon Ave.
Des Plaines, IL 60018

REMOTE JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide Incoming Watts lines
- Complete systems and software support
- Full application library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, HASP, INTERCOMM, ROSCOE
- Complete data security including off-site storage

For information
call Walter Czerniak
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Data Craft, Data General, CDC, DEC, EMM, Fabri-Tek, Honeywell, GAI, HP, Intardata, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Varian, XDS.

Any Manufacturer's Memory

THREE DELTA CORP.

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

I.B.M. 360-40

All Shifts 128K, 4-2401
MOD-2, 9-2314, 1403-N1,
2540, 1401 Compatibility.
From \$35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036

Contact:
Al Palmo (212) 974-4966
Charles Leigey (212) 974-4967

COMPUTER Time/Services

2 IBM 370 165 & OS
1 IBM 370 155
RJE CICS TSO
Open Job Shop
CALL DAN ULREY

**COMPUTER RESEARCH
COMPANY**

CHICAGO, ILLINOIS
(312) 977-7500

WE ARE BROKERS OF COMPUTER TIME

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

Datacenter 370/158

3 meg VS2
Specializing in
Remote Job Entry
and Batch
Excellent Technical Support
Very Attractive Rates
Contact: Stu Keriensky
(212) 564-3030
Datamort
132 W. 31st St.
New York, N.Y. 10001

COMPUTER TIME

- ALL SHIFTS AVAILABLE
- DOS/VS AND GRASP ENVIRONMENT
- COMPLETE DATA PROCESSING SERVICES PROVIDED
- REASONABLE RATES

370/145-256K

PERIPHERAL DEVICES INCLUDE:

- (6) 2314 BIRK DRIVER
- (6) 200/400 NO DUAL DENSITY 8 TRACH TAPE DRIVES
- (2) 1403 N1 1100 LPM PRINTERS
- (1) 1442 CARD PUNCH
- (1) 2501 CARD READER
- (1) 2871 PAPER TAPE READER
- (1) 3215 CONSOLE PRINTER

CONTACT JIM GREEN OR LARRY YOUNG
MASS. TEL. (617) 583-8800

TURNKEY SYSTEMS

PDP11 SYSTEMS

Buy a new one from us*, don't pay a penny more than the manufacturer's list price and we will do your application programs for a smile. What do you have to lose?
* A Digital OEM

for consulting contact
1105 Massachusetts Ave.
Cambridge, Ma. 02138
Call (617) 354-5755

DS

DIGITAL PDP-11 DATASYSTEMS

Applications Software

- Accounts Receivable
- Accounts Payable
- General Ledger
- Payroll/Personnel
- Order Processing
- Inventory Control
- Sales Analysis
- Financial Planning
- Portfolio Accounting
- Custom Development
- RSTS/E System Utilities
- Complete DEC Systems
- Word Processing Systems

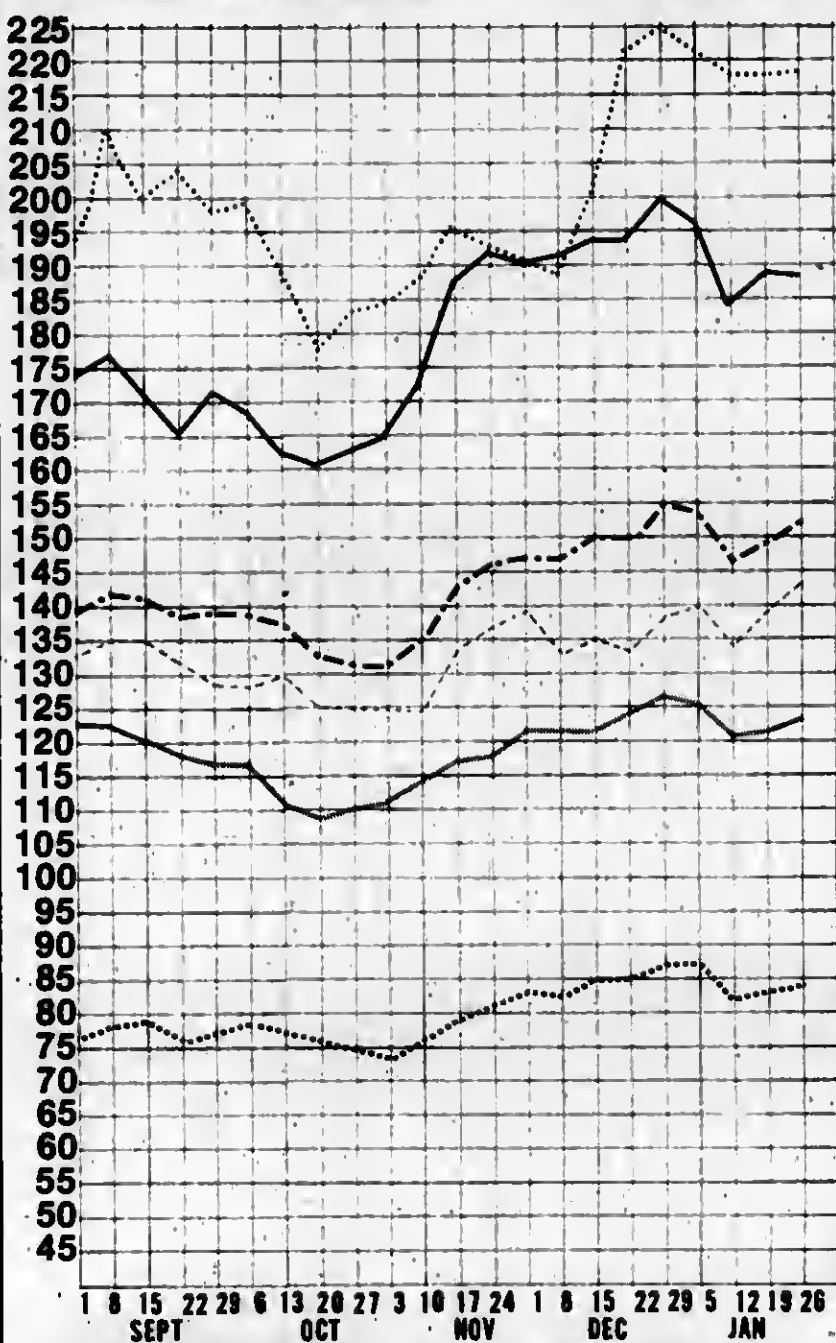
The RSTS/E Applications Specialists

ims

Interactive Management Systems, Inc.
375 Concord Avenue
Belmont, Mass. 02178 (617) 489-3550

COMPUTERWORLD
Computer Stocks Trading Indexes

— Computer Systems — Software & EDP Services
--- Peripherals & Subsystems --- Leasing Companies
--- Supplies & Accessories --- CW Composite Index

Earnings
ReportsAPPLIED MATHEMATICS
Three Months Ended Dec. 31

	1977	1978
Shr End	\$0.06	\$0.06
Revenue	15,406,000	\$13,983,000
Earnings	341,000	(123,000)

BURROUGHS
Year Ended Dec. 31

	1977 (000)	1978 (000)
Shr End	\$5.31	\$4.62
Revenue	2,126,822	1,901,849
Earnings	215,160	185,904
3 Mo Shr	2.32	2.04
Revenue	879,134	588,041
Earnings	94,074	81,976

CAMBRIDGE MEMORIES
Three Months Ended Dec. 2

	1977	1978
Shr End	\$1.11	\$1.63
Revenue	2,106,000	1,891,000
Tax Cred	97,000	91,000
Spec Cred		\$2,541,000
Earnings	208,000	2,764,000

a-Gain on extinguishment of certain indebtedness arising from sale of previously leased equipment.

MEMOREX
Year Ended Dec. 31

	1977	1978
Shr End	\$8.83	\$7.01
Revenue	450,112,000	344,823,000
Tax Cred	22,266,000	15,254,000
Earnings	58,325,000	40,130,000
3 Mo Shr	2.36	2.01
Revenue	124,043,000	100,055,000
Tax Cred	5,626,000	4,418,000
Earnings	15,415,000	11,598,000

IBM
Year Ended Dec. 31

	1977 (000)	1978 (000)
Shr End	\$18.30	\$15.94
Revenue	18,133,184	16,304,393
Earnings	2,719,414	2,398,093
3 Mo Shr	5.38	4.97
Revenue	5,038,121	4,816,710
Earnings	797,376	673,998

a-Preliminary.

Computerworld
Sales Offices

Vice-President/Marketing
Roy Einreinhofer
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
1212 Hearst Building
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Judy Milford
Account Coordinator
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

West Germany
Hans-Jürgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 25, 1978

All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

PRICE					PRICE					PRICE											
X	1977-78	CLOSE	WEEK	WEEK	X	1977-78	CLOSE	WEEK	WEEK	X	1977-78	CLOSE	WEEK	WEEK							
C	RANGE	JAN 25	NET	PCT	C	RANGE	JAN 25	NET	PCT	C	RANGE	JAN 25	NET	PCT							
M	111	1978	CHNGE	CHNGE	M	111	1978	CHNGE	CHNGE	M	111	1978	CHNGE	CHNGE							
COMPUTER SYSTEMS																					
A	ANDAML CORP	22-55	49 3/4	+1	+2.0	O	ADVANCED COMR TECH	0-2	1 5/8	+1/8	+0.3	D	DATA ACCESS SYSTEMS	4-5	3 1/4	0	0.0				
N	BURROUGHS CORP	55-91	65 1/4	-1 7/8	-2.7	C	ANACOMP INC	7-10	8 1/2	0	0.0	O	DATA IOD	6-11	9 1/4	0	0.0				
O	COMPUTER AUTOMATION	18-30	24	0	0.0	N	ARPLIO DATA RES.	5-10	8 1/2	-1/4	-2.8	A	DATA PRODUCTS CORR	9-19	15 3/8	-1/8	-0.8				
N	CONTROL DATA CORP	20-29	25 5/8	-1/8	-0.4	O	AUTOMATIC DATA RROC	23-30	26 5/8	+1/4	+0.9	C	DATA TECHNOLOGY	3-4	4 1/4	+1/8	+3.0				
C	CPAV RESEARCH INC	15-31	28	+1/2	+1.8	C	COLEMAN AMERICAN COS	2-2	1 3/4	0	0.0	C	DATUM INC	1-2	2	0	0.0				
N	DATA GENERAL CORP	35-54	47 1/2	-1/2	-1.0	O	COMPU-SERV NETWORK	9-15	10 1/4	-1/2	-4.6	C	DECISION DATA COMPUT	2-3	2	+1/8	+0.8				
N	DATARPOINT CORR	18-41	35 1/8	-1 1/4	-3.4	C	COMR ELECTION SYSTEMS	6-10	9 1/4	0	0.0	D	DELTA DATA SYSTEMS	1-1	1/2	0	0.0				
N	DIGITAL EQUIPMENT	37-53	42 1/2	-2 3/8	-5.2	C	COMPUTER HORIZONS	1-1	1 1/2	+3/4	+100.0	A	OCCUPATION INC	6-12	11	+1/8	+1.1				
N	ELECTRONIC ASSOC.	2-3	2 1/4	-1/8	-5.2	C	COMPUTER NETWORK	6-11	8 3/4	-1/2	-5.4	O	DATARAM CORP	2-24	18 1/2	-1	-5.1				
A	ELECTRONIC ENGINEER.	8-14	14 3/8	+2 1/2	+21.0	A	COMPUTER SCIENCES	7-10	8 3/4	-1/8	-1.4	N	ELECTRONIC M & M	4-5	4 1/2	+1/8	+2.8				
O	FOUR-PHASE SYSTEMS	13-23	21 1/4	+1 3/4	+0.9	O	COMPUTER TASK GROUP	1-2	1 1/2	0	0.0	C	FABRI-TER	1-2	1 1/8	0	0.0				
N	FORBORD	28-54	30 5/8	+1/2	+1.6	C	COMPUTER USAGE	1-3	1 5/8	0	0.0	O	GENERAL COMPUTER SYS	0-2	1 1/4	-1/4	-16.6				
G	GENERAL AUTOMATION	6-9	6 3/4	-3/8	-5.2	O	CONSHARE	5-8	7 1/2	+3/4	+11.1	N	HAZELTINE CORP	8-12	9 7/8	0	0.0				
C	GRI COMPUTER CORP	1-1	5/8	0	0.0	O	DATA DIMENSIONS INC	3-5	4 1/2	-1/8	-2.7	N	HARRIS CORP	28-47	41 3/4	+1 1/4	+3.0				
N	HEWLETT-PACKARD CO	68-87	66	-2 5/8	-3.7	O	DATATAB	1-2	1 3/8	0	0.0	N	INCOIERM CORR	10-19	17 1/2	-1	-5.4				
A	HONEYWELL INC	43-55	43 7/8	-7/8	-1.9	N	ELECTRONIC DATA SYS.	14-20	15 1/8	+1/4	+1.8	O	INFOMEX INC	4-7	5 3/4	0	0.0				
N	IBM	245-266	265 7/8	-3 3/8	-1.2	O	INSYTE CORR	2-3	1 3/8	+1/8	+10.0	D	INFORMATION INTL INC	8-14	9 1/4	+1/4	+2.7				
C	MANAGEMENT ASSIST	5-10	9 3/8	+3/8	+4.1	C	IRS COMPUTER MARKET.	1-2	2 1/8	-1/8	-5.5	C	INTEL CORP	38-57	43 1/2	+1	+2.3				
O	MICRODATA CORP	7-18	10 3/4	+1/2	+4.8	C	KEANE ASSOCIATES	3-4	3 3/8	0	0.0	A	LUNOY ELECTRONICS	3-8	3 5/8	+1/8	+3.5				
O	MINI-COMPUTER SYST	5-12	5 1/4	-2	-27.5	C	KEYDATA CORP	1-3	1 3/8	0	0.0	C	MSI DATA CORR	6-15	12 1/2	-1/4	-1.9				
C	MODULAR COMPUTER SVS	5-9	6 1/4	+1	+13.7	A	LOGICON	7-17	12 1/8	+1/4	+2.1	O	MEMOPR	23-34	29	+1 5/8	+5.9				
N	MCR	32-47	40 1/2	+1 5/8	+4.1	A	MANAGEMENT DATA	1-2	1 1/8	-1/8	-10.0	A	MONARK DATA SCI	5-8	5 3/4	0	0.0				
C	PRIME COMPUTER INC	12-25	23 1/8	+5/8	+2.7	A	NATIONAL CSS INC	10-18	16 1/4	-3/4	-4.4	O	NONAL CORP	2-6	5 1/4	-1/8	-2.3				
N	PEPPER-ELMER	17-22	18 3/4	+1/2	+2.7	C	NATIONAL DATA CORP	4-7	7	+1/8	+1.8	N	PERTEC CORP	7-11	10 1/8	0	0.0				
A	RAYTHEON CO	16-35	30 5/8	+1	+3.3	A	ON LINE SYSTEMS INC	18-22	18 1/8	+1 3/8	+8.2	A	POTTER INSTRUMENT	2-2	1 3/4	0	0.0				
N	SPERRY RAND	30-42	34 1/8	-1 1/8	-3.1	N	PLANNING RESEARCH	3-6	4 1/8	-1/8	-2.9	D	PRECISION INST.	2-2	2	0	0.0				
C	SYCOR INC	8-21	20 1/2	+5/8	+3.1	C	PROGRAMMING & SVS	1-1	5/8	0	0.0	D	QUANTOP CORR	3-5	3 3/8	0	0.0				
A	SYSTEMS ENG. LABS	5-13	12 3/8	-1/8	-1.0	O	RARIOATA INC	2-3	3	+1/8	+4.3	C	RECOGNITION EQUIP	6-10	7	-1/8	-1.7				
A	WANG LABS.	10-14	12 1/2	-1/4	-1.9	O	REYNOLDS & REYNOLD	17-21	19	-1/4	-1.2	G	SCAN DATA	1-2	1	0	+19.3				
LEASING COMPANIES																					
O	ALANTHUS CORR	3-6	5 5/8	-1/8	-2.1	C	SCIENTIFIC COMPUTERS	1-4	3 7/8	+1/4	+6.8	C	STORAGE TECHNOLOGY	10-22	19 3/8	-3/8	-1.8				
C	BOOTHE COPIER CORR	8-14	13 1/4	-1/4	-1.8	O	TYMSHARE INC	14-23	20 3/8	+3/8	+1.8	C	TAP INC	7-13	11 1/2	+3/8	+3.3				
C	COMISCO INC	10-16	14 3/4	-1/4	-1.6	A	URS SYSTEMS	4-5	5	+1/4	+5.2	D	TALLY CORP.	4-6	4 1/2	+3/8	+9.0				
A	COMMERCE GROUP CORP	1-3	3/4	0	0.0	N	WYLV CORP	1-2	3/4	-	-1.7	A	TALC INC	7-10	7	+1/8	+1.8				
A	COMPUTER INVESTS GPP	1-2	7/8	0	0.0	PERIPHERALS & SUBSYSTEMS										N	TEKTRONIX INC	29-40	35	0	0.0
N	DATACRINT RENTAL	0-2	1 1/4	0	0.0	N	ADDRESSOGRAPH-MULT	10-16	14 1/2	+5/8	+4.5	N	TELEX	2-3	3 1/4	+3/8	+13.0				
A	OCL INC	1-3	2 7/8	0	0.0	O	ADVANCED MEMORY SVS	7-9	8 1/4	+1/2	+6.4	O	TFSDATA SYSTEMS CR	13-20	13 3/4	-1/4	-1.7				
N	DRF INC	6-10	8	0	0.0	N	AMER CORP	8-12	11 1/4	+1/8	+1.1	C	WILTEX INC	1-1	1/2	0	0.0				
N	ITFL	13-22	17 3/8	-1/4	-1.4	C	ANDERSON JACOBSON	3-6	4 7/8	0	0.0	SUPPLIES & ACCESSORIES									
N	ILASCO CORP	19-27	24 1/2	+1/4	+1.0	N	ARPLIO OIG DATA SYS	10-20	15 5/8	+2 3/8	+17.9	A	AMERICAN BUS RDOOS	6-8	7	-1/8	-1.7				
C	LFASRAC CORR	1-2	1 3/8	-1/8	-0.3	C	BEEFIVE INT'L	5-12	6 1/4	+5/8	+11.1	O	BALTIMORE BUS FORMS	1-4	1 7/8	0	0.0				
A	PICRER TEX CORR	5-11	5 5/8	+1/4	+4.6	A	BOLT, BERANEK & NEW	6-9	5 7/8	-1/8	-2.0	A	BARRY DRIGHT	10-17	15 7/8	+3/8	+2.4				
N	U.S. LEASING	10-16	12 1/2	-1/4	-1.9	N	BUNKER-RAND	8-13	12 5/8	+3/4	+6.3	C	CYBERNATICS INC	1-1	7/8	0	0.0				
ERCH: N-NET YCRR; A-AMERICAN; P-PHIL-BALT-WASH															O	DUPLEX PRODUCTS INC	14-20	16 1/4	+1/8	+0.4	
L-NATIONAL; M-MIDWEST; O-OVER-THE-COUNTER															A	ENNIS BUS. FORMS	6-9	8 3/4	+1/8	+1.4	
O-T-E PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID															E	GRAPHIC CONTROLS	13-19	18 1/2	+3/4	+4.2	
111 TO NEAREST DOLLAR															F	3M COMPANY	45-56	47	-1/2	-1.0	
															N	JOPEL CORP LTO	24-37	26	-1/2	-1.8	
															C	NASHUA CORP	16-28	20 1/4	+2 1/8	+11.7	
															C	STANDARD REGISTER	18-25	20 1/2	-1/2	-2.3	
															C	TAP PRODUCTS CO	8-19	8	+3/8	+4.9	
															N	UAPCI	18-22	19 3/4	+3/4	+3.9	
															A	WASH MAGNETICS	10-15	11	0	0.0	
															N	WALLACE BUS FORMS	17-21	19	+1/4	+1.3	

"I COUNT ON A FULL LINE"

"I count on a Full Line in business too." Fran Tarkenton, MSA

On the football field or in the business world, a full line provides the kind of support needed for success. MSA has a full line of FINANCIAL SOFTWARE. Our systems include: General Ledger, Payroll Accounting, Canadian Payroll Accounting, ALLTAX™, Accounts Receivable, Accounts Payable, Financial Information and Control, Personnel Management and Reporting, Fixed Asset/Property Accounting, Supplies Inventory Control and Purchasing.

And we don't stop there. A full support staff provides the local customer contact you desire. With offices located in New York, Atlanta, Chicago, and Los Angeles, you receive continuous back-up support.

You can count on us for answers to questions, additional training for new employees, and the latest in tax changes or governmental reporting requirements.

Our strategy includes systems that are out in front through data base management, on-line processing, structured programming, and on-going enhancements.

Over 2,800 customers already know about our full line. You should too. You'll find you can count on it.

For further information, call Marge Kimbrough at (404) 262-2376 or mail this coupon to:



Management Science America, Inc.
3445 Peachtree Road, N.E. Dept J1
Atlanta, Georgia 30326

Chicago, 312-986-2450; Los Angeles, 213-822-9766;
New York, 201-871-4700

Name _____
Company _____
Title _____
Address _____
City _____
State _____ Zip _____
Phone _____ Computer Model _____

I am interested in:

- ☐ General Ledger
- ☐ Payroll Accounting
- ☐ Canadian Payroll Accounting
- ☐ ALLTAX™
- ☐ Accounts Receivable
- ☐ Accounts Payable
- ☐ Financial Information and Control
- ☐ Personnel Management and Reporting
- ☐ Fixed Asset/Property Accounting
- ☐ Supplies Inventory Control and Purchasing



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

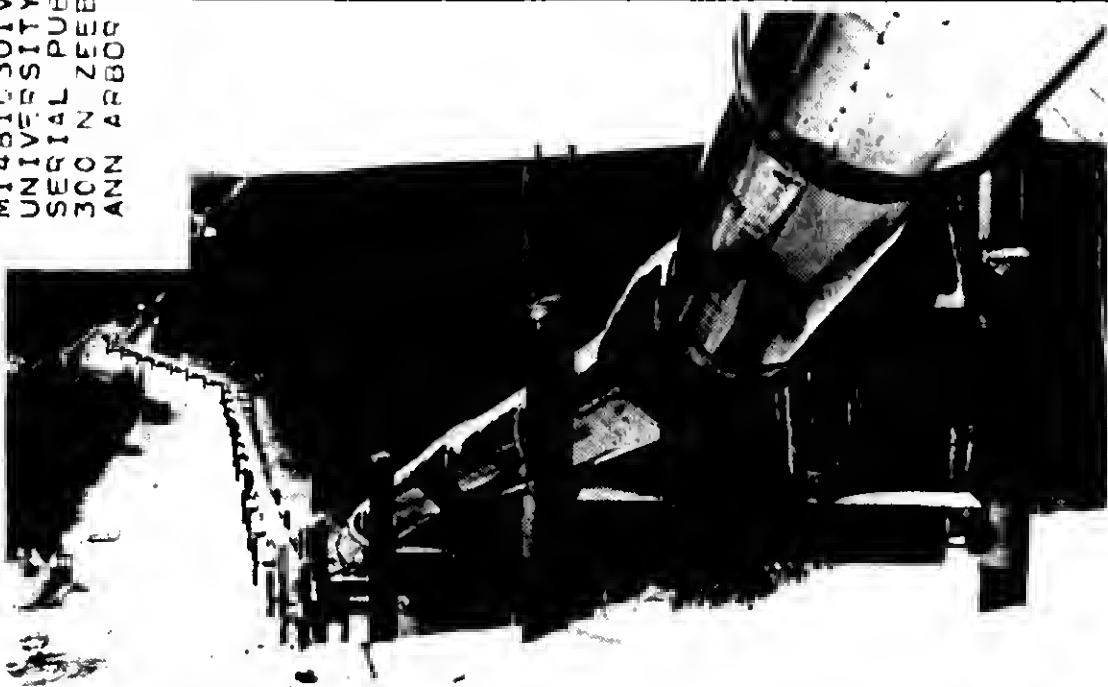
Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

February 6, 1978

75¢ a copy; \$18/year

CW SAMPLE COPY
M1481C3U1VYMUIVYM FCMB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48103

NEWSPAPER



Look Again . . .

This is not a downhill racing course — it's the Alaska pipeline, and several very cold computer maintenance engineers are doing their best to keep the oil running. Who are these people? See story on Page 5.

HIS Adds 'DPS' to Level 66 Line

By Frank Vaughan
And Don Leavitt
CW Staff

WALTHAM, Mass. — Honeywell Information Systems, Inc. has introduced the Level 66/Distributed Processing System (66/DPS), which it claimed "roughly covers" the IBM 3031, 3032 and 3033 in performance.

The system has five levels of performance, HIS said, adding that the system does not replace the troubled Level 66/85, with which it is "still going ahead."

The lowest performance level of the 66/DPS is comparable in processing power to the current 66/60 system, HIS said. Performance Level 2 provides an additional 55% in processing performance, while Level 3 provides an additional 35% over Level 2.

The fourth level adds another 60%, while the fifth and most powerful level adds still another 35%, making it about 450% more powerful than the entry-level machine. A fully enhanced Level 5 system provides 120% of the processor performance of a four-processor

Level 66/80, the firm said.

The lowest three levels are powered by twin processors within a single cabinet. The fourth power level has a third processor, in two cabinets, and the top performance model includes yet another companion processor, making four processors in three cabinets.

Cycle time for cache operations on the systems is 100 nsec, HIS said, adding that the effective cycle time is therefore 50 nsec because of the companion processors. The memory access

(Continued on Page 8)

Turnkeys Built on Series/1 Provide 3270 Emulation

By Ronald A. Frank

CW Staff

NEW YORK — DDP Products, Inc. has announced four levels of IBM Series/1 systems that provide 3270 emulation mode for IBM and non-IBM



Level 66/DPS

terminals.

The minicomputer-based turnkey systems will operate in networks configured for binary synchronous communications or Synchronous Data Link Control (SDLC). They are reportedly aimed at users who require a 3270-type network but need more upgrade options.

Called the System 100, 101, 102 and 103, the configurations start with a basic system that includes four CRTs, a Series/1 processor with 32K of storage and a typical communications link under Bisynch or SDLC to a 3705. This basic configuration, the System 100, costs about \$35,000 installed.

A System 101, which adds diskette storage capability and support for up to 16 CRTs, costs about \$60,000, depending on options, DDP Products said.

The System 102 supports 32 CRTs and has both diskette and disk storage at a price of about \$80,000; the System 103 has multiple disk subsystems, line

(Continued on Page 6)

Documation Has Substitute For IBM 3211/3811 Printer

By Frank Vaughan
CW Staff

MELBOURNE, Fla. — A micro-processor-controlled 3,000 line/min impact line printer/controller that is plug-compatible with the IBM 3211/3811 printer/controller has been introduced by Documation, Inc.

The Documation Impact 3000 is reportedly 50% faster and, at \$90,000, \$13,000 less costly than the IBM unit, which comes with a 3216 Interchangeable Train Cartridge. The IBM unit is used with most major IBM

360/370 mainframes.

The Impact 3000 controller is currently optimized for 50 nsec cycle time, resulting in an average instruction time of 350 nsec, according to Documation.

The Impact 3000 provides separate program and memory data address space, enabling the processor fetch cycle to occur during the execute cycle. This contributes to the overall speed of the unit, a spokesman noted.

An additional speed advantage is ob-

(Continued on Page 8)

Package for IBM Sites Aids Program Integrity

By Don Leavitt
CW Staff

TULSA, Okla. — Management and security of executable program libraries have been problems for most IBM installations, but Panexec, just introduced by Pansophic Systems, Inc., copes with both problems very effectively, according to a spokesman for the Bank of Oklahoma, where the software has been in place since last summer.

Executable program libraries are made up of programs ready for use on the computer. They are the output of the link-edit step, which uses as input object code created by the user's compiler.

Although software has been available previously to manage both source and object code — Pansophic's Panvalet or Applied Data Research, Inc.'s The Librarian, for example — Panexec is the first package to work with IBM 360/370-based programs after they have been link-edited, a Pansophic spokesman claimed.

Major features of Panexec are a multilevel password security system, cross-reference reporting between source and executable modules, executable library utilities, a management report-generating facility and DASD error handling, he said.

Tight Security

As many as five levels of security codes can be applied to groups and elements in an executable program library under Panexec control. In addition, the system flags attempted security violations in such a way that, once such an attempt occurs, only a designated security administrator can unlock the system, the company explained.

The cross-referencing is extremely useful to programmers, according to Pansophic, since it documents which source listing is involved when a problem occurs with an executable program. No time is lost trying to solve the problem with an out-of-date listing, the spokesman said.

The library utilities, interchangeable with IBM's, reduce the initiation/termination process so users can compile, link and go in one step. And work files, normally allocated separately for each module being compiled, need only be allocated once under Panexec, he added.

The management reporting facility accumulates and reports use data on Panexec library reorganization. This capability is built around a limited version of Pansophic's Easytrieve report writer that is embedded in Panexec, the

(Continued on Page 6)

Midwest DPeres Not Flustered By Bad Weather

By Ann Dooley

CW Staff

Neither rain, sleet nor the worst blizzard in one state's history kept DPeres from their appointed tasks after 18 to 24 inches of snow fell in the Midwest two weeks ago.

Many installations in Ohio, Michigan, Indiana and other snow-struck states were forced to close down the day of the snowfall, but they were up and running again the next day. Most

(Continued on Page 2)



EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Associate Editor	Esther Surden
Associate Editor	Molly Upton
Assistant Editor	Frank Vaughan
Washington Bureau	Edith Holmes
Staff Writers	Catherine Arnt Jeffrey Beeler Timothy J. Scannell Brad Schultz
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Barbara T. VanScoyoc Susan Gerrard
Photography Editor	Ann Dooley
Editorial Assistant	Denise Petski
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger Frampton
Munich	Hans-Jurgen Ballnath
Asia	Hidetuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone

SALES

Vice President/ Marketing	Roy Einreinhofer
Advertising Administrator	Terry Williams
Display Advertising	Mary Anne Furlong
Classified Advertising	Donna Whalen
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen

CIRCULATION

Vice-President/ Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti
Customer Service Rep	Peggy Kelly
Assistant	Maureen Burke

PRODUCTION

Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm
Typesetting Supervisor	Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352. Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Trislanstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S. — \$18 a year; Canada and PUAS — \$28 a year; Europe and Middle East — \$50 a year; all other foreign — \$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/ Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

In Unusual Abundance

Write-Ins Join ACM Election Slate

By Ann Dooley
CW Staff

NEW YORK — Several members of the Association for Computing Machinery (ACM) are writing themselves in as petition candidates in the association's 1978 election because they are unhappy with the ACM nominating committee's selections.

Some members claim the nominating committee did not give enough time and attention to their choices and as a result, came up with a slate unrepresentative of the ACM membership. Others claim that president Herbert Grosch "stacked the deck" by appointing two of the three members of the nominating committee and thus assuring nominees of his liking.

In any case, there are more write-in candidates running than in recent years — spurred by dissatisfaction over the official choices or possibly by the success of Grosch's petition campaign in the last ACM election, one ACM

member commented.

Petition candidate Peter J. Denning of Purdue University is challenging committee-selected candidates John Gosden, Equitable Life Assurance Society of the U.S., and John W. Hamblen, University of Missouri at Rolla, for the position of ACM vice-president.

Challenger David H. Brandin of SRI International is a petition candidate for the office of secretary. Committee-selected candidates for that office are Richard E. Nance of Virginia Polytechnic Institute and Marshall C. Yovits of Ohio State University.

Three petition candidates have entered the running to become members-at-large. Those challengers are Gerald Salton, Cornell University; Robert Ashenurst, University of Chicago; and Jeffrey Ullman, Princeton University. They are competing with Charles Bradshaw, Vanderbilt University; David H. Brandin; C. William

Gear, University of Illinois at Urbana; Portia Isaacson, The Micro Store; Bruce Van Atta, University of Rochester; and Seymour J. Wolfson, Wayne State University.

Only three out of these nine candidates will be elected.

Petition Procedure

A petition candidate needs to obtain signatures from 1%, or 253 of the members eligible to vote in ACM elections.

All of the candidate's petitions are in the process of being verified, an ACM spokeswoman explained.

No one has filed a petition to compete for the ACM presidency against nominating committee selections Aaron Finerman, State University of New York; and Daniel D. McCracken, current vice-president.

In addition, there have been no challenges to the committee's selections for regional representatives. For the North Central region, candidates are Barry Bateman of Southern Illinois University and Earl C. Joseph of Univac.

Committee selections for the Northeast region are P. Bruce Berra of Syracuse University and Monroe M. Newborn of McGill University.

H. Donald Barnhart, Boeing Corp. Services Co., and Fred N. Brand, Lockheed Missiles and Space Co., were selected for the Pacific region, while Della T. Bonnette of the University of Southwestern Louisiana and Robert R. Korfhage of Southern Methodist University were selected for the South Central regional by the ACM committee.

Only one candidate will be elected from each region.

Nominating committee members are Olin Johnson, chairman, George Glaser and Alex Hoffman.

All petitions must be turned in to ACM headquarters by Feb. 28. Ballots will be sent out to ACM members in April and will be counted the end of May. New officers will begin their terms July 1.

Snow Doesn't Scare DPers

(Continued from Page 1)

are already back on their regular schedules after several days of working hard to catch up, users said.

"We had to slow down, but were able to keep functioning," Gene Brachman, operations manager for Dayco in Dayton, Ohio, said. "Our computer operator stayed in a hotel across the road, so we were able to keep in constant touch."

Some IBM field engineers also stayed on the job around the clock — not so much out of loyalty, but simply because they couldn't move their cars and were forced to spend the night at a customer's installation.

The problems of these Midwestern users might have just begun, however, if the United Mine Workers strike is not ended soon. New supplies of coal are needed to bolster the dwindling supply soaked by the snow.

Ohio Gov. James Rhodes ordered all state offices to reduce electrical con-

sumption by 25% and cut the voltage power to all businesses by 5%. Most utilities have coal reserves for about 50 days and "a lot of people are pretty worried" about what will happen after that, Roy Reeves of Ohio State University in Columbus said.

If it gets much worse, "we'll tell everyone to go home and leave the computers running," according to Bradley Kirk, vice-president of systems and development for Nationwide Insurance Companies of Columbus.

If the strike is not settled within two weeks, electricity will be cut 50% to stretch remaining coal supplies and to maintain "human needs" services, Rhodes said. Such cutbacks would cause layoffs of 500,000 to 750,000 workers and force many places to close, he predicted.

Two to four inches of new snow was predicted for Ohio last week, but "that would be peanuts compared to what we've had," Dayco's Brachman said.

On the Inside This Week

NEWS

Selection of Antitrust Juries Called 'Abysmal'	4
To Some DPers, Cold and Darkness a Way of Life . . .	5
Two Charged in Theft of Time From Nasa System . . .	6
SSA Swapping Data With VA, Railroad Board	7
Cbema Asks U.S. Meet on Proposed I/O Fips	9
U.S. Stand on Data Flow Seen Months Away	10
IEEE Head Sees No Easy Answer to Itar Protest	11

EDITORIAL

Editorial: Must Be a Better Way	16
Human Connection: Empathy Needed First	17
Taylor Report: Problems in Two-Field Lines	17
Security Function No Longer Expendable	18
Data on CPU Life More Useful as Graph	19

SOFTWARE & SERVICES

DOS/VS Shops Going to On-Line Work	23
Package Handles Accounts Receivable On-Line . . .	24
Sigplan Meeting to Trace Languages' Growth	25
Once for Designers, DBMS Now Keyed to User . . .	26
Planning the Key to Easy DOS-OS Conversion . . .	27

COMMUNICATIONS

Firm Uses Device to Cut Satellite Delay	29
GE Teleprinter Operates to 1,200 Bit/Sec	32

Notion Firm Alters Order, Inventory System	36
ATL Has Terminals for Short Term	38
Teletype 40, CPUs Linked	38

SYSTEMS & PERIPHERALS

COM Receives Boost From Two Sides	39
Data Entry User Likes Revolutionary Evolution . . .	41
Mass Storage Facility Built for Xerox Systems . . .	42
Add-On-Memory Gives Clinic Flexibility	44

MINIWORLD

BC/7 Gets Multiprogramming, Diskette	45
Pharmacy Cuts Losses via Time-Sharing Mini	47
Manufacturer Heightens Accounting Accuracy . . .	49
Dual Systems Meet Newspaper's Backup Need . . .	54

MICROCOMPUTING

Heath H8 Users Get Floppy, Upgrade to Z-80	55
Floppy Disk Controller Fits 8010	58

COMPUTER INDUSTRY

IBM's Share of Federal Pie Shrinking	59
IBM Moves Hurt PCM Finances: Broker	59
Dealer Predicts 'Bloodbath' for 370 Lessors	61
Japanese DP Not the Dragon It Appears	62
Microprocessor Features Clock Oscillator	63

ADR's ROSCOE Improves Productivity And Reduces Manual Tasks At Hibernia National Bank

ROSCOE Gave Our Programmers Their Own Computer "Our 30 programmers and analysts are very high priced people to be spending time keypunching and running around trying to find

program decks. To cut that time and get out of the card business, we needed the ability to interact directly with our computer. The logical solution was ROSCOE," said Don Clark, DP Division Vice President. "Within a week

after ROSCOE was installed we could see the change.

The individual who had

been in a laborious, archaic card environment had his own online terminal. In effect, he had his own computer.

He can submit entries, verify them and have them in the system within seconds. "Everybody wants to use ROSCOE

now. For online maintenance.

Updating. Development programming.

Batch submission of testing.

Every programming function."

**One Big Difference
Between ROSCOE
and TSO**

"Many of our key people who had come from TSO shops thought ROSCOE would require

learning many new procedures. It didn't. They all found ROSCOE easy to use with almost no additional training," added Systems and Programming Manager Reg Campbell.

"We did, however, find one big difference between ROSCOE and TSO. ROSCOE requires much less overhead. It doesn't interfere with batch jobs and operations functions the way TSO did."



Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.

For more information on what ADR software can do for you, call or write

 **APPLIED DATA RESEARCH** THE ON-LINE SOFTWARE BUILDERS™
Route 206 Center, Princeton, N.J. 08540, Phone: 609-924-9100

ADR software products: in use at over 8000 installations worldwide. U.S. offices in Atlanta (404) 252-9130, Boston (617) 245-9540, Chicago (312) 694-2244, Cleveland (216) 826-0190, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (609) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 281-2011. International offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.

Selection of Antitrust Juries Called 'Abysmal'

By Molly Upton
CW Staff

LOS ANGELES — The jury selection process for antitrust trials is "abysmal," according to Dr. Donald Vinson, associate professor of business administration at the University of Southern California.

Vinson, a sociologist who supervised the shadow jury experiment for IBM in the California Computer Products, Inc. vs. IBM antitrust trial [CW, Jan. 31, 1977], also cited some of the strong and weak points of Calcomp's presentation to the jury.

Disagreeing with the lenient policy some judges adopted when selecting an antitrust jury, Vinson said the current procedure does not produce a cross-section of the population. One cannot say that one is being judged by one's peers, he said.

Juries consist largely of older or retired people, many of whom have "little or no experience with business and/or data processing. They have a tremendous naivete concerning computers, and many are opposed to computers to start with," he added.

Excuses for 'Extreme Hardship'

Prospective jurors should only be excused for reasons of extreme hardship such as health. They should not be excused just because serving on a jury for a lengthy period of time would inconvenience them, Vinson said.

Many prospective jurors argue that serving on a jury would present an economic hardship because their regular salaries are above the per diem rate paid to jurors, he pointed out. However, Vinson argued, there is no reason professionals should not serve on juries and, in fact, they are probably better able than others to survive the temporary reduction in pay.

Vinson would like to see some jurors with background or knowledge of the industry or the equipment. "I don't see why people have to be totally ignorant of the industry," he commented.

Being a juror in an antitrust trial is

difficult because the evidence is of a technical nature and the issues are complex. Vinson suspects that juries in criminal trials "are a bit more fair because they can all relate to interpersonal affairs."

Criminal attorneys have an advantage over antitrust attorneys, he said, in that they have developed a second sense on how to act before a jury. But antitrust attorneys are rarely before a jury, he said, and often they are so involved in the case they forget about the impact their behavior can have on jurors.

Jurors Watch Lawyers

In the Calcomp case, jurors began to judge the importance of the testimony in relation to reactions of the lawyers, Vinson said.

For instance, if an attorney seemed calm, the jurors were likely to think he felt the testimony was going well for his client. But if an attorney appeared upset, then the jurors often suspected the testimony was tending against what he wanted and would listen more keenly to the witness, he explained.

Although Vinson concluded that the jury in the Calcomp case would have decided in IBM's favor, he is convinced that IBM faces an uphill battle in jury trials because of its size and reputation as a firm with immense resources.

Attorneys for IBM have a double duty: to present their side of the case and to try to neutralize those attitudes or change negative views to positive, Vinson said. And changing attitudes is difficult, he added.

After the cases' opening segments, the jurors concluded the case involved the "big" vs. "small," he said.

During the trial, there were peaks and valleys during which the shadow jurors would swing back and forth, but Calcomp steadily gained in their favor until the very end, when former Calcomp president Lester Kilpatrick took the stand, according to Vinson.

"The last three days were the turning

Memorex Jury Picked Fast — After All That Research

SAN FRANCISCO — Although both Memorex Corp. and IBM attorneys attempted to research the backgrounds of prospective jurors in the antitrust suit between them [CW, Jan. 23] the jury was selected so quickly that it is unlikely much of this groundwork was useful, according to courtroom observers here.

Lead attorney for Memorex, John Endicott of Gibson, Dunn & Crutcher, repeatedly suggested the court adjourn for lunch before jury selection was completed, but Judge Samuel Conti seemed determined to select the jury as quickly as possible.

By the first day of testimony, both alternates had assumed seats on the 12-member panel after two designated jurors indicated inability to serve. Judge Conti remarked "at this rate, we have 12 more days to go." The parties have agreed that a jury of less than 12 persons is acceptable.

The six-man, six-woman panel includes four women who do not work outside their homes and two who generally hold full-time jobs.

One man is retired and two have held their jobs for more than 15 years.

Occupations of the jurors include secretary, collection agent, maintenance engineer for a school district, mail services supervisor at a

university, bus fueler and materials segregator for the Defense Supply Agency. One young man installs central office telephone equipment and was the only one indicating any knowledge of how computers function.

As in the California Computer Products, Inc. vs. IBM case, the parties appeared to reject any prospective juror who had some entrepreneurial business experience or supervisory background in a large firm.

Intent on Understanding

Thus far, at least some members of the jury have indicated a keen intent to speak up if they do not understand something.

For instance, during the show-and-tell tour of IBM's marketing office where various machines were installed, including some non-IBM gear, one juror made sure she got a good second look at the inside of one of the disk drives mentioned in the suit.

The jury also seems to be giving the attorneys lessons in how to cope with all their visual displays, indicating to them when an easel is blocking their view of the screen.

Although Judge Conti has emphasized to the jurors that the trial could last as long as 10 months, he has repeatedly told attorneys to plan on no more than three months.

point," he said. Kilpatrick's answers were verbose and it became evident that he had made a fair sum of money while competing against IBM. This factor tended to diminish the impression of big vs. small that had been established at the outset, he said.

Although both parties made an effort to educate the jurors about data processing, Vincent said the attempt amounted to a sensory overload.

Rather than cramming everything into jurors' heads at once, Vincent suggested having a preliminary introduction with a one-hour overview and product display, and then later, after they have heard the terms used in the courtroom, having another teaching session.

Most of the jurors in the Calcomp case were bored to death and horribly confused by the education effort, he said.

In the Calcomp case, the jurors were fond of both attorneys, Vinson said. They noticed what Calcomp's attorney, Maxwell M. Blecher, wore and were mentally puzzled by the navy blue "uniform" of David Boies, the attorney from Cravath, Swaine & Moore representing IBM.

Blecher had a real rapport with the jury and several felt badly for him when the case received a directed verdict, Vinson observed.

He said that Boies impressed the jurors as being a very bright person with a limitless facility for facts.

Correction

In "EFT Systems? No Thanks, Not Yet" [CW, Jan. 9], a large New York City bank in which an act of computer fraud occurred was incorrectly identified as the Dime Savings Bank of New York. The incident discussed occurred at another bank with a similar name.

"Top Secrets"

New Concerns in Information Security and Privacy, Deterrents to Computer Crime, Technical Advances in Information Security, the Management of System Security Risks, and Advances in Computer Auditing and Control.

These are some of the topics that will be uncovered in depth at the Fourth Annual Honeywell Computer Security and Privacy Symposium to be held April 18-19, 1978, at the McCormick Ranch, Scottsdale, Arizona.

If you are in any way responsible for, or have an interest in computer privacy and security, you'll want to be there. Or be represented. The fee is \$425.

Send us the coupon. Or call (602) 993-3193. We'll send you all the details.

Honeywell

Honeywell Information Systems
Jerome Lobel, Manager
Computer Security and Privacy
P.O. Box 6000 (MS K95)
Phoenix, Arizona 85005
Please send me more information and a registration form for your April Symposium.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

At Least in Valdez, Alaska

To Some DPers, Cold and Dark a Way of Life

By Ann Dooley
CW Staff

VALDEZ, Alaska — Wanted: computer maintenance engineer to work long hours in arctic weather conditions; position involves travel and working without sunlight.

Conditions such as these might not appeal to the average computer engineer, but six Honeywell volunteers recently decided to get away from the same old grind — and did they ever.

Working 10 hours a day, six days a week, sometimes in darkness and sometimes in weather that drops to -80° F, the group is monitoring the computer system on the Alaska pipeline.

Most seem to enjoy the work, although none of them or their families had lived in such conditions before, according to William Kersten, project manager. "They knew they were getting into something, but they didn't know quite what," he commented.

Of the six maintenance engineers on the project, four are stationed here at Valdez and two at Fairbanks. Kersten spends most of his time now in California, but visits the two sites regularly.

Valdez, population 3,500, has only one road in and out of the town; it is surrounded on all sides by mountains that reach 5,000 feet. Planes flying into Valdez often turn around because the pilots are unable to see through the narrow gaps between the mountains well enough to land.

Anchorage, the nearest large city, is eight hours away; it was almost unreachable last winter because of the 31-1/2 feet of snow that fell. "The isolation gets to everybody," Kersten said.

Typical Day

What is a typical 10-hour work day? "You get up and go to work, come home to eat and go to bed," Kersten said. "You know it's not going to last forever, so you put up with it."

The group arrived last March. Its job is making sure the systems controlling the flow of oil from Alaska's North Slope to the oil terminal at the southern port of Valdez operate reliably.

The systems, specially designed by Harris Corp., are based on dual Xerox 530 CPUs. Honeywell's Field Engineering Division agreed to provide maintenance under a two-year contract it signed with Xerox.

The six engineers service the equipment and do preventive and emergency maintenance. It's fairly typical work, according to Kersten.

The 12 remote terminals located at the 12 pump stations along the pipeline transmit data to the main computer system, which is called the Backbone Supervisory System, via microwave relay towers or satellite. The system transmits about 200 data signals and 1,400 status and alarm signals by polling the 12 terminals every 10 seconds.

Any of the information can be displayed on the CRTs located on the pipeline controller's console. All alarm signals are automatically printed on a General Electric terminal logger.

The engineers are on call 24 hours a day on a rotating basis. They must drive trucks or sometimes fly to a remote pump station to check on equipment or make necessary repairs.

Getting to those stations can be a pretty rigorous task, Kersten said, since they are strung out over 800 miles and Pump Station One is a 12-hour drive from Valdez.

The engineers went through a cold weather survival course when they first arrived. Luckily, there haven't been any emergencies so far, Kersten said. "There are certain rules to abide by, like telling someone where you're going and when you leave," he added. "There are radios in the cars; if

anything happens on the way to a pump station, an engineer can call for help. Arctic clothing and survival gear, such as a sleeping bag and dried-food are also provided.

Little to Do

Although the 10-hour days keep people pretty busy, there isn't much entertainment around, according to Kersten. Valdez has no movies, bowling allies or television unless a person pays \$30 a month for a TV hook-up.

When people get together, they usually play cards or go snowmobiling, Kersten said, noting Valdez just built a million-dollar high school with the profits from the pipeline and

the school swimming pool is available.

One problem is the long nights in Valdez. Last Dec. 21, it was dark at 9:30 a.m. and stayed dark until 2:30 p.m. the next day. "You get up in the dark and go home in the dark and don't see the sun for weeks," Kersten said.

In the summer, it's the opposite. The sun is up until 1:30 in the morning and people have to learn how to sleep with it. During that time of year, the biggest selling item in Valdez is black-out curtains, Kersten said.

While none of the eningeers has definitely said he is going to reenlist for another two-year stint, no one has said he won't, Kersten said.

2400 DP MANAGERS WORLDWIDE CAN'T BE WRONG!

**More than 2400 CA-SORT
users continue to report savings of
up to 50% on Disk Work Space . . .
up to 50% savings on I/O activity
. . . up to 25% on CPU time . . .
and dramatically improved
programmer efficiency.**



Significant enhancements make CA-SORT, Release 5.0 for 1978 the most advanced sort software system available in the world today!

Now CA-SORT Release 5.0 improves performance of the world's Number One sort software system.

- I/O accesses slashed further by an extension in the command chaining logic!
- Full support of 3350 disks is now available.
- Under DOS, support for multiple input devices (tape and disk) is provided.
- The sort has been more finely tuned for VS through the use of monitor systems and string extension techniques.

INSTALLATION STILL TAKES 10 MINUTES - SAVINGS BEGIN WITH THE FIRST LONG SORT RUN!

There are no lengthy "surveys" to be taken . . . no artificial benchmarks . . . no simulated environments . . . just install and start improving your throughput

CA-SORT is the only sort software system for OS, OS/VS, DOS, and DOS/VS that actual users have placed on The Datapro Honor Roll for three consecutive years.

**CA-SORT RELEASE 5.0 IS AVAILABLE
NOW . . . SEND (OR CALL) FOR
YOUR FREE, NO OBLIGATION,
INFORMATION KIT!!**

YES! Please rush my CA-SORT Release 5.0 Information Kit along with details of the FREE 15-day trial.

Name _____ CW 2/6/78
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone No. () _____
Computer Model _____ System _____

655 MADISON AVE. NEW YORK, NY 10021

COMPUTER ASSOCIATES

**MAIL THE COUPON OR
CALL COLLECT TODAY!
(212) 355-3333**

U.S. OFFICES: New York,
Georgia, Illinois, Ohio, Texas,
Connecticut, California,
District of Columbia, Missouri

WORLD WIDE OFFICES:
Australia, Austria, Belgium,
Denmark, France, Germany,
Holland, Italy, Japan, Switzerland,
United Kingdom, South Africa

Front End of Illiac 4

Two Charged in Theft of Nasa System Time

By Nancy French
CW Staff

SAN FRANCISCO — A federal grand jury here has charged two men with conspiracy and theft of government property in connection with the unauthorized use of a computer system owned by the National Aeronautics and Space Administration's (Nasa) Ames Research installation at nearby Moffit Field.

Although early reports estimated that the stolen computer time was worth "possibly millions of dollars" and that the giant Illiac 4 system here was involved, those reports were vastly exaggerated, according to Marcelline Smith, director of Nasa's Institute for Advanced Computation.

The time, now valued at about \$2,000 at commercial rates, was stolen from a Digital Equipment Corp. PDP-10 system used as a front end to the Illiac, Smith said.

"The Illiac, which is just a very high-speed processor with no I/O of its own, has a PDP-10 front end to handle I/O functions as well as data management and interactive use," she explained. The PDP-10 was the only part of the huge custom-made scientific mainframe that was used in the scheme.

Those charged were David Sampson, 28, a Sunnyvale resident, and Gary Miller, 30, of Redwood City, both employees at one time or another of Acts, Inc., a firm with which the research installation had a maintenance contract.

Sampson, who was no longer employed at Ames at the time the fraud was discovered, had been responsible for maintenance of the PDP-10. Miller, who is still employed by Acts, maintained the installation's computer terminals, according to Smith.

The theft came to light in March of last year during "a routine review and

purge exercise," Smith said. At that time, one of the supervisors noticed several directories were still in active use, even though the individuals to whom they had been assigned had left the organization.

That in itself was not unusual, Smith said, because in developmental projects like the ones carried on here people often benefit from occasional access to work done by previous employees. However, when the supervisor reviewed the data in those files, he found information pertaining to the formation of an electronics manufacturing company, she said.

The evidence was turned over to a Nasa inspection officer for further investigation.

The theft did not end here, however.

Several pieces of missing gear — which Smith described as terminals and oscilloscopes worth \$8,000 — were discovered in a dumpster behind a nearby tavern. Mountainview police traced the serial numbers on the discarded equipment back to Ames and then to Sampson, she said.

Miller was suspended temporarily without pay, but since he has not been connected with the equipment theft, he has been reinstated, according to Smith. Only Sampson will face charges for theft of the equipment.

Although the trial date has not yet been set, according to U.S. Assistant Attorney Edward Davis, the case will be heard in the Federal District Court for the Northern District of California by Judge William A. Ingram.

Series/1 Used in Turnkeys

(Continued from Page 1)

printers, etc., and costs "under \$150,000," a spokesman said.

Each of the systems includes a DDP Products real-time multitasking operating system for the Series/1. Called OS/1, the operating system is "plug-compatible software" that allows for upgrades, according to the spokesman.

The system software includes terminal control programs and device control programs, a host link with a data manager and other necessary communications support software.

The turnkey systems can support the IBM 4979 CRT in addition to CRT terminals from Hewlett-Packard Co., Bunker Ramo Corp., Applied Digital Data Systems, Inc. teletypewriters and "most other message-oriented Ascii CRTs," the company said. The IBM 3600 finance system terminals can also be interfaced to these systems.

Upgrade Capability

The turnkey systems were designed to allow users who now have non-IBM terminals to keep them when upgrading to distributed terminal-based systems. The upgrade capabilities allow users to start with small 3270 emula-

tion and build up to full distributed networks using Series/1 processors as local CPUs in transaction-oriented nets.

The DDP Products software makes non-IBM terminals look like conventional 3270 devices in a communications network and provides support for special-purpose banking and other terminals, he noted. Later versions of the turnkey systems will permit the use of the recently introduced Model 4987 programmable communications subsystem, he added.

The OS/1 operating system normally is supplied in object code format, but source code can be provided at a one-time charge of about \$8,000, the spokesman said. OS/1 is available to existing Series/1 users at a cost of about \$5,000.

First deliveries of the turnkey systems are scheduled for March; software support will be provided by DDP Products and hardware maintenance will be available from IBM. Users configuring multiple systems into a network will be able to get discounts, DDP Products said from 31 E. 28th St., New York, N.Y. 10016.

'Panexec' Boosts Integrity

(Continued from Page 1)

spokesman said.

The DASD error handling takes two forms. In the first place, "errors" of disk space overallocation are eliminated by the system's dynamic allocation procedures. Secondly, Panexec can recover from most permanent I/O errors; when an error is encountered, lost program names are printed, the track is flagged and the rest of the file is unaffected, Pansophic claimed.

Short Span to Debugs

At the Bank of Oklahoma, DP director Len Fears said program integrity was his primary reason for purchasing Panexec. He explained he had serious problems with programmers deleting good production program modules when modifications were being put into production.

Before Panexec, when a program "blew up," time was lost trying to determine what programs and what programmers were involved.

Fears also spoke highly of the dynamic allocation and compression features. He now has one library instead of four but, even more than that, he saves the four hours of "stand around" time the bank used to have. During that time, no one could access libraries being compressed with IBM's utilities.

That had been a "next-to-impossible" situation, he pointed out, since the bank's data center runs a 2M-byte IBM 360/65, employs 42 operations people, five technical support people and 28 application programmer/analysts.

Panexec is currently available for all OS environments; it will be released for DOS in June. The package can be leased starting at \$500/mo depending on the operating system and size of the system to be managed.

Purchase plans are also available, Pansophic said from 709 Enterprise Drive, Oak Brook, Ill. 60521.

HIRE A SUPER-SLEUTH

FORTRAN debugging with TRACER for NOVA/ECLIPSE and PDP-11 Users



If your program debugging efforts often seem like long-winded detective novels, odds are you're lacking the proper tools.

TRACER is a fully symbolic, FORTRAN debugging package that shows you exactly what happens as your program executes. So you can spot logic flaws at a glance. Examine variable values as they change. Determine if proper arguments are being passed to subroutines. And ferret out the culprit lines in your source code.

The cost? Minimal, if you figure in the time to be saved in software development and the increase in programmer productivity.

So, hire a super-sleuth. Call or write us today for a free TRACER User's Manual. Case closed!!!

TRACER from IPTC

2462 Embarcadero Way, Palo Alto, CA 94303
(415) 321-6284

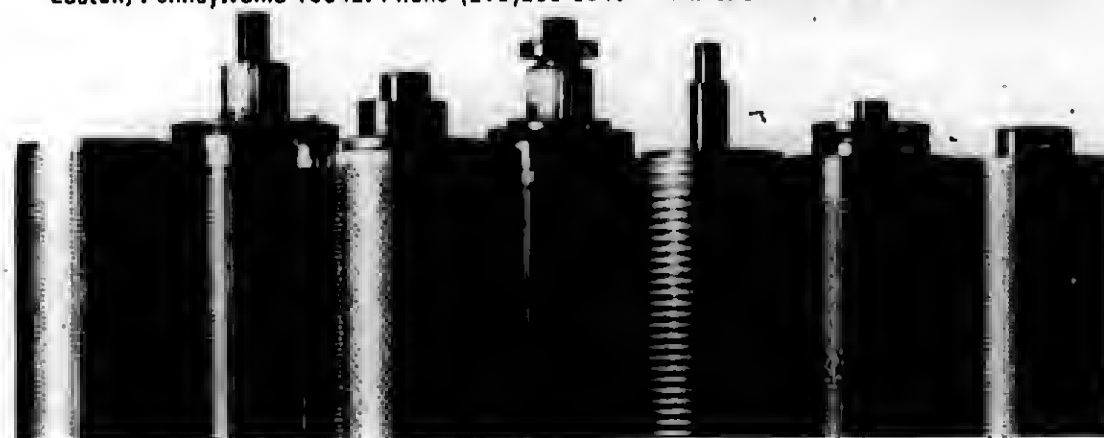
PRINT DRUMS

REPLACEMENT • SPECIAL SEQUENCES CUSTOM CHARACTERS & ASSEMBLIES

Our custom-designed character print drums and print-drum assemblies can fill your requirements. Industrial Engraving Company, Inc., P.O. Box 311 Easton, Pennsylvania 18042. Phone (215) 253-3541



INDUSTRIAL



SSA Swapping Data With VA, Railroad Board

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Social Security Administration (SSA) has been computing benefit payments for the blind and disabled using data from the Veterans Administration (VA) and the Railroad Retirement Board — a situation that has bred concern among members of Congress for the privacy of those individual records and the security safeguards accompanying this information exchange.

While only the VA and the Railroad Retirement Board currently provide benefit data to the SSA, the agency may begin to obtain similar information from the Civil Service Commission for Supplemental Security Income (SSI) payment calculations by April, according to a General Accounting Office (GAO) report recently released here.

"Social Security is also considering obtaining data from other federal benefit programs," the GAO report stated.

Although the GAO "fully identified the problems inherent in this information exchange," Capitol Hill sources contacted recently felt the agency failed to spell out any real solutions to the situation in the Nov. 15 report entitled "Privacy Issues and Supplemental Security Income Benefits," issued last month.

Moss Concerned

Rep. John E. Moss (D-Calif.) wrote to the GAO a year ago, asking the office to examine whether the SSA's reliance on the VA and the Railroad Retirement Board for accurate compensation and pension data was within the bounds of the Privacy Act of 1974.

Moss' concern grew out of a November 1976 GAO recommendation that the SSA collaborate with the VA and the Railroad Retirement Board for complete and timely benefit program income information because the SSA had been using inaccurate data to compute SSI payments.

The misinformation used to produce checks for the blind and disabled aided by SSI had resulted in annual overpayments of \$60 million and underpayments of \$4 million, the GAO noted. The office believed a data link between the three agencies would put an end to incorrect payments.

As a result of Moss' inquiries, the GAO thought again about its suggestion and recommended that the VA more fully inform the public about its disclosures to SSA and that the three agencies determine what security safeguards might be needed for the movement of data among them. The office supported the concept of other agencies sharing their data with SSA to aid in the administration of benefit programs, however.

Programs Cited

Among the programs from which the SSA is considering obtaining data are VA Education Assistance; Railroad Retirement Board Unemployment and Sickness Insurance; U.S. military retirement and, in the Department of Labor, Black Lung, the report stated.

The programs now sharing individual benefit data with the SSA are the Railroad Retirement Board's Survivor and Pensioner Benefit System and the VA's Veterans Dependents and Beneficiaries Compensation and

Pension Records. Both programs, the GAO said, fall into the "routine use" category of the Privacy Act, which permits additional uses for individual records if those uses are compatible with the purpose for which the information was originally collected.

GAO's View

Citing laws governing the SSA, the VA and the Railroad Retirement Board in addition to the Privacy Act, the GAO concluded that a federal agency can provide the SSA with information from any system of records as long as the data helps the SSA to determine an individual's eligibility or benefit amount. The disclosure must also comply with the requirements for routine use described in the Privacy Act.

This conclusion has not been tested in the courts, the GAO said, but added the VA and the Railroad Retirement Board need not fear giving certain benefit data to SSA as long as they follow Privacy Act procedures.

The VA has 20 defined routine uses for the Veterans, Dependents and Beneficiary's Compensation and Pension Records program. It has identified three routine uses it believes permit its disclosure of benefit information to the SSA. Among these, one routine use allows "any person" who applies for a veteran's benefit record to get it.

The VA disagreed with the GAO that it should have to redraft its routine uses to provide specifically for SSI program disclosure. "Further restrictiveness is unnecessary," VA Ad-

ministrators Max Cleland wrote to the GAO.

The VA fears a rewrite of the program's uses might prevent helpful sharing arrangements with other agencies.

Initially, at SSA's request, the VA furnished magnetic tape files of selected compensation and pension data on all veterans. The Railroad Retirement Board furnished its entire pension record to the SSA, the GAO said.

While most of this information was needed by the SSA at the onset of the data exchange to verify the accuracy and completeness of SSI payments "Social Security should consider developing a mechanism for obtaining information only on SSI recipients

(Continued on Page 15)

How do you know if your system is really doing the job?

We'll tell you. With PLAN IV and PLAN IV:MVS, program products for system management from Capex Corporation.

If you're operating an IBM OS, OS/VS, or MVS system, PLAN IV and PLAN IV:MVS will let you know where you've been, where you stand now, where you're going next. You'll get the information vital for making informed decisions quickly. In clearly understandable form. With as much depth and detail (or as little) as you demand.

Information For Decision Making

PLAN IV and PLAN IV:MVS provide the information needed for all levels of decision making. Whether you're concerned about turnaround and response time, balancing system resources and load, tuning system performance, scheduling, IPS tuning, or capacity planning, PLAN IV and PLAN IV:MVS provide the information you need. You get immediate access to key information, presented in a concise, highly readable

format, without smothering in extraneous detail. Yet when you need comprehensive information to support detailed analysis or problem solving, that too is available.

Proven Techniques

PLAN IV and PLAN IV:MVS apply proven management techniques to DP Management by Exception. Nobody likes to wade through stacks of reports. PLAN IV and PLAN IV:MVS pinpoint what you need to know first, what you need to know most. They automatically spotlight bottlenecks and significant changes. You identify problem areas quickly, get to work on them immediately. Information in Perspective. You can make immediate comparisons between shifts, with last month, last year, see where you're doing better... or doing worse.

Efficient, Effective, Proven

Both PLAN IV and PLAN IV:MVS utilize data from facilities already built into your system (SMF, RMF or MF/1).



to efficiently gather information about overall system operation. They bring information about past and present performance into focus, providing the perspective you need to manage your system now and plan intelligently for the future.

With PLAN IV and PLAN IV:MVS, you know where you stand. No wonder these tools are already in use at more than 150 sites throughout the world.

To arrange a demonstration contact us today.

Capex Corporation
2613 N. 3rd St. Phoenix, AZ 85004
Phone 602-264-7241 TWX 910-951-1594
Offices nationwide Atlanta Boston Chicago Dallas Los Angeles New York Phoenix Washington D.C.
Other offices worldwide

Capex Corporation Info Dept BX
2613 N. 3rd St. Phoenix, AZ 85004

☐ Please send me more information on PLAN IV and PLAN IV:MVS
☐ Please contact me to arrange a demonstration

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

Model _____

System ☐ MFT ☐ MVT ☐ VS1
☐ SVS ☐ MVS

Printer Replaces IBM 3211/3811

(Continued from Page 1)

tained since all 32 processor registers can be used as accumulators, he added.

To prevent the data transfer rate from affecting the throughput, the processor loads the data from the printer interface, tests it for validity and sets up the hammer fire buffers prior to printing each line. With a channel throughput rate of 70K byte/sec, less than 5 msec is required for line loading and associated housekeeping, the spokesman claimed.

Since the 5 msec occurs during paper motion, printer throughput is unaffected, he said.

The Impact 3000 received its speed rating while operating on a 132-print position line at either 6- or 8-line/in. using a 48-character set, the firm noted. A 150-print position line is optional.

Printing is accomplished when a hammer strikes the paper from behind and forces the paper and ribbon into contact with a character on the 432-character print band. With a band speed of 489 in./sec, a different character will line up with each hammer every 272 msec, the spokesman explained.

Because of this, each hammer location must be tested to determine if the character that is supposed to be printed will be the next one to pass. This is accomplished by comparing each location of the 150 character print line buffer with the associated character in the character set buffer (432 characters), a buffer whose character set changes in

synchronism with the band motion, Documation said.

If the two characters match, the forms control buffer (256 characters by 9 bits) is accessed to determine if the hammer has already been fired. If not, it is fired and the flag is loaded into the memory.

The unit has a high-speed slew rate, according to the spokesman. For skips up to seven lines, the unit slews at 35 in./sec. The rate increases to 100 in./sec. for skips beyond seven lines and

up to 51 lines at 67 line/in. or 66 lines at 8 line/in.

Other features of the Impact 3000, available on lease as well as by purchase, include off-line fault locating and hardware timing diagnostics; operator-adjustable power stacker for multipart forms; power-operated hood; and operator-controlled print density and character phasing adjustments.

Documation can be reached at P.O. Box 1240, Melbourne, Fla. 32901.



Documation Printer

HIS Adds Multilevel System to Its 66 Line

(Continued from Page 1)

time is 94 nsec/byte.

The system "is designed to provide users with increased performance and the flexible central system configurations required for communications-intensive applications," a spokesman suggested.

A 66/DPS at the base level includes the twin processors, a single systems control unit, an I/O multiplexer and 1M byte of 4K MOS main memory. The systems control unit is the interface between the CPUs and the I/O multiplexer, the spokesman noted.

The I/O multiplexer is configured with 35 board slots, which if fully utilized, would provide a user with as few as 11 channels or as many as 35, the spokesman noted. Different peripherals require different numbers of slots, he noted. A high-speed card punch requires three slots and a data

communication processor requires but one slot, for example.

An expansion option for the multiplexer adds an additional 19 board slots, or a second I/O multiplexer would provide 70 slots, offering the user some possible redundancy through plugging some items into both multiplexers, he explained.

Each 66/DPS also consists of a 64K-byte Level 6 minicomputer-based integrated network processor (INP) that accepts up to 96 communications lines. The INP can have its communications processing power increased as much as seven times through the installation of three INP modules and four performance options.

Software Requirements

The DPS environment requires a special version of the Generalized Comprehensive Operating System (Gcos) to control the multiple processors, but the basic capabilities of the software remain much as they are now.

The minis that act as INPs for the 66/DPS require an enhanced version of the General Remote Terminal Supervisor (GRTS/II) or — for more sophisticated operations — the Network Processing Supervisor (NPS) as operating systems, since they are outside of Gcos control.

GRTS/II has twice the speed and performance of GRTS, but otherwise has functional compatibility with it. It also supports easier addition of "stranger" or non-HIS terminals to the system, and a network processor link allows file exchange between two hosts, according to a spokesman.

NPS is needed primarily for message-switching, since GRTS/II does not support that activity. NPS also handles message logging and would be used by installations requiring more sophisticated networking applications than are possible under GRTS/II, the spokesman explained.

GRTS/II costs \$210/mo while NPS is available for \$890/mo. Support for the optional High-Level Data Link Control (HDLC) interface costs an additional \$90/mo with either system, HIS said.

DM-IV Supported

Data Management IV (DM-IV), introduced early last year, is fully supported under DPS. This package combined a version of the firm's Integrated Data Store (IDS/II) data base manager with a transaction processor, a query and reporting processor (QRP) and a procedural language processor (PLP).

Each of these subsystems is separately priced, ranging from \$255/mo for PLP and \$360 for QRP, to \$893 for

the data manager and \$1,134/mo for the transaction processor, the spokesman noted.

A data base-oriented Fortran has facilities allowing it to interface with IDS/II, while a PL/I compiler/runtime system for DPS is said to outperform HIS's current software for the Level 66. The PL/I package costs \$250/mo; no price was given for the Fortran compiler.

Upgrade Option

Level 66 users who have purchased their central systems and Series 6000 users who have purchased a "functionality option" can be upgraded to 66/DPS performance levels, the spokesman noted.

Main memory can be added in increments of 512K bytes to the 2M-byte level, then in 1M-byte levels to an 8M-byte maximum, he said.

A base-level 66/DPS costs \$957,215 with a monthly maintenance fee of \$3,350. The system is available on a 5-year lease for \$23,405/mo. Additional memory costs \$110,000 per 1M byte, while a full-performance INP sells for an additional \$358,450. A Level 5 system costs \$2,885,495, with a \$7,941 monthly maintenance charge. The system leases for \$64,175/mo.

The I/O multiplexer expansion option costs \$53,855 and leases for \$1,056/mo. A second one sells for \$175,055 and leases for \$3,249/mo.

Dartmouth Gets New Head of DP

HANOVER, N.H. — William Y. Arms, a lecturer in computing at Open University, England, has been named director of the Kiewit Computation Center at Dartmouth College.

Arms, who will replace John S. McGeachie, is expected to assume his duties here in mid-March. McGeachie resigned in June to accept a position with Automatic Data Processing, Inc., in Clifton, N.J.

Thomas E. Byrne, assisting director of computing services, has been acting director of Kiewit since July 1.

Oxford Graduate

Arms, a 1966 graduate of Balliol College, Oxford University, with a B.A. in mathematics, earned his Ph.D. from Sussex University in 1973. His doctoral dissertation was "Interlibrary Lending and the Use of the Computer."

Arms was a visiting assistant professor in mathematics at Dartmouth during 1976-77.

Immediate delivery on 3270 replacement systems.

Computer Optics offers immediate delivery on displays, controllers and printers, in any system configuration, for either local or remote installation.

Computer Optics systems are plug-to-plug compatible with IBM 3270 equipment. And they cost substantially less in nearly all configurations, whether you buy or lease.

Call today for prices and specifications.



Computer Optics Inc.

Berkshire Industrial Park, Bethel, CT 06801

Toll free: 800/243-1314 In Connecticut call 1-744-6720 collect.

Cbema Asks U.S. to Meet on Draft I/O Fips

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Computer and Business Equipment Manufacturers Association (Cbema) has asked Secretary of Commerce Juanita Kreps for a meeting to explain its opposition to the I/O channel-level interface proposed as a Federal Information Processing Standard (Fips).

Although the organization's officials wrote to the Secretary more than a month ago, Cbema has yet to hear from her office, a Cbema spokesman said.

Meanwhile, the X3T9 technical subcommittee within the American National Standards Institute (Ansi) has approved a draft I/O channel interface standard and sent to it the X3 Computers and Information Processing Committee for review. As a result of its first letter ballot, however, X3 members raised a number of questions about the draft. X3T9's responses to those questions will be considered at an X3 meeting this week in San Diego.

If those attending that meeting are satisfied with the responses, the X3 secretary will set up another letter ballot of the full membership. Two-thirds of the members must approve a draft before it is forwarded to Ansi for legal review and publication.

'Severely Damaging'

Echoing the beliefs of its mainframe members who find the proposed I/O interface standard technically obsolete, Cbema told Kreps the plan to adopt such a Fips will have "severely damaging consequences to the computer industry in the U.S. and to the U.S. government as a user of such equipment."

In asking Kreps for a meeting, Cbema noted it has been "unable to find anyone who will accept the responsibility for the overall economic and trade aspects of the adoption of such a standard."

The association has talked with the Administrator of the General Services Administration, Jay Solomon, and with the Office of the Special Trade Representative — both of whom referred Cbema to Kreps' office, the spokesman said.

Cbema's mainframe members object to the proposed standard because it was developed from a single IBM system in the mid-1960s and "major changes have taken place in the technology and architecture of systems" in the intervening years.

Not only will the marketplace not stand still, the adoption of the I/O interface as a Fips "would impose a severe economic hardship on the majority of competitive systems suppliers by making their current offerings non-compliant," Cbema has argued.

One Cbema member objects to the I/O interface, for example, because it limits a system's bus data rate to 1.5M bit/sec, although most commercially available large systems can handle 3M bit/sec, the spokesman stated.

Specifying I/O architecture will inhibit design innovation and initiative, Cbema said. The cost of altering systems to meet the requirements of a federal marketplace governed by the standard will cause many firms to leave this field to the Japanese, who adopted that I/O design for domestic use about six years ago.

X3's poll of its 50 members ended in a 28-14 vote for the I/O interface's adoption.

Under X3's rules, proposals winning less than two-thirds of the member's votes even if a simple majority favors them, cannot be forwarded to Ansi headquarters for final review and approval. Thirty-four X3 committee members must approve the suggested standard before its supporters have any hope of making it a standard.

The IBM user groups Guide and Share, Inc., were among those X3

members casting negative ballots.

The proposed standard "is based on obsolescent — if not obsolete — technology," Share said in comments accompanying its Ansi ballot.

Pro and Con Votes

Also objecting to the I/O channel-level interface as a standard were Burroughs Corp., Control Data Corp., Data General Corp., Digital Equipment Corp., Honeywell Information Systems, Inc., IBM, NCR Corp., Recognition Equipment, Inc., Univac,

Xerox, the American Nuclear Society and the IEEE Computer Society.

Firms and associations favoring the proposal included California Computer Products, Inc., Datapoint Corp., Intel Corp., Olivetti, 3M Co., National Association for State Information Systems, the U.S. Department of Defense, the U.S. Department of Health, Education and Welfare, the Association of Computer Programmers and Analysts, the Computer & Communications Industry Association and the Data Processing Management Association.

How to increase productivity in a COBOL shop...for \$25

When you think of it, the programming done in most COBOL shops is pretty haphazard. In general, programs are coded without ever being designed so they have no structure. Program documentation (if any) is likely to be incomprehensible. Few programs are coded in an understandable style. And testing and maintenance are often a shambles.

As you would expect, these practices are reflected in programmer productivity. In a study done in 1965, for example, the average COBOL programmer was shown to produce only 10 to 12 lines of tested code per day. What's worse, a study done in 1975 showed no improvement. In other words, we have been stuck for ten years at an incredibly low level of productivity.

Since the mid sixties, however, the techniques of structured programming have promised a way to improve productivity. In one experiment, for example, programmers who used structured programming produced from 35 to 65 tested lines of code per day. That's a 300 percent or more increase when compared with the results of unstructured projects. Another study showed an increase in productivity of 77 percent or more when the techniques of structured programming were used.

"Your book is by far the most readable and instructive book on structured programming that I've read—and I've read them all."

Unfortunately, few companies today are benefiting from structured programming. Only about one-fourth of the computer installations claim to be using the techniques of structured programming. And I know that many of these companies use the techniques far less than they would care to admit...and with results that they couldn't brag about. In short, though the theory promises much, no one yet has developed a practical method for applying the theory.

With this in mind, I'm happy to announce two books on structured programming that I think will have a major effect on programmer productivity. The first is a training textbook called *Structured Programming for the COBOL Programmer*. The second is a reference manual called *The Structured Programming Cookbook*. Both were developed by Paul Noll, who is a software specialist and training manager for a large company in San Francisco.

What the Textbook Does

Like other books on structured programming, Paul's textbook presents the theory behind the structured programming movement. Unlike other books, however, Paul's book presents a method for applying the theory that works...a method that is complete, logical, and practical.

Perhaps the major shortcoming of other books and courses on structured programming is the treatment of program design and documentation. In general, these subjects are either given academic

treatment or are omitted altogether. In contrast, Paul gives specific guidelines for designing and documenting programs with the emphasis on practicality. As Paul says, "It's ridiculous to try to teach structured coding and testing without first teaching structured design and documentation."

In chapter 2, then, you'll learn how to design a structured program. You'll learn the four steps for creating structure charts...what modules should go at what level...six things to watch for when refining structure charts...and much more.

In chapter 3, you'll learn how to document the modules within the structure chart using HIPO documentation. Why HIPO? Because Paul feels it is the most effective form of documentation that is currently available and it is the one most likely to be around ten years from now. But Paul doesn't use the cumbersome IBM implementation of HIPO. Instead, he shows you how to use an efficient HIPO subset.

After you have mastered structured design and documentation, chapters 4, 5, and 6 show you how to use the other techniques of structured programming. These techniques include structured coding, top-down testing, structured walkthroughs, chief-programmer teams, and development support libraries.

What the Cookbook Does

One of the problems with training is that it too often isn't applied after the programmer returns to his job. That's why we created an easy-to-use reference book that will follow the programmer back to his desk.

Section 1 of this book is called Standards and Guidelines. It summarizes the principles of the text for each phase of program development. So if a programmer can't remember the six steps to follow when creating a HIPO diagram or how to use compound conditions in a COBOL IF statement, he can use the cookbook to refresh his memory in a hurry. From

the manager's point of view, this section is an instant standards manual for a structured programming shop.

"Mr. Noll has written a straightforward, no-nonsense text which tackles head-on the problems of proper program design when writing a structured COBOL program."

Sections 2 and 3, however, are a more important aid to productivity. They present the complete solutions for four model programs. Since structured programming encourages you to develop similar programs in similar ways, this means that you won't have to develop each new program that you write from scratch. When Paul Noll develops an update program, for example, he finds that he can use the structure chart, some module documentation, and even some of the COBOL code from the model update program in the cookbook. Imagine how this can increase a programmer's productivity.

Our Unlimited Guarantee

Together, I think Paul Noll's text and cookbook can have a major effect on the productivity in a COBOL shop. In six chapters in the text, Paul presents a complete system for developing structured programs. In three sections in the cookbook, he has created a tool kit for the COBOL programmer. At \$25 for the pair, you don't need much programmer improvement to justify this investment. And this could be the most important purchase you will make this year.

But don't take my word for it. So there's no risk to you, all our books are sold with an unlimited guarantee. If you ever feel that they aren't effective, you can return them for a prompt refund...no matter how many books you buy, no matter how long you've had them.

So order a set of books today. There's no risk to you. And there's so much to gain.

Mike Murach & Associates, Inc., 4905 North West Avenue, Suite 102, Fresno, California 93705

Gentlemen: Please send me the books indicated below. I will take up to 30 days to review them, and I will hold you to your guarantee. If the books aren't effective, I will return them for a full refund at any time. I understand that I will be billed the appropriate price for each book ordered plus freight (and sales tax in California).

Quantity	Book	Unit Price	10 or More	25 or More
_____	Structured Programming for the COBOL Programmer	\$15.00	\$14.75	\$12.50
_____	The Structured Programming Cookbook	10.00	9.00	8.00

Name and Title _____

Company _____

Address _____

City, State, Zip _____

U.S. Stand on Data Flow Seen Months Away

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — Several more months will pass before the U.S. establishes its position on the privacy and economic issues surrounding transnational data flows — the movement of personal, scientific and corporate information among countries — sources here believe.

Even then, initiatives for a national policy are more likely to come from Congress than the State Department, the sources said.

The State Department recently held the first meeting of its Advisory Committee on Transnational Enterprises' Subcommittee on International Data Flows, but the organization probably won't meet again until May or June,

sources close to the department predicted.

Largely informational, this first meeting drew only four of the 35 Advisory Committee members, although 50 interested "members of the public" turned out to hear and participate in the subcommittee's discussions.

Search for a Sponsor

Meanwhile, a joint resolution that would direct President Carter to study the importance of international communications and the free flow of information and to establish a national policy regarding them is floating to establish a national policy regarding them is floating around the Senate side of Capitol Hill in search of sponsors.

Though addressing problems and

promises beyond transborder data flows, the resolution includes these issues. If passed by the Senate and the House and signed by the President, it would require that an international information policy be implemented within six months after its enactment.

Spearheaded by Sen. George McGovern (D-S.D.), who chairs the Senate Foreign Relations Committee, the resolution is reportedly on the desks of or on its way to Senators Clifford Case (R-N.J.), John Glenn (D-Ohio) and Jacob K. Javits (R-N.Y.) for cosponsorship.

Measure 'In Limbo'

The measure will remain "in limbo," however, until the Senate disposes of other, more pressing matters, such as

the Panama Canal treaties, a staff member of the Foreign Relations Committee said.

Unlike a growing number of countries in Europe, the U.S. does not have legislation that would limit the transfer of data beyond its borders. However, in the Comprehensive Right to Privacy Act introduced by Rep. Barry Goldwater Jr. (R-Calif.) and then Rep. Edward I. Koch (D-N.Y.) last year, there is a clause limiting the movement of information on individuals.

H.R. 1984 states that any organization maintaining an information system that includes personal data cannot transfer this information outside the U.S. without the individual's consent or a treaty guaranteeing the foreign government or organization receiving it will protect the data as the U.S. would. There has been no action on this bill to date.

Private Sector Input

At its subcommittee meeting, the State Department told representatives from the private sector that the government must have factual information concerning the public interest as well as that of private industry in international communications and data processing. The U.S. won't develop a policy of transborder data flows unless the private sector participates in this way and maintains political pressure, Dr. Oswald H. Ganley, deputy assistant secretary of State for technology, told attendees.

Meeting attendees complained that detailed financial and operational information on the effect international controls on transborder data flows would have is proprietary. The State Department had asked the firms, for example, for a general description of their security and access controls, the number of terminals, computers and telecommunications channels they will use this year and the numbers they plan to employ in 1983.

The government wanted this data by May 31, but the companies maintained that was too soon for complete answers to so many questions. The State Department is now considering sending a letter to the chief executive officers of major multinational companies selected from the Fortune 1,000, according to Morris Crawford, State's assistant secretary for oceans and environmental science and technology affairs.

Action in Europe

In the meantime, the State Department has turned its attention toward Europe, where the Council of Europe is working on a draft international agreement that seeks to "harmonize" the protective privacy laws already passed in such countries as Sweden and West Germany.

The State Department is focusing its attention on the U.S. proposal that another European-based international body, the Organization for Economic Cooperation and Development (OECD), create a task force to consider the legal, economic and social issues behind transborder data flows [CW, Dec. 26-Jan. 2].

While OECD hasn't established the task force yet, the State Department is "more or less" certain that will happen, Crawford said.

SOFTWARE



We need more pros for our team

Right now. Today. We've got challenging jobs for computer software specialists with experience in:

- Operating Systems
- Utilities
- Networks/Data Comm.
- Diagnostics
- Compilers
- Software QA

We devote more development dollars to software than hardware. Because that's computing's future. Perhaps it's yours. We need creative people who can design Interdata software for use in business, laboratories, government and by OEMS around the world.

Join the team that's growing faster than the industry average of 35 percent . . . Interdata, where you can make it happen.

Call me, Bill Beattie, at (201) 747-7300 or send me your resume in strictest confidence. Perkin-Elmer, Interdata Division, 106 Apple St., Tinton Falls, N.J. 07724. We Are An Equal Opportunity Employer with virtually unlimited opportunities.

PERKIN-ELMER

Interdata Division

Security vs. Civil Liberties

IEEE Head Sees No Easy Answer to Itar Protest

By Brad Schultz
CW Staff

NEW YORK — Recent protest from within the scientific community against federal regulations that are said to outlaw discussion of unclassified technical data such as the U.S. Data Encryption Standard [CW, Jan. 30] involves some very "fundamental issues," according to Ivan Getting, president of the Institute for Electrical and Electronics Engineers (IEEE).

Many laws have been passed over the years that "give the government an opportunity to protect the security of the United States against intentional ... and unintentional disclosure of information ... the government [has ordered] classified. These "appear oppressive to the scientific and engineering type of people," he said. "And the question 'How can this be resolved?' is not simple. It may rest on some very complex interpretations of constitutional rights."

Getting indicated that he saw issues raised by protest of the International Traffic in Arms Regulations (Itar) in two contexts: an historical process by which the increasing sophistication of data communications and digital technology entails an increasing potential threat to privacy; and an inherent

tradeoff between national security interests and civil liberties.

Remarking "without security, you don't have anything else," Getting said that national security is the first consideration of the U.S. government.

"IEEE should approach this problem with the intention of understanding all the elements and trying to arrive at constructive modifications [of the law] if they are indicated," Getting said.

"At this stage of the game, we have asked our counsel to ... look into the matter, to recommend a [law] firm or some attorneys who are experts in the matter because it's a very specialized business," he continued, adding that in the meantime IEEE is striving to

keep its members informed of the law and how it is being interpreted.

Getting said that, while IEEE may generally try to suggest that laws it considers undesirable be modified or discarded, it takes no position — pro, or con — as yet in the case of Itar.

However, he indicated that Itar prosecutions must be decided on a case-by-case basis. Intent is a key factor in determining guilt, he explained, drawing a distinction between malicious and inadvertent violation of the law.

"Between 'malicious' and 'inadvertent' is a whole gray area where you knew better but you said 'The hell with it, I'm smarter than the government,'" Getting said.

The IEEE president indicated that Itar's alleged "threat" may fluctuate in time between actuality and effective dormancy, since what counts in administering laws of its type is interpretation, which is subject to change.

"You can have the same laws on the books over a period of years, say half a century. And in the beginning of that century, certain actions may have been taken as being contrary to the law, but towards the end of that half-century, those same actions might be accepted because customs and values have changed. Now, it's conceivable to me that this may happen in the current situation."

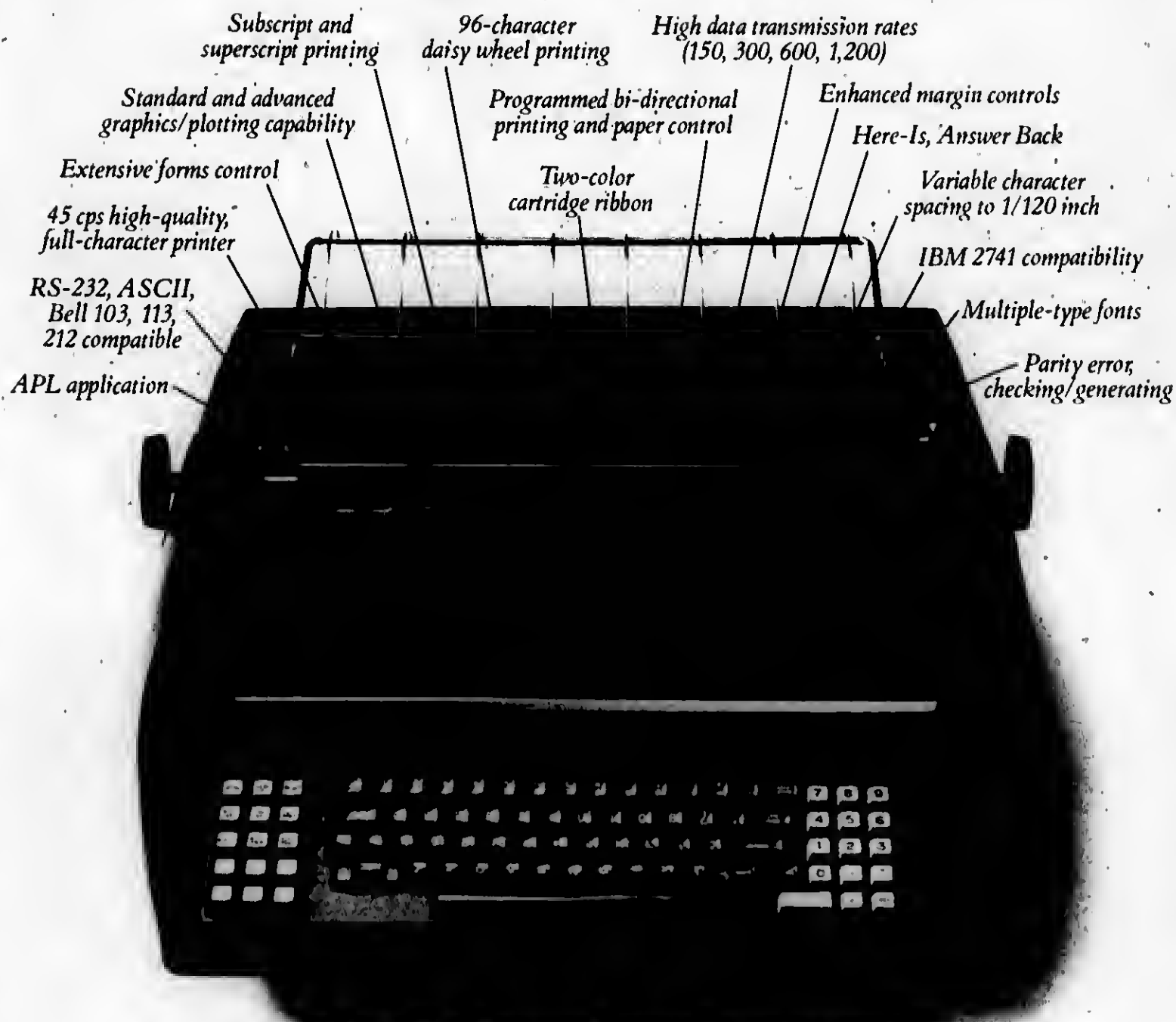
Lecht Book Gets March Debut

Publication of Charles P. Lecht's book *The Waves of Change* is tentatively scheduled for early March of this year. It originally appeared in excerpted form as a serialization in *Computerworld* between April and October. Demand for the book, an in-depth analysis of the DP industry, has been heavy, delaying its originally anticipated availability date.

Written orders for *The Waves of Change* are still being accepted. These should be mailed to Advanced Computer Techniques Corp., 437 Madison Ave., New York, N.Y. 10022. Price per copy is \$39.75, including postage and handling. A sales tax of 4% or 8% is being collected only on orders originating within New York State or New York City, respectively.

Checks should be made out to Advanced Computer Techniques and mailed to the attention of C. Menkel, Publications Division.

You can't judge this Diablo terminal by its cover.



The new Diablo 1641 is what you make it. Because you choose the exact combination of features to fit your particular needs. To find out more, call Joan Gruenbaum at (408) 733-2300, or write her at 545 Oakmead Parkway, Sunnyvale, CA 94082. When you get a Diablo terminal you also get Xerox quality, reliability, and availability. So you see, there's a lot more to the 1641 than meets the eye.

Diablo Systems

XEROX

Diablo and XEROX® are trademarks of XEROX CORPORATION.

COMPUTER COMMUNICATION
SEMINARS OF EXCELLENCE
KLEINROCK-FRANK-ROBERTS
JAMES MARTIN
EXPERTS ON NETWORKS (1 Day Registration Available)
MARCH 13-15, 1978 • WASHINGTON, D.C.

LUCKY-GREEN
DATA COMMUNICATION SERVICES AND PROTOCOLS
MARCH 20-22, 1978 • NEW YORK

OENNING UNDERSTANDING
PERFORMANCE EVALUATION
MARCH 28-31, 1978 • WASHINGTON, D.C.

KLEINROCK COMPUTER NETWORKS
APRIL 3-5, 1978 • WASHINGTON, D.C.

SEMINAR FEE: \$485
DISCOUNTS FOR PREPAYMENT, GROUPS, AND SERIES.

TECHNOLOGY TRANSFER CORPORATION
P.O. Box 49765, L.A., CA 90049 (213) 476-1331

March 1-3, San Francisco — Computer Performance Measurement: Tools and Techniques for Increased System Productivity. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 13-15 in Chicago and March 27-29 in Washington, D.C.

March 1-3, Chicago — Data Communications: An Introduction to Concepts and Systems. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 15-17 in Philadelphia and March 29-31 in San Francisco.

March 1-3, New York — Word Processing: Guidelines for Planning, De-

sign and Implementation. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 20-22, Washington, D.C. and March 29-31 in Chicago.

March 1-3, San Francisco — Effective Computer Operations Management. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 6-8 in Philadelphia, March 20-22 in Washington, D.C., and March 27-29 in New York.

March 5-7, Orlando, Fla. — The Small Computer Industry 1978-1980: Key Issues Facing Suppliers, Users and Investors; sponsored by Dataquest, Inc. Contact: Kathy Davis, Dataquest, 3000 Sand Hill Road, Menlo Park, Calif. 94025.

March 6-7, Washington, D.C. — Minicomputers and Microcomputers: Selection and Usage Guidelines. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 16-17 in Philadelphia and March

30-31 in New York.

March 6-8, San Francisco — Computer Security and Privacy: Management, Legal and Technical Implications. Contact: Continuing Education in Business and Management, University Extension, University of California, 2223 Fulton St., Berkeley, Calif. 94720.

March 6-8, Chicago — Laser Beam Information Systems, sponsored by the University of Chicago. Contact: Heidi E. Kaplan, Dept. 14NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017. Also being held April 26-28 in Los Angeles, June 7-9 in New York and Aug. 7-9 in Minneapolis.

March 6-9, San Francisco — Structured Systems, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

March 6-9, Las Vegas — Data Communications Interface '78, sponsored by Datamation. Contact: Datacomm Interface, Inc. 160 Speen St., Framingham, Mass. 01701.

March 8-9, Toronto — 1978 Association for Systems Management (ASM) Conference, sponsored by the Toronto ASM Chapter. Contact: R.D. Price, ASM, Toronto Chapter, Box 34, Toronto-Dominion Centre, Toronto M5K 1B7, Canada.

March 8-9, San Francisco — Structured Problem Solving: Bringing Productivity Improvements to DP. Contact: Don Welscher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 20-21 in Washington, D.C.

March 9-10, St. Louis — Personal Computers and the Development and Evaluation of Educational Programs in Computer Science and DP, sponsored by the Association for Educational Data Systems (Aeds). Contact: Ralph E. Lee, Director, Aeds Workshops, P.O. Box 951, Rolla, Mo. 65401.

March 13-14, State College, Miss. — 10th Annual Southeastern Symposium on System Theory. Contact: Dr. Robert Guyton, Mississippi State University College of Engineering, Drawer EE, State College, Miss. 39762.

March 13-15, New York — Computer-Communications Network Design and Analysis, sponsored by Columbia University. Contact: Heidi E. Kaplan, Dept. 14NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

March 14-15, Washington, D.C. — Federal Office Equipment Expo. Contact: National Trade Productions, Inc., Suite 104, 9301 Annapolis Road, Lanham, Md. 20801.

March 20-22, Miami — Data Processing Operations Management, sponsored by the University of Chicago. Contact: Heidi E. Kaplan, Dept. 14NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017. Also being held March 29-31 in San Francisco.

Calendar

Boost your Performance

- ☐ Personal
- ☐ Department's
- ☐ Organization's
- ☐ All of the above

By attending one or more of these

Datapro Seminars

January 16 through April 21, 1978

NEW! STRUCTURED PROBLEM SOLVING: Bringing Productivity Improvements to EDP— Productivity improvement programs within the EDP department are examined with an eye toward their utilization in a range of data processing and organizational environments. Instructor: Lon Grace.

DATA PROCESSING: An Introduction to Concepts and Systems— Equips the newcomer to EDP with an understanding of what computers can and cannot do, their applications, techniques, modes of operation, how to acquire and apply a computer, and much more. Instructor: Elizabeth F. Severino.

COMPUTER PERFORMANCE MEASUREMENT: Tools and Techniques for Increased System Productivity— Features discussions of and work with currently available tools to examine data processing system performance and action plans designed to increase system productivity. Instructional Staff: L. Kreuter Associates.

DATA COMMUNICATIONS: An Introduction to Concepts and Systems— Designed to provide EDP and data communications systems analysts, planners and decision makers with a thorough grounding in the terminology and operating concepts of data communications. Instructor: Ralph G. Berglund.

DATA COMMUNICATIONS: Advanced Concepts and Systems— An intensive summary overview of new developments—carriers, services, tariffs, protocols, etc.—that offer opportunities to improve network cost-performance or justify previously uneconomical applications. Instructor: Ralph G. Berglund.

WORD PROCESSING: Guidelines for Planning, Design, and Implementation— An in-depth presentation that encompasses evaluation criteria, techniques of data collection, systems design and implementation. Topics include equipment selection and cost justification. Instructional Staff: Truax, Smith and Associates.

EFFECTIVE COMPUTER OPERATIONS MANAGEMENT— Responds to the ever-growing demands of top management for accountable and tightly controlled EDP operations. The most effective methods, procedures and techniques are examined. Instructors: Thomas H. Farello and Michael De Vincenzo.

DATA BASE MANAGEMENT SYSTEMS: General Concepts and Planning Guidelines— Offers a full understanding of the concepts of data base management, and explains what these systems are all about, where their real economic advantages lie, and how to begin. Instructional Staff: DBD Systems, Inc.

MINICOMPUTERS AND MICROCOMPUTERS: Selection and Usage Guidelines— Analyzes today's small computers and how their new roles are changing all the traditional rules of EDP. Guidelines are presented for understanding, selecting, and utilizing today's minis and micros. Instructor: William E. Augustine.

New York	Washington	San Francisco	Chicago	Philadelphia (Cherry Hill)
Jan. 16-17	Mar. 20-21	Mar. 8-9	Apr. 20-21	—

Feb. 27-Mar. 1	Mar. 15-17	Jan. 25-27	Mar. 20-22	Apr. 5-7
----------------	------------	------------	------------	----------

Feb. 1-3 Apr. 17-19	Feb. 6-8 Mar. 27-29	Mar. 1-3	Mar. 13-15	—
------------------------	------------------------	----------	------------	---

Feb. 1-3	Feb. 15-17 Apr. 10-12	Jan. 18-20 Mar. 29-31	Mar. 1-3	Mar. 15-17
----------	--------------------------	--------------------------	----------	------------

Apr. 17-18	Mar. 20-21	Apr. 3-4	—	—
------------	------------	----------	---	---

Mar. 1-3 Apr. 19-21	Feb. 1-3 Mar. 20-22	Feb. 8-10 Apr. 5-7	Jan. 25-27 Mar. 29-31	—
------------------------	------------------------	-----------------------	--------------------------	---

Jan. 23-25 Mar. 27-29	Feb. 8-10 Mar. 20-22	Mar. 1-3 Apr. 12-14	Feb. 15-17 Apr. 5-7	Mar. 6-8
--------------------------	-------------------------	------------------------	------------------------	----------

Jan. 25-27 Apr. 3-5	Feb. 15-17 Apr. 17-19	Jan. 18-20 Mar. 29-31	Feb. 1-3 Apr. 12-14	Mar. 15-17
------------------------	--------------------------	--------------------------	------------------------	------------

Feb. 9-10 Mar. 30-31	Mar. 6-7	Feb. 23-24 Apr. 13-14	Jan. 26-27	Mar. 16-17
-------------------------	----------	--------------------------	------------	------------

Fee: \$425 for Datapro subscribers, \$475 for non-subscribers. 10% discount on registrations prepaid 30 days before course.

For course outlines, call toll free:

datapro

800-257-9406

Also call for instant enrollment or more information.

The CW Calendar generally appears in the first and second issues of each month, and events are listed a month in advance. All conference announcements should be sent to Calendar, CW Editorial Department, 797 Washington, St., Newton, Mass. 02160, at least six weeks prior to the month in which the event is slated to occur.

Progress Report:

370 USERS: ONLY CAMBRIDGE MATCHES THE MEMORY YOU NEED TO THE MEMORY YOU USE.

Cambridge Memories, Inc. is a world-wide leader in high reliability add-on memory systems for IBM System/370 Models 145, 155, 158, 165 and 168 processors.

Cambridge became a leader by going well beyond what other independent memory manufacturers have done. How?

1ST By providing total compatibility between its memory and the resident IBM memory you now have — from the interface right down to the memory device. Look at the chart. You'll see what we mean.

CPU MODEL	IBM TECHNOLOGY	CAMBRIDGE TECHNOLOGY
145/I	Bipolar	Bipolar
145/II	Bipolar	Bipolar
155	Ferrite Core	Ferrite Core
158	2K Static MOS	4K Static MOS
165	Ferrite Core	Ferrite Core
168	2K Static MOS	4K Static MOS

Only Cambridge matches IBM memory technologies model-for-model, chip type-for-chip type.

2ND By extending the memory capacity — CPU model by CPU model — well beyond the range offered by IBM. Look at the other chart. You'll see what we mean.

CPU MODEL	IBM CAPACITY	CAMBRIDGE CAPACITY
145/I	512KB	2048KB
145/II	2048KB	2048KB
155	2048KB	4096KB
158	4096K/6144KB	8192KB
158 MP	8192KB	16 MegB
165	3072KB	8192KB
168	8192KB	8192KB

Cambridge memories offer at least twice the capacity of most IBM memories, model-for-model above.

3RD By adding memory expansion capabilities that allow you to upgrade your CPU quickly, on site, to any capacity level shown, in just a few hours.

4TH By putting four levels of memory protection and safety into every single memory we ship. Those four levels help make your memory the most reliable part of your total system, under almost any operating circumstance. Check the box. You'll see what we mean.

5TH By delivering memory faster than any other supplier. Chances are, if you need any size memory for any IBM CPU that we support, you'll get it in 30 days or less. That policy should put an end to any fears you might have of becoming memory-bound. Cambridge guarantees fast delivery.

6TH By using a unique four-tiered field service organization. Most suppliers provide three-level service — local maintenance, branch specialists and home office field engineering technical support. To those, we have added a regional technical support group — located strategically in five areas. This team of experts is able to provide expedient on-site back-up to local and branch support personnel.

PROTECTION FEATURE	FROM IBM	FROM CAMBRIDGE
INTERNAL SELF-TEST (Operator-actuated memory diagnostics)	Yes	Yes
BUILT-IN MAINTENANCE PANEL (For operator or field engineering fault isolation and repair)	Some Machines	All Machines
MEMORY RECONFIGURATION (For immediate removal of memory sectors from on-line operation, without interruption)	Some Machines	All Machines
OFF-LINE SWITCH (For rapid removal of either resident or add-on memory from operations, while other memory keeps operating)	No	Yes

Only Cambridge offers a four-level memory protection hierarchy as a standard feature on every system it delivers.

Cambridge. The low-cost alternative memory you cannot afford to overlook. Ask more than 1,000 IBM users. You'll see what we mean. Or call the local marketing representative shown below.

CAMBRIDGE.

A good place to put your information.

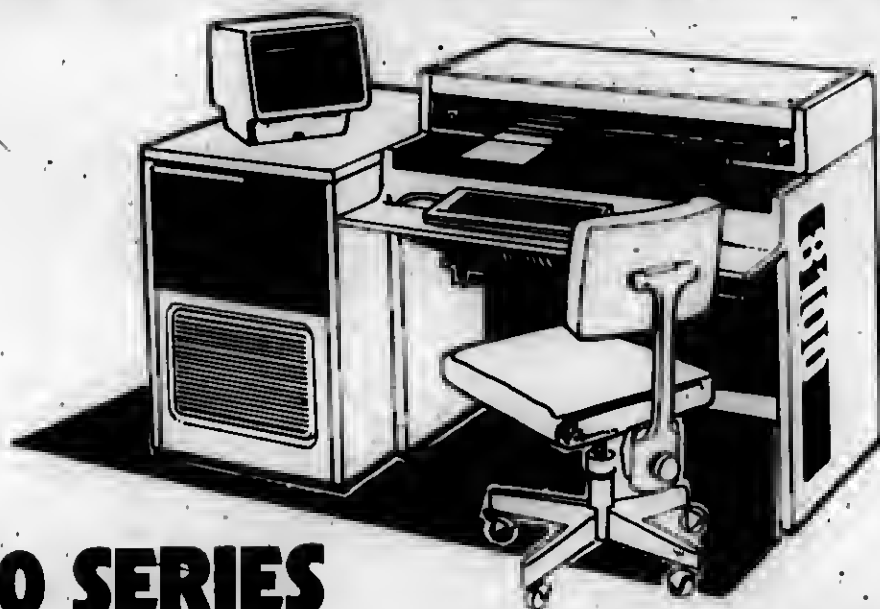


Cambridge Memories, Inc., 12 Crosby Drive, Bedford, Mass. 01730 (617) 271-6300

SALES OFFICES: Atlanta, Jim Squire — (404) 955-4416; Boston, Lew Latremore — (617) 271-6400; Chicago, Jim Markowski — (312) 671-5260; Dallas, Bud Smith — (214) 661-1750; Los Angeles, Mel Davis — (213) 885-0253; New York, Peter Bauch — (201) 368-0163; San Francisco, Ernie Poblacion — (415) 692-4806; Toronto, John Rattenbury — (416) 675-5667; Washington, D.C., Gerry Shanahan — (703) 683-5323.

COMPUTER DEVELOPERS

**WE ARE ONE OF THE KEY LEADERS TODAY,
HELP US BECOME "THE LEADER" TOMORROW...**



NCR 8100 SERIES

NCR Corporation has just developed a powerful family of computer products that offers smaller businesses hardware and solution-oriented application software at a readily affordable cost. The 8100 System is just a part of the advancement and involvement of NCR in solving mankind's problems for today and tomorrow.

Our current involvement at the Data Processing Division of NCR in Wichita in the 8100 series requires experienced and knowledgeable personnel to work on future and similar development.

These positions offer excellent income commensurate with your experience, a liberal benefits program and unusual and challenging opportunities for both professional advancement and personal growth with NCR Data Processing Division.

ARCHITECTURE DESIGNER

We need you to define and design processors and their interface for operating systems. Such a challenge requires a thorough knowledge of various design approaches. It also requires the ability to effectively interface with peers and management. Minimum qualifications are a CS degree and 5 years design experience in compilers and work utilities.

UTILITY DEVELOPERS

You are needed to develop utility programs in high level or assembly languages. Example programs are SORT/MERGE, Media Copies and Media/Memory Printouts, Dynamic File Inquiry, etc. You must have a CS or Scientific degree and a knowledge of assembly level programming and utility design.

COMPILER DESIGNERS/ANALYSTS

Would you like to lead or serve on one of our teams in Compiler Design from definition through programming and systems test? Do you know high level programming languages, assembly level languages, and PASCAL based languages? If your answer is "yes" and you have a BS degree or better with 3 to 5 years experience, we are interested in you.

SENIOR SYSTEMS ENGINEER

You will be responsible for the development of small business systems architecture. Special applications will be in the area of distributive processing and communications. EE or CS degree plus a minimum of 8 years experience needed.

DESIGN ENGINEERS

We challenge you to be responsible for logic and firmware design for micro processor based EDP systems. Specific experience with Peripheral Controllers desired with an EE and a minimum of 3 years experience.

SOFTWARE DEVELOPMENT DESIGNERS

You'll be responsible for operating system software design and implementation. Micro processor assembly language experience desired. Your assignments will be in Logical I/O, Physical I/O (including communications), systems internals and generation. CS plus 3 years experience required.

Please call (316) 687-6192 or send your resume to:
Ms. Dee Walker or Mr. Rick Veldhouse
Professional Placement Office, Dept. CW-26
3717 North Rock Road, Wichita, KS 67226

You'll get complete details either way.

NCR

Engineering and Manufacturing Group

An Equal Opportunity Employer



Offered on Tape, Fiche

NBS Codes Data on Towns

WASHINGTON, D.C. — Exact information on all U.S. localities has been coded and is being made available by the National Bureau of Standards (NBS) on magnetic tape and microfiche for statistical analysis.

Every city, town and place in the U.S. — more than 136,000 in all — have been coded for use in information systems and applications where there is a need to collect, process and interchange information on American locales.

The five-character code identifies a

town by state and county, tells whether it is located in more than one county and indicates the Zip Code and classification. Eighteen classifications show if the town is unincorporated, rural, a military installation or a shopping center, has an airport and other pertinent information.

The code also has a cross-reference for any alternative or former town name.

The magnetic tape, PB 274-150, can be purchased for \$125 and the microfiche, PB 274-146, can be purchased for \$17.50 for a set of 34 fiche from National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22161.

Agencies Giving Data to SSA

(Continued from Page 7)

who are veterans or railroad retirees," the GAO recommended.

Once the appropriate SSI benefits are determined, "Social Security turns information on the program's participants over to the Treasury Department, which issues the benefit checks, and to the Justice Department, which searches those individual records that the SSA suspects of fraud.

"Beginning with checks to be issued after Oct. 1, 1977, a Social Security official agreed to take appropriate action to delete information on the type of recipient from the payment tapes it provides Treasury because such information is not needed by Treasury," the GAO said.

None of the agencies is aware of any unauthorized access to the information they have transferred, the report added.

How Much Security?

Citing the department of Commerce's National Bureau of Standards guidelines for federal agencies to follow in performing risk analyses to determine the security needed for the handling and storage of such data, however, the GAO said the SSA, the VA and the Railroad Retirement Board have never determined how much security should be maintained in the transfer of SSI-related information.

Risk Analysis

The Department of Health, Education and Welfare is preparing a risk analysis of the security measures it employs to send payment tapes to Treasury each month. The Railroad Retirement Board has already studied the way it sends records to the SSA and will establish by February, "a uniform records transmittal procedure" to protect against unauthorized access, according to the GAO report.

The VA agreed additional security measures may be necessary.

Driver Finds 'NONE' Worse Than 'NOTHING'

RENO, Nev. — When the Department of Motor Vehicles' (DMV) computer issued Skip Swenson a bill for \$95.50 worth of unpaid traffic tickets, he immediately decided to try to "fix" things.

Swenson, whose car bears the vanity license plate "NONE," suspected there might be some mistake, especially since he hadn't received a ticket in seven years.

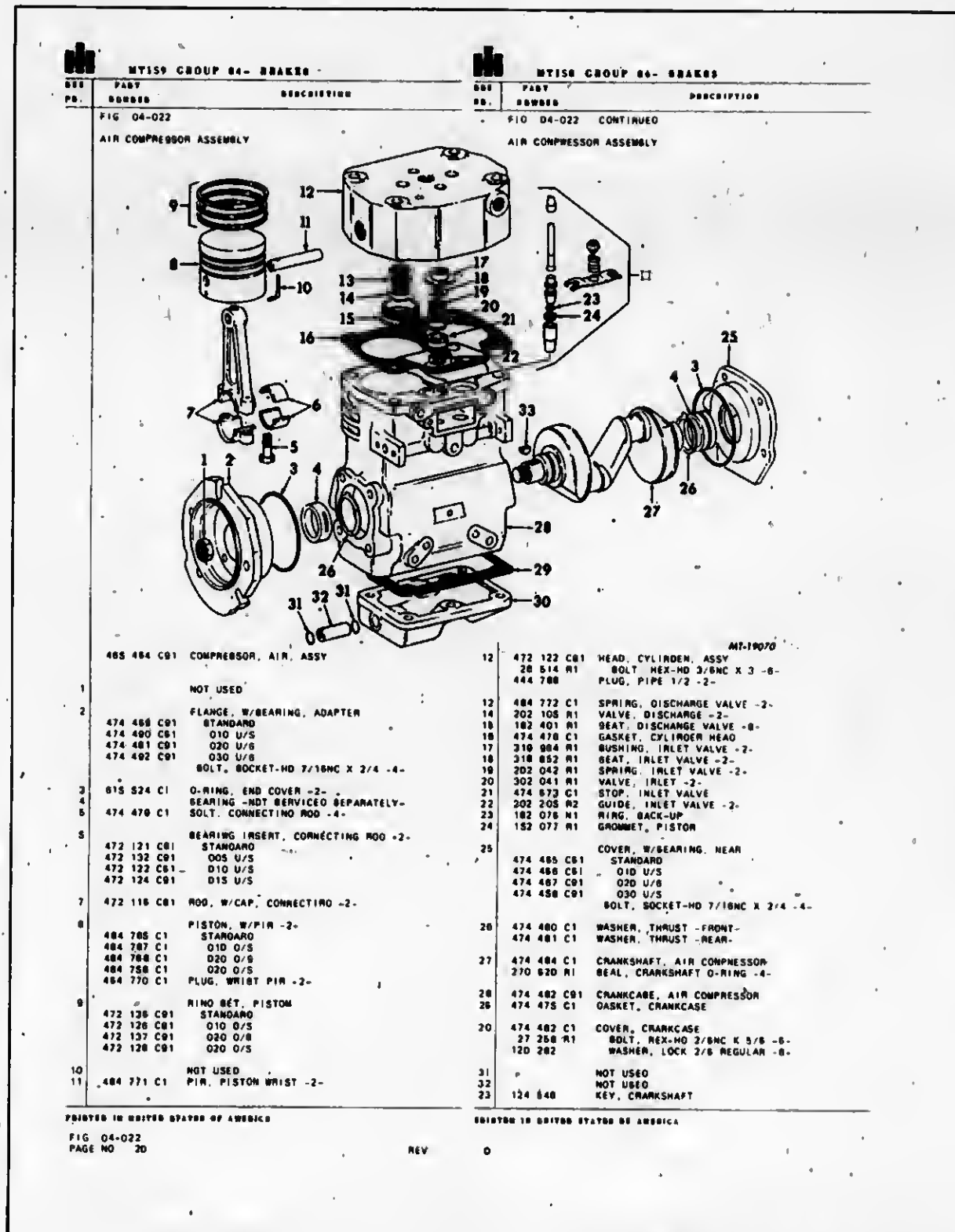
After calling the DMV and explaining his problem, Swenson discovered why he had been the target of the apparently errant computer.

Everytime a policeman would put

a parking ticket on a car without a license plate, he would write the word "None" in the space where the number was to appear. The computer would then treat this comment as an ordinary license plate number, check it against registry listings and add a violation to Swenson's file.

Although the Nevada DMV has assured Swenson it is working on the problem, he thinks he might have to modify his plate slightly.

"It's too bad the word 'NOTHING' is too long, or I'd use that," he said.



The illustrated parts list page shown was produced on an Information International electronic publishing system owned by International Harvester Company, Chicago, Illinois.

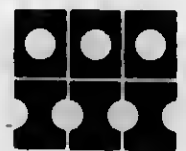
We talk your language.

If you produce illustrated parts lists, service bulletins, technical manuals or other complex, fast-changing publications, an Information International electronic publishing system can drastically reduce your production costs and time-to-press.

Ours is the only system that electronically automates the entire process—from layout and typesetting to reproduction and positioning of detailed line art, quality halftones, and logos. No process cameras. No screening. No stripping. No pasting. No waiting.

To talk about it with our experienced problem solvers, send your business card to Arnold Sorenson, Corporate Communications Director, Information International, Inc., 5933 Slauson Avenue, Culver City, California 90230. Or phone (213) 390-8611. TWX 910-343-6482.

INFORMATION INTERNATIONAL®



A satirical report exploring the attempts of male chauvinists to rewrite computer history to exclude the contributions of females.

FORGOTTEN WOMEN IN COMPUTER HISTORY

For your copy, send \$4.95 to:
Programmed Studies
Box 113
Stow, MA. 01775



Editorial

There Must Be a Better Way

Standards are needed in the computer community, and the federal government, unfortunately, may have to lead the way in providing them.

Such standards are needed because without them users are spending more than is necessary for computers and software. The lack of standardization locks users into particular vendors' equipment and prohibits them from taking advantage of lower priced alternatives.

However, the work of the voluntary standards groups within the industry has been abysmal at best. As the recent General Accounting Office (GAO) report on the standardization process in government points out [CW, Jan. 30], manufacturers have too often sent representatives to those groups to thwart standards rather than to support their development.

At the same time, it is very expensive to maintain a representative on these boards. Therefore, while theoretically open to all interested parties, only manufacturers regularly send representatives. Because of this, the voice of the user is notable by its absence on these boards — even though it is the user that has the most to gain from standards.

In the past, users have been urged to get involved, but that is a rather optimistic, perhaps idealistic, stance. How many user organizations can really afford to send a representative to American National Standards Institute meetings all over the country, particularly when conservative estimates show that it costs about \$25,000 per year to finance such participation?

This, unfortunately, leaves only the federal government — unfor-

tunately because standards mandated by the federal bureaucracy tend to be overrestrictive and overdone, no matter in what area.

Even with the best of intentions, federal programs too often go astray from their original principles.

It is clear that the government will now have to step up its activities in this area, however. It spends over \$10 billion yearly on computers and related services and the lack of standards is costing the U.S. taxpayers over half a billion dollars a year.

The National Bureau of Standards, and the Commerce Department have been called on the carpet by the GAO for their lack of activity in this area. Budgets for federal standards work will increase — and we will all have to live with the results.

Today the mainframe makers are protesting vigorously against the adoption of what they feel will be an unworkable federal I/O interface standard. But in the past 12 years they have thwarted every attempt to develop a more workable standard.

The temptation is great, therefore, to say they are just getting what they deserve.

But the trend — toward more government mandated standards — is troublesome and could have serious consequences for the entire user community.

There must be a better way, a middle ground between manufacturer indifference to standardization and standards by government fiat.

The National Bureau of Standards should not use its increased appropriations to just build its bureaucracy, but should use the funds to support user participation in the voluntary standards process.



'Whee-e-e!'

Letters to the Editor

Poor Statistical Methods

I read with interest "Users Award Xerox, Amdahl Top Grades in Annual Survey" [CW, Jan. 23].

Perhaps I should say that I read it with interest until I found the tabulation on Page 4, at which point I became violently ill.

You are either hopelessly ignorant statistically or determined to mislead your reading public by whatever means presents itself.

Your "universe" distributes like this:

IBM	1,291
Burroughs	146
Honeywell	130
Univac	78
NCR	70
DEC	27
CDC	23
Xerox	16
Amdahl	7

This is not a statistical universe at all.

Users don't "prefer" Amdahl and Xerox. In the first place, they have probably little or no basis for comparison. And in the second place, there is no comparison between servicing, programming, maintaining, etc. seven or 16 systems and supporting nearly 1,300, which turn out to be more in the neighborhood of 20,000 if all customers were to be counted (although that is purely a speculation). Why compare an ant and an elephant?

R.E. Kaufmann

Saratoga, Calif.

The article said that the users of Xerox and Amdahl equipment rated their computers and accompanying support higher than did the users of the other manufacturers' equipment. Users were only rating their satisfaction level with their own equipment. The sample is

valid because the seven responses for Amdahl and 1,291 responses for IBM represented almost the same percentage of each firm's customer base (at the time of the survey). Ed.

Xerox CPUs Like Edsels?

The Datapro Research Corp. user satisfaction survey provided interesting food for thought; however, the editorial on the same topic ["Think, Mainframers," CW, Jan. 23] was less than incisive. The fact that Xerox Corp. with only 16 respondents, topped the list appears to me to say a lot more about people who respond to surveys than how mainframers are performing.

Seriously now, how can a company who's been out of business for over a year get a non-negative score on maintenance or support? I wonder how the Edsel would rank in a similar survey among auto owners.

Xerox, despite its performance in other endeavors and high marks in this survey, does not appear to me to be a good model for other mainframers to emulate.

Dale W. Saville

Charlotte, N.C.

Privacy Overwhelming Ethics

Ethics and privacy are popular topics of discussion, but too often privacy overwhelms ethics.

Hiring DP people is a difficult job that is not made any easier by corporate policies regarding reference checks. Let's face it, there are incompetents in this business and it really hits home when you discover one on your own staff because you couldn't get a technical reference.

It is a sad commentary on the state of the business world when you can't get an honest, ethical evaluation of an individual.

Joanne E. Peterson

Dayton, Ohio

Data Past

Five Years Ago Feb. 7, 1973

WHITE PLAINS, N.Y. — IBM added a multiprocessing capability to the upper end of its 370 series to allow the integration of nonvirtual 155s and 165s with 158MP and 168MP mainframes. The keynote throughout the announcement was compatibility with users' existing applications programs.

NEW YORK — The Justice Department asked that IBM be compelled to reconstruct — or pay the Justice Department to reconstruct — the data base or index to the documents used in the Control Data Corp. vs. IBM antitrust case settled earlier. As part of that settlement, IBM had CDC destroy its computerized index to documents, which the government had been

planning to use in its case against IBM. The department contended that the destruction of the index was in violation of pretrial orders in its case.

Eight Years Ago Feb. 11, 1970

NEW YORK — College-trained programmers and systems analysts were found to change jobs almost twice as often as noncollege-trained programmers and systems analysts, according to a survey by Joseph M. Surkis of Oyer Professional Computer Services, Inc. here. For this reason, and because losses caused by high turnover rates were found to run into millions of dollars each year, it was predicted that many companies would decrease the emphasis on college education as a prerequisite for employment.

COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

Please enter my subscription
(circle number)

I'm already a subscriber,
but I'd like you to
change my:

address

title

industry

other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

Canada and PUAS – \$28

(MC Only) List four digits above your name)

[illegible]

Expiration
Date: _____

First Initial	Middle Initial	Surname										
Your Title												
Company Name												
Mail To:												
City					State		Zip Code					

☐ Check here if you're

wish to receive

information on

Computerworld's Index.



THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

- | | |
|----|---|
| 10 | Manufacturer of Computer or DP Hardware/Peripherals |
| 20 | Manufacturer (other) |
| 30 | DP Service Bureau/Software/Planning/Consulting |
| 40 | Public Utility/Communication Systems/Transportation |
| 50 | Wholesale/Retail Trade |
| 60 | Finance/Insurance/Real Estate |
| 70 | Mining/Construction/Petroleum/Refining |
| 75 | Business Service (except DP) |
| 80 | Education/Medicine/Law |
| 85 | Government - Federal/State/Local |
| 90 | Printing/Publishing/Other Communication Service |
| 95 | Other |
| 11 | President/Owner/Partner/General Manager |
| 12 | VP/Assistant VP |
| 13 | Treasurer/Controller/Finance Officer |
| 21 | Director/Manager of Operation/Planning/
Administrative Service |
| 22 | Director/Manager/Supervisor DP |
| 23 | Systems Manager/Systems Analyst |
| 31 | Manager/Supervisor Programming |
| 32 | Programmer/Methods Analyst |
| 41 | Application Engineer |
| 42 | Other Engineering |
| 51 | Mfg Sales Representative |
| 52 | Other Sales/Marketing |
| 60 | Consultant |
| 70 | Lawyer/Accountant |
| 80 | Librarian/Educator/Student |
| 90 | Other |

Detach here, fold, and place in post-paid envelope attached through binding.

In Complex Search Process Matchmakers Need Empathy First, Then DP

By Jack Stone
Special to CW

Will the computer produce love and happiness for Dick, Jane and the other millions of "singles" around the world?

"Not directly," according to Joan Hendrickson and Susan Galloway, copresidents of an exclusive singles introduction service in D.C., newly named the Georgetown Connection, Inc. "But it can provide needed support in the complex process of finding sensible friendships for mature people," they added.

My infatuation with the relationships between computers and human affections led to my first column on these enterprising businesswomen [CW, April 25]. You may recall that they coordinate singles matching through exchanges of profiles and video interviews and have been exploring the applications of computer technology to their business.

The last installment of this systems development saga left off with their lament for data base support of the programmable calculator and my offer of a joint development program to keep abreast of their progress. I finally negotiated a no-cost barter arrangement — my most significant win of the year — wherein I exchange my microsystems expertise for exclusive rights to publish their DP memoirs plus unlimited access to their townhouse

services.

So here is the next episode in the computer romance of Joan and Susan:

Q: Now that you have played around with computer concepts for a while, how do you now see the interface between your clients and your future computing system?

Joan: We don't! You see, our services are very personal. We deal in, well — love. Our clients need the qualities of a human to help them select partners. A machine can't listen to what a person says about his feelings — just out of a marriage or other relationship, or new in the area, knowing no one or having the feelings of rejection that can be experienced at the "singles" bars. Each client must be handled individually because they all have their own special situations and personal needs.

Video Instead of DP

Q: However, you certainly interface your clients to the videotape technology. Why this and not computers?

Susan: But that's different! Our clients become engrossed in the human images on the screen, just like good TV theater, absorbing an infinity of information about a prospective selection — all the personality nuances, hand gestures, facial expressions, tone of voice, etc. Also, we don't let them operate

the machine — they don't want to anyway, as it seems to interfere with their unprogrammable process of choosing a match.

Q: The mechanics of coordinating the matching must be quite complicated. Do you visualize computer

established selection criteria for a particular client. And it would be very nice to have a report generated to inform us if any clients had not been notified of their matches.

Joan: We're also talking about opening up branches in major cities and are thinking about some remote computing capabilities, still retaining central control of client records and billings.

Q: What do you think about existing hardware and software capabilities for your projected needs?

Susan: From what we've been told, we'd love to have a Commodore Pet, but we understand it's a bit short on memory and long on price relative to our applications. We've also been advised that the Basic language should pretty well handle our programming, so we've about given up on the programmable calculators.

Joan: Needless to say, it would be nice to have a computer to facilitate our record processing, but I've voted to wait a while until the prices drop. I should emphasize, however, that the real success of our business depends on the personal attention we give our clients, and there's no computer than can provide this service at any price!

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

The Human Connection

support in this area?

Joan: Oh, we see great potential for computer help in the "back room," as it were, but only in the hands of a trained Georgetown Connection staffer. With about 300 clients now, active and inactive — they drop in and out — we feel that machine assistance can give us the management control we need as we grow in the future.

Susan: For example, we would like to consider computerizing our client profiles. A profile contains about 30 data elements that describe, in the client's own words, his or her physical characteristics and personality traits. It also allows the client to identify and grade proficiencies in about 25 recreational and intellectual interests.

We would like to have immediate access to this information and identify all members that may meet pre-

Amid Identity, Address Errors Forms Show Problems in Two-Field Lines

January is here again, time for some of the bigger mass mailings. It would be appropriate, therefore, to look at the quality of these operations in 1978 and to see what improvements have been made over previous years and what mistakes persist.

First of all, J. Jonkman wrote me to find out whether Computerworld has started renaming cities in Texas. Jonkman, who lives in Houston and not "Houston City," as his mailing label said, suggested that the problem arose when he recently moved from Salt Lake City to Houston. Apparently the city-name field was not completely reinitialized. This is a good point to watch for — particularly with variable length fields.

Another CW-related item, this time on the receiving end, came from Time/Life, which was advertising Fortune. Here, the address was given as "N Desk-Computerworld," a 19-character abbreviated field, where apparently at one time there had been two fields — "News Desk" and "Computerworld." This had not been too

long before the mailing, apparently, because the letter started "You are a hard person to find, N. Desk." (And the comment from the News Desk was "You bet I was.")

The practice of merging two fields into a single one on the printed form, while holding one of them out separately as a true-name field — all within an effective 18 characters (one is required for the dash) — seems unnecessarily severe. In this case, even with double abbreviation, it left only six characters for a proper name. That's too few. A minimum of 10 should be permitted, unless it is certain that the first word is a forename. In the case of "News," of course, it wasn't.

Mistaken Identities

Interestingly enough, one improvement came with the same address from the same organization, Time/Life. This time, for some reason it had the address in full and had the recipient tagged as an organization, not a person. Using a four-line format, in contrast to Fortune's three-line one, it came out well: "News Desk, Computerworld," etc.

The interesting point was that there was a "Dear Reader" salutation instead of "Dear Desk." And the enclosed "bonus" certificate was made out to "Addressee" and not to the desk.

This introduction and use of

neutral forms when there is any doubt about the nature of the addressee is certainly a good solution. However, it does have its problems, of course.

The composition of the letter has to be changed to eliminate insert references. What would have come out "When you think about it, Mr. Desk ... many of the same factors etc. etc." came out "When you think about it, you'll see that many of the same factors ..." but this is no real problem.

Embarrassing Results

A much worse problem did arise, even within Time's four-line format, when there were still two fields to be put into the name line. In this case, the second field was a title designation that is very common in this industry: "Systems Analyst."

The first address line on the mailing form was abbreviated to read

"Dennis Gore Sys-Anal." Then the dash got lost, the title was concatenated with the man's name, and Gore's certificate from Time finally referred to him as "Mr. Anal!"

Oh well, 1978 shows no great improvement over 1977 in keeping the mailing problem from getting weird and unwelcome results. The trouble appears to be concentrated in the truncation and multifield operations, particularly in first lines.

The solutions would seem to involve more after-processing purging, more control of field definitions (dashes are particularly drop-pable, it appears) and generally more control.

Hopefully, the same problems won't crop up again next year.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.



Security Function No Longer Expendable

By Jack P. Curry

Special to CW

Management has certain obligations and responsibilities for the protection of corporate assets, not only to stockholders and customers, but also to its employees. A DP security program, like homeowners' insurance, life insurance and automobile insurance, represents a commitment that should not be overlooked.

Consequently, it is up to management to recognize the importance and value of the security function and take the steps necessary to support the development of a strong and useful program.

Management must also take an active role on a continuing basis. Very little effective planning, implementation or testing can be done without its support.

First Step

The first step in establishing the security function is to assign one individual within the organization that responsibility on a full-time basis.

It is only realistic to assume a small DP shop could not absorb the increase in personnel expense. If this is the case, then at least appoint a responsible individual who, along with a minimum of other responsibilities, can absorb in his present job description the responsibility for security. The point is, no matter how large or small the shop, make

someone responsible.

To whom within the organization should the security function report? Undoubtedly, the reporting mechanism may take several forms, depending primarily on the size and

Reader Commentary

complexity of the organization.

In a large organization, the security function, as a staff position, could report to the comptroller, operations division, an extension of auditing or even the president of the corporation.

In a small or medium-size organization, the function could report to the quality assurance group, systems planning and support, DP manager or a facilities security manager. Let's look at why some of these might not be appropriate.

Since DP security and privacy of information are corporate issues, the person responsible for security should have access to both users and providers of DP services. As a staff position to the DP manager, the freedom of the function to appropriately coordinate efforts in the various user areas could be stifled.

The DP security function is

heavily involved with establishing policy and standards for security; consequently, this should not be an audit function, since auditing is primarily involved with the evaluation of internal controls and the necessary checks and balances for compliance with established policies and procedures.

Picking the Candidate

Once the reporting mechanism is established, who, in terms of qualifications, should be appointed to the DP security function? Someone who possess the knowledge of the business and its relation to data handling, plus adequate technical skills of a DPer.

The primary reason for the dual knowledge and understanding is that it is too easy to establish policy, standards, and procedures which are unworkable and will therefore be ignored by management and employees alike.

In addition to business knowledge and DP skills, this individual must have an interest in security and its relation to DP. He will not only be involved in physical security and data security, but must also further expand the scope of security into the social issue of privacy.

Addressing what the position will include is not complete without identifying specific responsibilities — in other words, a job description. It should be recognized that a job description should be formulated around the needs and requirements of the organization.

The chances of Company A's job description for DP security being the same as those for Company B are very remote. However, there is, or should be, a marked similarity.

The following prime responsibilities should be included, especially for a medium- to large-scale DP activity with an in-house system development and programming staff:

(1) Determining appropriate policy and standards of data and physical security safeguards for the protection of corporation assets and confidentiality of information.

(2) Directing efforts for the inclusion of data security safeguards at the development stages of new corporate automated information systems.

(3) Managing the development, implementation and testing of appropriate security plans and control techniques necessary to protect against errors and omissions, fraudulent access, espionage, sabotage, natural disasters, fire, utility failures and related situations in all areas of the corporation where DP equipment, communication networks and/or personnel are located.

(4) Directing and coordinating efforts for compliance with the rules and regulations of outside governing organizations pertaining to DP security-related matters, such as the Comptroller of the Currency, Federal Trade Commission, Internal Revenue Service or local, county or state governments.

(5) Directing the development, testing and implementation of data security safeguards that will

monitor the integrity of sensitive corporation application programs, computer operating systems, hardware and telecommunications networks.

(6) Directing the development of procedures for detecting, reporting and investigating breaches in security and, with the assistance of appropriate security and auditing personnel, directing the investigation of security breaches.

(7) Maintaining a continuing review of existing and proposed state and federal legislation and regulatory laws pertaining to information systems security and privacy as well as keeping corporate management aware of the regulatory changes affecting information privacy, information processing and/or security standards and techniques.

(8) Reporting to management periodically on the status of data, physical security and confidentiality conditions, including problem areas and recommended enhancements.

Conducting Risk Analysis

One of the first tasks to be undertaken by a DP security function is to evaluate the present condition of security. It is necessary for the individual to define the degree of risk in all areas and report the findings to management.

My own experience has indicated management is unaware of the corporation's exposure and loss potential, and this seems to be the primary reason for management's resistance in providing support for security.

However, this resistance can be overcome by planning and implementing a formal risk analysis program with the objective of setting potential security problems in perspective. It serves as a measurement management can understand, in addition to providing cost-effective preventive measures.

A risk analysis is not, however, a panacea that will alleviate all of the corporation's security illness. It only sets potential problems in perspective by identifying the risk in relation to the probability of the threat occurring during a given time and the expected cost.

The probability of occurrence seems to be the nebulous portion of a good risk analysis. This is primarily because of the lack of adequate historical data concerning the tampering with input, programs, master files, output, plus sabotage and theft of computer time.

Even with these pitfalls in mind, the DP security function should conduct a thorough analysis of risk and the potential impact on the corporation, followed by a presentation to management with recommendations for improvements.

If presented effectively, management will recognize the importance and value of the proposed improvements by taking the appropriate steps necessary to support their implementation.

Curry is assistant vice-president of Seattle-First National Bank, where he is also manager of data security.

CBC COMPANIES

A new name in front of an old reputation for reliability. We have a CONTINUOUS INVENTORY OF TERMINALS and we STOCK AND INSTALL OPTIONS. Immediate delivery on most items.

The popular ones

DEC

- Writer II (LA-36 Printer Terminal) \$1,600 ea.
- Writer III (LS-120 Teleprinter) \$2,600 ea.
- Scope (Video Display Terminal) \$1,500 ea.
(Model VT-52)
- Printer I (LA-180 High Speed Printer) . . \$2,690 ea.

1. IAL (614) 461-5496.
2. DESCRIBE YOUR NEEDS.
3. PEND ON THOSE WHO USE
DIGITAL EQUIPMENT FOR YOUR BEST
ANSWERS, PRICE AND DELIVERY.

CBC COMPANIES
170 E. Town Street
Columbus, Ohio 43215
Call-614-461-5496

When Dealing With Management Data on CPU Life More Useful as Graph

By James V.M. Hale

Special to CW

Fred Springer-Miller's approach to projecting CPU life [CW, Jan. 9] represents a formalization of the technique we have used within The Coca-Cola Co. for a long time.

The approach is basically one of plotting a projected workload growth curve against time and identifying the point in time at which the curve crosses some predetermined capacity value. The advantage of the technique described in the Springer-Miller article is that it enables those using it to see the effects of different growth rates.

For purposes of dealing with man-

agement, a more useful presentation of the data might be to show it graphically as a family of curves plotted on a vertical axis representing CPU power (or workload) and a horizontal axis representing time.

This graphical representation facilitates the plotting of additional curves that might result from different growth patterns, a limitation of the basic technique as described.

For example, in real life the growth pattern is often a combination of a compounded annual rate, cyclical variations and some step functions. The annual rate is tied to normal systems activity, business growth, etc.; the cyclical variations

relate to peak business period, accounting cycles, etc.; and the step functions relate to implementations of major new applications.

Of course, the basic problem with

lems in the context of the installation's operating environment.

The former is dependent upon good long-range planning, while the latter is at best a very difficult factor to quantify since it depends upon job characteristics, job mix, scheduling constraints, systems software and installation performance criteria, to name a few factors.

As Springer-Miller pointed out, in installations with significant on-line applications, the solution must frequently be based on prime shift or even on peak busy period constraints.

For those wishing to derive for their own use tables similar to those given, there was apparently a misprint in the article. The correct formula for APL to generate the table as shown should be:

$$6 \log [1+B]^{\circ} A$$

Mathematically, the relationship is:

$$L = \log [1+B]A$$

where L = life expectancy in years; A = relative CPU power; and B = annual compound growth rate expressed as a decimal value.

Hale is manager of computer planning at The Coca-Cola Co. in Atlanta.

What Happened to 14th Amendment?

By Robert M. Sherin

Special to CW

The State of Tennessee's attempt to levy a use tax on in-house software [CW, Jan. 16] doesn't surprise me. Florida got away with it for a time. California, where software taxation originated, also has been getting away with it for years.

What sets Tennessee apart is a flagrant disregard for the U.S. Constitution that outclasses the rest. All U.S. citizens are guaranteed due process and equal protection of law by the 14th Amendment. The essence of the guarantee is simply that whatever classifications are made in the statute be reasonable and rational.

Nothing could be more unreasonable and irrational than Tennessee's classification as tangible the identical software the Tennessee Supreme Court found intangible (Commerce Union Bank vs. Tidwell) for sales and rise tax purposes. While my class action in federal court (Sherin vs. Tennessee) does deal with taxation, its major importance lies in the broad legal ramifications of Tennessee's

unquestionably arbitrary classification.

Based upon the tangible/intangible classification, courts and legislative bodies are making new law by reviewing the status quo. Allowing an arbitrary legislative classification diametrically opposite to that of the Tennessee Supreme Court as the centerpiece of new law clearly deprives those affected of due process and equal protection.

Whether software is patentable or a trade secret is determined by the tangible or intangible classification. The 14th Amendment was designed to protect U.S. citizens against state abuse by making federal citizenship paramount. Ratified in 1868, it has been strengthened through case law.

Sherin vs. Tennessee is the first case of the computer age on this broad issue of software classification to reach a federal appellate court.

The appeal resulted from Judge L. Clure Morton's ruling in a Tennessee district court that the federal due process guarantees does not apply to software taxation in Tennessee.

"No, the state legislature can't override Congress. But we are talking about here in your case... the taxing of products within Tennessee, and those products are then tangible within the state, and congress has no control over them when they come to rest here."

Whether our 14th amendment guarantee will be enforced in Tennessee is now to be decided by the Sixth U.S. Circuit Court of Appeals in Cincinnati. I feel strongly it will be.

Sherin is president of Novo Computing Services, Inc. of Miami

COMPUTER-EASE SPOKEN HERE



If you can operate a typewriter (even hunt-n-peck), you can operate a low cost Micon Data Terminal. There's a complete line of both timeshare and direct access units at prices so low you can't afford not to check them out.

THE CASSETTERM This battery operated timeshare or direct access terminal uses familiar ASCII code and features a mini-cassette memory system. An acoustic coupler allows for complete wireless mobility. An RS-232C connector is also provided for direct connection to most minicomputers. \$1995

THE MIGET The Miniature Interface General-purpose Economy Terminal is all that name implies. It provides direct access to minicomputers through a standard RS-232C connector, standard ASCII code and features a bright 32 character display. \$400

THE TIGER Micon's Television Interface General-purpose Economy Terminal makes any standard TV set into a timeshare terminal. 1024 characters of simultaneous display are switch selectable for 8 or 16 lines of 32 or 64 characters per line. Acoustic coupler provides for timeshare use and standard RS-232C connector gives direct access. \$500

For full information, call or write



252 Oak Street
Oakland, California 94607
(415) 763-8033

Further Clarification Of NCR Policy

Although our policy on maintenance of NCR equipment sold by someone other than NCR Corp. seems clear to us and to our customers, there is apparently some confusion on the part of Computerworld as evidenced by "NCR Clarifies Upkeep Policy on Resold Units" [CW, Jan. 9].

Since the article may have caused misunderstanding, I would like to point out the following facts:

When equipment is sold by someone other than NCR, our field engineers will, in most cases, inspect and install that equipment within two weeks.

It is in the customer's interest that we handle the installation of used equipment expeditiously and it is in our own interest that we do so. If we did not, we would place ourselves at a competitive disadvantage.

One would infer from the CW article that NCR was tardy in issuing a clarification on maintenance questions raised last summer. What was described as a "recent statement" was actually made last fall. The policy has been disseminated throughout our field engineering organization and has been discussed with NCR customers. In addition, a comprehensive article describing the policy has appeared in a quarterly publication which is received by members of all NCR user groups. Yet your article described the policy as "still not widely distributed."

The article also stated that the "cost of services needed to put the equipment into satisfactory condition would be borne by the prospective buyer." In actual fact, the terms of the sales contract usually specify who pays for necessary servicing when used equipment is sold. NCR's policy is to bill the buyer of the equipment for the services. However, someone other than the buyer may actually pay for the servicing.

NCR fully realizes the importance of available maintenance to the resale value of a customer's equipment.

R.W. Gaines
Vice-President

Field Engineering Division
NCR Corp.
Dayton, Ohio

Missed the Point

If Russell A. Hersch had not interpreted things so literally, ["UN, ACM Can't Be Compared," CW, Jan. 23], he might have understood the point behind my letter regarding the Association for Computing

Machinery's (ACM) severing of ties with the Soviet Union. As it is, he missed the point — completely.

I agree with Hersch regarding human rights in the USSR, but I feel strongly that:

• It is impossible for parties to understand or change each other's ideas (philosophies, ideologies, etc.) if they do not communicate with each other. I am an ad-

vocate of the "we agree to disagree" approach.

• Parties which have areas of strong (or even complete) disagreement can still benefit from exchanges of views and ideas in other, nonrelated areas.

It seemed to me that both these points can be applied to the ACM/USSR decision and the problem of keeping mainland China out of the UN for so long. Problems do

not usually go away just because one refuses to talk about them.

By taking the action it has, the ACM has left itself no hope (however slight) of having even the slightest long-term influence on the human rights question in Russia, yet it claims to want just that influence.

I continue to deplore the ACM's action and the short-sighted, ostrich-like logic which seems to have prompted that action.

H.R. Sides
Surfside Beach, S.C.

Hard copy made easy.

With the help of a high-speed microprocessor, Hewlett-Packard combines exceptional performance and convenience in a new low-cost printer and printing terminal.

The HP 2631A printer and HP 2635A printing terminal with alphanumeric keyboard are the first members of a new Hewlett-Packard family of hard copy terminals.

Each machine was designed to give you a number of high-performance features. And both can support a variety of interfaces, including RS232 and CCITT V24, to fit into systems made by HP and other manufacturers.

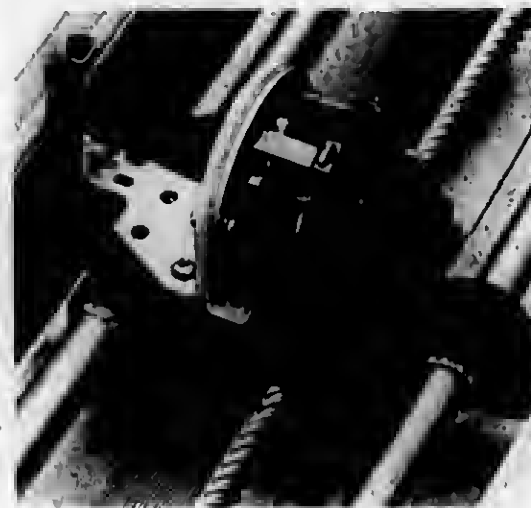
Bi-directional printing increases throughput. Both printers zip along at 180 cps in both directions, depending on your line layout. The microprocessor chooses the quickest path, and increases the speed even more by suppressing leading and trailing blanks.

High-speed slew for columnar data. When the microprocessor senses more than ten blanks in a row, it slews the print head at 45 inches per second to the next print position.

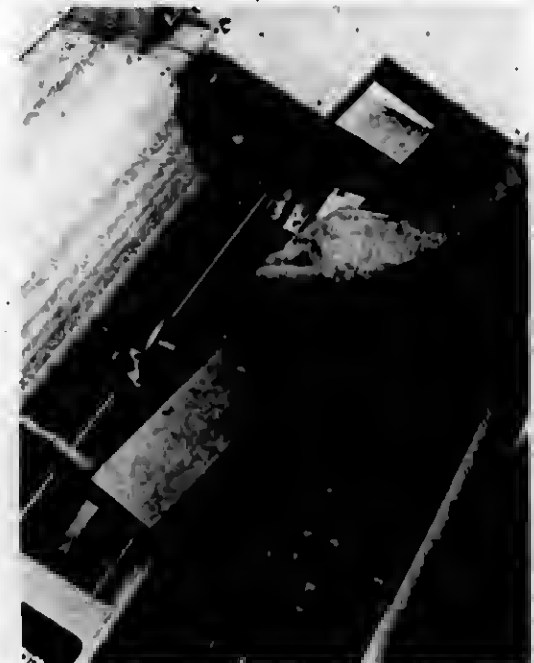
Three ways to print. The Character Compress/Expand Modes let you print more data on a page and emphasize points with headlines and titles. You can get as many as 132 characters on an 8-inch line, or 227 on a 14-inch line.

High-quality print, with six copy resolution. A 7 x 9 dot matrix (versus the usual 7 x 7) gives you clear, crisp printouts, right down to the sixth copy and meets the 128-character USASCII standard. And the extra two dot rows allow true underlining and descenders without character blurring.

Programmably interchangeable character sets. The HP 2631 can be made to print alternate character sets without reconfiguring the printer.



Long-life cartridge ribbon for a clean change. With a life span of at least 10 million characters, this innovative drop-in cartridge takes the mess and trouble out of ribbon changes.



Self-test for quick status checks. One key tells you if the printer is ready to go. If it isn't, the self-test feature helps you isolate the problem, reducing the time and cost for repairs.

Run everything under program control. All the features described and more can be programmably controlled. The software can take you in and out of the various modes. Or you can make a change yourself using one of the front panel switches or keys.

In a network or as part of a stand-alone system, HP now makes it simple to get the hard copy you need. If you'd like to see our printer or printing terminal in action, call the Hewlett-Packard sales office listed in the White Pages and ask for a computer systems representative. Or send us the coupon.

Long lasting, quick change print head saves service calls. The 9 wire print head is conservatively rated at a 100 million character life-span. It's also self-aligning. When you finally replace the head, you can do it yourself in a couple of minutes.

- Yes, I'm interested in your new
- ☐ Printer ☐ Printing Terminal.
 - ☐ Have your representative contact me.
 - ☐ Send me more information.
 - ☐ Send me OEM information.

Name _____ Title _____

Company _____

Address _____

City/State/Zip _____

Phone _____

Mail to: Bill Murphy, Marketing Manager, P.O. Box 15,
Dept. 308, 11311 Chinden Blvd., Boise, Idaho 83707

DECscopes



For Sale
•VT52

BEST PRICE
FAST DELIVERY

CALL TOLL FREE 800-323-2288
/ IN ILL. CALL 312-279-1960

Data Equipment Group

ICE, INC.

772 N. Church Rd.
Elmhurst, Ill. 60120

Non-Codasyl DBMS a Bad Choice for Users

By L.E. Towner
Special to CW

Raging within the software industry today is a fierce battle for position within the developing data base management system (DBMS) market. Particularly for those vendors who sell products for IBM 360/370 hardware (and its compatible competitors), the competition is often brutal.

The term Codasyl, an acronym for the Conference on Data System Languages, is being encountered with increasing frequency. The vendors who follow the Codasyl recommendations insist it is the only way to go.

On the other hand, the vendors who don't follow Codasyl either claim to be "Codasyl-like" or bad-mouth it.

Who cares? Let's go back in history a bit. In 1960, an obscure or-

Codasyl committees which worked on this language wanted something that

Reader Commentary

ganization composed of vendors, users and other interested parties proposed the development of an English-like, high-level programming language. The

could satisfy the increasing need for a business-oriented language.

When it was first announced, all of the "experts" said Cobol would die

an early death. It was too unwieldy, they contended.

Well, today Cobol is used in over 80% of the installations, excluding minicomputers, in the world. It is one of the very few computer languages recognized by the American National Standards Institute (Ansi).

Now, on to DBMS. Codasyl started working on DBMS standards and specifications in 1966. It published the first draft specification in 1968, followed by a more detailed one in 1971.

In 1975 the Data Manipulation Language (DML) was submitted to Ansi for standardization. It has been accepted and is likely to appear in the next update of the Ansi Cobol standard.

The language used to define the data base structure itself, the Data Definition Language (DDL), is being readied for Ansi.

History appears to be repeating itself. The "experts" are still saying it will never fly. However, nearly all of the data base packages developed in the last four years used the Codasyl specification as their guide.

How does this affect the user? It depends on his perspective of the future and how rich he is.

Assuming the trend toward Codasyl standardization continues, the non-Codasyl DBMS vendor will be forced to upgrade his system to meet the standard. When that happens, the user will have two choices — both bad.

His first alternative is to rewrite all his application programs and restructure his data bases to conform with the vendor's upgraded package. Expensive? The cost will make his last conversion from one computer to another look like peanuts.

The second alternative for the user is to stick with what he has. However, if he thinks the vendor will continue to enhance and maintain what it considers an obsolete version, he had better think again.

Before taking that big step into the world of data base, the user had better separate all of the wheat from the chaff and find out what it will really cost to implement a data base. He should not allow the vendor's salesmen to blind him to the fact that buying a non-Codasyl DBMS will return to haunt him when he can least afford it.

Towner heads the Systems Management Division of the Novol Intelligence Processing System Support Activity in Alexandria, Va.

*Last, efficient
and economical:
the new printer and
printing terminal from
Hewlett-Packard.*

HEWLETT  PACKARD



Cullinane Corporation Announces Free Seminars In Database and EDP Audit Software

IDMS, the
only Database
System on the
Datapro honor roll
for the second
consecutive year.

Database Seminar

Presentations tailored to technical and management personnel on the Cullinane Data Management System (CDMS) including IDMS-DB/DC, INTEGRATED DATA DICTIONARY, ON-LINE QUERY and CULPRIT/EDP AUDITOR Report Generating Systems.

EDP-Audit Seminar

In-depth exploration of the capabilities and uses of EDP-AUDITOR, EDP-AUDITOR/3 and CARS 3, for IBM and non-IBM computers. Seminars include lectures, user presentations, examples of applications and discussion of auditing topics.

While these seminars are free of charge, they are conducted by individuals with extensive backgrounds in applied database and EDP audit technology to insure that the time spent at these sessions will prove of the utmost value for you and your staff.

John J. Cullinane
John J. Cullinane

Free Database Seminars

Cities	Dates
Raleigh, NC	Feb. 7
Philadelphia, PA	Feb. 7
Milwaukee, WI	Feb. 8
Greensboro, NC	Feb. 9
Louisville, KY	Feb. 21
Washington, DC	Feb. 21
Dayton, OH	Feb. 23
Grand Rapids, MI	Mar. 1
Memphis, TN	Mar. 7
New York, NY	Mar. 7
Birmingham, AL	Mar. 9
Minneapolis, MN	Mar. 15
Buffalo, NY	Mar. 21
Ottawa, ONT	Mar. 30

Free EDP-Audit Software Seminars

Cities	Dates
Philadelphia, PA	Feb. 7
San Francisco, CA	Feb. 7
Los Angeles, CA	Feb. 21
Washington, DC	Feb. 21
New York, NY	Mar. 7
Birmingham, AL	Mar. 9
Minneapolis, MN	Mar. 15

How to register

For further information and registration mail coupon or telephone (617) 237-6600

I plan to attend your _____ IDMS _____ EDP-Audit seminar in _____ on _____
City Date

Name _____

Co. _____ Title _____

Address _____

City _____ State _____ Zip _____

Tel. () _____ My computer is: _____

Send confirmation to: _____



Cullinane Corporation

Wellesley Office Park, 20 William St., Wellesley, Mass. 02181 (617) 237-6600

Wisconsin Survey Indicates DOS/VS Shops Going to On-Line Work

By Don Leavitt
CW Staff

KAUKAUNA, Wis. — Even among the small IBM 360 and 370 installations, on-line systems — including on-line program development services — are becoming a way of life, if results of a recent survey of the Northeastern Wisconsin DOS/VS User Group are any indication of patterns.

The group's president, James L. Downs, DP manager at Thilmany Pulp & Paper Co. here, reported he got responses from 34 of 40 installations in the group; 24 of them use CRTs or hard-copy terminals while three others utilize remote job entry ter-

minals.

Within the group, 22 shops use some form of specialized data communications software. Although Downs didn't identify specific software, he noted parenthetically that 80% of what his group members use comes from IBM.

Seventeen of the installations use specialized data base software, he added, and 60% of it was supplied by IBM.

On-line software development support is provided by 11 installations, the report showed without noting what change, if any, had occurred in this figure since the group's last annual sur-

vey. Perhaps the fact that one-third of this group is using on-line techniques shows there will be more movement in this direction in the future, Downs suggested.

Twenty-three out of the 25 shops running under DOS/VS are using either Release 33 or 34. The other two DOS/VS users are on Release 32 and two installations in the group are staying with Release 26, the last one available for normal 360 use.

The remaining installations are using independent alternatives such as Extended DOS (Edos) from The Computer Software Co. of Dearborn III from Dear-

born Leasing, Downs said. He also noted that 21 shops were using the Power/VS spooler provided free with DOS/VS, two were using Power and three were renters of Grasp from SDI, Inc.

Although all installations surveyed use some form of disk storage, Downs said only four shops utilize disk space management software. With much the same pattern, 30 installations have magnetic tape operations, but only eight are currently utilizing automated tape control systems.

CPU Numbers Growing

Generally confirming the picture presented last year by the Minnesota DOS Users Group, Downs reported 33% of his group have IBM 370/138s, 27% are scattered on 370/125s, 135s and 148s and 17% are running with 370/115s. Twenty-three percent of the group still uses IBM 360/30s, 50s and 65s.

There's growth here, the survey showed. Fifteen CPUs are on order for installation this year and these include six 370/138s, three 370/148s, one 370/115-2 and five of IBM's 3031 processors.

Memory sizes represented by the group range from 32K to 1M bytes with the high end of that

(Continued on Page 24)

PL/I Available for PDP-11s

CHAPEL HILL, N.C. — While Data General Corp. and IBM race each other to get PL/I to their users this spring (CW, Jan. 23), a small software house here — Applied Information Systems, Inc. (AIS) — has had the language up and running at various Digital Equipment Corp. PDP-11 sites for more than a year.

The AIS software includes both a compiler and a runtime system for use under DEC's RSM environments, according to a spokesman.

The compiler is a subset of the complete language specifications sanctioned by the American National Standards Institute (Ansi). Like the compilers from DG and IBM, however, it will be "approximately compatible" with the subset Ansi is now formulating, the spokesman said.

String Structures

Currently the AIS compiler has no decimal arithmetic, but it has strong support for bit- and character-string structures and good I/O, he claimed. It works through the operating system's access methods and supports inline, reentrant and recursive code.

It also supports fixed-point and floating-point numbers.

Version 1, now available, requires DEC's floating-point

hardware, but Version 2, expected this summer, will not. The update will also provide the now-missing decimal arithmetic and support for multikeyed Isam "if we can determine how it would fit into PL/I efficiently," the spokesman said.

Currently the software is most effective in applications with extensive file handling and in which considerable amount of the work involves nonnumeric data, he noted, citing com-

munications message switching and transaction processing as examples.

The company is distributing the PL/I package on 9-track tape or a DEC RK05 disk pack, although other media are possible. The \$4,000 cost does not include on-site support since "any system programmer" can install it "inside an hour."

AIS can be reached through Box 2584, Chapel Hill, N.C. 27514.

Low-Cost Package Checks CICS/VS

BOISE, Idaho — A series of CICS/VS utility programs, developed by Robert M. White, a systems software specialist with the State Auditor's Office here, provides users with inquiry capabilities into many aspects of CICS/VS and OS/VS.

Written at public expense and now in the public domain, the programs are available from White for the cost of reproduction — \$103.

As White described the package, it was designed to display certain basic functions in both OS/VS1 and CICS/VS. Since that basic development work, however, certain maintenance functions have been added to enhance its capabilities, he said.

In the user manual, the func-

tions are outlined in the following areas: OS/VS1 data management; OS/VS1 internals; CICS/VS internals; and "Games (fun stuff)."

Under OS/VS1 data management, the system can list an entire Volume Table of Contents (Vtoc) in summary format or list a data set's Vtoc entry. A Partitioned Data Set (PDS) directory can be listed and so can a PDS member of a source library, White noted.

More actively, the routines can be used to rename or scratch a data set; catalog or uncatalog a data set; or delete or rename a PDS member, he added.

Working with the OS/VS1 internals, users can display Unit Control Blocks (UCB), input or

output queues, active tasks or partitions in the system, a job's Syspool output or any outstanding operator messages. Through White's package, users can also issue any operator command.

Similarly with CICS/VS internals, users can display and maintain the Processing Program Table (PPT) as well as the Processing Control Table (PCT). Display and maintenance for the Terminal Control Table (TCT) and display of current CICS/VS statistics are other capabilities.

To keep costs down, users are required to provide their own magnetic tapes. More information is available from White at the Idaho State Auditor's Office, 650 W. State St., Boise, Idaho 83720.

**You're in good company with
the Johnson Job Accounting Report
System used by more than
1,000 D.P. Managers.**



SUPPORTS:

MVS-SVS-VS1-DOS/VS-POWER/VS-MVT-MFT-CICS/VS-IMS/VS-HASP

Tell us what areas you're interested in!

- | | | |
|---|---|--|
| ☐ Job Accounting | ☐ Budget Control | ☐ Resource Utilization |
| ☐ Cost Distribution | ☐ Thruput | ☐ Programmer Efficiency |
| ☐ Software Performance | ☐ Customer Billing | ☐ Job Scheduling |

Send for your FREE 30 page System Characteristics Manual

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone (____) _____

Computer _____

Operating System _____

**Johnson
Systems, Inc.**

8400 Westpark Drive
McLean, Virginia 22101
(703) 893-8700

Using 'Datacom/DC'

Package Handles Accounts Receivable On-Line

DALLAS — Designed to work with Datacom/DC as its teleprocessing monitor, the On-Line Accounts Receivable (Olar) package from Insyte Applications Corp. is essentially a substantial library for functional modules and vendor-provided customization to make the library fit the user's needs.

The customization is usually complete enough so the vendor claims there is no need for the user to modify any existing accounting procedures; the package will meet the user's requirement once the system is ready for implementation, a spokesman said.

There are several modules related to cash applications/cash management,

he said, citing support for balance forward or open item accounting — or both — as one set of alternatives available. Within the open item alternative, the user may actually have cash applied by line item or by invoice, another Insyte source pointed out.

Provision for on-line customer file maintenance and inquiries on customer cash positions are other facilities, the spokesman noted.

The package included embedded logic similar to the Datacom/DB data base management system so that there is far less rigidity than in a file-oriented system, he said. The system generated a set of standard reports but

also lets the user create "unlimited" CRT screen formats.

Written in Cobol, Olar includes backing for up to 16-level security safeguards, the spokesman added.

The package typically costs \$40,000, which includes provision for substantial custom work. Users who already

have the Datacom/DB software installed get a 10% discount on the cost.

While Datacom/DC is the communications vehicle now, interfaces for both Turnkey System's Task/Master and IBM's CICS are coming, probably this year, Insyte noted from 3707 Rawlins St., Dallas, Texas 75219.

Datapoint Enhances RPG, Adds IBM-Like Capabilities

SAN ANTONIO, Texas — Tailored specifically for Datapoint Corp.'s 5500 and 6600 series processors, RPG Plus has been introduced by the company as an enhanced version of the RPG-II it has had for some time.

The modifications bring the Datapoint language closer to what IBM and others implemented previously. They will ease program development and conversion of programs created under other RPGs, a spokesman said.

A "Move Array" verb, now available in the RPG Plus calculation section, duplicates a facility IBM has had; therefore, users now have an easier time moving programs that use this verb in an IBM setting to Datapoint equipment, he claimed.

RPG Plus now supports a COPY command and allows input records to be described in any order. This combination permits the creation of standardized file definitions that can be stored on disk and used for more than

one program, the spokesman added.

The RPG Plus object programs, generated in relocatable code, can be stored in a relocatable library separate from the compiler.

The RPG Plus compiler can be used on any Datapoint 5500 or 6600 processor as well as on any 3800 or 6000 series Attached Processor, he added, further enhancing the capabilities of the Attached Resource Computer recently announced by Datapoint [CW, Dec. 5].

Object programs can be run on any Datapoint 1150 or 1170 Dispersed Processor in addition to the units which can handle the compiler, the spokesman stated.

RPG Plus is available under license for a one-time fee of \$2,000 or monthly fees of \$50, with discounts available for installations acquiring more than one compiler.

Datapoint is at 9725 Datapoint Drive, San Antonio, Texas 78284.

Ecma OKs 'Milestones'

GENEVA, Switzerland — The European Computer Manufacturers Association (Ecma) has adopted three standards, "each a milestone," according to a spokesman.

The association adopted a Minimal Basic standard which has the same technical content as the present American National Standards Institute draft, although it is edited slightly differently. It also accepted a proposal providing the first internal standard for the flexible disk cartridge, he said.

Ecma also adopted a standard for the representation of source programs — in APL, Cobol, Fortran, Minimal Basic and PL/I — for program interchange. It is an attempt to improve the portability of programs, the spokesman explained.

plained.

The standard links the character sets defined in the individual language standards and their coded representation by means of a 7-bit code and its implementation on a variety of data carriers. It is a standard of a new type in which already-standardized features are assembled in a new standardized combination aimed at supporting interchange and decreasing implementation dependence, the spokesman emphasized.

Copies of this standard (Ecma-53), the one on floppy disks (Ecma-54) and the one on Minimal Basic (Ecma-55) are available free from the association offices, 114 Rue du Rhone, Geneva, Switzerland.

DOS/VS Moving On-Line

(Continued from Page 23)

scale accounting for 20% of the installations. The "most popular" size was 512K bytes, used by 25% of the shops, while 20% had 128K installed.

Although Downs didn't show the ratios of virtual to real memory being utilized under DOS/VS, he noted that virtual memories ranged from 360K to 4.5M bytes, with 1.95M the average.

The currently installed CPUs were very evenly distributed between those rented from IBM (26%), leased from IBM (26%), purchased (26%) and leased from a third party (22%), the survey indicated.

The work week for 60% of the installations typically is five days, while 19%

work six days and the rest work seven. During the work day, half the installations work around the clock, 18% work two shifts and the others range from 10 to 23 hours, Downs said.

The total staff size — operations, systems and programming — ranged from a low of five to a high of 106. The typical size appeared to be about 18, although six shops that were "very large" in Downs' view (with 106, 88, 77, 58, 56 and 47 people) would lead to a different mathematical average.

Downs ended the survey report by noting the typical DP budget with his group was \$650,000, ranging from \$230,000 to \$1.5 million.

Presenting the most dynamic business Opportunity since the Big Mac.™

A National ComputerLand Retail Franchise

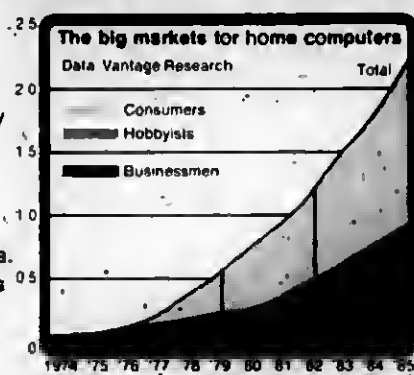
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Big Mac is a trademark of McDonald's Corp.

Mail to E. E. Feber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW, San Leandro, CA 94577 (415) 895-9363

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

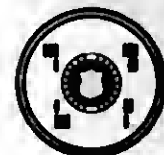
COMPUTER FACILITY DESIGN.

Because it's vitally important to design and secure your new computer center correctly, let's do it right!

We're a professional firm of management consultants and security engineers. We have helped over 300 major companies provide secure operating environments for their data processing installations.

As specialists in computer facility design, we have spent over \$1 million in research benefitting the owner/architect in the development of plans and specifications for an overall security system. We provide general floor plans and construction details. We design environmental controls, fire protection and security systems, including perimeter security. And we develop final engineering drawings and system specifications suitable for inclusion in the contract/bid documents.

Avoid problems before you build them. Contact J. C. Matlock, Jr., Dept. C, 235 Northeast Loop 820, Hurst, Texas 76053, (817) 589-2244.



DATA PROCESSING SECURITY, INC.
Atlanta Chicago Dallas/Fort Worth Los Angeles New York Washington, D.C.

Sigplan Meeting to Trace Languages' Growth

LOS ANGELES — A conference intended to document some of the history of programming languages will be held here June 1-3, just prior to the 1978 National Computer Conference.

Sponsored by the Special Interest Group on Programming Languages (Sigplan) of the Association for Computing Machinery (ACM), the meeting is meant to record the significant events that created the need for development of various languages, the environment in which decisions were made and the rationale behind the decisions that led to each language's style.

At least one key contributor to the original development of each programming language will present a paper on the language and participate in discussions, according to conference chairman, Jean C. Sammet.

ACM emphasized that the conference will not address the entire history of programming languages, since it will be limited to those languages in use by the end of 1967 and by then considered most significant in terms of usage, influence on language design, overall impact on environment, novelty and uniqueness.

Copies of the presentations will be

available before the conference as an issue of "Sigplan Notices" and afterwards as the final edited proceedings.

Attendance will be open to the capacity of Hyatt House Hotel (Los Angeles International Airport) facilities on a first-come, first-served basis, ACM said, strongly recommending advanced registration.

Registrations made now cost \$50 for those who are members of ACM and Sigplan and \$65 for those who hold neither membership, according to registration chairman Rorrie Ratkevich, Ground Systems Group, Hughes Aircraft, 1901 W. Malvern, Mail Drop 606-K126, Fullerton, Calif. 92634.

Speakers

Sigplan's conference will include the following languages and presentors:

Algol - Al Perlis, Peter Naur
APL - Ken Iverson
APT - Douglas Ross
Basic - Tom Kurtz
Cobol - Jean Sammet
Fortran - John Backus
GPSS - Geoff Gordon
Joss - Cliff Shaw
Jovial - Jules Schwartz
Lisp - John McCarthy
PL/I - George Radin
Snobol - Ralph Griswold

'Cadam' Aids Manufacturer

WHITE PLAINS, N.Y. — A graphics software package said to improve manufacturing productivity from design conception through machine tooling has been developed by Lockheed Corp and is being marketed by IBM.

The Computer-Graphics Augmented Design and Manufacturing System (Cadam) is a set of programs that supports IBM's 3250 graphics display system and the 2250 Model 3 display unit when tied to a 370 mainframe.

The Cadam data base can be used in five interrelated areas of engineering and manufacturing: design, analysis, drafting, tool design and numerical control (NC) programming.

As an example, IBM noted that with Cadam a part designer can use a CRT as if it were a drafting board, constructing the geometry of his design from a rough sketch or an idea.

Several parts can be displayed simultaneously to ensure they fit together properly, IBM said.

Once the designer is satisfied with it, the part drawing can be stored in the Cadam data base and retrieved by other designers for use in drawing their own designs or checking design compatibility.

A draftsman at a CRT screen can

work with the drawing, adding such details as physical dimensions in metric or English units; when required, the drawing can then be printed in hard-copy form, IBM noted.

A tooling engineer can then use the drawing to design the machine tooling by which the part is produced, and finally, the NC programmer can write and debug the program actually used to direct the tooling. Cutter movement can be followed on the CRT screen.

Cadam requires an IBM 370/135 or larger CPU and is being marketed by IBM as an Installed User Program. Prices for Cadam range from an initial charge of \$18,000 and a monthly license fee of \$1,600 to an initial charge of \$41,000 and a monthly license fee of \$3,800, depending on hardware configuration and whether NC capability is needed.

'DDP/1' Pushes Series/1 Usage

BOULDER, Colo. — The Distributed Data Processing (DDP/1) package from System Design & Development Corp. provides the IBM Series/1 user with data entry, data management and teleprocessing services to support remote job entry and local DP requirements, the vendor said.

The software features a programmerless approach with system commands entered through menus, providing access to forms generation, data editing and such data management services as dynamic file definition and automatic disk space allocation, a spokesman said.

Data prepared at the Series/1 can be processed locally or by a host, according to the firm, and teleprocessing of data between the CPU with DDP/1 and others is possible using bisynchronous communications over private or switched lines.

DDP/1 supports all IBM Series/1 announced printers, display stations and disk devices, the spokesman noted. The local processing mode reportedly accommodates program development and production using IBMs assembler and Fortran and PL/I compilers.

DDP/1 is licensed for multiple use, with the \$20,000 license fee dropping to \$1,000 per license for quantity orders, the firm said, adding Series/1 equipment required to operate the product begins at \$27,905.

Systems Design & Development Corp. is at 2355 Canyon Blvd., Boulder, Colo. 80302.

DTC Microfile Gains Fortran

CAMPBELL, Calif. — A Fortran compiler for use with the Data Terminals and Communications (DTC) Microfile commercial/data communications system has been announced by the firm.

DTC's compiler is said to be Ansi Fortran '66-compatible except that support for complex arithmetic is omitted. In addition, the instruction set includes PEEK and POKE commands for writing into and reading from specific memory locations and INP and OUT for working with I/O ports, DTC noted.

The Microfile system is microcomputer-based, featuring either two or four disk drives and giving 600K to 1,200K bytes of on-line storage, the firm said, noting that the system is available with an Extended Basic Interpreter and applications software in addition to the Fortran capability.

The Fortran compiler is six to 10 times faster in computing than the Extended Basic interpreter, according to DTC.

The compiler is available for \$500 from the company at 1190 Dell Ave., Campbell, Calif. 95008.

the terminal connection

We can match your terminal needs with our off-the-shelf price and delivery. A wide selection of terminals like DEC LA-36 with all options in stock, LS-120, LA-180 and VT-52, Datacassettes, all new Teletype 43 KSR, TI-745, and acoustic couplers. For your free quote, call us TOLL FREE: 800/323-2135

management response corporation
660 busse highway park ridge illinois 60068/(312) 698 3377

TU-BE OR NOT TU-BE

Alas, poor Yorick, his program won't run.
It went down the tubes at a quarter to one.
When called to explain why his run had exploded,
He couldn't be sure they had run what he coded.
Did they mount the wrong file, or have bad JCL?
He needed hard copy in order to tell.

For although console messages flashed on the screen,
The one guy who needs them was far from the scene.
Alas, poor Yorick, faced another long wait.
They couldn't dump DOCS till a quarter past eight.

So if you, like poor Yorick, have known the futility
Of waiting around for that printlog utility,
Let Datachron's CONSOLOG be your salvation—
Make the printer your console at job termination.

CONSOLOG

CONSOLOG: Automatically logs partition console messages to the printer at end-of-job.
CONSOLOG: Eliminates printlog utility runs that interrupt normal processing.
CONSOLOG: Uses no core, installs in minutes on any IBM 370 DOS/VS with 125D/3277 support.
CONSOLOG: Only \$985 or \$75/mo. Free 30 Day Trial

☐ Send More Info ☐ Send CONSOLOG For 30 Days
Name _____ Co. _____
Title _____ Tel. _____
Address _____
City _____ State _____ Zip _____
Computer model _____ ☐ 125D or ☐ 3277

DATACHRON CORPORATION 174 FIFTH AVE. NEW YORK, N.Y. 10010 (212) 675-5333

Efficiency vs. Flexibility

Once for Designers, DBMS Now Keyed to User

By Roy Wood
And Robert B. Chamberlain
Special to CW

An important and widely recognized movement in DP during the late 1960s and early 1970s was the shift from being machine-intensive because of high capital expenditures to being people-intensive. This movement arose from a combination of higher salaries and greater systems complexity, which increased DP staff expense while cheaper mainframes and cores decreased hardware expenditure.

The concept of the data base management system (DBMS) was a significant response to this shift. The rationale behind the concept is well-known but bears reiteration because some hidden implications have a time-dependent relationship with the origination of the concept itself.

The DBMS is an attempt to reduce the overhead and the inefficiency of complex and redundant file-oriented systems by centralizing data and making it program-independent.

The attractiveness of this, of course, is not the mere aesthetics of clean systems (or, for that matter, "structured" systems), but rather is contained in the bottom line of staff and system expenses; the DBMS has a distinct potential for staff reduction because of its briefer implementation

time and the reduced maintenance required in environments with a successfully implemented DBMS.

There is, however, an irony present in that the development styles of the original DBMS have tended to weaken the goals of program, and par-

Data Basics

ticularly programmer, independence.

Although the original data base packages were conceived in the glow of program independence, they were delivered by practitioners of machine/core optimization. The good intention of program independence through DBMS was itself compromised by design and implementation goals that emphasized efficient use of machines rather than people, despite the changing machine/people relationships which brought them into being.

We call these original packages "designer" systems because of their emphasis on skillful user implementation in order to function effectively. They contrast with the later "end-user" systems which allow a user to use a DBMS more simply, but with an accompanying loss of discretion regarding physical

structuring of the data base.

The trade-off then becomes utilizing hardware and saving designers, programmers and clerical staff.

System Characteristics

What are some other characteristics of designer and end-user systems? Designer DBMS, as the name implies, require higher levels of skill in system designers because of their greater potential variance in hardware efficiency.

They are, furthermore, rigid and oriented toward programmers rather than non-DP management and clerical staff. The interaction between the system and the user is preformatted and structured with a rather fixed output potential.

End-user systems, on the other hand, are oriented toward browsing the data to meet unstructured requirements which closely simulate real world demands. The end-user approach tends generally to use more hardware resources, but it saves in people (designers and programmers), the more valuable resource.

Management information systems (MIS) of the mid-1960s failed largely because of insufficient management support, hardware that was not adequate or cheap enough and a DP staff that frequently became overly involved in efficient use of hardware.

Designs were done in the DP

shop rather than in the offices of the client. DP traded toward the hardware rather than the user because staff was less expensive then.

For example, DP concentrated on creating large files that were mostly sequential and not integrated, since on-line storage was expensive. Reports were generated in fixed formats, with as many reports as possible created in one pass of the master file from either existing application programs or generalized report writer specifications.

The DBMS designed in the mid-1960s (Honeywell's IDS and IBM's IMS) reflect that period's orientation toward hardware efficiency. They are classic designer systems and lend themselves to very efficient structures, given a firm set of data maintenance and reporting services to provide.

But herein lies the problem. The minute user functions and services appear rigid and fixed, the world moves on and they must be changed.

Of course, maintenance is most efficient, physically, but data does not last long enough in a particular state to truly measure real efficiency. The physical efficiency does exist because one can quickly add new records into the data space or delete records by removing several pointers.

Designer system reporting is somewhat less efficient. It can be characterized as the printing of large groups of data or searching an entire data base, spinning off many reports with one pass.

This remains efficient as long as the user does not make ad hoc requests which require passing the entire data base.

The Real Concern

Reporting, however, is not the overriding concern in the design of a designer data base. It is, instead, updating.

Because reporting is the main issue with management and users and receives the greatest attention, however, it is the potential Achilles heel of the designer system.

Designer DBMS efficiency costs in user design dollars initially and can cost in designer and programmer dollars later. Also, a new application has a high probability of harming a user's designer system structure, forcing redesign with more design expense time.

Current Thinking

Current thinking is that DP organizations will be most beneficial in supporting management information needs if they can respond quickly to many new and different information demands. This means, more specifically, that data processing must trade off in

the direction of providing user/client services without necessarily optimizing hardware, by the use of designers from both DP and the relevant business disciplines.

These trade-offs are more readily equated with such recently developed data base packages as MRI Systems Corp.'s System 2000, Computer Corp. of America's Model 204, Software AG's Adabas and Insyte Datacom Corp.'s Datacom. They have two things in common:

- They can be fully inverted structures.

- They tend to be heavy users of the CPU, and in some cases, disk storage.

These characteristics are quite dissimilar from the designer systems that use pointers or chains and do not normally require much disk storage beyond normal data.

Both IMS and the Codasyl committee have addressed the question of inverted indexes. IMS now supports secondary indexes while the Codasyl group recommends inverted indexes as a capability of a Codasyl system, to be stored in owner records.

It is, of course, possible for users of designer DBMS to implement the direct index approach, but they now must incur the responsibility for index maintenance and logic operations to effectively utilize the inverted indexes.

This would seem prohibitive where a user's needs could be met more efficiently through an end-user system. In fact, the need for such a device highlights the rigidity inherent in designer systems.

Wood is director of education for Software AG of North America, Reston, Va., and Chamberlain is with CACI in Europe.

When You've Got It... Flaunt It!



JASPER JOB ACCOUNTING

FEATURING:

- WIZARD REPORT GENERATOR
- FREE CICS BILLING CAPABILITY
- RJE ACCOUNTING

NAME _____ CO. _____
 TITLE _____ TEL. _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP _____
 COMPUTER MODEL _____ OP. SYSTEM _____

DATACHRON CORPORATION
 174 FIFTH AVE.
 NEW YORK, N.Y. 10010 (212) 675-5333

Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3
BEST PRICE
FAST DELIVERY
CALL TOLL FREE 800-323-2288
IN ILL. CALL 312-279-1960
 Data Equipment Group
 ICE, INC.
 772 N. Church Rd.
 Elmhurst, Ill. 60126

BLIS COBOL
 MULTIPLE OPERATING SYSTEM

SYSTEMS
WORLDWIDE
 in the USA and 14 countries

For information call today

IP Phone (305) 647-2700 USA
 Telex/Tel. 810-853-5033
 1850 Lee Rd., Winter Park
 (Orlando), Florida 32789

Planning the Key to Easy DOS-OS Conversion

By Wayne Brown
And Dave Lawlis

Special to CW

DALLAS — Despite all the horror stories we had heard about converting from DOS to OS, by late 1976 we felt we had no choice but to make the change.

Continental-Emsco is an oil and gas field equipment manufacturing company, headquartered here, with approximately 3,000 employees worldwide.

With DOS, we were bogging down. We needed to pick up additional partitions and capacity and had made the decision to go to an IBM 370/148. We also needed better communications facilities since our plans include installing terminals in more than 50 sites in 1978.

Hardly anyone at Continental-Emsco really knew much about OS, but we did know we had to have a plan before we could do anything about converting. And this plan paid off. It was planning that made our DOS to OS conversion fast and relatively painless.

We had designed and established our OS standards and had put together a booklet for the people at our remote sites to study. We also renamed our data sets and designed JCL forms to fit our installation.

With the standards already set up, everyone was working on the same plan and going in the same direction. We felt it was imperative to know what we were going to do before we could do it.

Also, as part of our strategy (and because we knew we couldn't do everything ourselves), we decided to use a conversion aid.

After looking at the aids presently on the market and studying their pros and cons, we chose UCC Two (Duo) from University Computing Co.

One of the things that was important to us was that with UCC Two, we didn't have to maintain duplicate files shared by several systems. Conversion without UCC Two would have meant converting all systems that used these files at the same time or maintaining

DOS and OS copies of the files during conversion.

The package also allowed us to convert to OS without having to know about OS. We could take it one step at a time. This was especially important since only one person with Emsco had attended OS school during the entire conversion.

We installed UCC Two in mid-January of 1977. By mid-April, we were in OS production with the package. Before we went into production, however, we tested quite thoroughly.

Two-and-a-half to three months after we started production work, about the first of August, we began native conversion of the approximately 2,000 Cobol programs we were using under UCC Two.

This conversion was strictly changing programs — select statements, file names, removing console messages and whatever other oddities DOS would let us get away with that OS wouldn't. We did a lot of cleaning up during the native conversion.

Now we are on the last leg of the conversion, and after mid-January — exactly a year after we began — we no longer needed UCC Two.

The UCC Two package gave us a lot of help. We couldn't stop production and just work on the conversion. Using the package allowed us to meet our production schedules and development commitments during the conversion.

Another plus — the conversion was practically transparent to our users.

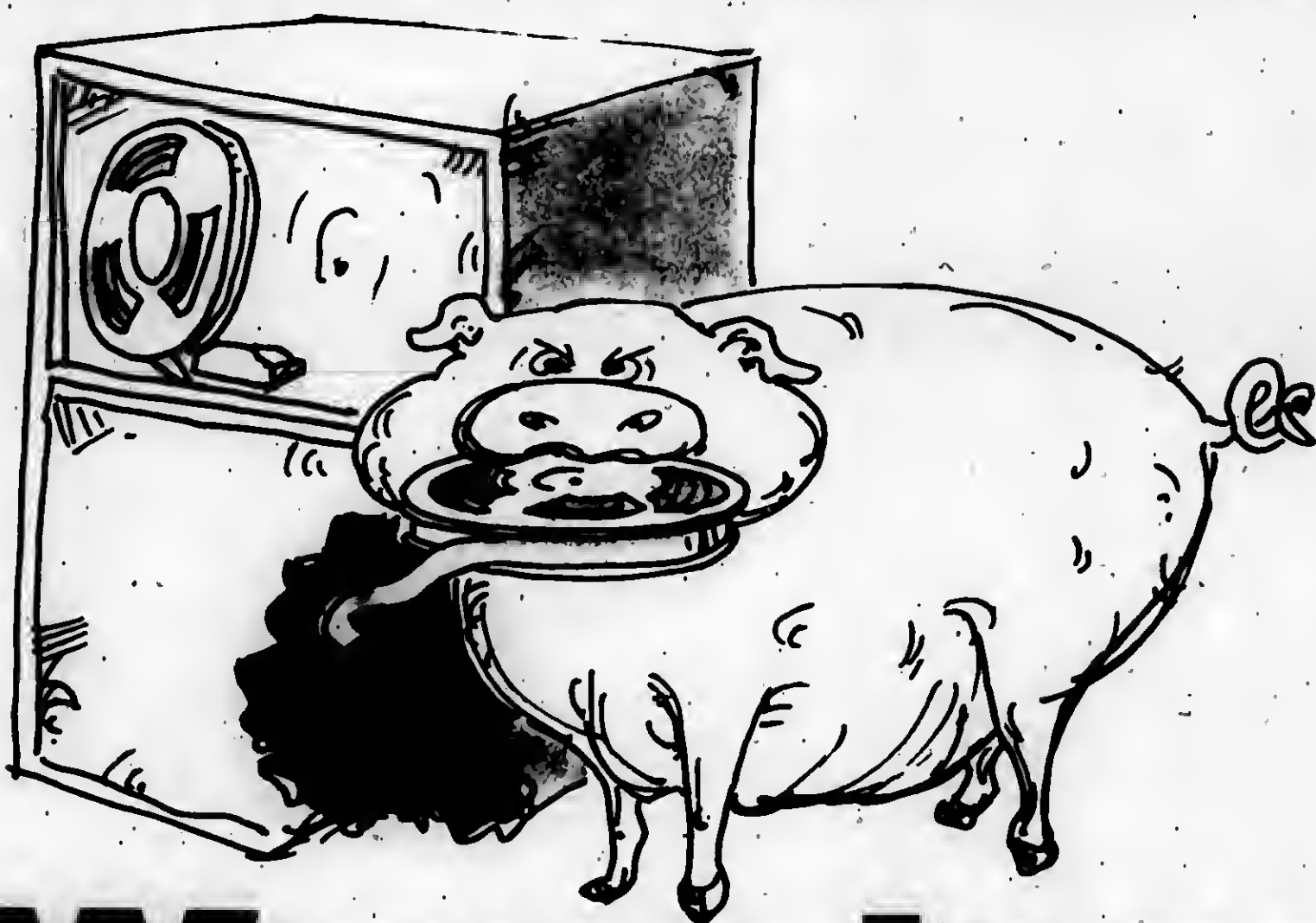
In spite of all our planning and the use of a conversion aid, we did, of course, run into some problems.

We had trouble with debugging because we weren't used to OS.

The biggest problem we had, though, was just learning OS. That is still a problem. Even after a year, we are continuing to learn OS and probably always will be in a learning phase.

In the way of training, we had video tape self-study courses on OS dump, JCL and on concepts and facilities and utilities for our DP employees to help familiarize everyone with what we were doing.

Brown is manager, systems and programming and Lawlis is a systems programmer at Continental-Emsco Co., Dallas, Texas.



Wanna buy a hog?

Or the DBMS with No. 1 throughput on the market!

Their DBMS can eat you up alive. Waste your resources, CPUs, and slash the performance value of your million-dollar mainframe. A smart buying decision now can save millions in additional staff and hardware upgrades over the next few years. You should buy **DATAKOM/DB**. We're easiest-to-use in design, implementation and maintenance of applications systems. Best on-line performance for inquiry and/or update transactions under **DATAKOM/DC** (our superior telecommunications monitor), CICS or

other monitors. ☐ Unequaled sequential processing capabilities. ☐ Minimum use of 360/370 hardware resources including CPU cycles, memory, I/O events and DASD space. ☐ Exceptionally readable and useable documentation. ☐ Continual, innovative, cost-effective enhancements. Call or write today. Let **DATAKOM** prove we're the most efficient, cost effective and easiest-to-use DBMS on the market...compared to any 'Big Bad Byte Eater' you can name!

I want you to prove **DATAKOM/DB** superiority on 360/370 systems.

Name _____ Title _____
Firm _____ Phone _____
Address _____
City _____ State _____ Zip _____

Member **SIA** Software Industry Association

DATAKOM DB and DC. Great by themselves... Even better together.

insyte datacom
corporation

214/526-4280
3707 Rawlins St. Dallas, TX 75219
Boston/Chicago/New York/Denver/San Francisco/Mexico City
Frankfurt, W. Germany Sydney, Australia

UCS 'Displa' Backs Graphics

KANSAS CITY, Mo. — Designed to produce two- to three-dimensional (3D) graphical formats, **Displa** from **Issco** is now available on the **United Computing Systems, Inc. (UCS)** network, according to a spokesman.

The software allows users to combine a range of standard features to create the desired output. Facilities include a variety of axis systems; a choice of alphabets, mathematical and cartographic symbols; 3D projection of "any" plot or surface from any perspective; and business plotting routines, the spokesman noted.

Displa output can be directed to a vector mode graphics device at the user's site, to devices installed at **UCS** local offices or to the large-scale graphics system at the data center here, the company said.

UCS is available locally in more than 140 U.S., Canadian and European cities. The network is headquartered at 2525 Washington, Kansas City, Mo. 64108.

CIF Saves Bank Twice its Cost in First Year

SAVANNAH, Ga. — Ann Strickland sometimes feels like that appliance repairman in TV commercials who maintains his company's products are so trouble-free nobody ever calls him. He gets lonely.

Strickland is assistant vice-president and savings officer for First Federal Savings and Loan Association here. Her job as a troubleshooter puts her in direct contact with the bank's customers and branch offices. Her brow isn't exactly furrowed by cares associated with loneliness, but, she pointed out, the number of customers calling with questions or complaints about the handling of their accounts has dropped markedly since First Federal came forth with a new banking service that, in a way, answers questions before they can be asked.

She referred to the issuance of a consolidated year-end statement of deposits and earnings that includes all accounts held by the depositor, the amount of earnings for the current quarter for each ac-

count, the year-end balance, the next earning date and the amount of interest for the year to be reported on income tax returns. The statement, which reaches the customer just a few days after the previous year's books are closed, thus doubles as a year-end trial balance of all savings and a 1099 form for the data to be submitted to tax agencies.

The new combined statement was issued for the first time last January and as far as Strickland's concerned, it was the most successful mailing ever. "We didn't have any complaints about late mailings and the lack of such complaints is definitely a positive and encouraging development," she said. "I've also been told by employees in our branch offices that the absence of negative feedback from depositors allows them to work more productively, without a lot of telephone calls at statement time."

Postage Savings

Some customers have even complimented the bank for cutting costs associated with mailing the combined statements, she said. "Customers are obviously concerned with how judiciously the association spends money and it's easy for them to see that by combining all accounts and earnings on one statement and not mailing a separate state-

ment for each account we are saving a substantial amount in postage and handling costs."

That savings adds up to nearly \$19,000 a year, according to H. Tayloe Compton Jr., First Federal vice-president, whose responsibilities include computer systems design. "If we had handled last January's mailing the old way, we would have had to send out 39,085 earnings statements and an equal number of 1099 forms, making a total of 78,170 mailings," he said. "But by using the combined statement that contains data on all accounts held by the customer, including the 1099, we had only 25,641 mailings. That means a cut of 52,529 mailings."

"Add that to the 30,000 mailings avoided during the first three quarters of 1976 and you arrive at a total reduction of 82,529. Since we calculate our postage, form and handling costs at about 23 cents per item, it means that we saved an estimated \$18,981.67."

Such a saving cannot be dismissed casually, even by a \$260 million institution like First Federal. "With operating costs continuously rising," Compton said, "we have to be alert for ways to cut overhead if we are to retain the complete confidence of our depositors. The amount of money we saved in only one year with our combined statement is

about twice what we had to pay for the computer program that made it possible.

Compton was referring to the Customer Information File software marketed by IBM as a Field Developed Program. That package ties all accounts to the appropriate customers' names and, in effect, makes it possible for First Federal to provide a total picture of customer-bank relationships.

The first step in applying the CIF program to the combined-statement concept was to begin issuing them for the next three quarters. The next step was to expand annual statements to include a comprehensive record of holdings and earnings, plus 1099 data.

When the time came last January to send out the statements, association employees were ready. Compton, who designed the combined-statement system and who spearheaded its implementation, recalled that preparation and mailing of 25,000-plus statements was accomplished over a three-day period.

Imagination and Know-How

What does it take to create a system that can do such an impressive job? It takes imagination and a knowledge of what the computer can do to speed up financial operations and save money. Ronald P. Weller, also a First Federal vice-president, had the idea of

combining year-end statement with the 1099 and he sold it easily, largely because First Federal had previous DP successes in lending activity.

It also takes talented programmers to put ideas into action within a brief time frame and First Federal has that talent. In fact, bringing up the consolidated statement system required only one man-month of programming effort, using the old statement format but adding the requirements for combining it with the 1099.

Further, the specific need has to be identified and described. The system producing the combined statement did not result from a sudden, critical deficiency. First Federal had been getting information to customers promptly in one way or another for years through the use of the computer. There was, however, a strong feeling that customer service could be improved significantly by issuing to depositors one piece of paper showing their total relationship to the bank.

Another vital ingredient of success is upper management's support in getting such a project off the ground and into the implementation stage. N. Carson Branan, president and chief executive officer of First Federal, enthusiastically extended that support.

"I think that use of computer systems, such as the one that produces our consolidated statement represents the best way to achieve economy, even though the initial cost might seem high. If we had it to do over again, we would follow the same route."

AKD (402) 392-2606
VOLUME DATA ENTRY SERVICES...
TAPE OR CARDS
"QUALITY AT A LOWER COST"
AMERICAN KEYIDATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Decstation Software Enhanced

MAYNARD, Mass. — An enhanced version of the OS/78 operating system, including a commercial Basic, multifunction support, and a

printer-spooler program, has been introduced by Digital Equipment Corp. for the Decstation small business systems, introduced late last spring [CW, June 2].

Built around DEC's VT78 terminal, which itself includes a PDP-8 minicomputer, the Decstation can be used in stand-alone operations or as a part of a network tied to a larger mini or a mainframe, a spokesman noted.

Basic Support

The Basic compiler supports commercial decimal arithmetic to 15-digit precision; a PRINT USING statement for formatted printing of numeric strings; a record-oriented random-access method for data storage and retrieval; and multiple data formats, he said.

The multifunction facility permits parallel operation of tasks under a real-time activity in the upper 4K words of the Decstation's memory. Those tasks run concurrently with other functions — communications and I/O spooling, for example — occurring in the rest of memory.

The enhanced OS/78 will be a standard part of the Decstation and will be delivered in all units starting in May, the

spokesman said. The current single-quantity cost of the small system, including a processor, dual floppy disks and the software, is \$7,995.

DISTRIBUTORS

Wordplex Corporation is a leader in the rapidly expanding word processing industry. We offer the broadest and most advanced range of products available — from a single station screen-based system to shared logic systems with as many as 32 word stations and massive storage.

In 1976, following a 3 year development program, the Wordplex products were first announced in Europe. Success has been outstanding with the result that Wordplex distributors now occupy prominent positions in all major European and Australian word processing markets.

We are now seeking organizations with experience in distributing computing systems in Canada and the following areas of the U.S. —

Alabama
Alaska
Albany & Buffalo, NY
Arizona
Arkansas
Hawaii
Idaho
Indianapolis, IN

Kentucky
Louisiana
Miami, Florida
Mississippi
Montana
Nevada
New Hampshire
New Mexico

North Carolina
North Dakota
Oregon
South Dakota
Tennessee
Utah
Vermont
West Virginia
Wyoming

Contact Geoff Groom
31829 W. La Tienda Dr., Westlake Village, CA 91361
(213) 889-4455

wordplex

Tutorial on Testing Computer Programs

Limited space is still available for the next U.S. tutorial...

March 6-7, 1978 in San Francisco

If you're involved in the specification, design, development and maintenance of computer software, you'll probably be interested in the "Program Testing Tutorial," sponsored by Software Research Associates for both management and technical personnel. The next scheduled U.S. tutorial takes place on March 6 and 7 in San Francisco.

The instructor, Dr. Edward F. Miller, Jr., has concentrated the material for the 2-day session into five major subject areas: Philosophy of Testing; Theoretical Foundations; Testing Tools and Techniques; Planning and Measurement; and Management and Control.

Price for each attendee is \$395, which includes luncheon both days, a detailed notebook with a complete 400-citation bibliography, a topical cross-reference, bibliographic notes, technical summaries of selected papers, a complete glossary, and more than 350 pages of separate "offprints."

For complete information write or phone immediately

Software Research Associates

P.O. Box 2432, San Francisco, California 94126

(415) 921-1155

1978 U.S. Tutorials in May, July, September and November.

In Coast-to-Coast Circuit

Firm Uses Device to Cut Satellite Delay

By Ronald A. Frank
CW Staff

GERMANTOWN, Md. — General Felt Industries is one of the first users of a device provided by American Satellite Corp. (ASC) to eliminate propagation delays.

Called the Satellite Delay Compensation Unit (SDCU), this ASC-designed unit virtually eliminates the effects of the approximate half-second delay in signal transmission time over the 44,600 mile-long satellite hop. When using the SDCU, data can reportedly be transmitted between computers by satellite practically at the same speed as if they were connected directly.

General Felt, which transmits payroll, inventory and other business data between its offices in Los Angeles and Saddle Brook, N.J., "has increased data transmission speed, or throughput, approximately two and one half times," according to Bob Fredericks, General Felt's DP manager.

After several months of successful operation, General Felt now plans to install an additional SDCU in its Dallas office with a Data 100 Corp. Model 77 remote batch ter-

minal. General Felt links together an IBM 370/135 in the company's main office in New Jersey with a remote job entry Basic-Four Corp. minicomputer in Commerce, Calif., a suburb of Los Angeles.

The firm is now operating at 9,600 bit/sec using Paradyne Corp. modems on the satellite circuit. Initially, the satellite link was used for 4,800 bit/sec transmissions but traffic increased significantly so the speed was upgraded, Fredericks said.

When the company began coast-to-coast data transmission at 3,600 bit/sec, the effective rate was closer to 3,000 bit/sec because of the error rate and line turnaround. Because of the high error rates, General Felt was interested in trying something new, he said.

The SDCU available was attractive to General Felt because it used an error-correction principle that could cut down on the need to retransmit data, Fredericks said. On a satellite link, the SDCU transmits only the error blocks a second time whereas other methods retransmit an entire message that was sent after the point at which an error occurred. By retransmitting only bad blocks,

effective throughput was increased, he explained.

Using the compensation unit, records can be blocked to cut down on retransmission, and thus retransmission factors are reduced significantly, Fredericks said.

The Model 135 CPU actually thinks it is talking to another CPU instead of the SDCU. In addition, the compensation unit has two buffers so that there is always a buffer full of data available when the line is ready to transmit, he added.

General Felt is paying about \$1,100 for its coast-to-coast satellite link including the SDCU, while a comparable terrestrial facility from the phone company would cost about \$1,800/mo, according to industry spokesmen.

The Model 135 at the New Jersey DP center operates under IBM's Basic Telecommunications Access Method (Btam) with an Integrated Communications Adapter (ICA).

U.S. Packet Nets Plan Datapac Link

WASHINGTON, D.C. — Both of the U.S. public packet networks have disclosed plans to interface with the Canadian Datapac packet network.

Telenet Communications Corp. of Washington, D.C. said it will have rates to 55 Canadian cities "as low as \$2.90 per hour." Two basic services will be offered: low-speed asynchronous to 1,200 bit/sec and higher speed synchronous to 9,600 bit/sec, using the CCITT X.25 interface protocol.

For Canadian-U.S. calls, connection will be 90 cents per hour plus \$3 to \$7.50 per kilopacket depending on location. For U.S. calls to Canada, connection will range from \$1.80 to \$4.20 per hour depending on city plus \$1.10 to \$5.60 based on destination.

Tymnet of Cupertino, Calif., said it will offer 110- to 300 bit/sec service, with Canada-to-U.S. charges ranging from \$4 to \$10 per hour and U.S.-to-Canada rates ranging from \$4 to \$6 per hour.

Tymnet will begin March 22, while Telenet said it will start service on Feb. 22.

TDMs Help Preserve Efficiency In Upgrade of Brokers' Network

NEW YORK — In an environment where a worldwide message-switching system connects 2,000 subscriber terminals of large brokerage houses with the major stock exchanges to conduct 15% to 20% of the total volume of trading on the New York and American Stock Exchanges, reliability is obviously important. When new clients were added to this network and its use grew, the Financial Services Division of ADP, Inc. faced a unique challenge in maintaining its system's reliability while upgrading capacity and performance.

Assigned to provide the software design for this message-switching system, Conversational Systems Corp. of New York incorporated intelligent time-division multiplexers (TDMs) in an important segment of the network.

To establish enhanced multiplexing capabilities for the upgraded network, Conversational Systems chose the System 4100/1 network processor from Western Union In-

formation Systems. The device is a microprocessor-controlled TDM that supports a range of terminal devices over switched and dedicated lines. It handles asynchronous lines up to 1,800 bit/sec and is rated for operation of synchronous lines up to 9,600 bit/sec.

For the ADP network, Conversational Systems is "single-ending" these multiplexers. That is, instead of configuring the multiplexers in pairs at both ends of a synchronous circuit, the System 4100 synchronous line goes directly into a switch interface unit.

"We decided to introduce this multiplexing equipment into a portion of the network because the System 4100 meets our special needs currently and also provides capability for future expansion," according to Jeffrey Goldfarb, technical marketing vice-president of Conversational Systems.

"Use of the System 4100 is a first step toward greater flexibility in managing the

(Continued on Page 30)

CLIP AND RETURN FOR FAST RESPONSE

save

buy a coupler/terminal

from the modem outfitter

A compact lightweight Series 150 coupler can be combined with popular terminals to provide a significant savings . . .

☐ LA-36 DECwriter II with 150A2-14B \$1637

☐ TI 743 with 150A2-12B \$1437

☐ Teletype 43 with 150A2-14C \$1287

☐ Teletype 33KSR with 150A2-11D \$1047

☐ Acoustic Couplers ☐ Modems ☐ Multiplexers ☐ Floppy Discs

Check items of interest and return to us for more information

COMDATA

8115 Monticello
Skokie, IL 60076
312/677-3900

New York
212/267-3696

member of
IDCMA
Los Angeles
213/624-0550

name _____
company _____
street _____
city _____ state _____ zip _____
telephone _____ ext _____

terminals

TDMs Keep Efficiency High in Net Upgrade

(Continued from Page 29)

network because it concentrates multiple communications lines into a single network for more efficient handling by the switching computer," he said.

In redesigning the network for ADP, Conversational Systems found that growth and changing customer requirements posed several major problems.

First, the financial community was moving toward higher speed communications, and ADP wanted to provide clients who were interested in phasing out low-speed equipment with this capability. This meant enhancing certain aspects of the ADP network to handle the higher speed equipment.

Second, research studies indicated

that sufficient expansion of the original message-switching computer (dual IBM 1130 systems) would not be cost-effective. As more customers joined the network, the number of lines increased.

Also, line costs rose as a growing number of subscribers were located far from New York. Yet continually adding equipment to the existing network architecture in order to sustain growth and maintain service quality was becoming more and more expensive.

An increase in lines added another problem: Efficiency of the system was threatened. Adding more equipment to the existing network was becoming more harmful to overall system reliability.

The 4100 was chosen in part because

it handles higher line speeds some customers might require for their terminals. Jack Gostl, vice-president for communications at Conversational Systems and project manager for the design of the ADP system, said, "Because the System 4100 concentrates 20 lines into one, it has increased throughput capabilities of the switch. And because we can modify the ways the concentrated lines are serviced, we can reduce overhead and permit a larger number of lines to be handled without overburdening the CPU. "With the System 4100 taking some of the load off the CPU, we can service more lines on each system," he said, "and the overall hardware and operating cost of the system on a per-line basis is reduced. Comparing this

switch with other existing switches and front ends, ADP has achieved a lower cost per line while maintaining high throughput rates."

"In addition, being able to isolate system faults, we have a more manageable system and gain greater network control," Gostl said.

The System 4100 is maintained by Western Union Information Systems' nationwide service. Downtime for the system is reportedly minimized when problems do occur, because the 4100 design relies on board replacement.

Switch Operation

Today the general-purpose switch handles 10 messages a second with a total turnaround time of less than 1.5 seconds on 90% of the messages. The switch uses dual Digital Equipment Corp. PDP-11/70s, one for backup, with RP04 disk storage and acts as a front-end processor to an order match system at ADP (dual IBM 370/158 computer system in New York). The 2,000 terminal stations tie in to the switch with 300 subscriber lines.

The system transmits administrative traffic between terminals and the stock exchanges, and also stores and forwards information for retrieval. Orders entered by the various broker subscribers are collected, transferred into the IBM 370 for order matching and sent back to the switch for forwarding to the floor of the proper stock exchange for execution or to other computers in the network.

Normally, System 4100 multiplexers would be used in back-to-back configuration with terminal traffic coming into one System 4100, transmitted via a synchronous communications line with special System 4100 communications protocol. At the remote location the traffic would be demultiplexed in the other System 4100 and presented to the processor.

However, Conversational Systems is instead "single-ending" the units, so that the synchronous communications line of each System 4100 goes directly into a DEC interface, and the messages are demultiplexed in the switch. Two 4100s handle up to 20 subscriber lines each and a third unit backs up the other two.

Concerning future enhancements and network growth, the multiplexers fit in with prospective expansion for the ADP network in several ways. First, according to Jeff Goldfarb, additional cost savings are possible. In addition, remote locations of the 4100 units in the network can further expand system cost-effectiveness.

"If ADP starts using the System 4100 in remote configurations, there will also be an increase in the system's ability to economically handle remote subnetworks for clients," he said.

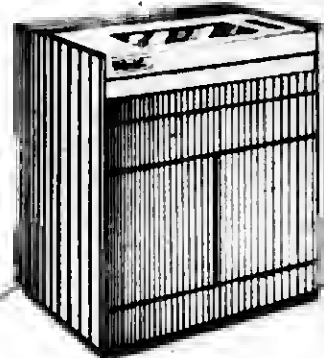
"These independent subnetworks can also be implemented through the central switch, with subscribers exchanging messages in complete security. This will mean there will be more efficient ways to use the network facilities, and therefore a higher degree of service will be available to ADP customers," he added.

Enhancement of the System 4100 could also provide greater error correction capability, Goldfarb said. Future ADP network plans call for enhancement of the communications protocol so the System 4100 can be buffered.

The Printer Store

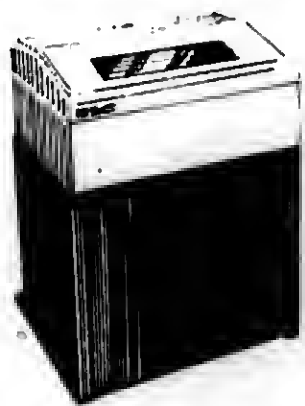
Digital Associates Corporation

Or, switch to ChainTrain quality.



The DAC CT 6644 is a 600 LPM ChainTrain printer that replaces LP11-YA. It gives letter-quality printing, and costs about 40% less than DEC's 600 LPM drum printer. Again it comes with PDP-11 interface, installation and maintenance.

Savings for Data General Nova & Eclipse DMA Users.



Save up to 40% on our models which are direct replacements for Data General printers. There are similar savings on all other printers, enabling you to replace Nova & Eclipse printers with higher speed or ChainTrain letter quality DAC printers. And we have the DMA Eclipse attachment.

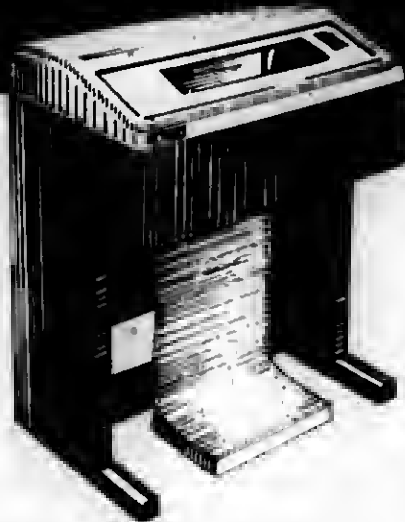
PDP-11

USERS:

Save 40%

on your printer costs.

Join the Fortune 500 companies and other mini-computer users who have purchased over 1,000 printer systems at the Printer Store.



You can save 40% on your LP-11 printer costs. The DAC-2260 is a 600LPM plug-to-plug replacement for your LP11-YA. Or, for 25% less than DEC's 600LPM printer, we offer the 900LPM, DAC-2290, plug-to-plug replacement for the LP11-CA. And they both come with PDP-11 interface, installation and complete maintenance service. Whether you buy, rent or lease, you still save.

Why we can offer such extraordinary savings.

The Digital Associates Printer Store is the first and the largest independent outlet of quality line printers for mini-computer systems. We buy printers, in quantity, directly from the manufacturers, and add interfaces to all the popular mini-computer CPU's. Then we offer complete printer systems (printer interface, installation and service) at prices the mini-computer suppliers simply can't match. The Printer Store can supply printers from 100 to 1500 LPM, dot matrix, drum, ChainTrain or band technology, for DEC, Data General, Hewlett-Packard, Interdata, G.A. and most other mini-computer systems! And for IBM Series 1 and S/3 computers. We install what we sell, and service what we install (unless you insist on doing it yourself). Buy, lease or rent, you'll save 20% to 50% on prices you'd pay to the mini-computer manufacturer.

Have you ordered an IBM Series/1?

Before you sign up for a 300 LPM printer, call The Printer Store. We'll give you a plug-to-plug, 600 LPM heavy-duty ChainTrain printer for the same price. We'll take your old printer as a trade-in when you order your new printer from The Printer Store.

Digital Associates Corporation
1039 E. Main Street, Dept. A
Stamford, Connecticut 06902

☐ I'd like more information on The Printer Store
☐ Send literature on following printer: _____

Name _____
Company _____ Title _____
Address _____
City _____ State _____ Zip _____
Phone _____

Digital Associates Corporation, 1039 E. Main St., Stamford, CT 06902, Phone (203) 327-9210. Outside CT, Call Toll Free 800-243-9054

HAZELTINE'S SWEETHEARTS

*A new definition in
conversational terminals that
includes most features usually
found only in higher-priced
terminals.*

**Hazeltine
1500**

*A buffered editing terminal
with extended system
flexibility and capabilities.*

**Hazeltine
1510**

*A Multi-Processor System
Terminal...A Breakthrough
in Printer Control.*

**Hazeltine
1520**



Some trio of terminals!

Capable. Fast. Reliable . . . Beautiful.
With specific capabilities for specific tasks.
Ready now for your next assignment.

Hazeltine Puts Performance Into Economy Terminals.

Hazeltine Corporation, Computer Terminal Equipment, Greenlawn, New York 11740 (516) 549-8800 Telex 96-1435
ENGLAND: Hazeltine Ltd. 01-948-3111 Telex (851)-928572

GERMANY: Hazeltine GmbH 0611-590748 Telex (841)-416924



Multiline Buffer Added by BPI

MIAMI — The BPI Model 8 multiline buffer reportedly permits CRTs and other RS-232C compatible terminals to be located up to 4,000 feet from a CPU without the use of modems.

The Model 8 includes eight buffered lines that permit buffering of up to four terminals. The Model 18 includes 18 buffered lines conforming to signals described in the EIA specification, the firm said.

Both units carry a full-year warranty, BPI added.

The Model 8 is \$149, and the Model 18 costs \$195. BPI Electronics, Inc. is at 4470 S.W. 74 Ave., Miami, Fla. 33155.

GE Teleprinter Operates to 1,200 Bit/Sec

WAYNESBORO, Va. — The Terminet 1232 teleprinter, featuring 132 columns, designed for use at rates to 1,200 bit/sec and including a 1K buffer, has been announced by the General Electric Data Communication Products Business Department.

This Terminet belt printer device makes use of the same rotating belt principle developed a decade ago for the Terminet 300 printer. The rotating print belt utilizes a 510 char./sec hammerbank mechanism which has a hammer for each print position. All 128 Ascii characters may be generated from the standard Ansi four-row keyboard, the firm said.

The Terminet 1232 printer uses a replaceable Mobius loop ribbon cartridge, a device introduced by GE nearly three years ago. The cartridge

contains 65 yards of 3/4-in. ribbon.

The Terminet 1232 printer is available in keyboard send-receive (KSR), receive-only (RO), automatic send-receive (paper tape) or magnetic send-receive (magnetic tape) configurations. The KSR stands 38 in. high, 26 in. wide and 34 in. deep and weighs 166 pounds.

Front or rear paper handling is a standard feature, while six-pin tractors handle one- to six-part forms. Paper widths from 3- to 15 in. can be accommodated, the company said.

Horizontal tab and vertical formatting are standard with 10 char./in. horizontally and six line/in. vertically. Operator-selectable six or eight line/in. is optionally available. Speeds are switch-selectable at 10-, 20-, 30-, and 120 char./sec.

Optional features of the Terminet 1232 teleprinter include numeric cluster, answerback, 20 mA interface and line control. APL character set and keyboard are also optionally available as is a bridge-mounted single or dual magnetic tape accessory or side-mounted paper tape reader and punch, GE said.

The Terminet 1232 printer costs \$5,155 and lease plans are available from Data Communication Products Business Department, Waynesboro, Va. 22980.

Unit Monitors Data Circuits

RIDGEFIELD, Conn. — Digitech Data Industries, Inc. has announced the availability of the Pacerscope, a CRT monitor with programmable control for diagnosing data link failures.

The Pacerscope has been designed to provide "a clear window" to a data communication circuit from the RS-232 interface. The user can reportedly view all data in real time up to 9,600 bit/sec (full duplex) or selectively filter data to show only those portions of diagnostic interest. Offline it will display thousands of characters to permit analysis of recorded data, Digitech said.

Software control, coupled with visual enhancements, provides for viewing data between the occurrence of two distinct events. For example, the user may observe data from one or any number of CRTs in a multipoint drop. In addition, the unit will display special operator messages, prompt, alarm conditions, any time measurements, event counts (up to four separate events) and special symbols, all of which permits recognition of data stream conditions, the firm said.

The Pacerscope is available with a 9-in. tabletop CRT for \$2,500 or a 14-in. rack-mount CRT for \$2,600 from Digitech Data Industries, Inc., 66 Grove St., Ridgefield, Conn. 06877.

Telecom Serving Datapoint Users

ALEXANDRIA, Va. — Users of Datapoint 3000, 3300 and 3360 CRT terminals, which were discontinued by the manufacturer in late 1977, can obtain refurbished units, parts and service from Telecommunications Services Co. (Telcom).

Telecom also offers updated features for the Datapoint terminals, including scrolling on the 3370, higher transmission rates (to 9,600 bit/sec), 20 mA loop and a variety of smaller convenience changes on the Datapoint dumb and editing terminals. Telecom is at Box 4117, Alexandria, Va. 22303.

ATTN: 3270 USERS

Here's a *tailor-made* system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. Systems Programmers, in particular, find the following features very valuable.

Both Local and Remote 3270 are available, of course,

PLUS

Local Job Entry. Line printers up to 1200 LPM with 1403 addresses and card readers with 2501 addresses can be placed next to any BRAEGEN CRT. These "hot" printers and readers are located in the users' areas up to 7,500 feet outside the computer room. Most popular uses are for programmer listings and accounting work. Users get the benefits of increased productivity because turn-around time is reduced to minutes.

PLUS

Address Switching. Any BRAEGEN CRT terminal provides as many addresses as required for Console, TSO, Applications, etc. Any CRT can have both Local and Remote addresses. This feature can reduce the number of CRT's required and will eliminate NCP,

VTAM type software overhead requirements.

PLUS

Multiple Controller Interfaces. The BRAEGEN controller allows multiple channel and remote interfaces. Any CRT can access multiple local IBM CPU's or remote CPU's. Just 2-3 seconds to switch a CRT between CPU's or addresses.

PLUS

Fast Cursor, Programmable Keyboard, 7500' Coax,

Multiple Drops per Coax, Wide range of speeds in 3286/3288 compatible printers; from 45 cps to 1200 LPM, Offline Data Entry, and our Offline TSO Editor.

PLUS

Features others have promised for 1978-1979 are **AVAILABLE NOW . . .** Local Copy, 128 character set CRT, Typamatic keys, Home key, etc.

PLUS

Low Prices — 1, 2, 3 year leases available.



Customers throughout the U.S. are benefiting from these features now. For more information please write or call; The BRAEGEN Corporation, 20740 Valley Green Drive, Cupertino, California 95014. (408) 255-4200.



BRAEGEN

**DECwriter II's & III's
For Sale**
•LA36
•LS120

**BEST PRICE
FAST DELIVERY**
CALL TOLL FREE 800-323-2288
IN ILL. CALL 312-279-1960
Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

Fill out and mail this self-addressed postcard.

☐ Please send me more information on:

☐ Have someone call me about:

☐ UCC ONE (Tape Management Software)

☐ UCC TWO (DUO, DOS under OS)

☐ UCC THREE/ADAM (Disk Management System)

☐ UCC SIX (PDS Space Management)

☐ UCC TEN (IMS Data Dictionary/Manager)

☐ UCC FIFTEEN (Job/Recovery Management System)

☐ UCC FCS (General Ledger/Financial Control System)

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Telephone _____

Hardware _____

UCC

UNIVERSITY COMPUTING COMPANY

First Class
Permit No. 13443
Dallas, Texas

BUSINESS REPLY MAIL

No postage necessary if mailed in United States

Postage will be paid by

UCC
UNIVERSITY COMPUTING COMPANY
Customer Relations
P.O. Box 47911
Dallas, TX 75247.

Computerworld CW-278

WE CAN HELP YOUR COMPUTER TO DO MORE OF THE WORK.

UCC software is solving problems in more than 2500 installations. Worldwide. We can help your computer do more of the work, too. With software systems like:

TAPE MANAGEMENT: UCC ONE's 700 installations represent about ¾ of all automatic OS tape management systems. UCC ONE manages your tapes and protects valuable data from loss or destruction. It provides real-time tape status. Eliminates costly, handwritten records and the expensive mistakes they breed. Gives you better control and greater efficiency.

DOS UNDER OS: UCC TWO lets you continue to use your DOS programs—without reprogramming—while you convert to OS. You plan the conversion or consolidation to fit your work schedule, instead of the other way around. You can consolidate your DOS operation into your OS/VS environment today. Or, you can spread the conversion—and the costs—over months. UCC TWO is the best path to OS and 500 users have proven it.

DISK MANAGEMENT: UCC THREE/ADAM solves the problem of inefficient DASD space usage. Based on user specifications, it automatically scratches unneeded, unused and invalid data sets. Or it will migrate the data sets to tape, based upon any combination of criteria—such as usage frequency, size and retention period. Then, UCC THREE keeps the problem from

recurring by controlling data set allocation. Fragmentation and the need to periodically compress packs is reduced. Accurate reports on your current space utilization are produced.

PDS SPACE MANAGEMENT: UCC SIX is the only software package that eliminates PDS compression—because it automatically inventories and controls PDS disk space. It spells the end for ABENDS and “dump and restore” operations caused by exhausted PDS disk space. You even save money on your disk investment, too.

IMS DATA DICTIONARY/MANAGER: UCC TEN is the standard IMS dictionary, with more installations than the Program Product offered by its nearest competitor. Not only does UCC TEN give you superior control over your data base environment, it also defines your data communication network, produces 3270 screen formats and generates IMS Stage 1 SYSGENS. Now, at last, you can get the benefits you expected from IMS.

JOB RECOVERY MANAGEMENT: UCC FIFTEEN lets you restart at the proper job step—instead of at the beginning. The OS catalog is corrected, unnecessary direct access data sets are deleted, and GDG biases are properly altered for the rerun. Automatically—so manual errors in restarting and rerunning are eliminated.

FINANCIAL SOFTWARE: The UCC General Ledger/Financial Control System is the most advanced and complete system of its type. Full general ledger accounting. Budgeting. Cost allocation and profit center reporting. It can generate over 100 standard reports. Plus, it has an easy-to-use report writer that the Accounting Department can use—with a minimum of EDP assistance.

SUPPORT: It takes more than code to make a good software product. It takes dependable, long-term maintenance and support of these products. And support is just one more way that we're helping the computer to do more of the work in more than 2500 separate installations.

UCC

USA: P. O. Box 47911
Dallas, Texas 75247
Canada: 101 Duncan Mill Road
Don Mills, Ontario M3B 1Z3
Europe: 1258 London Road
London, U.K. SW16 4EG

CALL 1-(800) 527-3250 OR MAIL THIS CARD.

- ☐ Please send me more information on:
- ☐ Have someone call me about:
- ☐ UCC ONE (Tape Management Software)
- ☐ UCC TWO (DUO, DOS under OS)
- ☐ UCC THREE/ADAM (Disk Management System)
- ☐ UCC SIX (PDS Space Management)
- ☐ UCC TEN (IMS Data Dictionary/Manager)
- ☐ UCC FIFTEEN (Job Recovery Management System)
- ☐ UCC FCS (General Ledger/Financial Control System)

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Telephone _____

Hardware _____

Customer Relations • University Computing Company
P. O. Box 47911 • Dallas, Texas 75247

CW-278

Member SIA  Software Industry Association

Cuts Billing Run Time 80%

Notion Firm Alters Order, Inventory System

NEW YORK — Lidz Brothers, Inc. is realizing internal breakthroughs with DP techniques that are sophisticated in design but simple for the user.

Inventory has been reduced 40%, while billing run time has been slashed 80%. Cobol programs written by an employee are running smoothly on a Univac 90/30 system together with Uniscope 200 CRT terminals and using a special software program known as Information Management System/90 (IMS/90).

Lidz Brothers is one of the major suppliers of buttons and other sewing notions in the U.S. Marketing is handled by two divisions: One sells to apparel manufacturers while the retail division

services a variety of retail customers including department stores, variety stores, chain stores and fabric shops.

In the past dozen years, the company has gone from using keypunch machines to the Univac 9200 CPU (first a card system and then disk-oriented) and finally to the current Univac 90/30.

Data Entry Upgrade

Data entry precision was achieved by a changeover from conventional keypunch units to Uniscope 200 display terminals.

Lidz receives several hundred orders daily, each containing about 50 line items. The orders come in various

forms — reminder cards from the display racks at the stores, customers' formal purchase orders, telephone messages and written orders from the sales offices.

The first operation is to log the orders manually and code them with customer and store number plus exception handling instructions. Previously, the various order forms were used as input media by keypunch operators. They would punch the customer and store number into an 80-column card which, when entered into the system, caused the shipping billing information to be accessed from the master file stored in disk memory.

The present procedure, using Uni-

scope 200 terminals connected to the 90/30, enables data to be directly entered or accessed in any sequence. The terminal operator, novice or experienced typist, keys the customer and store number from an order form which causes the full shipping and billing information as well as the keyed information to appear automatically on the terminal display screen. The balance of the order information is then keyed and displayed.

With the complete order visible on the screen, the operator is able to visually validate the order, key any update or correction and visually verify the changes made.

This procedure produces accurate shipping documents. But in addition, it saves in valuable CPU time and in equipment cost because the terminals cost less than keypunch units.

An on-line billing application written in Cobol reportedly prepares data in 20% of the time taken previously by the keypunch procedure. The program was written by a man with no formal training in Cobol, Lidz said.

The billing method is based on the existing order entry files. The entering of billing data into the system via the on-line CRTs and the editing and validation were simplified by the maneuverability of data on the video screen.

Changes Simplified

Prior to the use of the terminals, copies of the picking tickets were routed to the keypunch stations. Operators would punch a finder card including all the pertinent information about each order. Any last-minute changes in quantity and their effect on price and discounts would also be punched.

The cards had to be verified and the information edited for correct items and quantities. This accumulated a lot of keypunch time and card volume. Now, when the picking document comes from the warehouse, the operator keys in the customer and log number on the terminal and the name and address appear on the screen.

The operator selects the order for billing, fills in a formatted screen with detailed changes to items (price, quantity, deletions, etc.). The operator calls another formatted screen which allows overriding master file information such as terms, discounts, salesmen, etc. and the inclusion of shipping data and comments.

While this procedure allows for the changing of the entire order via the Uniscope 200, most orders are billed as ordered.

The editing procedure is simplified by automatic queries and instructions that appear on the screen. The screen asks for order numbers, shipping instructions, changes, and comments, so that even inexperienced personnel can handle the procedure.

In addition to developing the new order entry and billing systems, the DP department of Lidz Brothers is changing to a management information center. The use of Uniscope terminals in the on-line mode of operation makes this change viable.

A complete inventory management application, using by-product data (Continued on Page 38)

A SECOND "OPEN LETTER" TO THE

UNDER-EMPLOYED

COMPUTER INDUSTRY PROFESSIONALS....

THE GOOD NEWS...

is that the Computer Industry has an overwhelming need for innovative professionals and for middle and upper management talent.

THE BAD NEWS...

is that the Computer Industry, driven by a never-ending need to invest in technology, is not investing heavily enough in the professional and economic growth of its people. All too often, the **BEST JOBS**—the high responsibility, the high visibility, the high paying jobs—are given to **OUTSIDERS**. Unfortunately, economic and professional growth must often be attained through the **JOB-HUNTING** process.

MORE BAD NEWS...

If you've tried job-hunting, either casually or aggressively, during the past several years, you appreciate that there is **NO EFFECTIVE SYSTEM** for identifying the **BEST JOBS**. The conventional techniques, if they work at all, yield jobs that are beneath your capabilities, that pay less than you are currently earning, and/or provide little upward mobility. If you've tried the conventional techniques, you know how ineffective they are—

- Contacted Industry Friends
- Answered Advertisements
- Written to Company Presidents
- Contacted Search Firms
- Contacted Employment Counselors
- Contacted Employment Agencies

Use of these **CONVENTIONAL TECHNIQUES** has probably caused you to assume that there are no good jobs available, or assume that you aren't qualified for better.

You've probably decided to wait for the next reorganization to see how you fare. You have decided to wait...and wait...and wait for someone to call you with a job offer.

SO, WHAT'S WRONG??

If the Computer Industry really needs innovative professionals and needs middle and upper level managers...and if you are **UNDER-EMPLOYED** in your current company, why aren't you being "wooed" by competitive firms?

The answer, we believe, is that there is no effective and selective way for you to learn of opportunities for the **BEST JOBS** and there is no way for you to make your availability and interests known. There is a **BREAKDOWN IN COMMUNICATIONS!**

PROFESSIONALS REFERRAL SERVICE has been established to improve communications. We believe that a high percentage of the **BEST JOBS** are filled by the nation's 1,100 Executive and Professional Search Firms. **PROFESSIONAL REFERRAL SERVICE** serves you by making your background, skills, and interests known to Search Firms at precisely the time they are looking for someone with your qualifications.

The advantages you enjoy under the **PRS Plan** include:

THE BEST JOBS—Only those jobs worthy of Search Firm involvement are represented.

CONFIDENTIALITY—Search Firm involvement assures you that your current employer will be unaware of your activities.

NEGOTIATION LEVERAGE—Prospective employers don't look at you as a "job hunter", thus preserving your ability to negotiate a better compensation package, and...

COVERAGE—Nationwide exposure to opportunities, worthy of your consideration are provided.

If you are interested in evaluating employment alternatives in a sane, efficient, and economical manner, please contact **PRS** for details of our **UNCONVENTIONAL** job hunting technique.

Please send me information about the PRS Plan.

Name: _____

Address: _____

City: _____

State: _____ Zip: _____

PRS

PROFESSIONAL REFERRAL SERVICE, INC.

672 Silver Spur Road, Rolling Hills Estates, CA 90274

CW/2

Mexican User Banks on Independent Modems

MEXICO CITY — A network based upon IBM's System Network Architecture (SNA) concept and utilizing an independent's licensed 1,200 bit/sec and 2,400 bit/sec CCITT-compatible modems is now in use at Multibanco Comermex here.

A requisite of the net was a greater integration of the bank's offices throughout the country over a reliable data transmission system. Once the network was established, Multibanco Comermex decided to install backup systems both at the mainframe and in the telecommunications equipment. The use of distributed intelligence technology was supported by a high-level synchronous communications protocol.

One of the bank's objectives was to use modems manufactured in Mexico. This objective was achieved by contacting the General de Telecomunicaciones S.A., which supplied modems manufactured in Mexico under license from the Vadic Corp.

Two types of modems were licensed from Vadic: the VA1200L CCITT V.23-compatible 1,200 bit/sec modem and VA2400L the CCITT V.26-compatible 2,400 bit/sec modem.

The network is supported in **Kit Eases Design Of CRT Output**

NEW YORK — Magic Chart, Inc. has introduced the Terminal Layout Chart for the design and testing of output intended to appear on CRT screens.

A layout chart kit comes with one 11-in. by 11-in. mylar sheet, two marking pencils, one marking pen and an eraser. The layout board also comes with an 11-in. by 11-in. white vinyl sheet and two marking pens.

The kits cost \$25 each, for either the mylar or vinyl versions. Quantity discounts are available for three or more kits. Magic Chart is at 25 Broad St., New York, N.Y. 10004.

a DP center and a data telecommunications center here. Multibanco Comermex also offers a verification and screening through telephone service back-up to remote and branch offices, in case of a catastrophic failure such as a power outage at a remote office.

Installation of controls for remote terminal management of provincial branch offices has been planned, and integra-

tion of remote offices in the country's interior has already been started.

The Multitronic network, based on the IBM 3600 financial terminal system, includes IBM 370/125 and 370/135 computers and two IBM 3704 communications processors to provide complete backup for the on-line operation. Normally, the 135 is used on the first and last days of the week and on pay days (15th and

30th of the month).

Each 3704 front end is capable of managing the entire network, because of data divider bridges, following the VA2400L modems. The bridges accept four 3600 terminal controllers backing up both the 1,200- and 2,400 bit/sec modems, which are housed in 16-channel multiple mounting racks.

At present, the system has 46 branches, most of them in the

metropolitan area of Mexico City. The system contains 140 data terminals linked by the Vadic-licensed 1,200- and 2,400 bit/sec modems.

The 1,200 bit/sec modems are used at the branch level, while the 2,400 bit/sec modems are used at the DP center. The system is used for debits, credits and verification on checking and savings accounts and financial mortgage loans.

DatagraphiX brings an end to the 80 column squeeze.

It's unbelievable — but true. You'll never again have to squeeze 132 columns of printer output onto an 80 column terminal. The new DatagraphiX® Model 132A Display gives you a full 132 columns in 30 lines on an 11" x 8 1/2" screen. And these are high resolution, easy to read, Charactron® characters in upper and lower case. Microprocessor-controlled with an 8 to 16k byte buffer, it scrolls, tabs, changes brightness, edits on a line, and has addressable cursor, with asynchronous communication to 9600 bps in half or full duplex. So now you can stop wasting time and money on processing communications and programming to reformat your data. Use the coupon to get all the details on how you can end

DatagraphiX

See how easy it reads at only 50% of actual size.

TI 765

BUBBLE MEMORY TERMINAL

Available MARCH

Call NOW for your Delivery Slot...

TI 745

PORTABLE DATA TERMINAL

Available NOW for
SALE or LEASE

EQUIPMENT RESOURCE, INC.

1022-3 Cherokee Rd.
Smyrna, Georgia 30080
(404) 434-1382

Mail to: **DatagraphiX, Inc.**, Display Department
P.O. Box 82449, San Diego, CA 92138
(714) 291-9960

Please send me information on how I can end the 80 column squeeze with the new 132 column display from DatagraphiX.

Name _____

Title _____ Phone _____

Company _____

Address _____

City _____ State _____ Zip _____

C1D

See it June 13-16 at the NCC Show in Dallas.

With 90-Day Minimum Lease ATL Has Terminals for Short Term

BOSTON — American Used Computer Corp. has launched the American Terminal Leasing Co. (ATL) to provide users with short term (90-day minimum) leasing of new terminals as alternatives to outright purchase.

Most leasing companies will lease terminals only for a year at a time and insist on the continuation of the lease for a minimum of another year if the user still needs the equipment, ATL said.

A recent ATL survey, reportedly found users need considerably more flexibility, especially when they are expanding and testing communications

applications. Most of these trials last less than a year and burden the user with extra months of the lease as a hid-

Terminal Transactions

den penalty to the fixed one-year term, ATL said.

Another user consideration is the continual upgrading in many hard-copy applications. Here users start off with a 10 char./sec. Teletype, upgrade

to a 30 char./sec Digital Equipment Corp. Decwriter II and next step up to the Decwriter III with 180 char./sec. The user often needs the Decwriter II for 18 months or so while he upgrades his CPU to more power, according to ATL.

In these cases, the outright purchase of hard-copy terminals is uneconomical and the residual values of the terminals subject to high depreciation risk because terminal technology is rapidly changing, ATL said.

With terminals such as the Decwriter II, the addition of microprocessors will eliminate or reduce computer transmission requirements, the company noted. A user seeking to take advantage of the advances that will be coming within the next 18 months will be at a disadvantage if he purchases terminals today, ATL said.

ATL will lease both Decwriter II and Decwriter III terminals for 90 days with all options available. The leases are also available with an option to provide maintenance directly from DEC, even for 90-day leases.

The Decwriter II (LA36) costs \$80/mo. on a 90-day lease while the Decwriter III (LA 120) costs \$160/mo. for the same period.

At the termination of the lease, a user can continue on a month-to-month basis or a one-year lease can be written for \$60/mo and \$120/mo.

Delivery is immediate from ATL at 712 Beacon St., Boston, Mass. 02215.

Teletype 40, CPUs Linked

HOUSTON — The 200- and 300 line/min. versions of the Teletype Corp.'s Model 40 line printer can now be linked to computer mainframes with an interface from Tel-Tex, Inc.

The Model Universal Parallel Interface generates a universal handshake routine, permitting the replacement of existing line printers with similar operational specifications, Tel-Tex said.

Features include a print-stop switch to interrupt printing on two of several selectable control codes. This permits an operator to make required service of forms or other duties without stopping the computer program.

The unit comes with either manual or automatic control of printer motor. The printer can be turned on or off by the user or by control codes in the data stream.

The Universal Parallel Interface has the capability of utilizing a Tel-Tex furnished buffered serial interface. This permits a serial data flow in TTL, EIA or 20mA current-loop modes and allows the use of the line printer as a remote peripheral receive-only device.

The Model 40 and interface cost \$5,750. The interface alone is available for \$900 from Tel-Tex at 3203 Audley St., Houston, Texas 77098.

Firm Alters Order System

(Continued from Page 36)

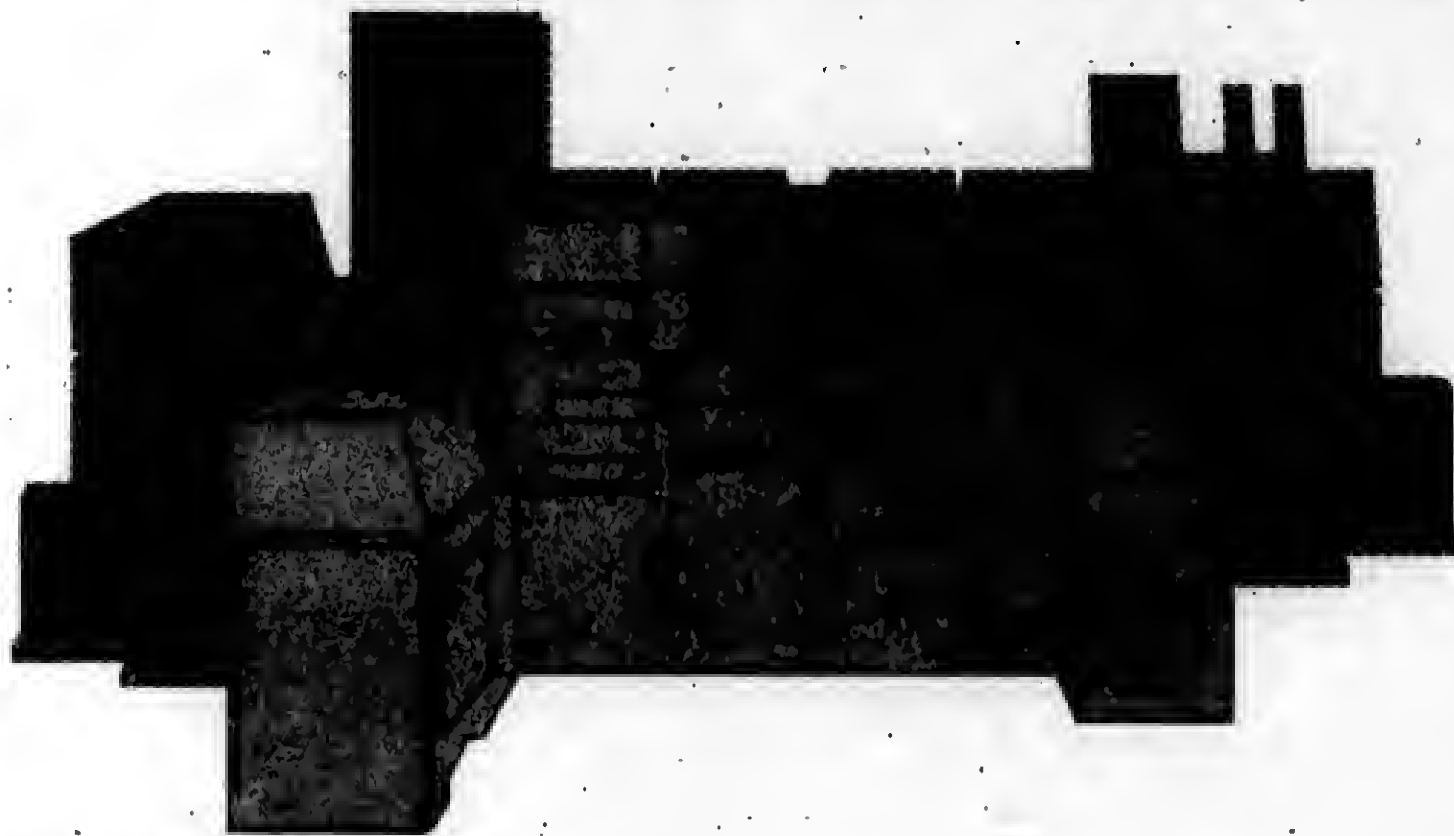
from the order entry and billing runs, provides management with information to closely control stock status conditions and make well-advised purchasing decisions. These reports also identify merchandise sales trends for the judicious adjustment of product lines.

Over the past six years, the reports have been modified and improved on a continuing basis producing an inventory much better balanced in terms of demand while paring down the number of out-of-stock situations. As a result, a continuous improvement in profitability is being realized. Moreover, there has been a reduction of

more than 40% in inventory carried over the past two years, the firm claimed.

For the near and distant future, Lidz Brothers plans to continue sharpening its DP systems to further improve the company's response to customers needs. A computer-generated purchasing system with a related accounts payable application are on the "to-do" list. An on-line inventory project is to receive concurrent attention and development. This project will introduce more time savings by obtaining a much wider variety of information in response to terminal inquiries and will almost eliminate the clerical work in this area, the company noted.

More System/3 for the same money!



easy to implement...
easy to upgrade leasing...

All IBM Hardware & Service. Amplicon leases only IBM equipment. All equipment refurbished to new equipment specifications. IBM provides all maintenance.

No Conditional Sales Contract Lock-In. Amplicon gives you true leasing flexibility. Upgrading is easier with an Amplicon lease than with an IBM contract.

Nationwide Specialists. Amplicon has System/3 specialists in most major U.S. cities. They can structure leases to meet your data processing, financial, and upgrading needs.

AMPLICON
INCORPORATED

505 North Tustin Avenue, Santa Ana, California 92705

(800) 854-0217 In California Call: (714) 834-0525

Economical and Flexible Alternatives from . . .

Sought by Users, Managers

COM Receives Boost From Two Sides

By Frank Vaughan
CW Staff

SAN DIEGO — Decisions concerning computer output microfilm (COM) equipment often result in paradoxical situations in which both users and management push DP managers to install it, according to William Porter, director of marketing for Datagraphix, Inc., a manufacturer of COM systems.

"COM is an inexpensive peripheral system from the point of view of total capital outlay, but the savings which can be derived from its use can be quite significant. So, if users look at the savings, there is a high priority for its installation," he said in a recent interview.

"If the DP manager has re-

ceived from his management the task of bringing on new applications, installing a new on-line system or putting some highly sophisticated DP techniques, he will give these tasks a top priority and assign a systems analyst to the jobs, because these tasks are carrying a big price tag.

"COM is low on the list because it is only going to cost \$100,000. But COM could derive tremendous savings, so the man at the top may see that quicker than the DP manager does," he continued.

"Also, the user may be the force that drives the DP manager. He may say 'Hey, I went to a meeting the other day and some of my colleagues in the industry were using COM. Why don't you give me COM?' " Porter suggested. If the user likes COM, the DP manager is going to be forced to get it, he forecast.

Likely Candidates

Who is likely to become a first-time user of COM? There is no clear picture of that user, according to Porter. "In general, he's got a computer, of course, although there are some users who don't have a CPU. They are using a service bureau which in turn uses a COM service bureau or has COM," he noted.

Historically, the vast majority of COM users have had a computer, typically a large-scale system, until the last couple of years. Now, however, COM users sometimes have medium-scale computers or even small-scale computers, he explained, adding "there are at least two [Digital Equipment Corp.] PDP-11s that I know which are driving COM.

"So now, the first-time COM user generally has a computer in the range of the IBM 370/135 and up, and is printing or has the applications available to print on COM between 200,000 and 500,000 [pages] a month. There are exceptions to these quantities — for example, people who have tremendous distribution problems of a smaller data base," he said.

One of the advantages of COM
(Continued on Page 42)

Taxable? It Depends

By Frank Vaughan
CW Staff

SAN DIEGO — Is computer output microfilm (COM) that gets produced by a service bureau subject to sales tax?

The answer is more complex than one would imagine, according to William Porter of Datagraphix, Inc.

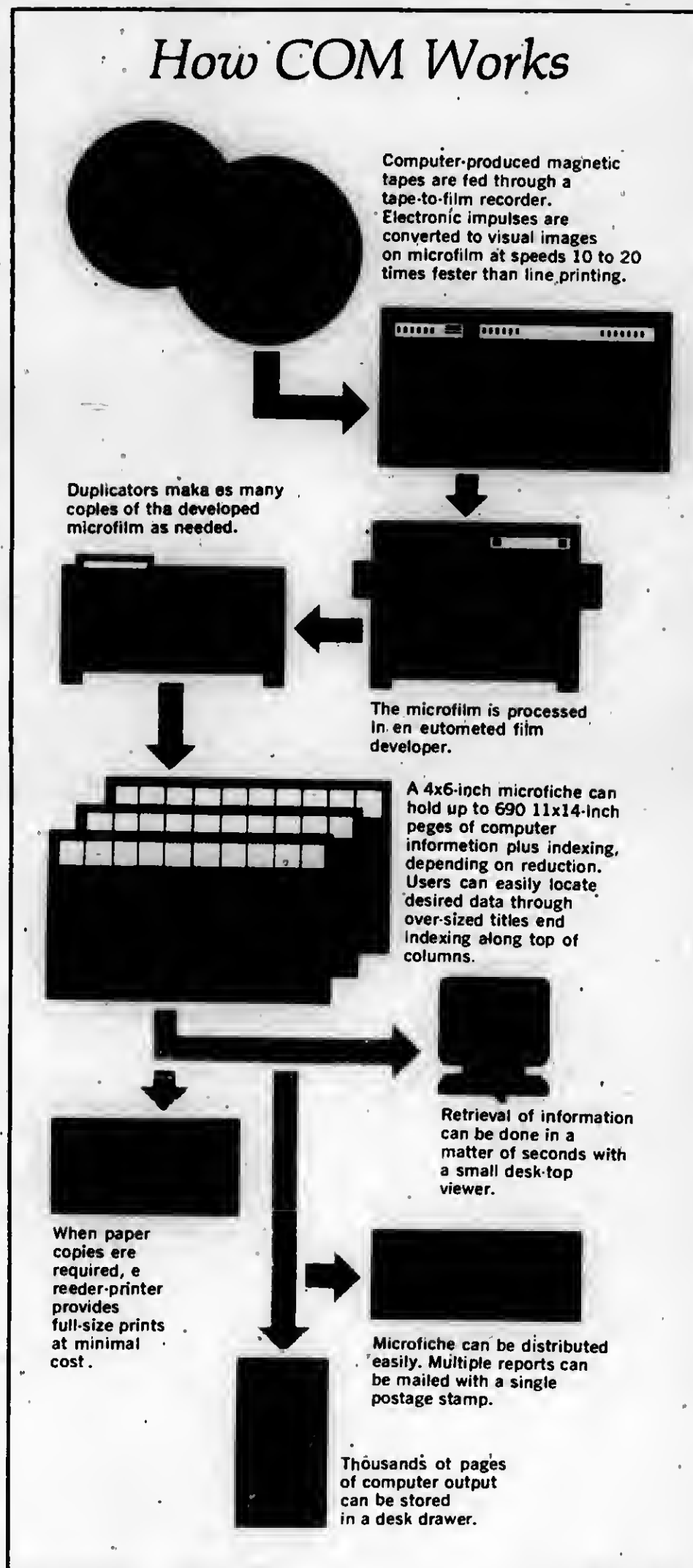
"COM output, on microfiche, that I sell to you is taxable in some states and not taxable in others," he explained.

"In California, if you give me a data tape and I give it back to you in the form of a microfiche and give you your tape back, it's not taxable unless I did it with a minicomputer.

"In other words, if you give me a tape that is already formatted to give the titles, and indexes and the fiche breaks, and I just run it on my COM recorder and give you back microfiche and your tape — it is not taxable.

"But if you give me a raw data tape and I format it with indexes and titles — it's taxable," he observed.

How COM Works



U.S. Datagraphix Graphics

SYSTEMS & PERIPHERALS

FIGHT TERMINAL INFLATION

- Low Rates
- Fast Delivery
- 1 to 3 Year Rent/Lease Plans
- No Automatic Renewals on Any Rental or Lease
- Choice of Rent/Lease/Purchase Agreements
- Mix and Match Master

AND OF COURSE

All Rentals and Leases include Complete On-Site Maintenance

BEEHIVE B-100
UPPER/LOWER CASE
ADDRESSABLE CURSOR
\$1195⁰⁰



**NATIONAL
COMPUTER**

The Greatest Name in Terminals

Call 800-243-9006

CONN 203-325-3831 NEW YORK 212-354-9886
BOSTON 617-235-7055 NEW JERSEY 201-786-4662



T.I. 745/743/733/765
Bubble Memory

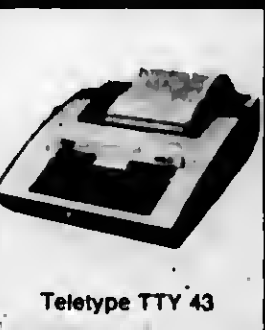
National Computer
1050 Reader Punch
1050 NC
for Numeric Control



NCC LA-36 ASR



Lear Siegler
ADM 1A/2/3A/400



Teletype TTY 43



Dieblo 1620/1640
IBM 2741



DEC LA-36/LS-120
LA-180/VT-52



Techiran Cassette Drives
815/8410/8400/8420/8421

MORE BIG TALK ON ECLIPSE SYSTEMS.



First, we brought you AOS, the most intelligent multiprogramming operating system to be found on a small computer. Now we bring you the fastest, largest and most efficient version of PL/I ever implemented on a minicomputer. And that's not just talk. It's available now on all multiprogramming Data



General ECLIPSE systems. So now you can take advantage of the sophistication and efficiency of big computer PL/I without having to buy a big computer. PL/I is just one more reason why Data General is the computer company that really talks sense. Call (617) 366-8911, Extension 4735. Or write.

 **Data General**

We make computers that make sense

Data General Corporation, Westboro, MA 01581, (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61 rue de Courcelles, Paris, France, 766.51.78. Data General Australia, (03) 82-1361. Data General Ltda., Sao Paulo, Brazil, 543-0138 © Data General Corporation, 1978. ECLIPSE is a registered trademark of the Data General Corporation.

Saves \$2,000/Mo Over Keypunch

Data Entry User Likes Revolutionary Evolution

SALEM, Ore. — In the 20 years that George LeTourneux has been involved in DP at the State of Oregon's Highway Division, he has seen a revolutionary evolution. "Devices that we used to dream of 20 years ago have come and gone," he recalled, "only to be replaced by more sophisticated, more cost-effective machines."

From the Highway Division's first IBM 650 computer to its latest, a 370/158, LeTourneux has seen more and more processing power placed into smaller and smaller packages. At the other end of the line, the same telescoping has occurred: he recently installed a multifunction key-to-disk system in the Salem office, replacing two separate systems — a Remcom remote job entry station and Univac 1701-1710 keypunch and verify machines.

As a result, the Highway Department is saving \$2,000 a month in equipment and card costs, LeTourneux said.

Besides the cost effectiveness of the system, LeTourneux is also getting cleaner, more accurate data for fewer keystrokes, he said. And less work for the data entry operators means they can be more responsive to the growing needs of the various user groups in the department that LeTourneux, director of DP, and his staff serve, he noted.

Great Variety

"We work, in effect, as a service bureau for the Highway Division," LeTourneux explained, "and while there is not a great volume of data on any one application, the work is characterized by a tremendous variety of applications to be entered."

There are, he estimated, "500 different screen formats with up to 99 levels each." The formats are now stored on the Data 100 Corp. Keybatch system's 5M-byte disk, where any of the 12 operators access them independently via their 256-character CRT terminals.

Operators no longer have to file through a full tray of cards to find the correct format; the system does it automatically after they key in the appropriate job number. As they begin entering the source document data, the system "prompts" the operators' answers and guides them through data entry.

While one operator accumulates historical records of construction bids for a highway cost analysis project, for example, another enters traffic data so engineers will know the time and prevailing conditions when accidents occur and be able to take corrective action.

A third operator might key in transportation study information to help determine the location and volume capacities for future highway construction while a fourth updates information on parks, visitor registration and playground and recreational equipment.

Data Kept 'Logical'

At the same time the data is being entered, it is also being edited to ensure it is within the range of conditions pre-programmed by LeTourneux's staff. Besides the routine alpha and numeric features, there are checks to assure that, for example, the data entered on

gallons of gasoline used by the department's fleet of trucks is in the range of logical quantities.

The system also performs other editing functions. A table lookup, for example, can either verify that work crew numbers for cost accounting are valid or that an employee's Social Security number is correct.

Range checking ensures that work data entered on personnel who pave or stripe Oregon's highways is within range; if an operator entered, for instance, that 1,000 miles of road had been paved one day, that would constitute an "out-of-range condition."

"Now we are sure that the data flowing through our CPU is relatively free

of errors. The problem with keypunch and verify systems, even the best ones, is that you can still verify bad data," LeTourneux noted. "You can clean up the data entry process, but the actual data may still exceed the standard parameters for a particular item."

An Error is an Error

"So while it's not a data entry error, because it reflects the amount shown on the source document," he explained, "it is, nevertheless, an error. If an error should occur, the Keybatch system automatically stops and displays the error for the operators so they know right away if the data is good."

Despite all the advantages of the key-to-disk system, the prospect of changing was an unsettling one for the keypunch-oriented operators. To alleviate some of their fears, LeTourneux programmed the system for card format key entry — so that Column 27 became position 27, etc.

As soon as the operators became comfortable with the system, edit features were added, constants were eliminated, formats were compressed and productivity increased.

At the same time data is being entered, the Keybatch system is performing concurrent background tasks such as communications, printing or spooling to tape for backup, he noted.

There's One Number for the Number One Computer Lease (703) 683-4606

Call Us.

We've been solving leasing problems for end users and brokers since 1967, longer than most leasing firms, and doing it better, too. CIG has been a leader in the lease/purchase field, offering a variety of flexible financing plans. Short-term or long-term leasing, Equity funding, Walkaways.

There's a CIG plan to meet your needs.

Tell us what you need and we'll help you get it. With full financing, flexible leasing terms, the latest IBM/370 systems and plug compatible equipment, and a Technical Service Center which stands ready to help you get the most from your computer investment. Plus, we have a sizable portfolio of IBM/360 systems.

Whether for your own use or for a client, leasing through CIG can save you time and money—your two most precious resources. All negotiations are held in strict confidence for your protection. Our first quote will convince you . . . when you're talking leasing, you're talking our language.

Call CIG today (703) 683-4606.

CIG

CIG Funding Corp.
303 Cameron Street,
Alexandria, Virginia 22314

Call CIG: (703) 683-4606, or mail this coupon today

Tell me more about CIG. I am ☐ interested in	
☐ leasing ☐ buying the following system:	
I'm also interested in	
☐ Memory Systems	☐ Block Multiplexer Channel
Name _____	
Address _____	
City _____	State _____ Zip _____
Phone number _____	
Mail to CIG Funding Corp., 303 Cameron St. Alexandria, Virginia 22314	

Telefile Mass Storage Facility Built for Xerox Sigma Systems

IRVINE, Calif. — A mass storage facility for Xerox computer systems is available from Telefile Computer Products, Inc.

Designated Matchmaker II, the facility is built around a device controller, disk drives and tape transports to provide billions of bytes of mass storage, the firm claimed.

Through firmware and interface changes, the hardware can be adapted to any future combination of operating system, host CPU and storage media, a spokesman added.

The Telefile mass storage facility is plug-compatible with any Sigma 5 through 9 computer and can be expanded in modular increments. Up to eight devices can be connected to a single host CPU through the Matchmaker II.

Winchester Modules

For maximum fast-access storage, 317.5M-byte Winchester technology storage modules would normally be

specified. Also available from Telefile are IBM 3330-type drives with 80M, 100M, 200M and 300M bytes of storage.

These units can be combined in any mixture along with 800/1,600 and 1,600/6,250 bit/in. tape transports to serve as on-line active or off-line backup storage. Disk-to-tape and tape-to-disk transfers can be accomplished on-line or off-line, the spokesman said.

Separate Ports

The mass storage facility has a separate controller "port" for each spindle or tape transport. This radial or star interface isolates each device, increasing the reliability of the system, the spokesman claimed.

Several different Device Interface Modules can be attached to a single Matchmaker II controller at the same time, Telefile said. Each module provides the addressing and control logic needed for a par-

ticular type of device. Separate driver/connectors are then added for each disk spindle or tape transport.

32K Buffer

The mass storage facility also features a 32K byte buffer, that can be expanded to 128K (16-bit) words.

A minimum Matchmaker II system with one controller and a single 635M-byte dual-disk unit costs \$77,880 from Telefile, at 17131 Daimler St., Irvine, Calif. 92714.

Dema Meeting Regionally

GREENWICH, Conn. — Three regional meetings of the Data Entry Management Association (Dema) have been scheduled for early this year. The first, in Houston, will kick off Feb. 16 at the Galleria Plaza.

Other regional meetings on the books include Washington (March 30-31) and Columbus, Ohio (May 11-12).

The regional meetings, which are not restricted to members of Dema, are designed to help people in data entry operations grow professionally in a hands-on, informal atmosphere, according to Norman Bodek, president.

The day and a half schedule will include speakers and problem solving workshops and will provide an opportunity for data entry professionals to meet and exchange information and ideas, Bodek noted.

The price of the seminars is \$125; preregistration forms and other information is available from Dema, 16E Weavers' Hill, Greenwich, Conn. 06830.

Users, Managers Boosting COM

(Continued from Page 39) is that a user can make as many high-quality prints as he wishes, Porter noted, so it is possible for someone with small printing jobs and big distribution problems to justify a COM unit on less than 100,000 original pages a month.

"Banks fit both bills," Porter noted. "They have large numbers of pages and large distributions. Of course, they are currently the largest users of COM. Then, there are some retrieval problems that COM can solve," he recalled. "In the beginning we used to say that a user had to have so many pages a month to justify COM, but now we say the user has to have so many pages, or a distribution problem or a retrieval problem that we can solve. If that is the case, then the number of original pages is no longer the only justification."

Selection Process

The first-time user's selection process for COM is somewhat different from that for other mainframes and peripherals, Porter suggested.

"At this stage of the game, a large portion of the responsibility in the selection process falls upon the vendor, in that the COM industry is not as large as the computer industry. There are just not large numbers of users groups to which the prospective user can go for information. We do have users groups, of course, and they are valuable but not to the extent that the computer business has them. Therefore, the vendor has a large responsibility in the user's selection process," he explained.

"So, the DP manager is pretty well going to have to have the help of the vendor in making an evaluation unless he is in one of the large industries using COM — such as banking, where all he has to do is pick up the phone and call his neighbor," he said.

"What we would suggest to the user is that he go to a con-

sultant; there are some good consultants to help him evaluate COM," Porter said, adding that the user should ask vendors about references and large applications.

"Probably the best solution is the reference approach," he explained, "because he can find a pretty good amount of written material on how to evaluate COM. There are four or five good books and there are 400 to 500 articles available to read about COM."

The fundamental things he has to consider are the

economics of installing COM and the user satisfaction. User satisfaction is the key to it. If he accepts the microfilm data and he can see the economic savings, he will probably opt for a system. The DP manager must also look at archival requirements; distribution of data; turnaround; data security and efficiency.

"But basically, there are two things to consider: whether he will save money and whether his users will accept the data happily and get the job done more effectively," he said.

ACQUISITION WANTED

Boston-based computer terminal lease/service Company would like to acquire Sales-oriented company with Fortune 1000 customer base. Our strong suits are administrative and financial expertise, plus excess cash flow from operations and lines of credit. Qualified organizations are invited to participate in our explosive growth — We double revenues every two years, and earn 10%+ profits. Contact PHILLIP K. CIOLFI, Pres.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300

Low Cost Card Punch and Card Reader for DEC HP DG IBM Computers

The CCC 1700A Key Punch Interface can connect your computer, time-share terminal, or any bit serial communicating device to an IBM 129 or 029 Key Punch so it will both punch and read data cards! It's EIA compatible, converts ASCII or any bit serial code to Hollerith when punching, converts Hollerith to ASCII or any bit serial code when reading, and permits the efficient transfer of data through a 900 character buffer. The 1700A operates at all standard baud rates from 110 to 9600. And it requires no special software drivers; standard Basic or Fortran "PRINT" or "WRITE" statements work just fine!



COMMUNITY COMPUTER CORPORATION
185 West School House Lane • Philadelphia, PA 19144 • (215) VI 9-1200

Upgrade to IBM 6250 BPI tape drives now!

SAVE IBM RENT — ELIMINATE DOWN-TIME caused by field conversion

We will purchase your IBM 800 1600 BPI drives now & install 3420-4, 3420-6 drives immediately from inventory.

Call Nick Dibari
312-698-3000
or your nearest Comdisco office

COMDISCO

TEXAS INSTRUMENTS TERMINALS

IMMEDIATE DELIVERY

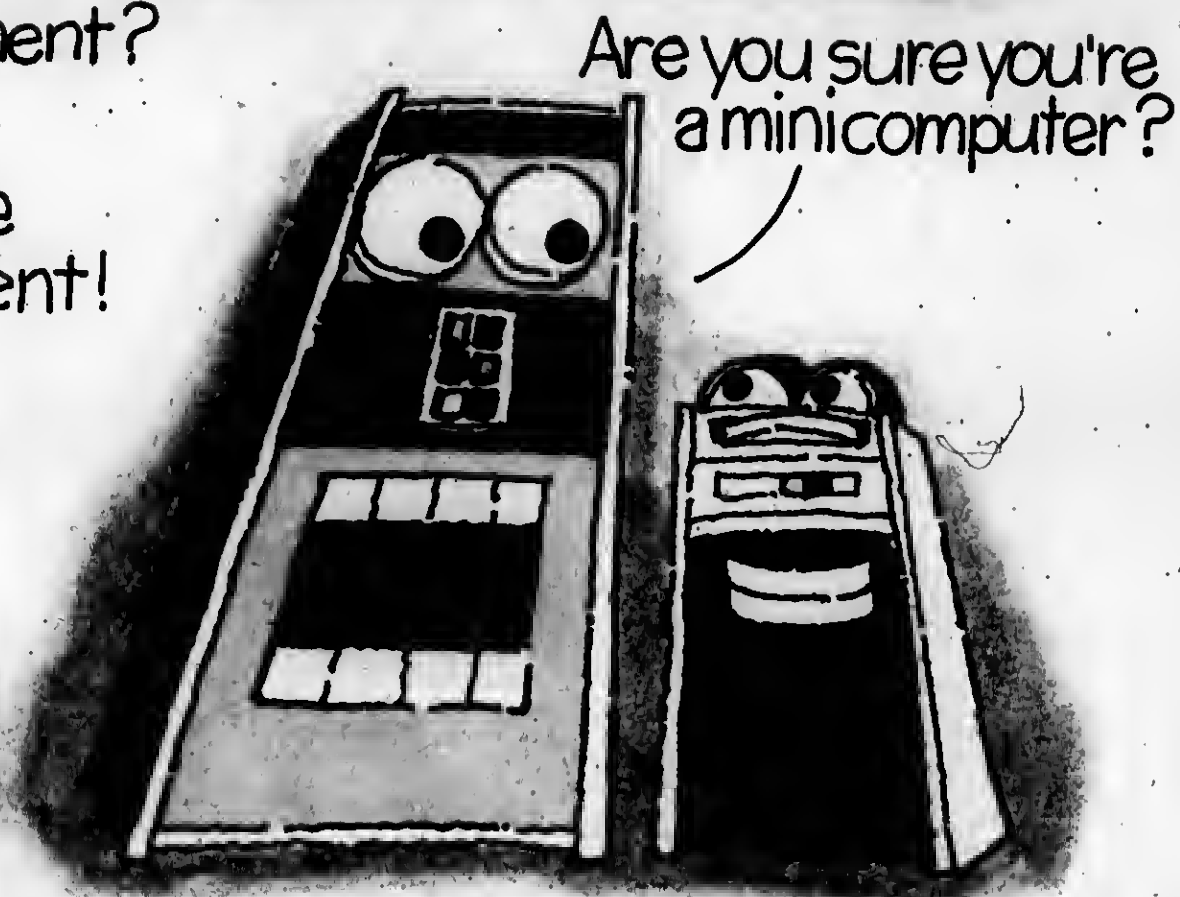
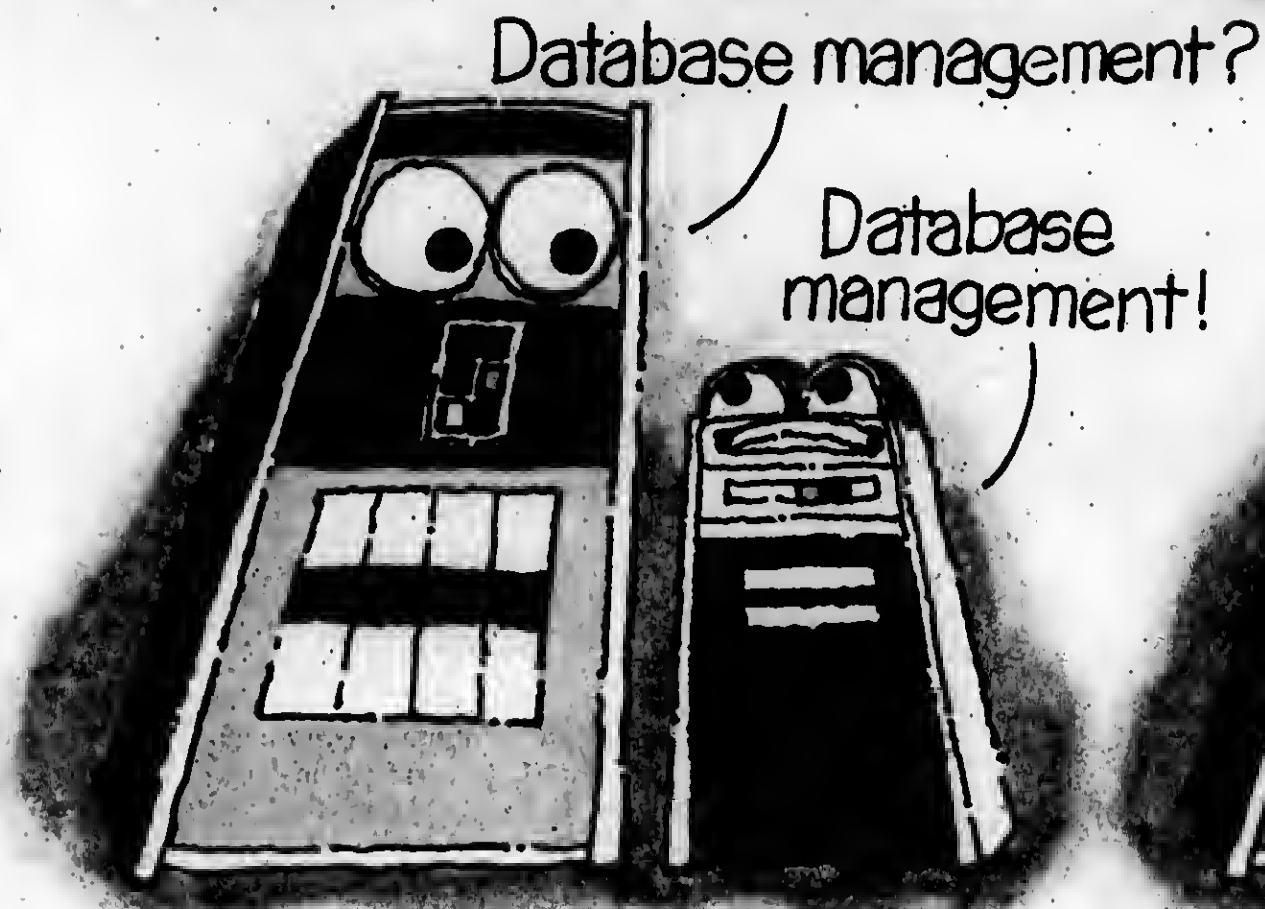
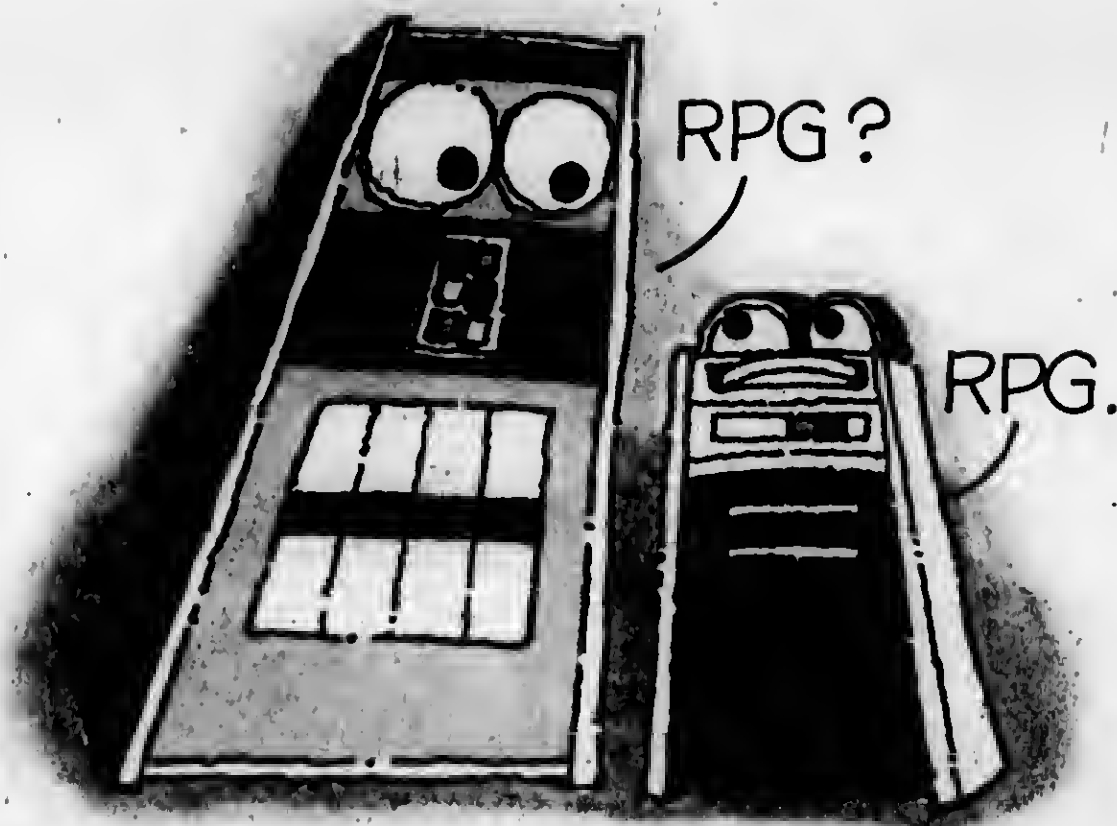
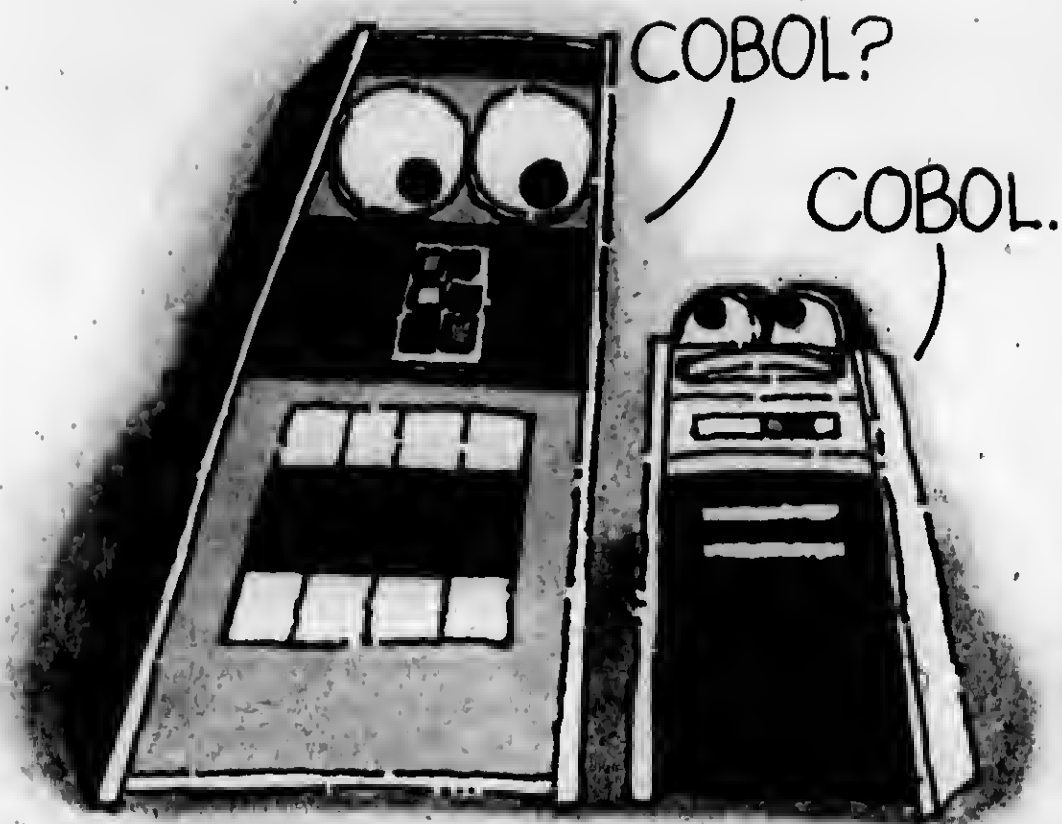


T.I. 733 A.S.R.

AVAILABLE FROM STOCK

T.I. PORTABLES	DECWRITERS
T.I. ASR & KSR	DIABLO PRINTERS
ADDS CRTS	FLOPPY DISKS
DATA GEN.	TECHTRAN DIGITAL
TELEPRINTERS	RECORDERS

Westwood Associates, Inc.
DATA COMMUNICATIONS EQUIPMENT
1442 Broad St., Bloomfield, N.J. 07003 / (201) 338-0200
N.Y.C. (212) 964-3018 Phila. Area (609) 829-7280



Our software speaks your language.

Now the largest manufacturer of interactive minicomputers offers the broadest spectrum of commercial software tools: ANSI '74 COBOL, DBMS, SORT, RPG, QUERY, MULTI-KEY ISAM, and more.

That means even better Datasystem functionality in commercial applications. Better because you get:

- great performance in multi-task environments with our new, easy-to-use, interactive, full-function COBOL

- advanced multi-key ISAM data management with our new RMS-11

- fast, versatile report generation with our RPG II

- super fast sorting of data files with our new SORT-11

- advanced data base facilities with our CODASYL-compliant DBMS-11

- quick easy access to data, plus flexible, selective reporting with our new COBOL-compatible DATATRIEVE-11

What's more, we've dropped our prices. And that means even better Datasystem

price performance. For details, contact the nearest Digital office, or Digital Equipment Corporation, Business Products Group, MK-2/H32, Merrimack, N.H. 03054. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital



The Carle Clinic is now providing faster service for patients since it doubled the capacity of its IBM 370/125 with independent add-on memory.

With Add-On Memory, Clinic Gets the Flexibility Needed to Serve Patients

By Tim Scannell
CW Staff

URBANA, Ill. — The Carle Clinic Association here was reportedly able to extend the services it provides to the more than 390,000 people who annually visit the clinic after it doubled the size of its IBM 370/125 mainframe with independent memory.

The clinic, utilizing the flexibility of the expanded memory, has also boosted the number of its terminals from 38 to 85, according to Edward J. Beranek, DP manager for the association. "Terminals are an important part of our

business, so that's where the difference is most visible," he noted.

Intel Corp. was the only non-IBM vendor taken into consideration as the add-on memory supplier, Beranek added. The In-7125 was selected because of its lower cost in comparison with an IBM upgrade, he said.

However, any additional memory would have proved to be acceptable, he pointed out. "We would have had an improvement no matter whose memory [we used]. We were so degraded because of our lack of available memory that it was just a case of our being out of gas," he remarked.

Clinic Systems

The Carle Clinic is the largest group medical clinic in Illinois and is associated with the Carle Foundation Hospital.

On-line services handled by the IBM system include patient scheduling and identification, a record locator and admissions systems, two inventory systems and various business functions.

Patients can be scheduled into the clinic over a three- to four-month period with the system providing information on the day and time the patient will arrive, the reason for the visit and the name of the doctor he will see.

Patient identity information is available through either alphabetic or numeric search procedures. The medical record locator system includes such information as whether the patient's record is in the doctor's office, the emergency room or in inactive storage.

The admissions system stores preadmission data so nursing personnel can assign beds, move the information to admissions when the patient comes into the hospital and make any corrections as the patient is moved from bed to bed or discharged.

The mainframe system is also used for daily updates of transactions in all accounts and for tracking of hospital inventory.

The In-7125 memory system runs seven days a week, 24 hours a day and has been up "99.999% of the time," according to Beranek.

The only problem the clinic encountered with the add-on concerned a loose power wire in the unit, he said.

"The downtime with that one failure was almost nothing because I just happened to be fortunate enough to jiggle the wire and it came back up," he recalled. "When the engineers came in on the call, they just tightened the thing so we weren't down more than an hour and a half."

Register now for DataComm 78!



Call 800-225-4242*

Don't miss the one Data Communications Industry Conference and Exposition held in the city where DataComm policy and regulation are established!

Profit from vital information, insight, ideas brought to you by nationally known data communications experts! Be there in person. Don't get DataComm secondhand!

Call 800-225-4242

Take part in panels and sessions that let you ask your questions, share experiences, express your needs.

Make DataComm your personal conference, choosing your options each day — ranging from tutorials for the beginner to advanced networking panels for the sophisticated user.

Call 800-225-4242

And register for one, two, or all three action-packed days, including:
Keynote Speaker—Richard Wiley, former chairman of the FCC • 19 Vendor/User Rap Sessions • 3 Special Management Sessions • 6 Network Tutorials and Panels • All Day Government Miniconference—and MORE!

FREE! The Exposition at DataComm 78 will feature exhibits from manufacturers all over the country. Discuss your needs and plans with key representatives in a quiet-paced, informative atmosphere.

Call 800-225-4242

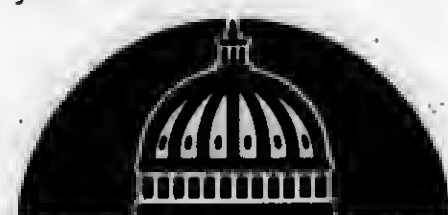
REGISTER NOW!

If this is the first news you've learned about DataComm 78, don't miss this chance to attend.

AFFORDABLE:

UNMISSABLE! Just \$115 for the whole DataComm Conference, or \$50 each for single days.

Don't delay! Master Charge, American Express, Visa/BankAmericard accepted. Call our toll-free number now to arrange your attendance at DataComm 78—the ONE conference you don't want to read about later and be sorry you missed.



DataComm

78

CONFERENCE AND EXPOSITION

February 21-23, Washington, D.C.

*Inside Massachusetts, call collect: (617) 964-4550.

Or write DataComm 78
Registration

The Conference Company

60 Austin Street, Newton, MA 02160



'We Have a Large-Scale Computer as Well... Let Me Demonstrate...'

At Top, Bottom of Line

BC/7 Gets Multiprogramming, Diskette

By Esther Surden
CW Staff

BLUE BELL, Pa. — Univac has unwrapped two additions to its BC/7 product line, rounding out the company's small business systems offerings with a diskette-based system on the low end and a multiprogramming unit on the high end.

With the announcement of these machines, Univac split its BC/7 offerings into three series. The original model, introduced last year, becomes the 750, the first member of the 700 series.

The latest offerings are the 611, which inaugurates the 600 series, and the initiators of the 800 series, the 860, 865 and 870, which differ from each other only in disk capacity.

The BC/7-611 was designed for the very small first-time user who has been using an accounting machine or a service bureau. It is

a diskette-based system that uses Shugart Associates double-sided, double-density floppy disk drives. Up to 6M bytes of diskette can be put on the system.

Main storage for the 611 ranges from 48K bytes to 64K bytes; up to two CRT workstations can be accommodated. Each CRT can have its own printer.

A 200 char./sec unidirectional, 200 char./sec bidirectional or 125 line/min system printer is optional, the company noted.

Greater Sophistication

The 800 series, a more sophisticated branch of the BC/7-800 family, is said to give users anticipating "near-term expansion" a system into which they can grow.

The BC/7-800 comes with 128K bytes of memory. Its disk storage capacity can be increased from 10M to 40M bytes in 10M-

byte increments.

Users can attach up to six CRTs to the system and each CRT can be accompanied by its own printer. Additionally, up to two system printers with speeds from 200 char./sec to 600 line/min can be accommodated on the 800 series, Univac said.

The BC/7-800 runs programs in two 48K-byte partitions. A roll-out/roll-in feature allows programs of higher priority to be executed first, a spokesman explained.

In cases where two programs of different priority are running concurrently and program roll-out is invoked, the operating system selects the lower priority item for roll-out.

If both programs are low priority, the operating system determines roll-out on criteria including the status of the program and the number of I/O requests, the firm said. Users assign their own priority to programs.

Spooling can take place at the same time programs run, according to Univac. The spooling facility supports a maximum of six open print files, two for each of the active partitions plus two for the roll-out partitions.

All spooled files are written to a dedicated on-line disk file, the firm explained, and users can alter the spool queue and direct the operations of the output writer with a utility program.

A file-sharing/record-lock feature included with the 800 allows users to safely update programs, the firm noted.

Univac said that all programs that can be run on the 600 and 700 series are object
(Continued on Page 48)

Some Users Retiring IBM 3/10 As Others Keep Going Strong

By Esther Surden
CW Staff

Users of the original IBM System/3, the Model 10, may be retiring the workhorse system, according to an unscientific sampling of users contacted by *Computerworld*.

Of the 10 users contacted, four are still using the old system to process their applications, but one is considering an upgrade.

Most of the users contacted have, however, stayed with IBM and are still using IBM 3 systems. Two switched to other vendors' systems, two use the Model 12 and two have upgraded to the Model 15.

Of those who have upgraded, growth of their business seemed to be the major factor in the move.

A manufacturer of industrial equipment, Alten Foundry and Machine Works, Inc. of Lancaster, Ohio, is using its leased 3/10 for machine performance analysis, foundry performance analysis, processing of the incentive system, payroll and scheduling.

According to Harry Elliott, treasurer, the Model 10 was adequate for the firm's needs at the time of its installation in July 1972, but growth has spurred the company to look at other systems.

Presently considering the IBM System/34, which Elliott said it "needed yesterday," the firm feels there would be no advantage in buying its Model 10.

No Need to Switch

Another user, Howard Thomas, DP manager for Cannon Craft in Sulphur Springs, Texas, uses his 3/10 for financial applica-

tions and sales analysis. Cannon Craft, a manufacturer of louvered shutters and panels, purchased its system.

Although IBM has approached Thomas about the System/34, he likes the system the firm now has and said he has no desire to switch.

Another dedicated Model 10 user, Charles Myers, DP manager for Hedrick Gravel and Sand in Salisbury, N.C., purchased his System/3 in June 1976 because his firm had
(Continued on Page 52)

Switch From Batch Processing Supplies Savings to Distributor

By Ann Dooley
CW Staff

BRIDGEPORT, Conn. — Willis Distributors, Inc. switched from a batch processing service bureau to an on-line minicomputer system in order to provide more efficient customer service at a lower cost.

The move to the minicomputer took place because Willis needed a program the service organization couldn't provide, according to Ruth Paules, the firm's president. "I couldn't get out the reports I needed," she said.

In addition, the service costs kept increasing to the point where it was no longer economical, she recalled.

The distributor of pet supplies looked at offerings from several companies, such as

IBM, Basic/Four Corp., Applied Data and Wang Laboratories, but "you get more confused as you look at all of them," Paules commented.

Willis had originally automated in 1961 with an IBM 403 and Paules leaned toward IBM because of its familiarity and service record. But the company accountant said the System/32 couldn't handle the work and the System/34 wouldn't be out soon enough to offset the increased costs of the service company.

So Willis went with Telecomp, Inc. of Milford, Conn., which promised to install a turnkey wholesale distribution system within three months and offered a good price as well, Paules said.
(Continued on Page 48)

#2 IN DEC BECAUSE WE'RE #1 IN DELIVERY

HIGHLIGHTS from our Stock for IMMEDIATE SHIPMENT!

11 11/05 16K CPUs in Low-Boy Cab
with (2) VT20M CRTs
11/40 16K+ CPUs
RF11/RS11 262K Wd Fixed Disk
RK05 1.2 Meg. Cartridge Drive
SERIES RP02 10 Meg. Disk Drive

RP03 20 Meg. Disk Drive
DIVA 128 Meg. Disk Subsystem
TC11/TU56 DECtape Subsystem
LP11VA 300 LPM Printer (DP2330)

...AND MUCH MORE

8

8A 8K CPUs w/ KL8A & KM8A
DF32D 32K Word Fixed Disk
RF08/RS08 262K Wd. Fixed Disk
RT02AA 16-Key Data Terminals
VT05, VT50, VT52 CRT Terminals
8L, 8I, 8E, 8M, & 8F CPUs

CENTRONICS
101A • 102A • 103
With 8 & 11 Interfaces

SEND FOR
FREE
DEC PRICE
LIST NOW!

AMERICAN USED COMPUTER

P.O. BOX 68, KENMORE STA.
BOSTON, MASS. 02215

617-261-1100

Executive Perspective on Human Resource Management

March 8-9, 1978
Atlanta, Georgia

To be held at...

The World's Tallest Hotel
Peachtree Plaza Hotel
Atlanta, Georgia

Call Toll Free Today 800-228-3000.

Conference attendees will receive...

- Reservations for 18 Conference Sessions
- Executive Perspective Dossier
- Conference Luncheons (2)
- Human Resource Office of the Future Demonstration

Sponsored by...

WANG

Wang Laboratories, Inc.

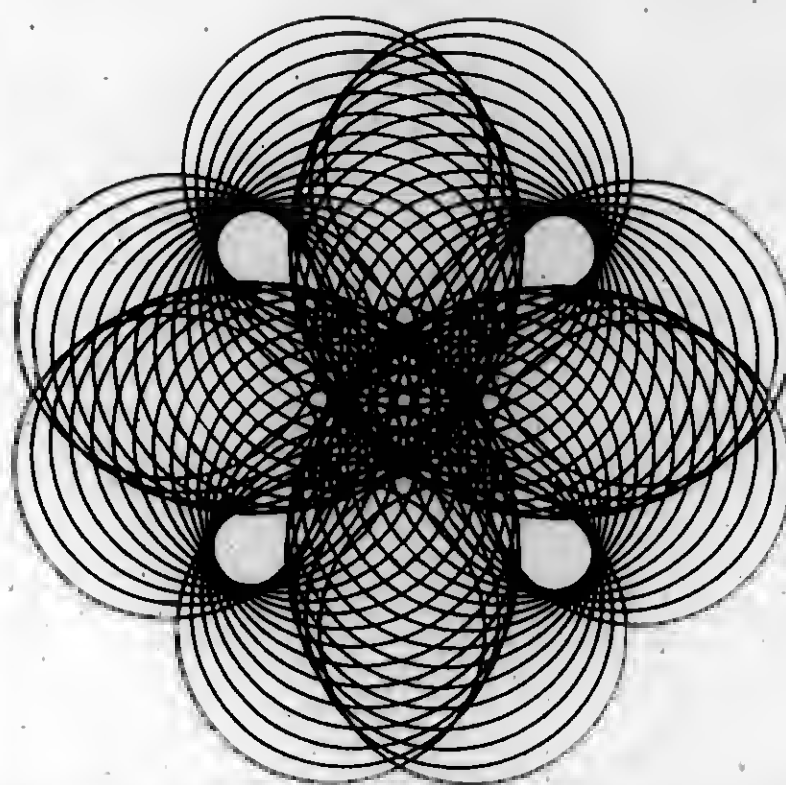
Program Products Division

To register...

Fill out and return the registration form or contact
Emlyn Griffin, Conference Registrar, at 617-851-4111
Extension 2735. Confirmation will be forwarded.

Individual Fee \$395 person

Group Rate for
Two or More \$300 person



**"That's what you'll get from this intensive,
on-target Human Resource Management
Conference."**



Senator Birch Bayh
Focus on
"Industry's Legal and Social
Obligations to Employees"



**Congressman
Barry M. Goldwater, Jr.**
Prepare for
"Privacy in America"

Focus on the relevant issues facing
Human Resource Managers today and
in the next decade!

Preview the future of employee rights
legislation and how it affects the
corporate P&L and, most importantly,
you as a Human Resource Manager.

Gain a realistic perspective on future
Human Resource Management trends
and technology!

See the "HUMAN RESOURCE
OFFICE OF THE FUTURE" where
Wang will display computer systems
exclusively designed for the Human
Resource Manager. You'll see the
"coordinated information flow" -
concept at work in a distributed
workload environment.

Program topics include...

"National Health and Industry"

"Enforcement of ERISA"

"Benefit Trends in America"

"Equal Opportunity for Women and Minorities...
Closing the Gap between Corporate Intent and
Results"

"Future Demands of OSHA"

"Employment of the Handicapped"

"Fair Information Practice is Good Management
Practice"

"Salary Trends in the U.S."

Mrs. Marvella Bayh

J. Vernon Ballard, Deputy Administrator of ERISA,
Department of Labor

Charles B. Jackson, President, American Benefit Plan
Administrators; Board Member, International Foundation of
Employee Benefit Plans

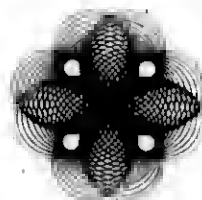
Barbara Boyle Sullivan, President, Boyle/Kirkman
Associates, Inc.; Country's foremost FORTUNE 500
Affirmative Action Consultant

Dr. Lawrence Partridge, Occupational Safety and Health
Unit Manager, Arthur D. Little, Inc.

Norman Hammond, IBM Representative to White House
Conference on Handicapped Individuals

Jane Yurow, Esq., Privacy Protection Study Commission
Project Manager for Employment and Personnel Records

Benjamin Cole, President, Cole and Associates, Inc.;
Country's Leading Compensation Analyst



Please register me for the Wang Conference,
Executive Perspective on Human Resource Management

Atlanta, Georgia
March 8-9, 1978

Name _____ Title _____
Company _____ Division _____
Street _____
City _____ State _____ Zip _____
Phone (Area Code) _____ Signature _____

Please register the following who will also be attending:

Name _____ Title _____
Name _____ Title _____
Name _____ Title _____
Name _____ Title _____

WANG

Mail to: Ms. Emlyn Griffin, Conference Registrar,
Wang Laboratories, Inc., One Industrial Avenue,
Lowell, MA 01851

Saves Annual \$30,000, Gains Control

Pharmacy Cuts Losses via Time-Sharing Mini

By Ann Dooley
CW Staff

CHICAGO — Time-sharing on an off-site minicomputer is improving patient care, cutting expenses and reducing drug loss for Mount Sinai Hospital Medical Center here, according to Ronald Betz, director of pharmacy services.

Pharmacy staff enter all medication orders on CRTs; the patient profile, which includes a history of all active and discontinued medications, is displayed on the screen.

From this list, the pharmacist can see whether the newly prescribed drug duplicates a previously prescribed drug or conflicts with other medication. If such a relationship occurs, the pharmacist consults with the doctor, who then makes a final decision.

The system also displays the patient's diet so the pharmacist can determine if the medicine will conflict with food intake. A patient's allergies are also displayed and checked for possible conflict.

In addition, the patient's diagnosis is shown so the pharmacist can check whether the medication and the diagnosis correspond. If the medicine doesn't seem suitable, the pharmacist checks with the doctor.

Total Control

Since the system works in real-time, the pharmacy can maintain the most current prescription information for each patient, keeping control over drug processing at the hospital, according to Betz.

The system is also programmed with the formulas for intravenous fluids. Only the physical preparation of the fluid is left uncompleted by the computer.

Once order entry is completed, the system automatically generates complete medication labels and prices. In addition, the system prints another label the day before a refill is needed and automatically bills the patient for the continuing medication.

The system provides data security through a user-defined password protection system. Each pharmacist must enter an identifying code before an order can be completed so an audit can be performed to check on drug dispensing.

Daily and monthly control reports were instituted on the system to list drug replacement orders suspected of being caused by unexplained loss. If such a loss occurs, the head nurse of each ward receives a document listing drug quantity and dollar amounts.

Because of the system, drug loss has been cut in half; this has brought annual savings of \$30,000, according to

Tab Has 5100 Cartridge

PALO ALTO, Calif. — Tab Products Co. has a .25-in. magnetic tape cartridge designed for small systems applications.

Called the 1040, the cartridge features ceramic edge guides for extended cartridge life and interchangeability with IBM 5100 and 3M Co. DC300A cartridges, Tab claimed.

The cartridges cost about \$20, a spokesman said from Tab headquarters at 2690 Hanover St., Palo Alto, Calif. 94304.

Betz.

The system also provides physicians with daily medication schedules for review and updating. In addition, all nurse stations are given daily schedules for dispensing medication to patients. As drugs are deleted from a patient's schedule, the system provides an update.

Aid to Dieticians

Hospital dieticians are provided with CRT access to the system to update dietary information and to inquire about diet restrictions based on current drug therapy.

In addition, the clinical laboratory can access the system via CRT to de-

termine drug-to-lab test interactions.

The system provides detail and summary billing of medication charges by patient. By eliminating manual pricing errors and making sure the correct patient is billed for the correct amount of medicine, losses are being greatly reduced and revenues have increased, Betz said.

The pharmacy is planning to install an outpatient prescription program, provision for unit dose processing, interdepartmental billing and inventory control soon, he noted.

The Mount Sinai pharmacy has two CRTs and two printers and time-shares a Datapoint Corp. 5500 or 6600 at Distributed Information Systems

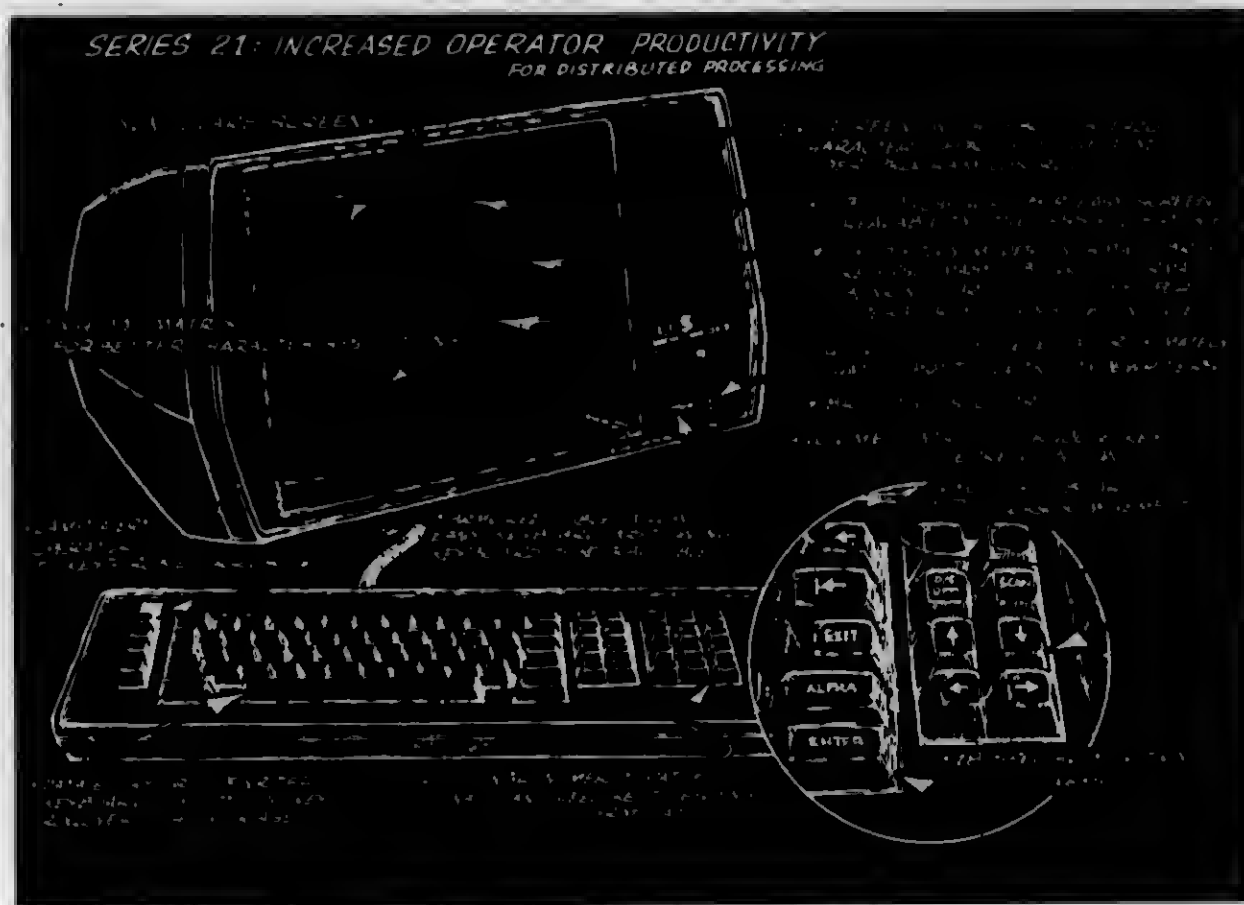
Corp. (Disco) headquarters here. The system is based on the Discomed Pharmacy II program.

The pharmacy operation is scheduled to convert to a stand-alone operation within a year.

The system, which has undergone continuous expansions, has been in operation for nearly six years. "We first went to IBM and Honeywell, but they both said they didn't have time to develop a pharmacy system, so we went to Disco and are extremely happy," Betz said.

Mount Sinai is a teaching hospital with 440 beds and 10,000 active outpatient pharmacy records per year.

MDS Series 21. Engineered to make your operators more productive in 25 different ways.



Mohawk Data Sciences learned a lot about data entry productivity over the past 13 years while meeting the high-volume needs of more than 6,500 customers worldwide. In the engineering of Series 21™ we put those lessons to work on behalf of users requiring reliable source data entry tools for low-to-moderate volume applications.



We learned, for example, that a large display screen makes an operator station easy to use. A 15-inch, non-glare CRT is standard on all Series 21 systems. We learned that some record formats fit well on a 480-character screen while others require 1920-character capacities. Series 21 offers both, under program control, and displays 7x9 dot matrix characters in green against a green background — a combination we've learned is easy on the eyes.

Or consider the Series 21 keyboard. We offer a choice of data entry or typewriter style layouts, either of which can be moved to suit the preference of each individual operator. Features like programmable function keys, full keyboard cursor movement, moveable keyboard and "N" key rollover — to enable operators to key at maximum speed — are only some

of the 25 different features engineered into Series 21 to make your operators and your system more productive.

Engineering for data entry productivity is only one reason why Series 21 provides your best growth path into distributed processing. Others are its two-level software, its peripherals flexibility, its communications capabilities and its low system prices. Consider your distributed application, then consider Series 21 from MDS™.

MDS is now conducting seminars on distributed data processing in major cities throughout the country. For an invitation to a seminar and a demonstration of Series 21, call our headquarters, 1599 Littleton Road, Parsippany, N.J. 07054, (201) 540-9080, and ask for James J. Byrne, VP, U. S. Sales.

™Trademarks of Mohawk Data Sciences Corp.

MD

Mohawk Data Sciences

Move In-House Supplies Savings to Distributor

(Continued from Page 45)

She also liked the fact that Telecom is a young company; since Willis would be its first installation of this kind, she felt they were eager to do it right.

In addition, Paules was familiar with the work of one member of the staff and trusted his expertise.

"They've provided good service and are capable people," she said. "There were a few minor problems, but all in all they've done an excellent job. Now I have more control, better figures and can save on help."

Payroll Still Outside

The system performs general ledger, purchasing, order entry, sales, accounts receivable, inventory and sales

analysis. Payroll is still done outside, however, since it's cheaper, Paules noted.

The order entry process begins when a salesman takes an order from a customer and on a portable terminal keys in information including the order number, the quantity and any special discounts. At the end of the day, the orders are transmitted over the phone via dial-up lines for a complete listing.

The order list can be updated and transmission errors corrected before the data is keypunched into the order file. Orders are sent up to the inventory department where the supplies are packed and picked up.

A truck list is processed which includes the same information taken at the point of order entry as well as any

changes or out-of-stock listings. The trucks are loaded with the merchandise and the invoice is sent to the customer with the merchandise.

Orders taken during a day are loaded onto the trucks that same evening and the invoices are prepared and ready to be delivered along with the order the next morning, according to Paules.

System Reports

The system updates changes by giving the average retail price and the effective date to the salesman. It also provides a daily out-of-stock report which creates a more accurate inventory, Paules said.

In addition, the system can generate a report for customers that shows the kinds and quantities of merchandise

they have ordered for the year. The system also performs a daily run off of invoices and a daily profit list.

No training was required for the user staff and the installation of the system took place in one day, according to Paules.

The system hardware consists of 64K Interdata, Inc. 6/16 CPU, two 25M-byte disk drives, four CRTs, six portable Azurdata, Inc. terminals used by the salesman for direct input and a 300 line/min printer.

With the programming, the system cost the firm approximately \$87,000.

Univac Expands BC/7 Offerings

(Continued from Page 45)

code-compatible with the 800 series but since commands have been added to the system control language, it may be necessary for users to alter the jobstreams, recompile programs or slightly modify programs.

To upgrade from the 611 to the 750, users need only trade in their diskettes for disks. The 700 series is field-upgradable to the 800, the firm said, although that upgrade is a bit more extensive, requiring a different backplane, a different memory and more I/O slots.

With the introduction of the two series, Univac effectively realigned the pricing structure of the 700 systems. In effect, the 750 has been reduced by \$700 while gaining some capabilities, such as a menu-driven inquiry feature that allows users to find out such information as the status of a part.

A BC/7-611 with 48K bytes of memory, one CRT with a standard keyboard, two 1M-byte diskette drives with power supply and a 200 char./sec unidirectional printer costs \$21,795.

The BC/7-750 with 48K of memory, one workstation, 5M bytes of disk and a 200 char/sec unidirectional printer costs \$31,200. The 860 with 128K bytes of memory, one workstation, 10M bytes of disk and a 200 char./sec printer costs \$35,475.

ONE GETS YOU FIVE.



**Ven-Tel offers
the only
acoustic coupler
five year warranty
in the business.**

The bottom line on product reliability is how the manufacturer backs that product up: It's the warranty.

The fact that three-to-six month warranties are the rule in the industry—and 12 months is considered going out on a limb—doesn't demonstrate a great deal of manufacturer confidence in the product. And shouldn't inspire a great deal of customer confidence, either.

Until now, that is. Until Ven-Tel.

Ven-Tel is a relatively new company by industry standards. But we are experienced

enough to know how to turn out the finest acoustic couplers by any standards. Eight different models to cover a wide range of needs. And we are sensible enough to know that, if the reliability is there, the warranty should be there as well.

Ven-Tel's is. A full five year option on parts and labor, providing, of course, that you don't tinker with the product. We warrant ours as long as we do for the same reasons that we imagine the others warrant theirs for as long as they do.

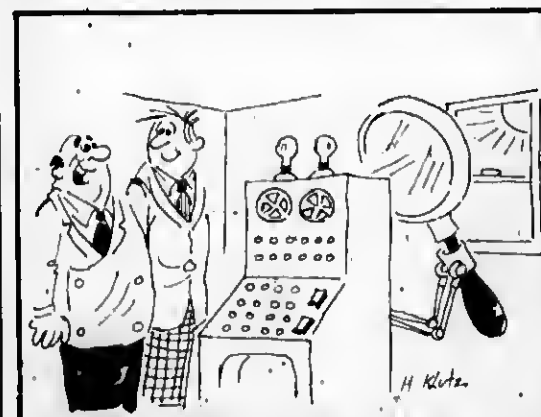
We know how good our couplers are.

Ven-Tel. You are going to be hearing a lot more from us in the coming months. Because we are into a lot more than just the best acoustic couplers in the business. We make a complete line of low and medium speed modems, for instance. Frequency division multiplexors. And a series of limited distance line drivers.

But we are getting ahead of ourselves. This is our acoustic coupler ad. And in that regard, we are satisfied with just being ahead of everyone else. Call our toll free number, (800) 453-2400 for the name of your nearest Ven-Tel distributor. He'll tell you just how far ahead that really is.

VEN-TEL

Maybe not number one. But the one to watch.
2360 Walsh Avenue Santa Clara, California 95050 (408) 984-2727



'We've Got the First Solar Powered Computer in the World ...'

DECprinter I's

**For Sale
•LA180**

**BEST PRICE
FAST DELIVERY**

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-279-1960

Data Equipment Group

ICE, INC.

**772 N. Church Rd.
Elmhurst, Ill. 60120**

With Small System

Manufacturer Heightens Accounting Accuracy

By Esther Surden
CW Staff

CHICAGO — A small business system combined with the vendor's packaged software has increased the accuracy of general accounting applications, a maker of industrial tempered products and glass here found.

Until last May, Chicago Dial Co. had used an "old-fashioned bookkeeping machine" and, except for the help of an IBM 5100 desktop system used for certain estimating applications, had no computer power at all, according to Douglas Felten, general manager.

Felten was able to determine what his business needed from prior experience. "I'd learned some hard lessons about upward capability and upward mobility. My knowledge of the various manufacturers' products led me pretty much directly to the Burroughs B80," he said, adding "we did do some peripheral looking" to make sure there wasn't anything the company had missed.

Chicago Dial is running payroll, general ledger and accounts receivable on the system. "We have scheduled payables, invoicing system and inventory control to run within the next year," Felten noted. The company also expects to develop its own order entry control system.

Minor Modifications

Some of the packages acquired from Burroughs have needed modifications, but they have been "relatively" minor. "We were the test site for the payroll system," he noted, so that system needed a few more modifications than normal.

The receivables system took only two weeks to put in and there "were substantially zero modifications" in that case, he said. Most of that time was spent entering the initial data, such as customer name and number and address, for the approximately 1,000 customers.

The company has performed a number of modifications on the general ledger package and "we will do more," Felten noted, mainly because of their reporting system.

The accounting part of the general ledger system needed none, but the reporting part did because of the specified format of its reports.

Order Detailed

Chicago Dial plans to write the order entry/production control system on the small business system. "We will be collecting the in-bound data on orders," such as what kind of an order it is, where it is going to be processed and what raw materials are necessary to complete the order, Felten said.

The application will also keep track of the order while it is in the production system. It will answer questions such as how many pieces the company lost and how much the product cost to produce.

In addition, the system will work with the sales invoicing and the accounts receivable system. A sale will be recorded by category or territory. Eventually the company hopes to produce a report on profitability by customer.

Chicago Dial employs a programmer

to run its small business system. Felten and his controller have extensive computer-related experience as well.

Help from Home

"We are also getting some help from our home office," he said, explaining that Chicago Dial is a subsidiary of a larger company.

"I'm sure it's possible to run a 'stock' system without an in-house programmer, although somebody would have to make a few modifications to every system," he continued. Most users could turn to the vendor to make those modifications. "Rarely does a packaged system fit your needs exclusively," he added.

The former bookkeeping machine operator is now the B80 operator.

The company expects to soon add one CRT terminal to the system that will allow a billing person to input invoice information. Later in the year an inquiry terminal will be added to be used by the customer service people and in the inventory control area.

Savings Predicted

The company has not identified any immediate cost savings from installing the small system, but Felten expects savings in the long run. "My experience is that computers rarely save you any money in the short term; the plan that I had for the computer is to

save money in the long term."

He pointed out the firm had to hire a programmer and it is not yet performing any applications on the B80 that it did not do in the past, and "with the same number of people."

"However, the volume we are processing right now is higher than before, and going into this next year we will be processing substantially higher volume. 'I'm sure at that point we will start to realize some savings,' he noted.

The company also feels the better reporting it will get from its small business system will help management make better decisions, thereby helping the company increase revenues.

flexible disks

Verbatim

The superb quality of Verbatim™ removable magnetic storage media is now on a dealer's shelf not far from you.

The reason Verbatim is now so accessible is that so many of you like the Verbatim idea: noticeably better quality and durability that show up in tough everyday use. The reason? We make almost everything ourselves, because we found that we could improve on the quality that we were getting from our suppliers.

Being demanding isn't always easy. But it's good for the people who buy and use Verbatim, and it's good for the scores of companies who specify Verbatim for the equipment they make. And we enjoy doing business that way.

For your nearest sales office call toll free:
(1) 800-821-7700, Ext. 515
(in Missouri call 800-892-7655, Ext. 515)

Information Terminals Corp., 323 Soquel Way,
Sunnyvale, CA 94086. (408) 245-4400.
TWX: (910) 339-9381.

In the Far East:
ITC - Far East
404 Roppongi Skyheights
3-2-21 Roppongi, Minato-ku
Tokyo, Japan
Telephone: (03) 583-1981
Telex: J 47879

In Europe:
Information Terminals S.A.
Case Postale 296
1215 Genève 15
Switzerland
Telephone: 41 (22) 34-90-55
Telex: 22647 ITGE CH

data cartridge

Verbatim

minidisks

Verbatim

Ask for it by name.

Verbatim™

Dear Verbatim people:
Tell me where my nearest Verbatim dealer is. 89-2-6-78

My name is _____
Title _____
Department _____ Tel. _____
Organization _____
Address _____
City _____ State _____ Zip _____
And while you're at it, send me literature on _____

Information Terminals Corp., 323 Soquel Way
Sunnyvale, CA 94086. (408) 245-4400

**"Our Remote Energy Information
helping clients save money, and the
computer is our key tool."**

John B. Phillips, President, Engineering Supervisor Co. (ESCO)



PRIME

Center is e Prime

ESCO, a California-based energy consultant, needed an extraordinarily versatile computer for their Remote Energy Information Center.

They needed a timesharing system that could simultaneously monitor electric meters in office buildings from Montreal to San Diego, analyze data, project daily power requirements, and feed back load management alternatives for maximum energy efficiency.

For ESCO, the choice was Prime. For ESCO's clients, the result has been significant energy savings in a totally voluntary program with minimal capital requirements.

Prime's family of interactive computer systems offers industry standard software including FORTRAN IV, BASIC, RPG II, COBOL, and a CODASYL-compliant Database Management System. They also have greater memory capacity than any other family of small computers: up to 8 million bytes of high-speed main memory, 2.4 billion bytes of disk storage, and 32 million bytes-per-user of virtual memory.

Prime computers are also true multi-user systems: one computer can handle up to 64 simultaneous users in such diverse activities as RJE communications, forms processing, on-line data entry, computational time-sharing, and database management. And the PRIMOS Operating System allows any user to use any language at any time.

For more on how Prime helped ESCO and on how we can help you, write David R. Johnson, Marketing Manager, Prime Computer, 40 Walnut Street, Wellesley Hills, Massachusetts 02181.

PRIME Computer
"Prime is helping"



Some IBM 3/10s Retired, Some Going Strong

(Continued from Page 45)

accrued enough credits to make its purchase worthwhile. In addition, IBM had reduced prices by 10% at that time.

Myers has also looked at the System/34. "It looks like a super system. If we were going to move up from a 10, we might consider the 34."

Since his firm is not using to its capacity the 3/10 it has now, Charles L. Golden, assistant controller of Diamond Glass Co. in Royersford, Penn., feels it will be adequate in the foreseeable future.

The firm, which makes glass containers for the cosmetic and beverage industry, began its DP history with a service bureau, moved to a 360/20 and then upgraded to the 3/10.

The company leases its system and has been asked to buy it "countless times," Golden reported, but it is "not interested."

Upgrades to Model 12

In Menasha, Wis., Wisconsin Tissue Mills, Inc. upgraded from its original 3/10 to a Model 12 for more storage capacity, according to Calvin Barrow, DP manager. The maker of paper products does order entry, billing, inventory control, payroll, sales analysis and efficiency reporting on its system.

The 3/12 is leased and will continue to be because its user feels it might outgrow it in the next five years. Although IBM has not yet approached the company about the System/34, Barrow feels the system — with some

major enhancements — could be an upgrade alternative.

"As it is right now, the system is not large enough," he explained.

Hillcrest Baptist Hospital of Waco, Texas, is also a 3/12 user who upgraded from the 3/10 because it needed more disk capability, according to Ed Moore, DP manager. The hospital runs all of its financial applications, including patient billing, on the system.

The hospital leases its system, installed last year, and will continue to lease it because "we will be growing," Moore predicted.

A former 3/10 user who upgraded to the Model 15, Santee Portland Cement Corp. in Holly Hill, S.C., runs all its accounting and inventory applications

for five divisions on its system. Santee's DP history dates back to the installation of a 360/20, which was upgraded to the 3/10.

Although the firm has been approached about the System/34, that system's storage capacity is not large enough for its needs, C.D. Townsley, DP manager, noted.

A company that has moved through the 3/10 to the 3/12 and finally to the 3/15, Adirondack Chair Co. Inc., in New York City, grew at a pace that the early systems couldn't handle. "We also went into on-line applications," Herb Stanger, DP manager, recalled.

The company, which sells institutional furniture through catalogs runs order writing, billing, receivables and payables on its rented system.

Although it has been asked to buy the system, the firm feels "it doesn't really pay unless you plan to hold on to the system for five years," Stanger said.

One of the users who switched systems, Ranzy Gammal, DP/systems manager for Henry Walke Co., Inc. in Norfolk Va., now uses a Hewlett-Packard Co. minicomputer. "We needed to upgrade," Gammal said, and the HP system looked "much more advantageous."

The two influencing factors were cost and machine performance. HP also had "very strong software," he noted.

Another user who switched was a 3/10 user which moved to a Data General Corp. Nova 3D because it needed to go to on-line order entry. The user, which did not want to be identified, leased its system from IBM.

Disk Controller Gives DG Users Alternatives

PALO ALTO, Calif. — Minicomputer Technology has a minidisk controller that reportedly allows Data General minicomputers to accommodate drives from Control Data Corp., Ampex Corp., California Computer Products, Inc., Memorex Corp. and Microdata Corp.

The single-card Model SMC902 offers up to 600M bytes of on-line storage and occupies one CPU slot, according to a spokesman.

Software support for the SMC902 includes RDOs, Iris and Blis/Cobol compatible drivers and a stand-alone diagnostic/formatter program, he said, adding standard features include full sector buffering and direct memory access (DMA).

The unit costs \$2,400, including cabling to the first drive and a one-year warranty, Minicomputer Technology said from 2470 Embarcadero Way, Palo Alto, Calif. 94303.

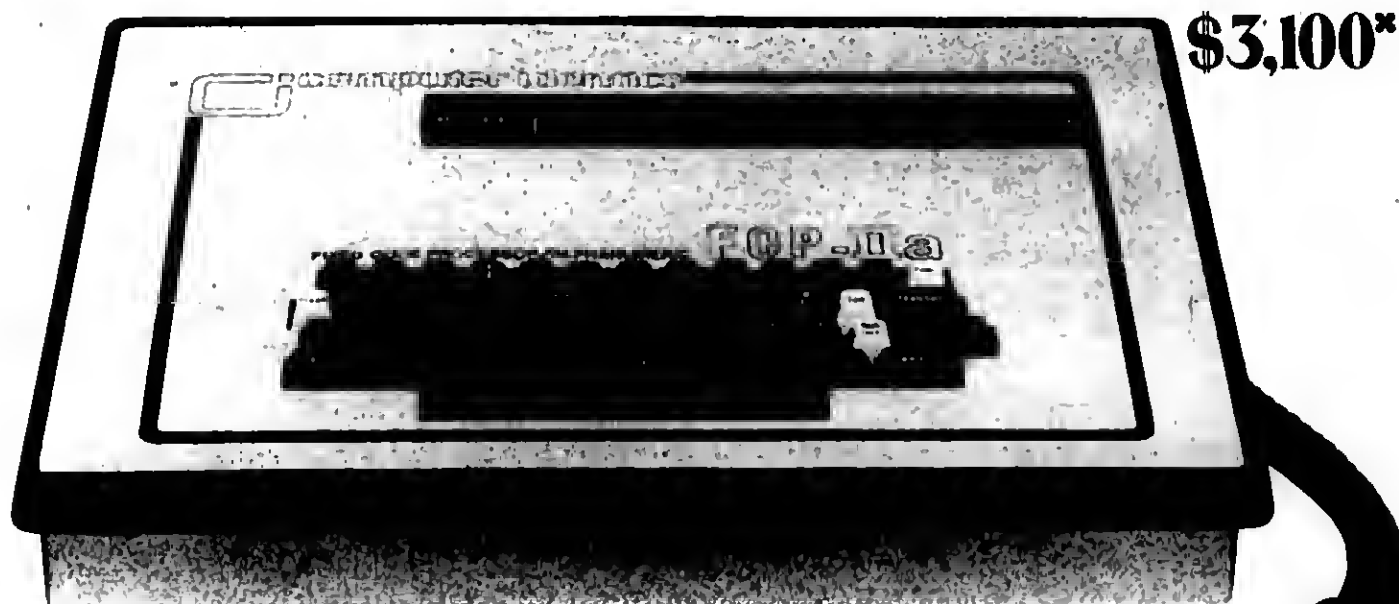
Printer Fits Series/1

STAMFORD, Conn. — Digital Associates Corp. (DAC) has a heavy-duty, chaintrain printer plug-compatible with the IBM Series/1 minicomputer.

The company is offering print speeds of 300-, 600- and 1,000 line/min on the printer, which will be available in the second quarter.

The 300 line/min unit will cost \$10,965, the 600 line/min printer \$13,366 and the 1,000 line/min unit \$18,900, DAC said from 1039 E. Main St., Stamford, Conn. 06902.

Our lightpen comes attached to an alphanumeric unit with full LED display.



How many code readers can make that claim?

Just ours.
It's part of a remarkable bar code data entry terminal system. The FCP-IIa. It's a plug-in system that eliminates errors, cuts pre-processing costs and saves valuable operator time in both plant and office data entry applications. The FCP-IIa is interactive! The operator receives both audio and visual scan confirmation immediately as well as visual computer feedback. Send/receive message length can be up to 32 characters. And, codes? The FCP-IIa handles "2 of 5", Interleaved "2 of 5", "3 of 9" (including variable length codes), Codabar and UPC. The FCP-IIa. It's what's behind the pen that counts.

(*Quantity of one, OEM and volume discounts available.)



computer identics

31 DARTMOUTH STREET WESTWOOD, MASSACHUSETTS 02090 TELEPHONE: (617) 329-1980

- ☐ I'm interested in more information on the FCP-IIa
☐ I'm interested in OEM possibilities

NAME _____

COMPANY _____

ADDRESS _____

STATE _____

ZIP _____



I bought ITRAC.

And my transaction processing worries went away.

I admit it. I was really worried about using a minicomputer for transaction processing. Until I saw how simple it is to put up an on-line system using Interdata business computers and ITRAC, Interdata's new transaction processing software.

Take programming. I was afraid my programmers would have to learn a new language. But with ITRAC they sat right down and went to work. Because ITRAC is totally COBOL compatible.

Screen formatting used to be a big headache. Now it's a snap. My designer keys in a screen in any format he chooses. And, in seconds, a completed screen comes back. Then he tests and modifies the screen on-line. No waiting or delays.

No problems with unsophisticated terminal users, either. Screen formats are easy to follow and all input data can be validated. So the user knows immediately when he makes an error.

But here's the best part: ITRAC software runs on Interdata's 32-bit processor. So you get the response time of a main-frame...for the price of a mini.

Interdata business computers and ITRAC. If you need transaction processing, they can help.

For more information, write Perkin-Elmer, Interdata Division, Oceanport, New Jersey 07757 or telephone (201) 229-4040.

Here is my business card. Send me your brochure, "How to succeed in transaction processing."

PERKIN-ELMER
Data Systems

Dual Systems Meet Newspaper's Backup Need

By Esther Surden
CW Staff

HUDSON, N.Y. — A production/editorial/classified processing system that uses two small processors as its base has helped the *Hudson Register-Star* here cut costs and improve production, according to Paul J. Zindell, production manager.

The newspaper spent less than \$60,000 for the system and expects to recoup its costs

in three years, he added.

Based on Harris Corp. Compu-type equipment, the system was chosen on the criteria of modularity, simplicity of use and reliability, he said. Modularity was important because the hardware needed to be swapped out for repairs; simplicity was a must because nontechnical people were going to operate it and reliability was essential because newspapers have deadlines to meet.

The paper kept its business operations and newspaper production separate so that if one part went down, the other would not necessarily be affected.

The system has allowed the *Register-Star* to cut by two and a half the number of positions needed to put out the paper. Composing time per page was cut from 2.8 hours to under two, Zindell said.

Each CPU stores local copy,

display ads and wire copy on its floppy disk. In-house copy is produced and edited on-line, filed in the system and output on paper tape. "Canned" copy — press releases, for example — is set by a production typist who inputs it.

When reporters write a story, it is output to a hard-copy printer for backup. Thus, if the system goes down before the story is edited, the

article isn't completely lost.

The *Register-Star* expects to put two Compu-Edit CRT terminals in its two bureaus next year, connected by dial-up lines to the CPUs in Hudson.

The display and classified advertising sections are always an important part of a newspaper's business and at the *Register-Star* ads are set via a CRT by a production typist; the classifieds are categorized by the system. In the future the newspaper expects to put a CRT in the classified advertising department so an operator can input an ad while the customer is still on the phone.

Double Backup

"A unique feature of the system is the double backup to allow continued processing should one or even both of the Microstar CPUs fail. If one goes down, the other can handle other terminals by simple interfacing with a four-way switch box," Zindell noted.

"Should both processors fail, all terminals would output directly to the punches via two four-way boxes," he added.

April 17 — 19, 1978 Chicago, Illinois

1978 DELTAK International Data Processing Training Conference

DELTAK, the world's largest video publisher, announces its 3rd Annual International Users Conference, to be held at the Hyatt Regency in Chicago on April 17 — 19, 1978.



Hyatt Regency Chicago

This year's agenda features presentations of importance to Data Processing training organizations.

- DP Education and Training for the 1980's
- Industry Futures — Hardware, Software, People

- Programmer Productivity — Past, Present, Future
- The Jackson Structured Design Techniques
- Performance Goals and Appraisals

During the conference, a number of workshops (conducted by experienced DELTAK users) will deal with effective planning and management of in-house training activities.

- Designing a Learning Resource Center
- In-House Course Design and Presentation
- Establishing a Tutorial Program
- Record Keeping and Management Reporting

Additional workshops will address training areas that will become critical during 1978 and 1979:

- Data Base
- Structured COBOL
- Distributed Processing
- Mini/Micro Computers
- Structured Analysis
- Supervisory Training

Our speakers' forum consists of DELTAK users and a number of well-known and highly respected individuals who have made significant contributions to the Data Processing and Training Industries:

- Leo J. Cohen, Performance Development Corporation
- Dr. J. Daniel Couger, University of Colorado/DPMA "Man of the Year"
- Dr. Herbert Grosch, President, ACM
- Capt. Grace Hopper, U.S. Navy
- Michael Jackson, Michael Jackson Systems Ltd.
- William Oncken, William Oncken Corporation
- John Toellner, J. Toellner and Associates
- Ed Yourdon, YOURDON, Inc.
- Plus DELTAK staff, selected DELTAK users and several other guest speakers.



Conference Logo

You are cordially invited to participate in this Conference.

The registration fee for the conference is \$100.

Write or call Ms. Sharon Trube, DELTAK, Inc., 9950 West Lawrence Avenue, Suite 50, Schiller Park, Illinois 60176; phone: 312-671-5300.



Turnkey Set On Series/1

ENGLEWOOD, Colo. — A turnkey business system based on the IBM Series/1 minicomputer is available from Gemini Information Systems, Inc.

The system, with 65K bytes of memory, console CRT, 9M bytes of both floppy and hard disk, an additional CRT and a 200 line/min printer, contains a software combination of IBM and Gemini packages.

Included with the system is the Real-Time Programming System, Fortran IV and PL/I from IBM and Gemini's Data Demon, a data base management and query system and an accounting system.

The hardware/software system costs \$48,500 from Gemini at 5650 S. Syracuse Circle, Englewood, Colo. 80110.

ATTENTION!

If you buy, lease, or operate an IBM 3032, 3033, 370 series, CDC 7600 series or other liquid cooled processor contact us.

We have a cooling system for large processors that can save you up to 50% operating costs. It can outperform, and outlast anything on the market. Also it does not take up computer room space.

For further information, call or write:

CONTROLLED ENVIRONMENT CORP.

640 Reynolds Ave.
Kansas City, Kansas 66101
(913) 342-3599

Over ten years experience in computer room environments.

CARSON, Calif. — Users of Heath Co.'s H8 microcomputer can both add a floppy disk and upgrade their processor to a Z-80 with a system released here by the Info 2000 Corp.

The disk system includes Persci, Inc. dual diskette drives, a power supply, an intelligent controller and a disk monitor.

The unit has 7K of erasable programmable read-only memory (Eprom) and 1K of scratch-pad random-access memory for the disk monitor, according to a spokesman.

With the addition of an adapter board, the H8 microcomputer can run in either one of two switch-selectable modes. One

Heath H8 Users Get Floppy Disk, Upgrade to Z-80

mode enables continued use of the H8 Eprom monitor and Heath Benton Harbor software; in this mode, the computer performs at Z-80 speed and uses the extended instruction set of that micro-processing unit, the spokesman noted.

The second mode supports the Info 2000 disk monitor and related software, allowing use of its TDL and CP/M disk systems, he said.

Price of the disk system is \$2,750 with a 5% discount available when payment accompanies the order. Info 2000 Corp. is located at 20630 S. Leapwood Ave., Carson, Calif. 90746.

Hobby Becomes a Business

Micro Monitoring Home Water Use

By Tim Scannell
CW Staff

PIEDMONT, Calif. — When William Oliver decided to use his microcomputer system in this small residential town, the last thing he wanted to do was wait until a rainy day.

Together with his daughter and a few neighborhood teenagers, the self-employed computer consultant operates a weekly water-usage reporting service that provides individual statistics to more than 100 homes in what was, until very recently, a water-short and rationed California.

Using a system based on an Imsai microcomputer, Oliver's business evolved from a program he had written for himself. "Northern California thought it was short of rain up until the last couple of weeks. Late last spring my daughter came to me and told me she needed a job for the summer.

"At that time, I had written a small program to keep track of my own water use and that of my mother's. So I thought to myself, maybe people would like to know how much water they use on a weekly basis," he recalled.

The district water company for Piedmont provides the same service, but on a bimonthly and somewhat limited basis, he said.

After deciding his idea would

be accepted, Oliver took steps to introduce its existence: "I had teenagers pass out some 8-1/2 by 11 printed things to the surrounding homes, telling them what I was going to do.

"Since then, on a weekly basis, we've been reading their meters and plugging the stuff into a program and coming out with beautiful little computer reports that tell them all their averages over a period of time," he said.

Even though Oliver's business is competition of a sort, the local water company doesn't seem to mind. "The utility district that is in charge of [monitoring] the water responded with no answer when I asked whether it would be all right if I did it," he said.

The system used by Oliver, as-

sembled from various kits, is composed of an Imsai 8080 with 64K of memory; two floppy disk drives, each with a capacity of 250,000 characters; a Lear Siegler, Inc. ADM-3A terminal; a Qume printer; and four serial ports. He uses the system in his business for approximately four hours each week, he noted.

Switching Help

The Imsai has also been used as an intelligent terminal between two time-sharing computer systems, Oliver stated. While working for a former employer, he had a problem switching from one computer to the other.

"Because of the nature of the two different computers and the languages involved, nobody could figure how to transfer in-

formation. I taught my Imsai to talk to both of them through the telephone lines and I did the translation. It was a great tool to have around," he said.

Oliver, having entered DP through the software field, had no previous electronic experience other than that acquired from assembling various Heath Co. kits.

"I bought my computer in kit form for two reasons: number one, saving money; and two, I wanted to deal with a computer on a one-to-one basis," he said.

Aside from having a few problems with defective boards and short circuiting, Oliver is satisfied with his selection of Imsai products. "Once you get the stuff up and running, it stays up and running," he said.

Terminal Comes on S-100 Board

PALO ALTO, Calif. — A terminal contained on an S-100 bus board that reportedly requires only the addition of a microcomputer, CRT monitor and keyboard for operation is available from Dynabyte, Inc.

The Naked Terminal displays 24 lines with 80 char./line, prints both upper and lower case and requires no support software, a spokesman said. It features com-

plete cursor control, direct cursor addressing and switch-selectable half- and full-duplex and block modes.

In the block mode, editing is allowed before transmission, the firm noted.

Status bits of the unit may be positive, true or negative true and can reportedly be assigned to any bit of the status word. The status port can be addressed anywhere,

the spokesman said.

The unit includes an underline cursor that can be switch-selected as blinking or nonblinking and a selectable black-on-white or white-on-black display.

Assembled, socketed and tested, the Naked Terminal is priced at \$350 with quantity discounts available, Dynabyte said from 4020 Fabian Way, Palo Alto, Calif. 94303.



Introducing the lowest cost PDP-8 based business system in the business.

If you're an end user who finds programming easy, or a small systems house, here's an offer you can't refuse. Quodata Corporation is offering a complete PDP-8 based business system — with the very latest technology — for only \$9,990.

That's \$2,400 less than you'll find anywhere else.

And QDP78 is an outstanding system. It features QBOL, our own business-oriented language. QBOL is compatible with DEC's DIBOL, but it's better. One reason is that it runs under the more flexible OS/8 operating system. FORTRAN IV and

BASIC are also part of the system.

The QDP78 system is comprised of the latest LSI video display computer, the VT-78, and includes a processor, 32K bytes of MOS memory, a large 24 line by 80 character video terminal with upper and lower case characters, DECwriter II printer, dual diskette drives, and a portable mini-desk.

We have a limited number available, so call or write now: Richard Prendergast, (203) 728-6777.

quodata

196 TRUMBULL STREET · HARTFORD · CONNECTICUT 06103

H HERTZ — A unit of frequency equal to one cycle per second.

H HEXADECIMAL NUMBER SYSTEM — The number system with the base of 16 (contrasted with decimal, which has a base of 10).

I ICAND REGISTER — The register which in multiplication holds the multiplicand.

I ICE — ICE is an In-Circuit Emulator which is plugged directly into the user's systems in a real-time environment. ICE is used to control, interrogate, revise and completely debug a user's system in its own environment. For Intel Corp. 8080-based products, ICE-80 is provided, and ICE-30 is used to develop products with the bipolar microcomputer set.

IEEE — Institute of Electrical and Electronics Engineers.

IER REGISTER — The register that contains the multiplier during a multiplication operation.

IGNORE — 1. A typewriter character indicating that no action whatsoever be taken, i.e., in Teletype or Flexowriter code, a character code consisting of holes punched in every hole position is an ignore character; this convention makes possible erasing any previously punched character. 2. An instruction requiring nonperformance of what

normally might be executed, i.e., not to be executed. This instruction should not be confused with a no op or do nothing instruction, since these generally refer to an instruction outside themselves.

INITIALIZE — 1. Refers to a program or hardware circuit which will return a program, a system or a hardware device to an original state. 2. To set an instruction, counter, switch or address to a specified starting condition at a specified time in a program.

IN-LINE — A method of processing in which individual input transactions are completely processed and all pertinent records are updated without previously having been grouped.

INPUT — 1. An adjective referring to a device or collective set of devices used for bringing data into another device. 2. A channel for impressing a state on a device or logic element. 3. Pertaining to a device process or channel involved in an input process or to the data or states involved in an input process: in the English language, the adjective "input" may be used in place of "input data," "input signal," "input terminal," etc., when such usage is clear in a given context. 4. Pertaining to a device, process or channel involved in the insertion of data or states, or to the data or states involved.

LEARNER'S LEXICON

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc., 207 Kenyon Road, Champagne, Ill. 61820.



COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

Processor Technology Sol-20 Computers 20% off. Byta (215) 525-7712.

MICROCOMPUTER SYSTEMS COMPONENTS 1 ea. used: INTEL SYSTEM 80/20 \$1650, SBC 80/20 \$800, SBC-016 \$880, PRO-LOG PLS441 \$150, NATIONAL BLC 80/10 (new) \$400, MCS-40 parts @ 100 pc. price in fives: 4040, 4201, 4289, 4002-1, etc. Stock 25. This sell-off of excess stock prepaid or, NET 30 + shipping to rated firms. MAIN MICRO-SYSTEMS, 4726, Balboa, Fremont, CAL 94536.

WANTED: Applications software in Basic for the Data General microNOVA with 28K and dual floppies. Outright purchase or royalty negotiable. Box 1415, 797 Washington St., Newton, MA. 02160.

TEXAS INSTRUMENTS: SR 60A manuals, 250 documented systems, rolls, memory expansion chips, mag cards, INFOTRON 1401 W. Broadway, Vancouver B.C., V6H 1H6 (604) 732-0132.

TAXES SOFTWARE: Computas Form 1040 & 5 schedules. See if you can itemize, income average, etc. BASIC; 10 K min. Tarbell, Sol, Northstar, call about others. Cassette, \$20, Disk \$26. DICOMP, 2053 Manzanita Dr., Oakland, Ca. 94611. (415) 434-4767.

OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS. California Microcomputer Company's (CMC) previous ads in Computerworld has resulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved business software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927 (916) 891-1420.

LEARN MICROCOMPUTER PROGRAMMING. At home. At your own pace. Complete course consisting of 10 lessons, problems, solutions, practical examples in 8080, 8085 assembly language. \$49.95. Write or call Pat for FREE BROCHURE. Logical Services, Inc., 711M Starlin Road, Mountain View, California, 94043. (415) 985-8365.

Microsoft ("Altair") BASIC for 8080/280/8502 and FORTRAN IV for 8080/280 now available to OEMs, and users. 8080/280 BASIC has random sequential files; double precision; IF ... THEN ... ELSE and more. FORTRAN produces optimized relocatable code, meets ANSI68 except complex CP/M and ISI-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 San Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 262-1486.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02160.

I have read the rules, and would like to place my ad as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (_____) _____

Show and Tell.

To learn more about computers at any level, you have to hear. Discuss. Ask questions. Share ideas. Watch things work.

Computer shows dot the map every year. But Computer Expo 78 is different. An exhibit showing you all that's new. A conference telling you about new ways to use it.

The Show.

The Exposition. Your chance to hold a one-to-one consultation with hundreds of representatives in the know from the nation's top manufacturers. You don't have to travel all over. They're coming soon to a city near you.

And the Show is free! Including exhibitor seminars and demonstrations of the latest developments in:

Data Communications Terminals • Software • Minicomputers • Data Input Equipment • Computer Output Equipment • Supplies • Magnetic Media • Modems • DP Education • Small Business Computer Systems • Flexible Disk Drives • Data Communications Interconnect Equipment • Mini-peripherals • Magnetic Tape Transports • Cassette Systems • Power Supplies • Printer Terminals • Keyboards. And more.

Ask your questions. State your needs. Discuss your plans. This low-key atmosphere is your chance of the year to compare what's on the market, all in one place. As sophisticated or as simple a show as you need. You're the center of attention, whatever your level.

You're important enough to bring top people from all over the country to you. Find your show dates here:

ANAHEIM Southern California Computer Expo	March 21, 22, 23 Disneyland Hotel
SAN FRANCISCO Northwestern Computer Expo	March 28, 29, 30 San Francisco Civic Auditorium
HOUSTON Southwestern Computer Expo	April 11, 12, 13 Astrohall
ATLANTA Southeastern Computer Expo	April 18, 19, 20 World Congress Center
ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place.
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

COMPUTER CARAVAN'S



Save time!

To register, to get more information or for your free advance tickets to the Exposition, call TOLL FREE: 800-225-4242. (In Massachusetts, call collect: 617-964-4550.)

The Tell.

The Conference. Computer Expo's Conference takes place from 9 AM to 1 PM, leaving your afternoons free for the Exposition. The Conference includes keynote speeches, case studies, presentations, panel discussions and workshops. All put together by experienced conference planners, making this the most respected conference in the country. Well-known authorities — consultants and users — will share experiences, ideas, insights and foresights with you.

These are days that will bring you facts you need now, to put to practical use now. No frills, no fluff.

Whatever your level, you'll find at least one of these days a must:

Tuesday

For you on the executive level, dealing with data processing personnel, problems, payments, plans.

The Executive Briefing.

A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing. Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday — Simultaneous Double-Conference

For you who are bringing in a first computer system for a small company, or are involved in light inhouse computer use — maybe about to trade up — or just thinking about your own system.

Small Business Systems.

A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

For you who interface with computer personnel on a day-to-day basis and need to anticipate, communicate, elicit their best work.

Managing People Problems.

A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Thursday

For you, the manager or technician whose organization is thinking of distributing its computer resources to regional offices and plants.

Distributed Data Processing.

A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Take one, two, or all three days.

Send yourself. Send your key personnel.

The Exposition is free.

The Conference is just \$55 per single day, only \$135 for all three days.

Register now.

For the Show.

And for the Tell.

Write to
Conference Chairman
Computer Expo 78
60 Austin Street
Newton, MA 02160

Pro-Log Uses 6800 As Logic System Basis

MONTEREY, Calif. — A single-card programmable-logic system based on the 6800 microprocessor and suited for small-scale DP applications has been introduced by Pro-Log Corp.

The PLS-868 includes 1K of IBM 2114-type random-access memory (RAM) and sockets for up to 8K of IBM 2716-type erasable programmable read-only memory (Eprom), the firm said.

The user can jumper-set either RAM or I/O into memory base Page 00 for use with the 6800's memory direct instructions, a spokesman added.

The logic card includes a crystal clock, two interrupt inputs, power-on and external reset, three (expandable to eight) 8-bit output ports and two (expandable to eight) 8-bit input ports, he said. The system operates from a 5 Vdc power supply and is TTL-compatible.

The unit is priced at \$295 with quantity discounts available, Pro-Log said from 2411 Garden Road, Monterey, Calif. 93940.

Board Links S-100 Devices

SYLMAR, Calif. — Vector Electronics Co., Inc. has a motherboard designed to allow the interconnection of microprocessors, memories and interface boards using the S-100 bus.

The Model 8803 reportedly eliminates the need for backplane wiring. It has prewired circuits for either active or passive bus-line termination, the firm said.

The unit has etched traces for all 96 bus lines as well as heavy buses for ground, 5V

and 12V. Pre-established points for power supply sense lines permit remote monitoring voltages.

The 8803 has positions for 11 R681-2 or equivalent card-edge connectors with 100 contacts, .125-in. centers and .250-in. row spacing, a spokesman said.

Price of the motherboard, including a component layout and calibration procedures, is \$29.95 from Vector at 12460 Gladstone Ave., Sylmar, Calif. 91342.

Floppy Disk Controller Fits 8010

WALTHAM, Mass. — GSI Systems Co. has introduced a single-board floppy disk controller it said is 8010 bus-compatible and can control up to four disk drives.

The Model 10043 is a microprocessor-based disk control card that has an IBM-compatible format with 3,328 bytes of data per track and a total of 77 tracks, a spokesman said.

The unit also features a non-IBM-compatible option that formats each track with two

Minifloppy Unit Stores 70K

SANTA ANA, Calif. — A minifloppy disk system with a storage capacity of 70K characters that is RS-232 compatible has been announced by Western Telematic, Inc.

The Datamate features selective transmission rates up to 9,600 bit/sec and operates under both manual and remote control, a spokesman said.

Edit-Features

Editing capabilities include backspace erase, insert, delete, skip, go-to-link and auto line feed functions.

The price of the minifloppy disk system is \$1,750 from the firm at 2435 S. Anne St., Santa Ana, Calif. 92704.

sectors containing a total of 4K bytes, he stated.

Interrupt Option

The controller independently executes commands and reports completion of a command to the host, the firm said. An interrupt option allows the host to be interrupted when the disk controller has

completed a task.

The 10043 has a formatter option that enables the user to format raw diskettes; it is equipped to perform self-tests and status and error reporting, the firm stated.

The price of the floppy disk controller is \$495. GSI Systems is at 223 Crescent St., Waltham, Mass. 02154.

Micral C Has 32K RAM

MINNEAPOLIS — A microprocessing system with 32K of random-access memory (RAM) and a 10M-byte cartridge disk unit has been introduced by R2E of America.

The Micral C system includes an 8-bit microprocessing unit (MPU), a 1,920-character upper/lower case CRT, a keyboard with numeric pad and dual double-density minifloppy drives providing 320K bytes of storage, a spokesman said.

The cartridge disk drive stores data onto a removable or fixed surface and has a transfer rate of 92K byte/sec, he added.

100W Power

The disk drive operates with 100W of power and its head positioning is controlled by a

linear motor/voice-coil positioner with position feedback from the media, the firm added.

Software includes an assembler; BAL with a sequential and random-access file management system; and an 8080 Ansi Fortran IV compiler, the firm said.

The system costs \$15,950 from the firm at 3406 University Ave. S.E., Minneapolis, Minn. 55414.



Micral C

DO YOU QUALIFY?

OUR PRODUCT WAS DESIGNED FOR THE VANGUARD OF THE COMPUTER INDUSTRY. SOPHISTICATED USERS RECOGNIZE THE VERSATILITY OF OUR MACHINE AND HAVE BEATEN A PATH TO OUR DOOR.

We've installed our revolutionary computer system, the QM-1, in Fortune 500 Aerospace Corporations, Universities, the Military, major System Houses and in a giant Computer Manufacturer.

They purchased our system because:

- The QM-1 was specifically designed to enable you to emulate any computer or, for that matter, any peripheral or digital device.
- When an emulator is running, the QM-1 architecture is transparent to the user. Software developed on the QM-1 will run on the machine which has been emulated. The opposite is also true; application and system software from the "real" machine will run unchanged on the QM-1.
- QM-1 customers have emulated commercial, militarized, avionic and special purpose computers. They range from micros to fourth generation Large Scale General Purpose Systems.
- Users are not limited to one system identity; they can emulate as many kinds of computers as they like, even run multiple emulations of different systems concurrently.
- The QM-1 allows you to control and monitor the emulated system, even primitives like gates, data buses and registers. You can use it to design new computers.



Here's what QM-1 users have found to be true:

- Emulators on the QM-1 are running one hundred times faster than simulators on more expensive systems.
- The QM-1 is an easily modified, reusable breadboard to verify and validate device design.
- The QM-1 is without equal as a software development tool for any computer. It will also protect investments in software running on standardized machines.
- The QM-1 is an excellent design tool for analyzing software structure, system composition and hardware/software trade offs.
- The QM-1 is ideal in a computer science environment for instruction and research into hardware and software architecture.

Prices range from \$190K for a minimum system configuration, capable of running Nanodata supplied software, to upwards of \$700K for a multiprocessor. A "typical" customer configuration sells for \$280K and includes emulators of the PDP 11, Data General NOVA, IBM 360, etc.

Do you qualify as a prospective user? If you do, then write for additional information or, better still, call Michael Senft, Director of Marketing.

NANODATA CORPORATION
2457 Wehrle Drive • Williamsville, N.Y. 14221 • (716) 631-5880

GSA's 1977 Inventory Shows

IBM's Share of Federal Pie Shrinking

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — Federal users helped themselves to bigger portions of Digital Equipment Corp., Hewlett-Packard Co. and Data General Corp. computer and communications equipment during fiscal year 1977, according to the annual inventory of federal DP installations conducted by the General Services Administration (GSA).

In beefing up their presence at government installations, DEC — which showed a gain of 39% over the dollar value it had installed in fiscal 1976, HP — which grew 35%, and DG — which jumped 53%, ate away at IBM's leadership as a government DP supplier.

IBM continued to lead in the value of its installed federal DP base, but its percentage of the total dropped from 32.6% at the end of 1976 to 30.5% by October 1977.

Mainframers, too, helped reduce IBM's share of the federal market. Honeywell Information Systems, Inc. and Burroughs Corp. fattened their installed bases 24% and 16%, respectively, and did so on equipment values far exceeding those of the small computer companies.

IBM continued to consume the biggest piece of the pie in net DP shipments, which

grew to \$1.46 billion from \$1.44 billion the year before, a gain of 1%.

The second and third slices of that pie were considerably smaller and went to Control Data Corp., with \$735 million in net shipments, and Univac, with \$635 million.

DEC No. 1 in Numbers

DEC far and away netted the largest number of CPUs installed — a total of 2,593 by year-end 1977. Because most of these processors are small, however, DEC only achieved sixth place in dollar value of the federal base with \$171 million.

Univac installed 1,617 CPUs in fiscal 1977 and IBM had 1,225 CPUs in place at year-end.

The GSA inventory showed federal computer installations took a bigger bite out of the total government budget in 1977; the total value of the equipment installed by October was \$4.77 billion, a gain of 8% over the \$4.41 billion owned, leased or rented by the government in 1976.

GSA includes in its inventory commercial computer gear installed in all federal agencies. It does not, however, list specialized militarized computer equipment or the commercial installations involved in classified and intelligence operations.

While CDC increased the total dollar value

of its installed base by only 1% from \$727 million last year, Univac gained 8%, jumping from \$583 million in 1976. Its increase was attributable, in part, to its acquisition of Varian Data Machines, which had an installed federal base of \$14 million in 1976.

No. 4 in dollar value, HIS achieved a 24% growth in dollar value in fiscal 1977 — to \$456 million from \$368 million the year before.

The sharpest percentage gains belonged to the smaller companies, however. DEC achieved its 39% increase by boosting its dollar value installed from \$123 million to \$171 million.

HP won its 35% increase in dollar value installed by jumping to \$38 million from \$28 million in fiscal 1976, and DG rose 53% to \$23 million from \$15 million the year before.

DEC's lead in number of processors represented a 23% increase over the 2,095 CPUs it had installed last year.

Univac only had five more processors installed at the end of fiscal 1977 than it did at the close of 1976. Similarly, IBM added 23 CPUs to the 1,202 processors it had in place in fiscal 1976.

HIS, fourth in number of processors as in dollar value installed, increased the number

(Continued on Page 60)

IBM Moves Hurt PCM Finances: Broker

By Molly Upton

CW Staff

SAN FRANCISCO — IBM's actions between 1969 and 1972 caused the investment community to cease extending permanent capital to plug-compatible manufacturers (PCMs), according to Eugene K. Collins, director of research at Evans & Co., a New York brokerage firm.

Collins told the jury in the Memorex Corp. vs. IBM antitrust trial here that the PCMs' inability to raise permanent capital constituted a barrier to entry in the market.

He drew a distinct parallel between the chronology of IBM's actions and the PCMs' inability to raise permanent capital — that which a firm held for over five years.

The IBM moves perceived by investors as boding ill for the PCMs included introduction of the 2319A disk drive for the 370/135 and 145 and the 2319B drive for 360s, and

the Fixed-Term and Extended-term plans, he said, as well as the addition of the 3330 drive and the use of integrated file adapter and integrated storage controllers.

The witness also testified extensively from documents written by members of the financial community, including himself, concerning their skepticism of the PCMs' viability after various IBM announcements. Other documents introduced into evidence showed IBM analysis closely watched the health of firms such as Memorex.

Leasing Environment

The PCMs' requirements for capital constituted a barrier to entry because they could not survive in a lease-based industry without funding, he said. Lease revenues accrued more slowly than revenues from equipment sales and firms had difficulty showing a profit during their early years.

The PCM market was lease-oriented because it, like the rest of the DP industry, grew out of the tabulating machine market for which IBM had constructed a leasing environment, he observed.

Although permanent capital became unavailable for PCMs and others in lease-based DP markets, by contrast, minicomputer firms, which are in a sales market, have been able to raise increasing amounts of capital since 1969, Collins said.

Ten large PCMs obtained capitalization at a relatively good rate from 1966 to 1968 and in 1969 reached \$113 million, he said. This grew in 1970 to \$128 million and then "fell off sharply," dwindling to the point where virtually none was available in 1974, he said.

IBM announced the 3330 disk drive in June 1970, the 2319A in September and the 2319B in December. The Fixed-Term Plan

(Continued on Page 60)

Comdisco
is the leader in
buying, selling & leasing
IBM processors and peripherals.

Re-

THINK

COMDISCO

THE LOGICAL CHOICE

IBM Moves Discouraged PCM Backers: Broker

(Continued from Page 59)

was unveiled in May 1971. In the first quarter of 1972, IBM announced the 3705 communications controller and the Extended-Term Plan. The smash announcement, including the integrated storage controller for its 370/158 and 168, came in the second half of 1972.

As an example of the difference in balance sheets displayed by sales- and lease-oriented firms, Collins said a \$100 million company with a product cost of \$80 million would show a \$20 million profit before taxes if it sold its product.

But if that same company leased its product, it would show a loss of \$36.9 million, he said. The difference in cash flow — the amount investment bankers consider necessary to keep a firm in business — between the two firms is \$87.5 million, he said.

Collins concluded that it is extremely difficult for the investment community to finance a company entering the PCM arena in which it is competing against IBM or any company in a rental base market.

Memorex was attempting to raise \$200 million in the early '70s to finance its Independent Leasing Co. (ILC).

IBM Assessment

Looking at IBM's assessment of the industry, documents as early as September 1967 from IBM's T.C. Papes to Frank Cary and John Opel, now chairman and president, respectively, showed that a "predominant lease market places the greatest financial strain on the competing equipment

manufacturers."

In the latter part of 1969, IBM's market evaluation department shared the optimistic view of the investment community about PCMs' chances of finding capital. "There will be a rapid buildup of marketing and manufacturing ... As additional capital is required, the money market will smile on them," according to that report.

IBM was concerned about the inroads made by the PCMs, according to a memo from J.E. Bertram to W.C. Hume and John Opel in November 1970: The disk area "has come to be an item of major concern for IBM over the last six months, because of growth and technical competence of our competition."

Bertram suggested addressing the problem by introducing products more frequently, but said the firm would have some problem adjusting to that.

Another document from IBM a month later, written by R.P. Fletcher, indicated the 2319B, announced for use with 360s, should reduce PCM penetration from 60% to 38% and cause PCMs to lower prices in order to compete. Their reduced prices would extend the pay-back period for PCMs, who, as a result, would have more difficulty obtaining financing, he said.

"The cost of money (12%-18%) and the ability to obtain financing can be a problem for the PCM manufacturers," he observed.

The Fletcher memo also observed that over 90% of the PCM base was on lease.

If IBM took no action, a 1970 management committee memo expected PCMs could account for 30% of the

leased disk drive base and 16% of the leased drive base by 1976.

Wall Street's Attitude

Wall Street, meanwhile, did not view the PCM arena as an isolated segment of the business, Collins indicated. The exit of RCA, GE, Memorex, Singer and Xerox from the mainframe arena because of the capital requirements "shocked Wall Street and left it with continuing concern regarding risks involved in competing against IBM in any market," he commented.

Lessors, too, had their troubles obtaining capital, in part because of IBM's unbundling and the announcement of the 370 which had a larger purchase-lease ratio than the 360, he said.

Their predicament in turn affected the PCMs because lessors were a large market for the PCM's products.

Investors became increasingly jittery. A memo from D.A. Duncan to William D. Witter, Inc. a New York brokerage firm, in December 1970 after the 2319B announcement, said he could "not recall any such substantial prior price reduction in IBM's history which covered such a broad population base." IBM had announced its price umbrella and had elected to take on the PCMs, he wrote. Because the 2319B announcement also included elimination of extra-use charges, the price reduction was about 25% compared with a 2314, he said.

The 2319 actions "raise a significant investment cloud over the entire independent peripherals industry and this uncertainty makes us extremely cautious until further developments take place," Duncan wrote.

IBM's marketing moves and timing in recent months have come at extremely inopportune times for Memorex, Duncan observed.

A comparison of lease prices showed IBM's 2314 was priced at \$2,935 and the PCM's version was \$2,610, but the new IBM 2319 was \$2,480, Duncan observed.

Eye on Memorex

IBM, too, was watching the effects of its actions, and an IBM advisory financial analyst wrote in April 1971 that Memorex's 2314 business was

"marginal, the firm's success with its version of the 3330 is 'critical.'"

Memorex would need volume and its cash needs would peak in 1974 when it would have to refinance its leasing subsidiary, ILC, the memo said.

The price reaction would result in 2314 program losses, which in turn would mean a cash problem for the firm, the IBM memo said. Memorex's alternatives, according to the IBM study, were to reduce production of its 2314, reduce the size of its organization and announce the 3330 early.

In June 1971 a report from Goldman Sachs Co., another investment firm, said the implications of the Fixed-Term Plan and other IBM moves were "more than just another price cut."

The PCMs were getting to the point of a slight profit margin and might have to evaluate their spending on such areas as research and development. According to the report, "the high degree of risk imposed by IBM might make financing shipments difficult."

By March 1972, Collins said he and the rest of the investment community were losing interest in the PCMs.

Firms such as Marshall Industries

had to leave the business because of lack of capital, as cited by that firm in its 1972 annual report.

IBM's cross-examination of Collins attempted to establish that Memorex's actions dissipated investors' faith in Memorex. These acts included its accounting practices, which were scored by the Securities and Exchange Commission, management practices and changes in management, as well as the IBM suit alleging wrongful appropriation of IBM secrets on the 3330.

But Collins maintained the underlying problem was the lack of capital.

A report by L.D. Duane Kirkpatrick of G.A. Saxton, another investment firm, reviewed the effects of IBM actions on the peripherals industry. "There was an immediate retrenchment and a cessation of new entries into the business. BASF, Tractor, Marshall, Bucode, Peripherals General and Texas Instruments have either merged with other companies or are no longer a factor in the end user business. Within the tape and disk product areas, there have been new entries," the Saxton report said.

IBM Slice Smaller in '77

(Continued from Page 59)

of its CPUs in the federal government by 17%, to 886 processors from 752 the year before. Fifth place DG went up in number of CPUs from 526 to 724, a gain of 38%.

HP, with 641 processors in fiscal 1977, gained 28% over the 499 CPUs it had installed last year. CDC, on the other hand, lost four processors, dropping from 519 in fiscal 1976 to 515 CPUs by October.

Ninety percent of the government's computer processors are owned. Owned CPUs represent 79% of the total dollar value of installed processors, however.

The total \$4.77 billion in federal computer equipment includes \$1.57 billion in CPUs; \$1.69 billion in storage devices; \$971 million in I/O devices; \$277 million in communications terminals; and \$259 million in other types of DP equipment.

Introducing the \$3890



Meet Lear Siegler's Dumb Connection™ Peripheral Package.

At first glance, it might seem a lot to pay for a cable. But when you consider that it comes connected to the Dumb Terminal™ on one end, and to the Ballistic™ Printer on the other, it becomes a pretty smart buy.

From a single source, you get the world famous video terminal, the Dumb Terminal, and hardcopy from Lear Siegler's new Ballistic Printer.

The Dumb Terminal is, of course, that same reliable terminal, with loads of standard features, that specializes in dependable performance with a minimum of frills.

Our new Ballistic Printer is designed for heavy duty applications. Thanks to its unique head design, it'll give you output

Dealer Predicts 'Bloodbath' for 370 Lessors

PHOENIX — IBM 370 lessors should prepare now for the upcoming "bloodbath" that IBM's 3031, 3032 and 3033 will inflict on the financial community, Adolf F. (Sonny) Monosson, president of American Used Computer Corp., warned here in a recent seminar sponsored by the American Association of Equipment Lessors.

Although more than \$1.3 billion has been invested in IBM 370 leases, the majority of these agreements will require at least a 20% residual to recoup the capital investment, according to Monosson. But IBM 370s will not sell at these hypothetical residuals, he warned, because few investors anticipated the high rate of technological advance.

Thus, errors in underestimating residual values could lead to "horrendous" consequences, especially for

publicly owned companies, Monosson said.

If residuals drop so quickly in the computer field, why did the leasing industry book more than \$1 billion of 370 equipment? Several factors have caused the lessors' apparent blindness to the impending disaster, which recalls the similar fiasco that befell IBM 360 leasing companies in 1973, Monosson explained.

First, lessors of 360 and 370 equipment are not the same kinds of firms. Unlike the big dealers of 360s, which are independent leasing outfits, 370 companies are either commercial financing institutions or private investors.

Investment bankers apparently remember the bitter lesson learned from their equity investments in the 360 lessors, Monosson concluded.

Highly profitable banks and industrial credit companies like GE Credit Corp. and Ford Motor Credit Corp. sought to use investment tax credits and the accelerated depreciation generated by their leases to offset taxes on their earnings, he added.

The second factor in the apparent blindness was the ability of lessors and packagers to get a Lloyd's of London insurance policy which guarantees 370 lease payments, provided the com-

panies make a reasonable effort to remarket the equipment.

Lessors seemed to forget, however, that computers, unlike many other kinds of major equipment, do not increase in value with age, Monosson contended. On the contrary, they have steeply declining price/performance curves, reflecting the rapid pace of technological developments in the field and the sharp drop in components' costs since 1963.

Judge Rules TRW Director Cannot Serve on AM Board

WASHINGTON, D.C. — A Federal Trade Commission (FTC) administrative law judge recently ruled the former chief executive officer of TRW, Inc. cannot serve simultaneously on the boards of TRW and competing corporations.

Judge Joseph P. Dufresne determined that TRW itself was not involved in Horace A. Shepard's decision to serve on the board of Addressograph-Multigraph Corp. (AM) from Jan. 1,

1973 to Nov. 5, 1975 — a period when the two firms were competitors.

The judge called Shepard's joint membership an interlocking directorate because TRW and AM were at that time competing in the manufacture and sale of point-of-sale credit authorization equipment, teller-operated bank transaction equipment and similar devices.

This director interlock violated Section 8 of the Clayton Act, which prohibits joint board memberships where either of the corporations involved has capital surplus and undivided profits of more than \$1 million and where the agreement to limit competition between would break the antitrust laws, the judge ruled.

Shepard's actions also violated Section 5 of the FTC Act, which prohibits unfair methods of competition and deceptive practices that effect interstate commerce, he added.

The judge urged Shepard "to make absolutely certain that this situation does not occur again" as he issued an order that would go beyond the corporate executive's assurances.

EFTA Charter Memberships Open Until March

WASHINGTON, D.C. — The Electronic Funds Transfer Association (EFTA) has extended its charter membership program until early March.

Charter member dues for the trade association, based here, have been set at \$500.

The organization is aimed at promoting the value of EFT technology and taking "a constructive role in stimulating a better understanding of EFT in the federal legislative sector, the organization explained in a recent news release.

"We have not yet begun to distribute."

A Special Report on Distributed Data Processing
in our February 27th Issue

According to independent studies by Becker Research, Inc., only 20% of *Computerworld* subscribers' organizations "currently use a distributed approach to data processing," so the buzzword of the late 70's has yet to become a byword.

On the other hand, 27% of *Computerworld* subscribers say their organizations are now "planning to use a distributed approach to data processing" — which indicates a substantial current interest in what some have called the wave of the future.

Of course, there are still wide differences on just what is meant by distributed data processing. And that's one of the topics to be covered in our February 27th Special Report.

Edited by Esther Surden, this report will gather opinions on what DDP is from several sources, including mainframe manufacturers and users.

It will also give some practical help to DDP users and prospective users — with articles on configuring networks, distributing data bases, and selecting and maintaining equipment.

"Distributed Data Processing" will also report on users' experiences with DDP — both pro and con.

If you're into DDP, planning to be into it, or thinking about it at all; this report is the place to be when our February 27th issue reaches your desk. Closing date is February 10th.

And if you're marketing products or services in the DDP field, make sure your ad is there. Contact your *Computerworld* salesman, or call Terry Williams at (617) 965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Zinger
Mike Burman
(617) 965-5800

New York
Din Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486

Dumb Connection.™

almost as long as you want to give it input.
At 180 cps.

The Dumb Connection. Another reasonable, cost-effective product from Lear Siegler. For those who always wanted a Dumb Terminal, but needed hardcopy, too.

Now you can have the best of both worlds. And the connection to go with them. In one package.

Dumb Connection.™
Smart Buy.



LEAR SIEGLER, INC.
ELECTRONIC INSTRUMENTATION DIVISION
DATA PRODUCTS



Lear Siegler, Inc./E.I.D., Data Products,
714 N. Brookhurst St., Anaheim, CA 92803; (800) 854-3805. In California (714) 774-1010.

Calculations Show Japan DP Not the Dragon It Appears

By Bohdan O. Szuprowicz
Special to CW

Japan, now into its second government-sponsored "Program for Promoting More Sophisticated Use of Computers," appears to be driving relentlessly toward becoming the leading computer user and manufacturer in the world.

The Ministry of International Trade and the Ministry of Posts and Telecommunications jointly formulated a program to increase the total installed value of general-purpose computers to \$18.2 billion by the end of 1980. This is 2.5 times the Japanese hardware base that existed at the end of 1975.

Japan is already the undisputed No. 2 in total computer installations, value of equipment and hardware manufacturing capabilities, outpaced only by the U.S. At the end of 1976, there were almost 39,000 general-purpose computers installed in Japan — almost as many as in France, the UK and the Soviet Union combined.

There were also 14,060 minicomputers as well as large quantities of small business computers.

Only yesterday it seemed it was still a toss-up whether Japan or West Germany was the second largest computer power in the world. Today Japan has almost twice as many general-purpose computers as Germany — \$8.1 billion

Country	Estimated General-Purpose Computer Installations in 1976	Value in Millions of U.S. Dollars	Non-Agricultural Labor Force in Millions	Number of Computers per Million of Non-Agricultural Workers
U.S.	170,000	34.0	92	1847
Japan	39,000	8.1	47	829
West Germany	21,000	4.4	25	840
United Kingdom	15,500	3.5	25	620
Canada	14,000	2.4	10	1400
France	13,000	3.6	20	650
USSR	12,500	4.5	103	121
Switzerland	2,300	1.3	2.5	920
Brazil	1,800	0.5	17	105
China	1,000	0.25	50	20
India	350	0.1	60	6
Taiwan	76	0.02	4	19
Sri Lanka	9	0.001	2	4

The above chart, compiled from various sources, shows the estimated inventories of general-purpose computers in selected countries.

worth, which is also almost twice what all the German computer installations are worth.

Japan appears to be well ahead of the Germans and rapidly closing in on the U.S. to become the leading computer power in the world.

But Japan is nowhere near the American computer usage levels and is still behind West Germany and several other countries where it really counts. It is so because sheer numbers of computers are a poor and deceptive indication of a country's sophistication in their deployment and application.

What must be compared is not even the number of computers for every million of inhabitants, as economists sometimes do, because it distorts the true picture in countries with large peasant and illiterate populations. Rather, the number of computers available for every million of the non-agricultural labor force in a country gives a better picture.

Looked at in this way, the Japanese computer power dragon shrinks to its proper size. There are, to be sure, 829 general-purpose computers for every nonagricultural working million in Japan, but there are 849 machines for every million of nonfarming German workers also.

Swiss Use More

Neither Germany or Japan are anywhere near the U.S. or Canada, where comparable computer availabilities are 1,847 and 1,400 machines for every million of the industrial labor force respectively. In fact, even little Switzerland with a mere 2,300 computers utilizes 920 machines for every million of its nonfarm workers.

Recent projections published by the Japan Electronic Computer Co., Ltd., which finances the purchases and operation of Japanese-made computers by Japanese users, indicate Japan plans to have at least 106,000 general-purpose computers in operation by the end of 1985.

This would give Japan about 2,000 computers for every million nonfarm workers. But there is already little doubt the U.S. will still be well ahead, probably with at least 2,500 computers for every million workers at the time.

Industrialized countries will all very soon reach and surpass computer utilization levels of 1,000 units for every million nonfarm workers. Now the state of industrial and bureaucratic modernization in other countries can also be assessed by comparison.

Brazil, for example, with a vigorous computer manufacturing program and continuing imports, may soon be able to catch up and even overtake the Soviet Union on this count unless there are very many more computers in the Soviet military-space establishment than is suspected.

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.

NCR
Varian Graphics
Informatics
National Semiconductor
Datamation
Communication News
McCormack & Dodge
Data Rentals
Computer Sales International
Intel
Electronic Ventures
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing
S.E.A.
Tri-Data
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems
Shasta
Mostek
DIVA
SBC Magazine
Tele-dynamics

Control Data
Honeywell
Printonix
Codex
Lear Siegler
E.M. & M.
The Morley Company
Vanier Graphics
Total Typography
Weng Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Intorex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Informet
Computer Decisions
Infosystems
T-Bar
Corporate Systems
Dynatech

IBM
General Computer
Atlantic Research
Telefile Computer Products
General Electric
Qume
Moore Business Forms
DataMedia
Texas Instruments
Computerworld
NCI
Dellak
Kodak
BASF
Western Union
Anderson Jacobson
Computer Input Services
Paradyne
ComData
Genesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service

Ille Corporation
Peripheral Products
Applied Digital Data
Epic Data
Sykes Datatronics
Cummins Allison
American Microprocessor
International Data Corp
Programs, Inc.
Beehive International
Interlec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini-Computer Systems
Tandem Computer
PCC/Pertec
Computrend
Extel
Meniel
Sycor
Digitronics
Computer Services
Datamart
Courier Terminals
Trac/Hughes & Bomac
Modems Plus
Software Design
Curtis 1000
Spectron
K&K Associates

Sperry Univac
Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathematica
Rianda Electronics
Computer Corp of America
AT&T
Cullinane
Hewlett Packard
Pansophic Systems
General DataComm Industries
Continental Peripherals
Computer Associates
Qantel
Diablo Systems
Marketechs
Raquel-Mitgo
Data Systems Specialists
Key Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
McGinn Safe
Allstate Computer
H/G Professional Forms
Nichols & Company
Datapro

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

For complete information on how the 1978 Computer Expo can work for you, use the coupon below or call Kim Wichert, toll free 800-225-4242. In Massachusetts, (617) 964-4550 (collect).



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
☐ Have Sales Representative call me
☐ Send Reservation Agreement
☐ Send Copy of 1977 Attendee Analysis

- | | | |
|--|---------------|---------------|
| ☐ Southern California Computer Expo | Anaheim/LA | March 21-23 |
| ☐ Northwest Computer Expo | San Francisco | March 28-30 |
| ☐ Southwestern Computer Expo | Houston | April 11-13 |
| ☐ Southeastern Computer Expo | Atlanta | April 18-20 |
| ☐ Gateway Computer Expo | St. Louis | April 25-27 |
| ☐ Midwestern Computer Expo | Chicago | May 2-4 |
| ☐ Mid-Atlantic Computer Expo | New York | May 9-11 |
| ☐ Great Lakes Computer Expo | Detroit | May 23-25 |
| ☐ New England Computer Expo | Boston | May 30-June 1 |

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (____) _____

Microprocessor Features Clock Oscillator

SANTA CLARA, Calif. — The S2000 microprocessor from American Microsystems, Inc. has a clock oscillator, a 4 microsec cycle time, 8K bits of read-only memory (ROM) and 256 bits of random-access memory (RAM).

The TTL-compatible S2000 also includes 13 outputs, eight inputs and eight bidirectional tristate I/O lines, the firm said. A seven-segment display

decoder and LED drivers are included in the architecture.

OEM Products

The NMOS microprocessor has an arithmetic logic unit, a control section

and three registers for addresses and intermediate values.

Firmware consists of 51 instruction codes, including skips similar to those in the Digital Equipment Corp.'s PDP-8 instead of conditional branching, a spokesman said.

The microcomputer operates with either a 9 Vdc power supply or dual supplies of +5 and +9 Vdc. Typical power dissipation is 360 milliwatts.

Software for the S2000 consists of a macro assembler, a development/debug module, a simulator to determine program function and a text editor.

Available in 40-pin plastic or ceramic packages, the unit costs \$10 in quantities of 5,000 to 10,000 from American Microsystems, 3800 Homestead Road, Santa Clara, Calif. 95051.

Card Offers 1K RAM

MONTEREY, Calif. — Pro-Log Corp. has announced a programmed logic system with 1K bytes of random-access memory (RAM) on a single card and sockets for an additional 1K of RAM and for 8K of programmable read-only memory (Prom).

The PLS-888 card includes an 8080A microprocessor, crystal clock and power-on reset; it is plug-compatible with Pro-Log's other single-card 8080A-based system, the PLS-881.

The PLS-888 sells for \$195 each in 100-piece quantities from Pro-Log, 2411 Garden Road, Monterey, Calif. 93940.

Elpac System Powers Micro

SANTA ANA, Calif. — A microprocessor power supply that is convection cooled and features isolated outputs for positive or negative operation has been announced by Elpac Power Systems.

The UPS-35 specifications include integrated circuit regulation, remote sensing/programming, foldback current limiting, an electrically shielded transformer and a full rate output from 0°C to 55°C, 105-125/210-250 Vac, the firm claimed.

No heat sink or forced air devices are required because of the UPS-35's cooling system; the unit does not exhibit

Octal Buffers Expand Monolithic Interfaces

SUNNYVALE, Calif. — Monolithic Memories, Inc. has announced bipolar octal buffer circuits for use in microprocessor systems with 8-, 16-, 24- and 32-bit data widths.

The buffers are said to be suitable for programmable read-only memory (Prom) and standard I/O bus applications.

Designated SN54/SN74S240, S241, and S244, the buffers feature eight bus drivers, inverting and noninverting outputs and a choice of active-low or active-low-and-active-high enable.

The buffers sell for \$4.40 per unit in quantities of 100 to 999 from Monolithic Memories at 1165 E. Arques Ave., Sunnyvale, Calif. 94086.

Try These Revolutionary Products FREE for 10 Days

12K Computer only \$299.95 POSTPAID

- 5 times more processing power than the Z-80 alone
- Completely assembled and tested
- 8K ROM, 4K RAM
- Z-80 based
- In stock now
- High resolution color display
- Supports exciting and educational games
- Expandable to 48K system with full Basic.

Order today and get all this for \$299.95

The processing power of the Z-80 is multiplied 5 to 10 fold by custom NMOS chips containing the equivalent of 800 SSF and MSI IC's. The Bally Arcade® comes with all these features: 5 function, 10 memory calculator; Onlight, Checkmate, Scribble games with color, action, and sound; 24 key keyboard; 4 pistol grip control handles; connects to black and white or color T.V. set, 16,000 dot picture image (vs. closer to 4,000 for most other video games); 1 year limited warranty NCE and Bally service depots.

Order today and get Tiny Basic FREE!

One of the optional ROM cassettes for the Arcade is Palo Alto Tiny Basic. Includes keyboard overlay, ROM cassette, and instruction booklet. Features: music, graphics and color; programs up to 1,800 characters. "Token" feature enabling substituting a single character for an instructional word or phrase. 68 characters from the keyboard. Displays 11 lines of 28 characters/line. Buy Tiny Basic now \$49.95 and when you buy the expansion package return Tiny Basic and get a full refund of \$49.95. This limited time offer is available only from NCE/Compumart.

Software

Includes the most popular selections from Bally's professional arcade games, educational programs for the entire family, and functional programs for home, business and the arts. NCE 10 day return privilege applies to Bally Videocades® of course. Videocade® series includes: STRATEGY — \$18.95 each • Black Jack • Draw Poker • Acey • Deuce • SPORTS — \$24.95 each • Baseball (available now) • Tennis • Hockey • Handball • EDUCATION — \$19.95 each • Bingo Math (available now) • Speed Math • Word Math • Word Hunt • Scramble • ACTION/SKILL — \$19.95 each • 260 Zzzap (available now) • Dodgem • Sea Wolf • Bombardier • Panzer Attack • Red Baron. OTHERS coming every month.



Expandable

- 48K Full keyboard and display at an unbelievably low price.

In the third quarter a \$350 expansion package is scheduled. Preliminary specifications include: Full Basic and assembly language. Provision for 2 audio cassette drives. Graphics and Music. Additional 16K RAM. Additional ROM. Industry standard keyboard. 25 x 80 character with monitor, IEEE port. Price, delivery, and specifications subject to change without notice. Future contemplated options include printers, acoustic coupler, temperature and light control, telephone dialers, disks, Selectric interfaces, digital tape decks and, of course, extensive software.

Priority Delivery

As the value leader in mini and micro computers we placed a large order early and have the Arcade® in stock for immediate shipment. Orders will be strictly processed in the order received. Priority of shipment of expansion packages will be based on the date of order of the Arcade® so order now. Phone orders accepted.

Attention Computer Users!

Slash programming and debugging time!

Try the T.I. programmer absolutely free for 10 days.



TI Programmer

Now there's a faster, easier way to perform number base conversions and calculations: Texas Instruments' new TI Programmer hexadecimal and octal calculator/converter. If you work with computers — programming, debugging, computer repair, digital logic design — this new handheld calculator/converter can save you hours of work... yet, it costs just \$59.95.

Capabilities

- Number Base Calculations — performs arithmetic in any one of three number bases.
 - Integer, Two's Complement Arithmetic — used in OCT (base 8) and HEX (base 16).
 - Signed Floating Point Arithmetic — in DEC (base 10) for use in day to day decimal computations.
 - One's Complement Key — provides one's complement capability in OCT and HEX.
 - Number Conversions — converts integer numbers between bases 8, 10 and 16.
 - Parenthesis — 15 sets available at each of 4 processing levels to allow you to dictate the order of interpretation of a mathematical sequence.
 - Memory — independent memory with summation to memory capability.
 - Logical Operations — perform bit by bit logical operations on numbers in HEX and OCT.
 - Constant Mode — allows operations with a constant number for all arithmetic and logical operations.
- Test the TI Programmer on the job for 15 days. How much time will the TI Programmer save you? How much easier will it make your job? The best way to evaluate the full capability of the TI Programmer is to try it yourself... at no risk.

Member



Computer Dealer's Ass'n.

\$59.95

Send for our catalog

FREE!

with your business card or send \$1.00 (refundable on first order)



Quantity	Description	Each	Total
	Bally Arcade	\$299.95	
	Tiny Basic option	49.95	
	Baseball	24.95	
	260 Zzzap (Road Racer)	19.95	
	Bingo Math	19.95	
	T.I. Programmer	59.95	
Total for Goods			
Free Shipping			
Mich. residents add 4% Sales Tax			
Total Amount			

ORDERED BY: _____
 Company Name _____
 Contact _____
 Address _____
 City, State, Zip _____
 Telephone _____

ORDER FORM

All orders must include bank check, postal money order (BankAmericard/Visa or MasterCard charge number, or qualify for open account (see Terms and Conditions)).

Signature _____

PLEASE FILL IN BELOW FOR CREDIT CARD ORDERS (Please include all card numbers.)

☐ BankAmericard/Visa ☐ MasterCard

Credit Card Account Number _____

For MasterCard Charge only (No above your name)

Expiration or "Good Thru" Date of Card _____

TERMS AND CONDITIONS: All orders must be signed by authorized person. Equipment may be purchased by cash or credit card (no COD's). Open accounts for only 60 days. Customer responsibility for billing errors. Prices and specifications subject to change without notice. NCE/Compumart makes no warranty (other than that stated in ad) with respect to merchantability or fitness of said material for any particular purpose. NCE/Compumart assumes no responsibility for any errors that may appear in this ad.

No Risk. If after 10 days you're not 100% satisfied, for any reason, just return the calculator or computer with all accessories for a full refund.

NCE/Compumart

1250 N. Main St., P.O. Box 8610
 Dept. CW28, Ann Arbor, Michigan, (313) 994-4445

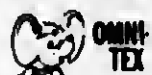


TOTAL SYSTEM FLEXIBILITY MEANS OMNITEC COUPLERS...

Get the most out of your remote computer time-sharing system with a proven coupler from the nation's leading supplier of acoustic telephone coupling devices.

A good example is our 702-3B Series — data rates of 300 baud (600 optional); switchable half or full duplex operation plus simultaneous TTY & EIA outputs. Other features include originate/answer/auto-answer plus hardware DAA line coupling with auto-answer and Bell 103A compatibility. For overseas, our 704B operates on 220V 50 Hz power and is compatible with CCITT Vol. 24 international frequencies.

More information? Write Dept. 26 or call (602) 252-2083 collect.



OMNITEC DATA
 "New Dimensions in Modems"
 2405 South 24th Street • Phoenix, Arizona 85034

position announcements

position announcements

position announcements

position announcements

position announcements

position announcements

programmers

Systems Programmers

Are you tired of maintaining your large 370 system's software and getting another I/O gen as a reward? If PSW, SVC, and TIC are familiar to you, and you look at your dumps before seeking outside help, we would like to talk with you. Amdahl Corporation has established a reputation for providing topnotch software support. As a Systems Programmer with Amdahl, you would be expected to assist Amdahl customers in maintaining a smooth OS, VS, or VM operation by working in close liaison with field hardware and software engineers to solve those knotty bugs that cause most shops to throw in the towel. Positions are also available to advise and assist Amdahl customers in MVS conversions and in installing and efficiently using VM/370. You will be based in the San Francisco Bay Area. You are invited to reply in confidence by indicating 352-E on your response and directing it to Phil Beckhelm, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. Or call him collect at 408/735-4280. We are an equal opportunity employer.

amdahl

Uncommon
growth opportunities in

COMPUTER SYSTEMS ARCHITECTURE

The Computer Systems Architecture Department of CSC is a corporate center of excellence in computer systems performance analysis, distributed systems interfacing analysis, and distributed database design.

Staff expansion now underway calls for individuals at all levels who seek the professional rewards associated with working at the leading edge of their discipline with nationally eminent colleagues.

Computer Performance Analysts — capable of predicting processing throughput, main memory, I/O bandwidth and auxiliary storage requirements for a variety of microprocessor, minicomputer and mainframe applications. Hardware and software experience, plus an analytical approach to computer applications, are desirable.

Digital Interface Engineers — capable of selecting and assessing vendor hardware interfaces for microprocessor, minicomputer and mainframe applications. Knowledge of communications protocol alternatives, database concepts, terminal interfacing and digital design for special purpose interfacing are desirable.

Distributed Data Base Designers — capable of analyzing database requirements, structuring databases and implementing database designs in a distributed processing environment. Knowledge of hierarchical and network database structures, schema and subschema specifications and database accession procedures are desirable. Specific experience in TOTAL, IMAGE, CODASYL or WDMS databases is highly desirable.

These are entry through senior level openings, and require an engineering or science degree. Mixed BS, MS and PhD's in electrical engineering and computer science preferred.

For further information about these openings, you are invited to telephone Dr. David Karlgaard, toll free at (800) 336-0173, Ext. 136.

Or forward your resume and salary requirements in strict confidence to Dr. David Karlgaard, Manager, Computer Systems Architecture, Dept. 207

CSC

COMPUTER SCIENCES CORPORATION

Systems Division

6565 Arlington Blvd., Falls Church, Va. 22046

Major Offices and Facilities Throughout The World
An Equal Opportunity Employer M/F

SOFTWARE PROFESSIONALS... THERE'S A BETTER WAY TO DESIGN AND BUILD COMPUTER SYSTEMS. AND THIS IS YOUR CHANCE TO PARTICIPATE.

It's a chance to rethink computer architecture from the ground up and produce a new type of computer system that works better than any other.

It's an opportunity to integrate hardware, operating systems and languages into a coherent whole.

It's an occasion to use high level languages and structured design throughout a system.

It's a new way to design maintainability and reliability into a system at every level.

It's an exciting time to become part of Data General's Advanced Development Group — a dedicated task force with top-to-bottom responsibility for producing a complete, major hardware/software system. And we're committed to doing it right.

We just moved into a new R&D facility in North Carolina's well-known Research Triangle Park. We have plenty of room to grow and we need more creative professionals at all levels to keep us growing. Projects with immediate openings include:

ADVANCED DBMS DEVELOPMENT

This project is developing a Data Base Management System capable of supporting hierarchal, network, and relational data bases with both interactive and procedural language based user interfaces; strategies being investigated include set theoretic models as well as conventional data models. We need professionals with data base design and application experience at all levels.

COMPILERS

These projects have responsibility for the languages to be supplied on the system. They will be implemented in a powerful, modular systems programming language, using state-of-the-art optimizing compiler technology, on a high-level language oriented machine. We are looking for professionals with an interest in the commercial end-user market, as well as a background in compiler design.

TOOLS AND PROGRAMMING SYSTEMS

We are developing interactive programming systems for each of the languages on the system; these will be closely integrated with the language translator and runtime systems. We need professionals with system design experience and an interest in the design and construction of interactive programming tools.

OPERATING SYSTEM PERFORMANCE MEASUREMENT

Throughout development of the system, detailed performance measurement will be critical to the design. We are looking for professionals with a knowledge of analytical modeling and discrete simulation, and an interest in applying them to real system problems.

TECHNICAL WRITING

Documentation is an essential part of our system design process. Technical writers are involved with all phases of the design and work closely with the development groups on specifications, reference manuals, and user documentation. We are looking for writers with hardware or software experience.

PUBLICATION PRODUCTION

We will be doing all typesetting, artwork, and layout for manuals at our facility, using state-of-the-art word processing and typesetting software, and an on-line phototypesetter. We need a supervisor interested in managing a complete facility, with responsibility for manuals throughout the entire production process, and a working knowledge of typesetting hardware and software.

QUALITY ASSURANCE

Reliability and maintainability of our software and hardware are top priority, and we are starting a QA program now to make sure that testing is fully integrated with design. We are looking for professionals who can staff and manage a quality assurance program, develop standards for software and architectural validation, and work closely with system designers to enhance total system maintainability and reliability.

If you're in one of these areas, or if you like the total picture and feel you can contribute, call Jim Stewart or Gerry Clancy collect at (919) 549-8421, or send your resume, with salary history, in confidence to: Jim Stewart, P.O. Box 12358, Research Triangle Park, NC 27709

Data General

An equal opportunity employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

CONVINCE US WE CAN'T DO ALL THIS WITHOUT YOU.

JOIN THE ACTION AT TELEFILE

Telefile is making a name for itself pioneering the computer enhancement business—making computers of many types work beyond their original capabilities. The goals: Increasing price/performance and paying off user software investments.

It's a challenging assignment.

New computers and emulators. We're about to bear a clan:

- **32-bit'ers** for Xerox users. Some models will have up to four times the performance of the Sigma 9 and work to keep Xerox users' highly prized operating systems operating well into the 1980's.
- **24-bit'ers** to help maintain the software investment of GE-400 users.
- And **16-bit'ers** to give Lockheed users a place to grow.

Software developments. We're working on enhancements to what is recognized as the world's best operating systems—CP-V and CP-R. In addition, we're upgrading existing operating systems of other non-IBM computers, as well as providing software handlers to enhance the operation of many minicomputers.

New mass store facilities. High speed, microprocessor-based, universal Matchmaker controllers to adapt latest technology disk and hot, new 6250 bpi drives to virtually any non-

IBM computer. Resulting systems will set new levels of mass-storage flexibility and efficiency.

New high speed memory systems. Core, RAM's, CCD's and bubble components will be used in developing new memories for non-IBM computers as well as internal memory in our own intelligent controllers and computers.

New controllers, I/O processors and front-ends. Fast IOP's, controllers, and multiple-use front-ends will enable non-IBM users to use the new high speed technology peripherals and terminals.

Are you up to the tasks? The only thing easy is the California living. If you can cut it, working with a dedicated team, the rewards can be enormous.

Telefile has grown in both revenue and earnings at the breakneck pace of over 50 percent per year since 1972. Sales last year: Over \$11 million; projections this year: Over \$20 million.

If you're convinced you're good enough and feel you can make a *significant* contribution to making computers work better and last longer than they're supposed to, write or run to Telefile. We've got hard, challenging work for energetic men and women and all the benefits of a growing company.

HARDWARE ENGINEERS

Computer Systems Designers

Unlimited future for systems engineers and computer architecture specialists to work on new generation Xerox, GE and minicomputers.

Logic Designers

Must be proficient in latest microprocessor or ECL technology.

Memory Designers

Must have working knowledge of core and RAMs. Background in CCOs and bubble memory experience helpful. Grow with the state of the art.

Tape Controller Designers

Apply your knowledge of PE, NRZI and GCR data formats in matching 800/1600/6250 bpi tape drives to new controller designs.

Disk Controller Designers

Work with microprocessors in developing Telefile's current and long-range, highly flexible mass store facilities.

Packaging Engineers

Need mechanical packaging, thermal, and interconnection experts for commercial computers.

Microprocessor Designers

Experience necessary in both hardware and firmware.

Interface Design Engineers

Experience with Univac 1100 series, Xerox, MCR, Honeywell, COC or General Electric essential.

Computer I/O Processor Designers

Must have IOP experience with Xerox, General Electric, Univac, and COC computers.

Data Comm Network Designers

Must have knowledge of latest techniques in data communications and networking.

Communications Controller Designer

Interface knowledge with Xerox, General Electric and Univac computers important to support existing data communications programs.

Systems Test Technicians

Must know how to trouble-shoot, prepare test procedures and test aids and isolate subsystem faults on computer and computer equipment.

Associate Engineers and Technicians

Exciting engineering development programs await experienced technicians.

Sustaining Engineering Manager

Will supervise sustaining engineering effort on full product line and coordinate engineering effort with OEMs.

SOFTWARE PROFESSIONALS

Senior Systems Programmers

Will design, code, debug and document software and firmware for new mass store facilities. Cover diagnostic level to system software. Supervisory capability.

Communications System Software

Must be capable of supporting front-end communications processor development for Xerox and other computers leading to supervisor positions.

Diagnostic Programmers

Must have programming experience in peripheral/controller diagnostics and microprogramming techniques.

Software Support Analysts

Should have working knowledge in software drivers and handlers to enhance performance of minicomputers. Must be well oriented in assembly languages. Should know RSTS/E, RQOS, MPE, or OS-32/MT.

Development Programmers

Thorough working knowledge in data communications, operating systems of major computers, and data base management techniques.

Systems Analysts

Help coordinate and implement and support such on-going operating systems as CP-V, CP-R, GCOS, OAPS, Exec 8, OS/2000, SCOPE, KRONOS, B1-B4, and MCP.

MARKETING SUPPORT

Application Systems Engineers

Must be able to provide technical support to users of major minicomputers as new latest technology disk and tape systems are applied. Writing ability important.

Field Service Engineers/Tech Support Specialists

A wide variety of positions need filling now at California headquarters location as well as key regional sites. Knowledge of major disk and tape drives important. Also working experience with mainframe and minicomputers.

Product Marketing Specialists

Will be dedicated to system level design and support of Xerox, Univac, and other non-IBM computer systems.

District Salespersons

Must know minicomputer peripheral field or non-IBM computer system and have proven sales performance record. Several locations available in U.S. and Canada.

Telefile

Telefile Computer Products, Inc., 17131 Daimler St., Irvine, CA 92714, Telephone: (714) 557-6660.

Telefile is an equal opportunity employer (M/F)

ENHANCING COMPUTERS IS OUR BUSINESS.

position announcements

position announcements

position announcements

position announcements

position announcements

All of a sudden.....

It's HARRIS!

The Computer Systems Division of Harris Corporation is perhaps the fastest growing division within our Fortune 500 company. Our new divisional headquarters are in the process of being built in the highly desirable Fort Lauderdale, Florida location where we are now situated. Most of the positions listed below will be situated here in Fort Lauderdale where the cost of living, climate and avocational activities are most enjoyable.

FIELD MARKETING ANALYSTS

The individuals we seek will have broad exposure for pre- and post-analyst field support. We prefer experienced systems personnel having backgrounds in Honeywell, Univac, Control Data, IBM or RCA mainframe exposure. Expertise in FORTRAN and COBOL with a solid grasp of operating systems will be helpful in adding to, and aiding our revenues with current and future customers. We prefer degreed individuals with 3+ years' experience in the field or performing in a benchmark analysis group. We will consider candidates with solid realtime, data base and varied applications exposure. Positions are available in New York, Atlanta, Washington, D.C., Dayton, Los Angeles, Portland, Oregon and New Jersey.

DISTRICT SALES MANAGERS

We seek professional sales and sales management individuals who have established performance sales records in total systems. Medium to large scale systems background is preferred as well as broad gauged applications. Only quoted performers should apply for this position. In addition, a suitable BS degree would be helpful.

FIELD SERVICE ENGINEERS

We prefer individuals with heavy exposure to pre- and post- installation problems. A thorough knowledge of electronics, especially CPU's, disc drive and other peripherals will be necessary for successful customer support. Medium to large scale computer systems experience is desirable.

MARKETING COMMUNICATIONS SPECIALIST

These positions are available throughout the U.S. To research, write and edit sales promotion materials. We prefer a degreed individual with prior experience as a technical writer, instructor or analyst. Emphasis will be upon software literature. Communications skills, both verbal and written, are musts.

SENIOR SOFTWARE ANALYST

Due to the rapid introduction and sale of our S-100, S-200 Computer System, which incorporates the VULCAN, multi-purpose virtual operating system, our Quality Assurance group has established this new growth position. The individual we seek must have a BS or MS degree in Computer Science or math and a minimum of 5 years' solid experience in operating systems coupled with some in-depth exposure to compilers. Language capabilities should include both verbal and written, will be necessary. Functional responsibilities include: establishment of Quality Assurance tests with appropriate documentation and advance planning for continuous software testing. In accomplishing these tasks, vertical and lateral communication with key management personnel will be expected. Software oriented individuals with familiarity with CPUs and Operating Systems from CDC, H-P, DEC, UNIVAC, and/or IBM will help in determining applicant's success.

DIAGNOSTIC ENGINEERS

Immediate openings in our Engineering area for digital hardware and diagnostic software engineers. We require a possession of in-depth knowledge of software design/implementation, digital fault isolation and protection procedures. Successful candidates will be degreed in engineering or possess suitable on-the-job experience.

SENIOR DESIGN ENGINEERS

Two positions exist at our Fort Lauderdale location in the Computer Systems Engineering Department. The first position involves peripheral systems and will be responsible for the development of magnetic tapes and disc storage systems, including the specification and design of system controllers, evaluation and selection of existing OEM products and advanced product planning. Additional responsibilities include project scheduling, budgeting and supervision of technicians.

The second position involves computer terminals and the development of computer terminal systems as they would relate to CRT's and teleprinters, including terminal system and subsystem logic design; also, advance product planning, project scheduling and budgeting, as well as supervision of development technicians.

Both of the above positions require a Bachelor's degree in electrical engineering with 3-6 years' experience for peripheral systems and 2-5 years' experience in the case of computer terminals.

LOGIC DESIGN ENGINEERS

Individuals experienced in the design and development of digital computers will be most welcome in our engineering development area. We prefer degreed individuals having a minimum of 2-5 years' experience in the development of CPU circuit design.

SENIOR QUALITY ENGINEER

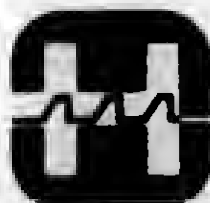
Will diagnose and resolve manufacturing problems and analyze quality data in order to report unfavorable trends and the cost of quality. Will initiate corrective action; conduct quality audits of manufacturing and inspection processes; write QC standards, procedures and process inspection instructions; evaluate the disposition of non-conforming material; represent QA at equipment design reviews and ECP meetings. BSEE, ME or IE with 5-6 years' quality engineering experience, preferably in the EDP environment.

SENIOR ANALYSTS

Several positions are available to marketing which includes the following areas: software development, which includes the development of systems software or the development of high level compilers.

MIS includes programming responsibilities which involve implementation of a comprehensive marketing forecast system and system design. Also, will assist with the development of the front-end order entry system. Applicants with familiarity in the areas of personnel applications will be considered.

Send your resume and salary history in strictest confidence to: Mr. Robert M. Coyner, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309.



HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

An Equal Opportunity Employer Male and Female

Positions Available Nationwide

Call Toll Free
800-426-0342
Assured Confidentiality
and Employer Retained.

Programmer/Anal 18-22K
370 OS/IMS experience.
Systems Programmers 20-25K
IBM DOS/VS, OS/MVS & Honeywell D/S.
Application Prog 16-20K
Need several with Cobol, Bel & Fortran experience.
Systems Analysts 17-23K
2-5 years experience in mfg., ins. or finan. areas.
T.P. Programmers 18-23K
Several openings for CICS/VS specialists.

PARKER PAGE ASSOC.
P.O. Box 12308
Seattle, WA 98111
Offices in Wash. D.C.,
Chicago, Atlanta, Portland, Or.

The school of Electrical Engineering, Purdue University, has an opening for a computer maintenance engineer with responsibility for scheduled and unscheduled maintenance of Digital Equipment Corporation computer systems consisting of one PDP 11/10 and PDP 11/40, two PDP 11/70's, four PDP 11/45's and peripheral equipment.

Desired qualifications: knowledge and experience in maintenance of DEC systems and operation of DEC system diagnostic software. Excellent fringe benefit program. In the environment of a large university. Submit resume of education and experience to: T.L. Hawthorn, Personnel Services, ADMS Building, Purdue University, W. Lafayette, IN 47907 or call (317) 749-6256. Purdue is an equal access/equal opportunity employer.

PROGRAMMER UNIVERSITY SYSTEM OF GEORGIA ATHENS, GEORGIA

We are seeking a programmer to work on various applications to be implemented in all the schools in the Georgia University System. Experience should include 3-5 years Cobol and extensive work with large scale computers. Familiarity with IBM 370 under MVS, IMS, TSD, and OS JCL is highly desirable. Must be willing to do maintenance programming as well as development. Previous work with CRT applications a definite plus.

Salary competitive. Excellent fringe benefits include 5 weeks leave/holiday, generous sick leave, and free individual group life and health insurance.

Located only 65 miles from downtown Atlanta, Athens offers the convenience of a nearby metropolitan area, yet retains its university town atmosphere. This is an excellent opportunity for the right person to participate in new large scale system development and individual professional growth while living in a collegiate environment.

Initial screening of applicants will be based on resume, contents. Send applications, resumes and salary histories to:

UNIV. OF GEORGIA
Mgr., Personnel Dept.
Personnel Svcs. Div.
Cntr. Jackson & Fulton Sts.
Athens, GA 30602
An EOE/AA



ENGINEERING PROGRAMMER \$16-20M
Structural or civil engineering.
BURROUGHS
NOL-FORTE \$18-24M
DB-DC or NDL or FORTE.
Algol move to the south-east.
SYSGEN \$22-24M
Dynamic oil co seeks OS-MVT and will train on MVS-JES3.
SVS-MVS preferred! 2 yrs exper.
NCP-2705 27M
International
International travel to South America-live in Houston.
EDP AUDITORS \$18-35M
We have over 80 positions open from coast to coast.

position announcements

position announcements

position announcements

position announcements

position announcements

The ROMAC DIFFERENCE

We Never Pass Out A Laundry List

Romac policy forbids using the "Laundry List Technique." Other personnel consultants send out huge lists of names to prospective employers, we never do. Romac supplies its clients with only the best qualified professionals.

No professional wants his career bunched with countless other more or less qualified candidates. He wants special attention and consideration from his personnel consultant. The Romac Partners see to it that he gets it. That's the Romac Difference.



ROMAC

& ASSOCIATES/
Personnel Consultants

Contact Romac & Associates, A. L. Lomay, President, 2 Sun Life Executive Park, Wellesley Hills, MA 02181 for transmission to our Partners in Atlanta, Boston, Buffalo, Charlotte, Hartford, New Haven, New York, Philadelphia, Portland, Rhode Island, Rochester/Syracuse, Stamford.

COMPUTER SERVICES ADMINISTRATOR

FLORIDA

Salary \$18-24K

This position performs highly responsible, technical and administrative work in planning, organizing and directing the 24 hrs/day, 7 days a week operation of a computer facility.

Requirements: College degree + 6 yrs professional experience in computer-based systems design or operation, 2 yrs supervisory level. Experience as required may be substituted on a year-for-year basis for required college.

Send resumes to: H.F. Goodwin, Management Systems & Services Director, Dept. of Health & Rehabilitative Services, Office of Management Systems, 1323 Winewood Blvd., Tallahassee, FL 32301.

This may persuade you to join ADR...

The Company

ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed \$20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

The Products

ADR's diverse product line is state-of-the-art. Our systems range from on-line programming systems to language translators; from text processing to performance measurement. IBM technological advances are usually heralded by new ADR products. ADR software products are rated #1 in the 1977 Datapro survey — surpassing every other company in the number of products (4) honored by Datapro.

The Environment

ADR offers the comfortable, informal surroundings best suited to system development. At ADR, members of the technical staff average twelve years of computer experience. They constantly have opportunities to expand their professional skills into new technological areas. Our role as a pioneer in the software products industry gives our employees a unique position in the computer industry. At ADR, you are part of the leading edge of technology, not a follower.

Openings for Systems Software Development

If you are a capable IBM Assembly language programmer and consider yourself a System Software Specialist, then you definitely should consider ADR. We have openings at all levels for qualified programmers and analysts who have the capabilities for developing sophisticated, state-of-the-art software. Experience with online systems (CICS, TSO, etc.) or knowledge of OS internals is a definite plus. If you have participated in the development of any type of software packages — system, utility, or application — we would really like to talk to you.

Openings for Systems Software Support

ADR knows that its products can only be as good as the service we give our customers. If you like dealing with people, enjoy an occasional trip, and have strong communication skills, you might consider a support position at ADR. To qualify, you should have a strong technical background in IBM computers and operating systems, and a college degree. As our product line continues to expand, our product support needs will grow as well. You could be a part of that growth!

This may persuade your family...



Princeton: A Top Ten Town
Princeton is on almost everyone's list of the ten best American communities in which to live. Yet it is surprisingly affordable. It offers not only beauty and serenity but a wide variety of cultural, sporting, and educational activities.

Sports Unlimited
It's been said that Princeton has almost as many tennis courts as people. You can also sail, ice boat, and skate on Lake Carnegie. Or jog to work. Or golf at one of the many courses in the area.

One hour to N.Y. or Philadelphia
You're less than an hour from the shore — a stone's throw from historic Washington's Crossing and New Hope — within easy reach of the New Jersey Turnpike and the Garden State Parkway.

Educational and Cultural Facilities
The home of Princeton University. The Institute for Advanced Studies. Westminster Choir College, and many superior grade and high schools. The McCarter Theatre is in town and the Bucks County Playhouse nearby.

Excellent Housing
You can live next to the old Raritan Canal, on a golf course, or in an old grist mill. Princeton and other beautiful communities nearby can fill your needs for an apartment or home at every price level.

ADR's new home
In the summer of 1979 ADR will be moving to a new 65,000 sq. ft. building on 40 wooded acres in the foothills of the Sourland Mountains. This new site is less than a mile from ADR's current location.

Please send your resume in complete confidence, including current salary and position desired, to:
Director, Software Products Division. Or call 609-921-8550.



APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS™

Route 206 Center, Princeton, N.J. 08540

An Equal Opportunity Employer

DATA PROCESSING SECURITY ANALYST

Major NYSE company has an immediate growth opportunity for an ambitious, highly motivated individual to audit all data processing functions (computer security and department/interdepartment controls).

Credentials should include:

*Degree in Accounting or Business

*Minimum 5 years experience in Data Processing *Ability to communicate effectively with all levels of management.

Career development and creative challenge coupled with an attractive Florida location, and an excellent benefit program makes this an outstanding opportunity. Send resume and salary history in confidence to:



Jesse Burns, Professional Recruiter

TROPICANA PRODUCTS, INC.
P.O. Box 338
Bradenton, FL 33506

AN EQUAL OPPORTUNITY EMPLOYER M/F



INTERGLOBAL is...

a subsidiary of a NYSE listed company, with an EOP service bureau placing consultants throughout the United States and foreign countries.

To take advantage of our nearby and worldwide EOP opportunities, please submit your resume for inclusion in our worldwide computerized retrieval system, to our corporate headquarters in New York City.

Ralph Young
INTERGLOBAL
TECHNICAL SERVICES, INC.
56 W. 35 St., NY, NY 10001
(212) 695-7773

Equal Opportunity Employer M/F

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Oublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

position announcements

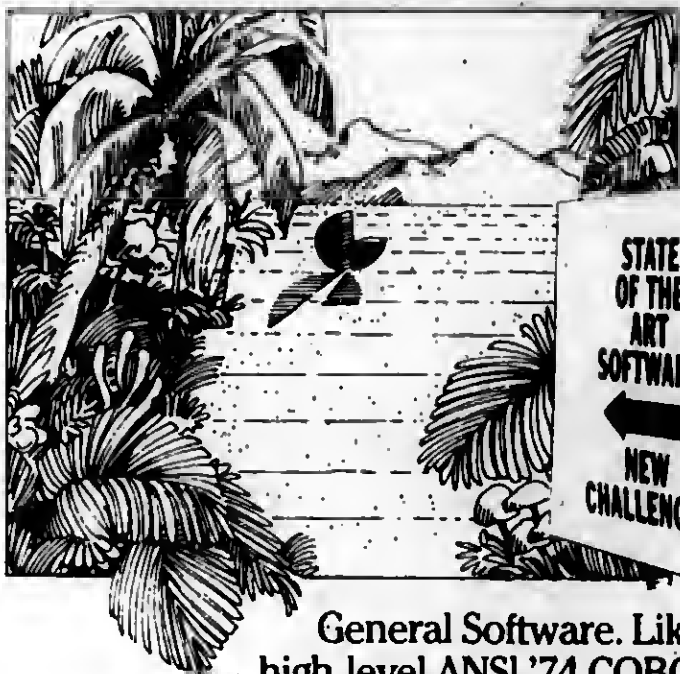
position announcements

position announcements

position announcements

position announcements

SOFTWARE WIZARDS: BORED WITH ROUTINE WORK? COME TO THE DATA GENERAL OASIS.



Naturally you're parched. Too much of the software you're working with has gone old, stale and dry. But now's your chance to work with some of the most advanced software in the world. Data

General Software. Like AOS, Idea, INFOS and high level ANSI '74 COBOL.

As a Data General Technical Support Engineer you'll be called upon to isolate and resolve systems level problems every day. You'll also be interfacing with design engineering in the development and evaluation of new hardware and software products.

SOFTWARE TECHNICAL SUPPORT ENGINEER

You'll need solid experience in assembly language and operating systems internals (real time, communications and batch) to qualify. Your background should include a minimum of five years software experience working either as a Software Support Analyst, post-sales Systems Engineer or Systems Programmer.

This job not only means you'll be moving up into a position with more freedom, and greater challenges, but you'll also be working for the most exciting, fastest growing minicomputer company in the world. Data General.

If you feel this is the kind of opportunity you've been waiting for, please forward a resume, including salary history, in confidence to Ms. Joanna Flint, Data General Corp., 235 Old Conn. Path, Framingham, MA 01701. Or call Joanna at (800) 225-4623 (in Massachusetts call collect (617) 620-1200).

Data General

An equal opportunity employer M/F.

MINI-COMPUTER SALES MANAGEMENT

A sales professional with 5 years of solid sales management experience to spearhead the building of a highly qualified sales force. This individual should be able to single-handedly put together a team of successful sales professionals capable of generating sales and lease financings on the multi-million dollar level within 1 year. Markets of initial interest include Fortune 1000 accounts and medium sized municipalities. We are qualified as an OEM with a major mini-computer manufacturer and intend to broaden considerably our involvement in this area. We have developed proprietary software packages aimed at the Fortune 1000 and Municipal markets. In addition, we are a major equipment leasing company controlling equity dollars in the range of \$25,000,000 and an equipment lease portfolio exceeding \$75,000,000.

Compensation arrangements are open and subject to past experience.

Interested parties should respond in confidence to:

CW Box 1420
797 Washington St.
Newton, Mass. 02160

OPPORTUNITY

PLUS PLUS PLUS

Entrepreneur wanted as working partner for two year old corporation specializing in minicomputer turnkey systems. A small investment and a lot of motivation are the only requirements. Full ownership is possible. Contact:

PRODATA INC.

39 Country Club Rd.
Carlisle, PA 17013

DIBOL PROGRAMMERS

A rapidly growing DEC OEM in Florida is looking for trained DIBOL programmers with at least one year's experience on DEC mini-computers. Company does \$3,000,000 in business with great opportunity for personable, bright, young programmers. Salary open. Send current picture and resume with salary history to Dan Kopack, Digital Systems, Inc., 1818 N. Palofox, Pensacola, Florida 32501.

Data Processing Management Consulting

Expanding International Big 8 CPA firm seeks computer systems professionals for openings in New York, Boston, Washington, Cleveland, Atlanta, Chicago, Kansas City, Los Angeles, San Francisco, Houston and other U.S. offices. Skills in two or more of the following areas are required:

- Evaluation and selection of hardware and software;
- Systems feasibility and cost/benefit studies;
- Operations, security and control evaluation;
- Project management/quality control of development projects;
- Computer performance evaluation;
- Mini-computer and teleprocessing.

Qualified individuals must possess B.S. degree (Master's degree desired), up to five years recent in depth technical data processing experience, strong skills in oral and written communications, programming and/or system analysis. Travel required depending upon location. Salary in the \$17-28,000 range.

For an outstanding career in management consulting, submit resume including salary history and geographic preferences to: Dept. CW C/O R. Dieckmann, 38th Floor, 345 Park Ave., New York, N.Y. 10022. An equal opportunity employer, M/F



programmer/ analysts

air traffic control systems

Opportunities In
Jacksonville, Florida

CSC's System Sciences Division

CSC is constantly expanding in the information sciences industry all over the world in governmental, commercial, and industrial systems.

CSC's System Sciences Division is now staffing a new FAA Air Traffic Control Systems Project, developing and implementing technology in our Jacksonville, Florida location.

We offer both a Florida lifestyle and a professional workstyle on one of our development teams. All levels of experience are welcome to apply for these positions...

- Software test and validation including development of tools to test and validate real-time software systems.
- Simulation/modeling of air traffic patterns. Knowledge of JOVIAL a plus.
- Design and implementation of data base management systems.
- OS/360 System generation and maintenance.
- Diagnostic design, development or enhancement and hardware orientation.
- Software Quality Assurance.

CSC offers a liberal relocation policy in addition to a complete benefits package. For immediate consideration, please send resume or call:

Greg Lattus

Call Collect: (904) 355-9687

**COMPUTER
SCIENCES
CORPORATION**

System Sciences Division
1833 Boulevard Street
Jacksonville, FL 32206
Major Offices and Facilities
throughout the World
Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER SALES

We are looking for sales professionals to sell our mini-computer systems to end-users. For the right individuals, these are truly unique and unusual opportunities for career and financial growth. To be considered, applicants must have prior sales/marketing experience in the mini-computer end/or small computer business systems marketplace. Compensation will include base salary plus incentives, and a liberal employee benefit package. Send detailed resume including current earnings to our Sales Manager.

CW Box 1418
797 Washington St.
Newton, MA 02180
EOE/MF

DATA PROCESSING SOFTWARE SPECIALIST

Generate and maintain operating system. Provide technical help to telecommunications specialist, data base specialist, and Operations Department. Write special subroutines and optimize operating system. Should be familiar with OS-MVT or OS-VS maintenance and generation. Requires 1 to 2 years experience as system programmer. Call (503) 225-5272 for appointment, or send resume to Blue Cross of Oregon, 100 S.W. Market St., Portland, Oregon 97201.

BLUE CROSS OF OREGON
An Equal Opportunity Employer

Systems Analysts-Teleprocessing

Rhode Island

As a leading New England commercial bank, we have created an unusual opportunity for a career-minded Systems Analyst. The challenge involves the design and implementation of an on-line network within a medium-large IBM 370 OS/VS environment with the opportunity to apply "state-of-the-art" developments in computer technology. A sound programming/systems analysis background and good verbal communications skills are required. Salary mid to upper teens. Inquiries will be handled promptly and in strict confidence. Send resume to:

Director of Personnel

Old Stone Bank

150 South Main Street
Providence, R.I. 02903

An Equal Opportunity Employer M/F

PROGRAMMER ANALYSTS

PROGRAMMER ANALYSTS

PROGRAMMER ANALYSTS

PROGRAMMER ANALYSTS

PROGRAMMER ANALYSTS

PROGRAMMER ANALYSTS

PROGRAMMER ANALYSTS

Seeking Career Opportunities With- CHALLENGE INNOVATION DEVELOPMENT

Federated Department Stores, a national leader in retailing, has a major systems development program in progress that is committed to developing advanced retailing systems incorporating data base and distributive processing capabilities.

Advanced technologies include:

IMS/VS • MVS • NCP • SNA
VTAM • VSAM • TSO • Data Dictionary

Methods include Top down design, HIPO, structured walk through simulation

There are still some ground floor opportunities at the forefront of design and development for PROGRAMMER ANALYSTS who have above average credentials and would like to embark their careers in our long term retail systems research and development program.

If your background includes solid COBOL programming experience on large scale IBM equipment with exposure to IMS concepts, and you're ready to advance your career in a highly professional environment, working with concepts that are ahead of existing technology, then send your resume, including recent salary history to: MR. FRANK McKAIN.

Federated Department Stores, Inc.

Systems Research & Development-Room CW206
222 W. Seventh St., Cincinnati, Ohio 45202

ALL REPLIES HELD IN STRICT CONFIDENCE

An Equal Opportunity Employer

EXCITING JOB OPPORTUNITIES BANK APPLICATIONS AND SERVICES

Does your present job offer all the opportunity you want?

Does working for the nation's leading supplier of financial software interest you?

Are you free to be creative?

Does being a part of a fast growing, on-line oriented bank servicing data center excite you?

Would you like professional technical writers to prepare your documentation?

Would you like to live and work in Central Florida?

FLORIDA SOFTWARE SERVICES PROVIDES APPLICATION PACKAGES AND BANK SERVICES FOR OVER 1000 BANKS THROUGHOUT THE NATION. COMPENSATION PACKAGE INCLUDES:

- Top Salary And Bonuses
- Major Medical Health Insurance Including Dependent Coverage
- Life Insurance
- Excellent Working Conditions.

OPPORTUNITIES AVAILABLE:

OPERATIONS MANAGEMENT

Must be experienced in Management. Requires knowledge and ability to develop and manage systems and data flow. Will be involved in planning and controls. IBM 370 and Burroughs Hardware.

APPLICATION PROGRAMMER/ANALYSTS

Must be experienced, Cobol programmers. Familiar with bank applications. On-line experience helpful. IBM 370/Burroughs systems.

If you are qualified, we have the perfect opportunity for you. We offer unlimited possibilities for growth and advancement.

Send your resume today in strict confidence to:

Personnel Director



FLORIDA SOFTWARE SERVICES

P. O. Box 2269 • Orlando, Florida 32802

"SUNBELT" OPPORTUNITIES

EDP Auditors To \$25,000. Dg. 2 yrs Mfg EDP Audits exp.
S/A To \$24,000. 3 yrs. 370/IMS, Mfg Systems exp.
Systems/Prog. To \$23,000. 370/IMS Systems, etc. exp.
DATA BASE, To \$23,000. Dg. 2 yrs IMS DATA BASE DESIGN exp.
Sr/Prog To \$20,000. 3 yrs. 370/OS/COBOL CICS exp.
O/A To \$19,000. Dg. 2+ yrs 370/IMS, MFG Applications
All employment expenses paid by client cos. For details on the above, contact in conf. J. Schwab (704) 375-0600. FOX-MORRIS PERSONNEL CONSULTANTS, 1742 Southern National Center, Charlotte, N.C. 28202.

EDP PROFESSIONALS

PROGRAMMER/ ANALYST

CITY OF DULUTH,
MINNESOTA

Ground floor opportunity in municipal DP center. PA will conduct system design in expanding user base necessitating installation of larger computer with capacity to handle tele-communications and data bases. Qualified candidate will have solid experience in user contact, system design, program implementation, and ability to direct/evaluate programming efforts.

Salary Range \$14,436 to \$19,944, depending upon qualifications. Excellent fringe benefits.
Send resume by February 17, 1978, to:

J.A. Heyden
Personnel Department
Room 313 City Hall
Duluth, Minn. 55802
Equal Opportunity Employer

COMPUTER ENGINEERS

Join an aggressive computer organization that is engaged in a five-year program to modernize and streamline the car engineering process. Applications development requirements span data acquisition, prototype testing, performance simulation, design analysis, and information control systems. Facilities used include CDC, Honeywell and IBM data centers, and dedicated computers such as DEC System 20, PDP 11's, and microcomputers. Experienced personnel are needed for:

MICRO/MINICOMPUTER APPLICATIONS

Laboratory data acquisition, engine mapping, electronic engine control, performance simulation and optimization, numerical control, microprocessor control, diagnostic testing, and data communications.

COMPUTER GRAPHICS

Body and structures design, component design and packaging, interactive design analysis, modeling for finite element analysis, vehicle dynamics, and related geometric data base, design information retrieval, and drawing dissemination techniques.

INFORMATION SYSTEMS

Part and design data, weight and material control, and product releasing, option codification and configuration control, model program timing, product change control, warranty data, reliability and durability analyses, and related on-line data base and interactive data entry/retrieval techniques.

You must be an innovator and be capable of complete project leadership from analysis of requirements, systems design, program specification, to launch of the needed computer facilities and systems features. Please submit your qualifications so that we may discuss a challenging career opportunity commensurate with your academic and practical background. Send resume to:



Car Engineering
Attn: J.B. Shaw
Salaried Personnel
P.O. Box 2053
Dearborn, Michigan 48121
An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

others talk about it — we've got it

MINI-COMPUTER FIELD POSITIONS

Become part of Sperry Univac's growth to leadership in the mini-computer world!

SALES ENGINEERS

Weigh these advantages:

- The best commission plan in the industry.
- Competitive products to sell.
- A highly respected, worldwide customer engineering support organization.
- Challenge and real growth opportunities.

Requirements:

- Minimum 2 years mini-computer sales experience in the Data Base, Data Communications and/or Distributed processing marketplace.
- Record as a closer.
- Technical competence in hardware and software.
- Record of maintaining account relationships.
- Ability to obtain new and repeat business.

FIELD SYSTEMS ANALYSTS

Key responsibilities in:

- Marketing headquarters interface.
- Sales/proposal preparation.
- Defining and solving customer requirements.

Requirements:

- Technical degree desirable.
- Creative problem solver.
- Minimum 2 years pre and/or post sales support.
- Real-time commercial (Data Base, Data Communications, Distributed Processing) and/or real-time scientific applications.

If you're a leading performer with your current company, don't pass up this opportunity to make a smart move.

You will find:

- Professionally challenging environment.
- Room for advancement.
- Achievements recognized.

Openings in the following areas:

Los Angeles • Denver • Dallas • New Orleans • Oklahoma • Seattle
Orlando • Huntsville, Alabama • Chicago • St. Louis • Washington, D.C.
Detroit • Manhattan • Long Island • New Jersey • Philadelphia • Atlanta

For more information, call Al Sack at
714/833-2400 (COLLECT). Local
interviews may be arranged.

SPERRY UNIVAC

MINI-COMPUTER OPERATIONS
2722 Michelson Drive, Irvine, CA 92713

An Equal Opportunity Employer M/F

Programmer & Systems Engineers

We seek qualified individuals to fill the following key positions in our Richmond headquarters.

Programmer/Analyst

Individual to assist in the analysis, development and programming of computer systems. Prepare necessary systems and program documentation. Must be able to communicate effectively with users, and program proficiently in COBOL, BASIC and Teleprocessing a plus. Degree preferred with experience in programming and systems analysis.

Systems Engineers

Develop new products and software including operating systems, language processors and application packages for building automation, energy management and process monitoring/control. Background in real time programming, primarily FORTRAN, D.G. experience a plus. Mini or micro computer experience an asset.

Liberal starting salaries plus incentives. Excellent benefits.

Reply in writing stating qualifications to A.J. Falco, Personnel Manager or call Mr. Falco at (804) 288-3081

Robertshaw Controls Co.

P.O. Box 27606 Richmond, Virginia 23261
An equal opportunity employer, M/F

COMPUTER ASSISTED INSTRUCTION ASSOCIATE COORDINATOR

Northern Plains
Consortium for Education

DESCRIPTION OF POSITION: Assist Consortium of six North Dakota colleges in implementing computer programs which will augment instruction in undergraduate social and natural science courses. Aid in analyzing, designing and coding systems and programs requested by college instructors; and conduct technical training programs and subject matter seminars in computer assisted instruction.

REQUIREMENTS: Extensive knowledge in developing and implementing computer assisted instruction packages and courses. Knowledge of an interactive computer language and interactive computing. Doctorate or near doctorate required. One or more years' experience in college level teaching which involved use of a computer as a teaching tool would be beneficial.

ADDITIONAL INFORMATION: A twelve month position available July 1, 1978. Minimum salary \$18,000. Send resume, statement of interest and qualifications, and list of three references to:

Northern Plains
Consortium for Education
Jamestown College
Jamestown, N. Dakota 58401
An AA/EOE

Faculty Position

ASSOCIATE EDUCATIONAL SPECIALIST COMPUTER SCIENCE

You'll provide support services, academic advising, tutoring, note-taking, interpreting, career guidance, and coordinate research activities for identifying jobs available to deaf students. M.S. Degree in Computer Science/equivalent educational experience and willingness to learn Manual Communication required.

Minimum four years' teaching/industry preferred including use of timesharing terminals, graphic displays, XSD computer operations, programming and application, Hardware/Software Systems Design and Analysis.

Personnel Coordinator - CW

This position carries faculty rank and can lead to a tenure. Send CV in strict confidence to:



**National Technical
Institute for the Deaf**
Rochester Institute
of Technology

One Lomb Memorial Drive, Rochester, New York 14623
NTID is an equal opportunity/affirmative action employer.

Marketing Manager

Market Segment Manager Communications Industry

We are looking for an experienced market segment manager to develop and implement test and measurement product programs designed to meet the needs of the communications industry. The responsibilities of this manager requires strong marketing skills as demonstrated by both sales experience within the communications industry and related industry, marketing experience. Educational background should include business and marketing courses as well as courses in electronics and/or computer science.

Government Marketing Program Manager Digital Systems

We are looking for a marketing program manager who has experience with government procurement organizations. Direct experience either selling to or operating within government agencies would be a distinct advantage.

The product line includes digital components and systems that require an understanding of digital hardware and software (e.g., A/D conversion, minicomputers and BASIC).

Educational background should include business and marketing courses and experience or qualification in electronics or electronic systems.

TEKTRONIX, INC., is a rapidly growing Fortune 500 Company that develops, manufactures and markets internationally recognized precision electronic instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Art Andersen, TEKTRONIX, INC., P.O. Box 500, C74, Beaverton, Oregon 97077 or call Art Andersen at 800-547-1164 (Toll free) or collect 503-644-0161, extension 7043.

An Equal Opportunity Employer M/F/H.

Tektronix
COMMITTED TO EXCELLENCE

position announcements

position announcements

position announcements

position announcements

position announcements

Systems Analysts Programmers

Our International Financial Systems Division has an immediate need for individuals with expertise in the following areas:

- Banking Applications
- COBOL Programming
- On-Line Transaction Oriented Systems
- Structured Design and Programming
- Terminal Programming

You will be involved in the design and implementation of an International Banking System using the latest hardware and software technology. These positions provide vital project team participation with opportunity for customer contact, international involvement and high visibility within our organization.

For further consideration, send your resume with salary history to:



Mr. Wm. H. vonReichbauer
Department IBS
Corporate Executive &
Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

DATA PROCESSING PROFESSIONALS

Career opportunities now available with a progressive data processing installation in one of the fastest growing electric utilities in the Southeast. Current environment includes IBM 370/158 and 370/155 OS-VS2, batch and on line applications using both CICS and TSO, several major new development projects. Installing 3031 in May 1978, 3032 in February 1979. We have immediate openings for the following:

SYSTEMS ANALYST

Must have experience in the design, analysis, and implementation of large applications. Strong accounting systems knowledge needed. Also, experience in projects involving property tax and tax depreciation concepts is helpful. Must have ability to function on systems with heavy user involvement. Strong technical background desirable. Degree preferred.

APPLICATION PROGRAMMERS

Requires 3-5 years experience primarily with COBOL. Working knowledge of structured programming concepts desirable. Experience with IBM hardware and software, OS-JCL, and CICS will be a definite plus. Degree in Computer Science, Math, Statistics or related area preferred.

PROGRAMMER/ANALYST

Needed to work in an engineering support computer organization. Wide range of application areas. Requires 2 years experience in PL1, COBOL, or FORTRAN and IBM-OS. Degree required.

SYSTEMS PROGRAMMERS

Requires a minimum of 2 years systems programming experience in medium to large scale IBM data processing installation, CICS, MVS, or SVS background desirable.

OPERATIONS SUPERVISORS

Requires management experience in supervision of medium to large scale IBM data processing installation.

Send resume and salary requirements to:

Ms. Martha Bryan
Department One
P.O. Box 1551
Raleigh, N.C. 27602

CP&L

Carolina Power & Light Company

An Equal Opportunity Employer M/F

ATTENTION: EDP PROFESSIONALS

Doubleday Wants To Put An End To Your Career!

Your job hunting career, that is. How do we do it? By offering you a career with all the creative challenges you could want in a professional environment crackling with motivation for personal rewards and satisfaction.

Continued expansion of our activities has created an immediate need for talented individuals at ALL LEVELS.

APPLICATIONS PROGRAMMERS SYSTEMS PROGRAMMERS ANALYSTS

Opportunity to assume Team Leader responsibility within a short time. We are currently operating sophisticated state-of-the-art hardware—twin 370/168's under OS, SVS, MVS.

Doubleday is located in the attractive, desirable suburban environment of Garden City, Long Island, within 45 minutes from New York City.

INTERESTED? Then give us a chance to show you a great new career opportunity.

Mail coupon, call collect, or send resume including salary history & requirements in confidence to
MR. JEFF KUNION, Dept. CW

DOUBLEDAY

A COMMUNICATIONS CORPORATION

501 Franklin Ave., Garden City, L. I., N. Y. 11530

(516) 294-4723

An Equal Opportunity Employer (M/F)

**FILL OUT
COUPON AND
MAIL TODAY!**

NAME _____

ADDRESS _____

PHONE # _____

Best Time to Call _____

I Am Interested In A Position As A: _____

EDP Experience: _____

COMPUTER TECHNOLOGY DEPARTMENT HEAD

Selection factors include experience in computer applications for business or commerce; teaching experience in an academic environment; evidence of leadership qualities; professional and peer recognition. Applicants should be knowledgeable in management, business, and personnel functions and activities. Relevant Ph.D. preferred. Employment Date: July 1, 1978

Two teaching positions: rank open at assistant or associate professor level. Full-time undergraduate teaching of computer technology courses. Minimum of M.S., preferably in computer field. Computer related experience in teaching, plus experience in business, commercial, and/or industrial settings are prime selection factors. Employment Date: August 1978

Send complete resume to: Dr. George W. McNelly, Dean, School of Technology, Purdue University, West Lafayette, Indiana 47907, by March 15, 1978. Purdue University is an affirmative action/equal opportunity employer.

COMPUTER OP. MGR.

to \$30,000

MGM'T BACKGROUND. Should have exp. in converting to a 370/168 operation. Mfg. environment exp. with Dual 370/168, JCL, MES, or HAST desirable.

INFO SYSTEM STAFF

Three openings in prod. inv. control, forecasting. Interface with upper mgmt. Need degree & exp in IBM 370, IMS, COBOL, PSO, or HAST. Low to mid \$20's starting salary. Co. Pays all fees. Contact: A. T. Toht, (312) 665-4455, S-H-S INTERNATIONAL, 1616 E. Roosevelt Rd., Wheaton, IL 60187 (Priv. search firm)

COMPUTER PERFORMANCE ANALYST

MID \$20's

We are seeking a candidate with one to two years experience as a Computer Performance Analyst or three to four years experience as a Systems Programmer. This person will utilize hardware and software tools to monitor computer system performance and seek solutions to specific problems. Knowledge of IBM's Information Management System, IMS Performance Products and IBM's System Management Facility are required. Successful candidate will have worked in third generation hardware and software technology.

We are the largest Mutual Savings Bank in the Nation. Our benefits include: Free lunches, comprehensive medical insurance, tuition pre-payment, liberal vacation policy and an excellent incentive and investment program.

Please send resume and salary history to:

Phyllis S. Lynch
Assistant Vice President

PSFS

12 S. 12th St.
Philadelphia, PA 19107
Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Good Reasons to Move to Amdahl... Wherever You Are.

Amdahl Corporation is growing at a rapid pace, and we currently have outstanding opportunities in several areas across the country for topnotch people. If you seek increased responsibility and job expansion, perhaps you've been considering upgrading yourself and making a move to another area... but the realities of relocation hold you back. At Amdahl, we're prepared to help you make a significant—and, we believe, rewarding—move in your professional career. And we're prepared to assist you in that move with minimum disruption for you and your family, regardless of your present location.

We invite you to come and visit us. You will find an exciting and challenging environment, an excellent compensation and benefits package, as well as a friendly regard for human feelings and a sense of involvement that have characterized the company since we began. And we'll be happy to tell you about our fully paid relocation policy.

PROGRAM SUPPORT REPRESENTATIVES

You will be working as a field systems engineer as you carry the Amdahl philosophy of complete service to the customer. You will utilize your initiative, expertise and talents to aid the customer in restoring computer center operations regardless of the origin of the problem. You will assist Amdahl 470 customers in OS/SVS/MVS/VM conversions, problem determination, installation planning and support for new 470 users in one of the following areas:

Birmingham	Portland	Dallas
Washington, D.C.	Seattle	Chicago
No. New Jersey	Los Angeles/Orange County	Detroit
Hartford	San Francisco	Minneapolis
Boston	Houston	St. Louis

You will also be responsible for assisting in the maintenance of a smooth software operation by working in close liaison with hardware engineers and the software specialists in Sunnyvale to solve knotty problems that cause most shops to throw in the towel. Qualified candidates are invited to direct their response to Phil Beckhelm, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086 or call him at 408/735-4280. We are an equal opportunity employer.

amdahl

DATA PROCESSING ON THE SAN FRANCISCO PENINSULA

Ampex, an international leader in the design and manufacture of professional audio/video systems, magnetic tape, recording devices and computer peripherals is seeking individual with systems and programming experience. We are headquartered on the San Francisco peninsula and our computer center is housed in a modern complex designed expressly for data processing.

Sr. Programmers/Analysts

Experience on IBM 360/370 generational computers in a project oriented environment and exposure to data base management systems, RJE and HASP in OS environment is necessary. If you can write in COBOL and are interested in a position combining programming and analysis, we have positions available in the areas of: file maintenance; work orders/work in progress; inventory control; bills of materials. We are currently going to MVS and experience is desirable.

Sr. Systems Programmers

You should have a minimum of 2 years experience including IBM 370/155 or large computer experience. Software background should include OS/MVT, HASP, TSO, TCAM, RJE, SMF, SPOOL, BAL, FORTRAN and COBOL. MVS experience desirable.

We offer competitive salaries. Choice of 4 Medical Plans. Dental plan, Pension Plan, Life, AD&D, travel insurance. Stock purchase plan. Educational assistance. Relocation and transfer expenses. Please send a resume to Ampex Corporation Attn: E. King, Building 2, 2655 Bay Road, Redwood City, CA 94063. We are an affirmative action employer m/f.

AMPEX

CAREER OPPORTUNITIES!

Sr. Programmers

5 years experience, degree helpful. Large scale IBM shop with large hierarchical data bases. Must know PL/1, OS-JCL, with some supervisory experience. Excellent promotion opportunity with southwest location. to \$24,000

Software Specialists

Experience in TP software and/or IMS. Assist in migration from OS/MVT with ASP to MVS/JES 3. Midwest location with Fortune 500 company. Knowledge of COBOL & FORTRAN. to \$20,000

EDP Auditor

3 to 4 years experience as Auditor with knowledge of COBOL. Insurance or financial background in auditing or accounting. Good communications skills helpful along with knowledge of systems design and sequential processing. Travel approx. 10%. to \$21,000

Many additional openings in other areas are also available. All fees are paid by our client companies.

In professional confidence, send resume, including salary and relocation requirements to: Jeff Holmes

dorsey love
& associates inc.
PO Box 4486 G S
Springfield, MO 65804
417/883-1212

Programmers

BECHTEL POWER CORPORATION, located in Galthersburg, Maryland, has immediate openings available for:

Business & Project Control Programmers

All positions require the ability to interface on a variety of business and project control applications including program design, program support and documentation. Some positions require 2-4 years' COBOL and some experience with UNIVAC EXEC 8. The other positions require 2-3 years' programming experience with RPG II, knowledge of COBOL, and experience on IBM System/3 Model 15B helpful.

Engineering Programmer

Position requires the ability to interface on a variety of engineering applications including program design, program support and documentation. Must have 2-4 years' FORTRAN and some experience with EXEC 8.

These positions offer competitive salaries and an excellent benefits package.

For immediate attention, please call Lyle Padgett collect at:

(301) 948-2700

Or send resume including salary history in confidence to: Lyle Padgett, Employment Dept. 2-16-8, 15740 Shady Grove Road, Galthersburg, MD. 20760.

an equal opportunity
employer m/f



CAD/CAM SYSTEMS PROGRAMMERS

MCAUTO (McDonnell Douglas Automation Company), a St. Louis data processing services company, needs individuals at all levels of experience in CAD/CAM systems. We offer you the opportunity to join our team of highly trained specialists, supporting the most advanced and integrated CAD/CAM systems in production today. We have opportunities available for people with experience in the following areas:

- Interactive Graphics System Development
- Advanced Numerical Control Development
- DBMS (Data Base Management System) Development
- Minicomputer (PDP-11 series) Systems Programming
- CAD Systems Development
- DNC and CNC Systems Development
- CAM Systems Development

If you have a minimum of two years of experience in one or more of these areas, or two or more years' experience in S/370 Assembler language and FORTRAN, a B.S. degree or higher in Computer Science, Mathematics or Engineering, and have an interest in moving forward in one of the most challenging areas in computer systems, contact us.

Excellent salary and fringe benefits.

Send your resume, with salary history, to:

W. B. Kellenberger,
Section Manager,
Professional Employment
Department CW-78P • P.O. Box 516
St. Louis, Missouri 63166

MCDONNELL DOUGLAS
AUTOMATION COMPANY

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

Telesat

Télésat Canada

Canada's domestic satellite communications company is looking for a

SYSTEMS PROGRAMMER

to work in the Systems Software Group. Duties will include specification and implementation of software which forms part of a system of integrated programs and system maintenance. The main programming language is HP ASSEMBLER.

Candidates will have a university degree and ASSEMBLER language programming experience with the Hewlett-Packard RTE system. Experience with on-line terminal systems, data file structures and operating system maintenance is desirable. Salary up to \$23,800 depending on qualifications and experience.

Please send your resume quoting advertisement TC785-OS14 to:

Telesat Canada
Coordinator, Recruitment
333 River Road
OTTAWA, Ontario, K1L 8B9

Senior Data Processing

Large scale opportunity with the "FED"

We are working with dual IBM 370/158's using MVS/MP, and are operating a communications network to 370/135's and 145's at our five multi-state Branches.

We are engaged in the design and development of a diverse array of projects including distributed data processing systems using 3790's. Immediate openings exist for:

IMS/VS Project Managers

These positions will lead 5 to 12 person projects on new IMS development and require proven leadership ability with a strong systems design background.

IMS Application Consultants

A strong IMS background is required for these application design consultants on IMS and other systems. Selected candidates will act as a consulting group working with diverse applications project teams.

Telecommunications Programmer Analyst

The individual selected for this position will be assigned to support the Bank's nationwide communications network. There will be additional opportunity to work, building a 3790 distributed processing network. Requirements include 6 years' programming with a minimum of 4 years' in ALC and telecommunications. Background must also include systems analysis design and MVS. Knowledge of BTAM, Binary Synchronous protocol (single and multi-point), 3270, and VSAM is desired. 3705 BS/CS is helpful.

For immediate consideration, call our toll-free operator at:

(800) 638-1915

or forward your resume with salary requirements to: Professional EDP Recruiter, Federal Reserve Bank, 400 Sansome Street, San Francisco, CA 94120.

An affirmative action employer

FEDERAL RESERVE
BANK OF SAN FRANCISCO



SOFTWARE SPECIALISTS

Programmers • Analysts • Engineers

NATIONWIDE OPPORTUNITIES

The Technical Services Division of Sperry Univac, a world leader in computer systems, is in the midst of a nationwide expansion program. Opportunities now exist throughout the U.S. By integrating the diverse and creative talents of our people, we have formed a highly qualified team of professionals capable of solving data processing problems from concept to operation. Our projects, highly challenging and extremely rewarding, involve sophisticated, state-of-the-art techniques in the following areas:

- Real Time Weapons Systems
- Naval Tactical Data Systems
- Real Time Command and Control
- Electronic Warfare
- Univac 1100 Series/COBOL and FORTRAN
- Operating Systems, Executives, Compilers
- Satellite Control Center Program
- Real Time Communications Systems

INTERESTED?

If you have one or more years experience in any of the above areas, we would like to hear from you. We prefer a degree in computer science, EE, math or equivalent experience. While a background with Univac Military or commercial computers is a plus, equivalent computer experience, particularly with 16 bit computers is also desired.

FOR IMMEDIATE CONSIDERATION CALL COLLECT:

John DePrima
(703) 558-4486

Or Rush Resume to:

SPERRY UNIVAC

Technical Services Division
1901 North Moore Street
Arlington, Virginia 2209

An Equal Opportunity Employer M/F/H

computer hardware



and
software
candidates
RELAX.

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

BRENTWOOD PERSONNEL ASSOC.
Computer Division
1240 Route 46
Parsippany, N.J. 07054
(201) 335-8700

COMPUTER CAREERS, INC.
Specialists in Data Processing
4720 Montgomery Lane, #503
Bethesda, MD 20014
(301) 654-9225

OEALY-RURKE PERSONNEL SERVICE
1808 West End Bldg.
Suite 121
Nashville, Tenn. 37203
(615) 329-1771

CRETNEY & ASSOCIATES
754 Hanna Bldg.
Cleveland, Ohio 44115
(216) 771-2141

CAREER SPECIALISTS PERSONNEL SERVICES
4600 El Camino Real
Suite 206
Los Altos, CA 94022
(415) 941-3200

members of
National Personnel Associates
Specializing in DP

DATA PROCESSING

Programmer/ Systems Analysts

Think Change...Think Pride

You don't change jobs often, but when you do, you make it count. At Decimus Corporation, we're proud of who we are and what we do. And we're proud of our good people — people who have made us foremost leaders in Data Processing services for the Financial Industry. If you're considering a change to better yourself and your career, you can count on Decimus for the kind of stimulating environment and professional atmosphere that comes only with a proud company.

Positions are available at various experience levels in:

* Communication Networks Design * Interactive Systems Development * Systems Simulation * Distributed Processing * EDP Audit * Check Processing (MICR) * Teller Inquiry Control * Credit Card Processing Systems * Deposit & Loan Systems * Database Systems

A State-of-the-Art working environment includes 370/155, 168, 195, SYS 3 (Mod 15), SYS 32, etc., and various minicomputers (General Automation, DataPoint, Four Phase, etc.), and operates under DS, MVS, DDS, IMS, CMS-VM. Software is primarily COBOL, but includes Assembler, RPG II, and PL-1.

Decimus offers excellent compensation and an outstanding benefits package, including a dental plan and reduced loan interest rates. Send your resume, including salary history/requirement, in confidence to D.B. Michaels, Decimus Corporation, Suite 320, 1700 Montgomery Street, San Francisco, CA. 94133. We are an Equal Opportunity Employer taking Affirmative Action M/F/H.



DECIMUS CORPORATION

A BANKAMERICA COMPANY



position announcements

position announcements

position announcements

position announcements

position announcements

San Diego opportunity in SOFTWARE SYSTEMS DEVELOPMENT

Want to combine the ideal career opportunity with your favorite lifestyle? NCR Systems Engineering/Torrey Pines needs your help now in developing advanced, high-technology, EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, La Jolla and downtown San Diego. You can live in the setting of your choice — beach, valley, mountain, country, small-town or urban — and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too — from mild coast to dry desert. San Diego is a place of extraordinary choices — and right now the choice is yours.

COMPUTER PROGRAMMERS

The Systems Engineering/Torrey Pines Division has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- Telecommunications Software
- File Processing
- Network Development
- Large Mainframe, Mini and Micro Processor
- Operating Systems
- COBOL Applications
- Assembly Language

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems; both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.



Thom Harris, Employment Specialist
SYSTEMS ENGINEERING/TORREY PINES
4046 Sorrento Valley Blvd., San Diego, CA. 92121
An Equal Opportunity Employer

SOFTWARE ENGINEERS San Francisco Peninsula

Intel, the pioneer in LSI technology, is developing high technology state-of-the-art data base systems. The following positions offer an opportunity for key technical personnel to play leadership roles in developing advanced products at Intel.

Performance Evaluation Engineer

We are seeking an individual whose background includes experience with file access methods and computer software systems architecture. Candidate must be competent in analytic and simulation modeling techniques. An MSEE or equivalent is preferred.

Software Development

This position requires prior experience with real time data base/data communication systems design and implementation. Responsibilities include specification, design and implementation of software to control general and special purpose advanced data base management systems.

Interested candidates are invited to apply or send resumes to Intel Memory Systems, 1302 N. Mathilda Avenue, Sunnyvale, CA 94086

intel
Memory Systems

MATHEMATICS AND COMPUTER SCIENCE

PhD in computer science or electrical engineering to teach courses in the logical design of computer hardware, computer hardware systems design, telecommunications, computer networks, FORTRAN, and COBOL. Twelve hour week teaching with six weeks summer teaching usually available. Send resume to Dr. Merritt N. Sugg, Chairman, Department of Mathematics and Computer Science, University of Arkansas at Little Rock, 33rd and University, Little Rock, Arkansas, 72204; an Affirmative Action employer.

JOB SEEKERS!

Start Your Own Company!

The newly published "How to Start Your Own Minicomputer Business" is written by a trained computer professional from practical experience. Not a franchise plan, not a wild scheme, but simple step-by-step instructions on how to begin your own enterprise. Includes one year consulting services. Send \$10 to: Handbook, 39 Country Club Rd., Carlisle, PA 17013.

EDP SPECIALISTS

Nationwide

- Mfg EDP Cons. To \$33K
NYC location
- EDP Mgr RPG To \$29K
11 mfg, N.J. location
- POS Proj Mgr To \$27K
Midwest location
- EDP Audit To \$26K
N.Y.C. location

Fees assumed by client co's
LESLIE KAVANACH
505 5th Av. NY, NY 10017
(212) 661-0670 (agency)

New! 1978 Computer Salary Survey



Call for your Free copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

This comprehensive free report also gives you expert advice on a variety of important career topics such as: when you should consider a job change; what you need to do to break into management; how to make sure you're getting the proper exposure; why timing is so crucial in your long range career development; how you can avoid stagnation... and much more.

The 1978 Computer Salary Survey has been compiled by Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

For your Free copy, call the Source Edp office nearest you.

East:	Midwest:	St. Louis:	West Coast:
Boston 617/482-7613	Chicago 312/762-0657	St. Paul 612/771-0544	Encino CA 213/995-6666
Hartford 203/522-6590	Cleveland 216/771-2070	South/Southwest:	Irvine CA 714/833-1730
New York City 212/736-7445	Detroit 313/963-0510	Atlanta 404/325-6370	Los Angeles 213/366-5500
Philadelphia 215/665-1717	Kansas City 616/474-3393	Dallas 214/367-1600	Oakland 415/444-5955
Stamford CT 203/329-6411	Minneapolis 612/544-3600	Denver 303/773-3700	Palo Alto 415/326-7155
Union NJ 201/687-8700	Northfield IL 312/446-8395	Fort Worth 817/336-9300	San Francisco 415/434-2410
Washington DC 703/790-5610	Oak Brook IL 312/966-0422	Houston 713/626-6705	Seattle 206/454-6400
Wellesley MA 617/237-3120	Rolling Meadows IL 312/392-0244	New Orleans 504/561-6000	Torrance CA 213/540-7500
	Southfield MI 313/352-6520		Canada: Toronto 416/364-2919

source edp

If unable to call, write: Source Edp, Department C3
721 Enterprise Drive, Oak Brook, Illinois 60521

(When writing, please be sure to use home address and indicate position title.)

PROGRAMMERS/ANALYST

The Dayton area's largest and most progressive financial institution has openings for experienced Programmers and Systems Analysts.

Two years NCR NEAT/3 or NCR COBOL experience desired. Experience with CIF, CIRF and/or commercial bank applications preferred.

We offer an excellent starting salary plus an outstanding fringe benefit program. Send resume to:
Personnel Officer



Winters

National Bank & Trust Co.
Winters Bank Tower
Dayton, Ohio 45401

An Affirmative Action Equal Opportunity Employer

position announcements

CENTRAL WISCONSIN

5th largest medical group practice clinic in U.S. seeks senior level programmer/analyst. Exceptional living environment and benefit plan offered. Degree required. Computer Science or Math preferred. Person selected will be a highly productive team oriented professional with experience in the following areas: COBOL, on-line systems, data communications and data base environment. Burroughs medium systems and health care experience desirable. Salary \$15K-\$20K. Send resume with salary history to Assistant Director-Employee Services, Marshfield Clinic, 1000 N. Oak, Marshfield, WI 54449 EOE M/F.

PROGRAMMER ANALYST

Major electric utility company in the State of Vermont needs an individual with a strong working knowledge of Cobol. Experience in CICS and Data Base is desirable. Will be working with an IBM 370-138 DOS/V5 System. Excellent benefits. Send resume to:

Kathy Knight
Empt. & Comp. Admin.
Central Vermont
Public Service Corp.
77 Grove St.
Rutland, VT 05701

SYSTEMS ANALYST

We are seeking several key individuals capable of assuming project management responsibilities for the development and implementation of large scale sophisticated banking systems. Initial assignments will be in such areas as EFTS, Central File, and On-Line Teller systems.

These are non-programming positions, however, candidates should have a programming background preferably in an IBM DOS environment. Experience with on-line systems and CICS is desirable but not required.

If you are interested in a challenging opportunity, personal growth and earnings potential limited only by your ability, and the contentment of working in a pleasant midwestern city, please submit your resume to:

Gene Ketchmark, AVP

BRENCO AUTOMATION CENTER INC.

717 Mulberry, Suite 503
Des Moines, Iowa 50305
A Subsidiary of Brenton Banks, Inc.

West

Los Angeles Area

San Francisco Bay Area

Seattle

Denver

Kansas City

Minneapolis/St. Paul

Chicago

St. Louis

Shreveport

San Antonio

Houston

Dallas

Salt Lake City

Albuquerque

El Paso

Milwaukee

There could be a Tektronix career in your backyard.

Or, maybe you want a Tektronix career and a new backyard.

Whichever, you have a choice. Stay where you are and advance your career with us, or move to another Tektronix area.

Our expansion is making it possible for even more professionals to join our winning ranks. As the undisputed leader in computer graphic terminals and computer graphic systems, Tektronix not only manufactures, sells and services the best line in the industry, we know how to care for our people.

If it's been a long, long time since you got a promotion, or a raise AND a pat on the back, or even recognized by the office receptionist, then you're ready for Tektronix. Match your career goals, interest and area of choice with what we have listed here. Then give us a call. Let's get together and YOU decide for a change just what it is you want, and where it is you want to live. It really can be that easy.

**District Sales Managers
OEM Sales Engineers
Sales Engineers**

Let's get together.

(800) 227-8340 Outside California
(800) 638-1915 Inside California

If you are ready for a Tektronix career, whether it be your present backyard, or one of our other openings, let's hear from you. Forward your resume or summary sheet or call one of the above TOLL FREE numbers, listing your area of preference. Address your inquiry to M.D. Westhoff, TEKTRONIX, INC., 3200 Coronado Drive, Santa Clara, California 95051. An equal opportunity employer m/f/h.

Tektronix
COMMITTED TO EXCELLENCE

East

Rochester, N.Y.

Syracuse, N.Y.

Philadelphia

Charleston, W.Va.

Richmond, Va.

Baltimore

Rockville, Md.

Detroit

Boston

Rhode Island

Springfield, Ill.

Long Island, N.Y.

Cleveland

Atlanta

Orlando

PROGRAMMER

Successful candidate should have 3-5 years experience with scientific language and Fortran programming (also exposure to top down structure techniques). Ability to work with Engineering staff in formulating program based on engineering and systems requirements is essential. Will develop innovative, aircraft monitoring systems on sophisticated real-time distributed microcomputer network.

Excellent working conditions in an attractive suburban location. For consideration please send resume with earnings history to: RALPH HOLTERMANN

Systems-East Division

CONRAC

32 FAIRFIELD PLACE
WEST CALDWELL
NEW JERSEY 07006

CONRAC CORPORATION

An Equal Opportunity Employer M/F

PROGRAMMER

Sysiem 3 model 15-0 installation needs programmers with 2-3 years RPG II experience.

KEY TO DISC OPERATOR

A minimum of 1 year experience on the IBM 3741.

Send resume or call Daniel Lorenger (617) 357-5107



ROLL FORM PRODUCTS

140 Federal Street
Boston, MA 02110

an equal opportunity employer

DALLAS

The demand for EOP professionals continues extremely high in the Dallas area. We have immediate openings at all levels... salary ranges. All fees, interview, and relocation expenses are completely paid for by our client companies.

A brief example of a few of our current openings:

Prog./Mgr.-mfg	to 26K
Prog./Analyst-Trens. Co.	to 23K
Programmers-Ins. Co.	to 17K
Sys. Engrs.-Electronics Co.	to 23K
Sr. Prog./Analysts-Ins. Co.	to 21K
Teleprocessing-Mfg.	to 25K
ALC Programmer-Ins. Co.	to 25K
Sr. Analysts-Petroleum Co.	to 21K
Software Dev. Mfg	to 24K
Sys. Prog Petroleum Co	to 26K
Sr Prog./Analyst-Bank	to 21K
Proj Mgr.-Communications	to 26K
Consultants-CPA Firm	to 25K
Lead Prog./Analysts-Bank	to 22K

Please rush your letter or resume on a strictly confidential basis to Ron Urbach.

ROBERT HALF PERSONNEL AGENCIES
Two North Park East, Suite 750
Dallas, Texas 75231
(214) 363-3300

MIS CAREERS

Owens-Corning Fiberglas, a fast-growing fiberglass industry leader, is currently expanding the MIS staff of one of its larger operating divisions based in Toledo, Ohio. As a result, we are seeking candidates for the following growth oriented positions:

SENIOR SYSTEMS SPECIFICATION ANALYST

Primary responsibilities in this position include performing research and development specifications for information systems in the operation and control of the manufacturing elements of the business. The successful candidate will possess the following qualifications:

- Bachelor's degree preferably in business or engineering;
- 2-4 years experience in manufacturing scheduling, production and inventory control, mini-computer based data collection, direct labor accounting, and production control systems;
- Excellent oral and written communication skills.

TECHNICAL OPERATIONS ANALYST

Primary responsibilities in this position include performing a basic design function required to develop and implement mini-computer based systems for data collection, and sensor-based input in a manufacturing environment; and integrating mini-computer based systems with a host IBM 370 environment. The successful applicant will possess the following qualifications:

- Bachelor's degree;
- 2-4 years experience in a manufacturing systems environment with exposure to on-line systems design, COBOL and TI 990 Systems;
- Willingness to travel 30-40% of the time.

Both of these outstanding career opportunities are complemented by an excellent salary and benefit package. Qualified applicants should send a current resume with complete salary history in confidence to:

Mr. G.T. Mills, OWENS-CORNING FIBERGLAS, Fiberglass Tower, Toledo, Ohio 43659.

An Equal Opportunity Employer M/F

Discover the Future of Fiberglass

OWENS CORNING FIBERGLAS

SYSTEMS PROGRAMMER

San Antonio, Texas

San Antonio, Texas

We are a leading manufacturer of high quality air-conditioning heating and commercial refrigeration equipment and currently have an opening for a Systems Programmer with several years experience. IBM DOS-VS, ALC and COBOL required. DBOMP, DL-1 or other data base knowledge a real plus. Manufacturing environment shop scheduling, MRP and machine loading highly desirable. This position will be key in converting to company wide data base system.

This position is located in San Antonio, Texas. Qualified applicants should send a detailed resume including salary history and requirements to: Employee Relations Manager, Industrial Relations, P.O. Box 1540, San Antonio, Texas 78295.

Friedrich

A Division of Wylain, Inc.
An Equal Opportunity Employer (M/F)

position announcements

position announcements

position announcements

position announcements

position announcements

THE SEARCH IS ON AT HONEYWELL'S LOS ANGELES DEVELOPMENT CENTER

Analysts/Operating System Development - Responsible for the design, coding, testing, documentation, and follow-on support of a multi-use main frame Operating System.

Analysts/Data Base Management - Responsible for the definition, design, implementation, testing, and documentation of data base management, query/retrieval and reporting software. (RPGII, SORT, MERGE, ANS 77 FORTRAN, and TEXT Editor system implementation languages).

Technical Writers - Create programmer reference manuals and users guides for operating systems and user languages. Work from programmer notes, source listings, and previous documentation. Programming experience highly desirable.

Engineers, System Test - System testing, measurement, and analysis in support of software system development. Design and implementation of test tools and measurement techniques.

Programming applicants should have degree in Computer Science or equivalent. Experience with higher level implementation languages is desirable as is experience on Honeywell or Xerox large systems.

Please send resume and salary history to:

Martha L. Andreani
Manager, Administration
Honeywell Information Systems
Los Angeles Development Center
5250 W. Century Blvd.
Los Angeles, CA 90045

HONEYWELL

An Equal Opportunity Employer M/F/H

Advancing State-of-the-Art in PHOTOGRAPHY - INTERPRETATION DIGITAL IMAGE PROCESSING INFORMATION HANDLING LASER TECHNIQUES

Mead Technology Laboratories, a unit of a \$1.5-Billion corporation, has for over 20 years been exploring and developing new technologies in a variety of fields, with emphasis on imaging and new information concepts.

These openings, reflecting both growth within our historical businesses and expanding new business areas, have special appeal for the innovative and creative professional who enjoys the challenge and opportunity to contribute that is present to unusual degree.

PROGRAMMER/ANALYST

At least 7-10 years of experience in software systems analysis, design, and implementation with a variety of computer hardware and operating systems, capable of designing computer configuration. Minicomputer experience preferably DEC/RSS-11. Will serve as development leader for the design and development of advanced hardware/software systems for digital signal processing and sophisticated process control applications.

COMPUTER SYSTEMS ANALYST

Minimum of 3-5 years experience in software systems design and programming using minicomputer, preferable DEC or Data General. Experience with real-time signal processing, digital image processing or sophisticated process control application highly desirable.

You will join an outstanding multi-disciplinary team of engineers and scientists, with very favorable career prospects. To explore these opportunities further, please send resume detailing pertinent achievements in confidence to Manager, Professional Employment.

mead

Technology Laboratories

Courthouse Plaza Northeast, Dayton, Ohio 45463
Equal Opportunity Employer M/F

VIRGINIA/MARYLAND OPPORTUNITIES

DP MANAGER To \$25,000
Industrial environ, design exp, 370/145 or larger. Manage ops and systems.

DIR COMPUTER EDUCATION To \$25,000
Direct training curriculum. Need computer industry training exp and technical bkgrd.

SYSTEMS ANALYST(9) To \$23,000
Senior or project leader level, industrial/commercial exp order entry, inc., etc. 370, OS, telecom environ.

PROGRAMMER/ANALYST To \$19,000
Degree, 3+ yrs exp. COBOL, large scale IBM.

PROGRAMMERS To \$20,000
Both junior and senior positions available. Req COBOL, ALC.

Client companies pay all employment expenses. For info on these and other career opps in Maryland, Virginia and Washington, DC suburbs, contact on Mgr O.P. Placement.

FOX-MORRIS PERSONNEL CONSULTANTS

409 Washington Ave.
7921 Jones Branch Drive

Baltimore, MD 21204
McLean, VA 22101

DATA COMMUNICATIONS COORDINATOR FLORIDA

Salary \$10-14K

Large data center in Jacksonville needs person for responsible technical work in coordinating the field operations of systems throughout the state. Individual must have experience in electronic test equipment.

Requirements: College degree + 2 yrs professional experience. Experience as required may be substituted on a year-for-year basis for the required college training.

Send Resumes To: R.H. Hall, Acting Computer Services Admin., Dept. of Health & Rehabilitative Services, Office of Management Systems, P.O. Box 2016, Jacksonville, FL 32203.

SENIOR POSITION IN SYSTEMS PROGRAMMING

Leading W. Va. Bank is seeking a data-processing professional to assume a major role in the expansion of its multi-bank data processing center.

Candidates must have several years of banking experience & in depth knowledge of NCR hardware and banking software. Excellent communications skills & supervisory ability are required.

We offer excellent salary/benefits package & an opportunity to become involved with the latest NCR hardware and software in an on-line environment.

Michael McKinney

**The National
Bank of Commerce**

P.O. Box 633
Charleston, W. VA 25322

(304) 344-5065

Affirmative Action Employer M/F

SYSTEMS PROGRAMMER

Several positions in the Southeast and other areas. IBM, Burroughs and other large scale. Also mini-computers. Salaries to \$24K.

TELEPROCESSING PROGRAMMER/ANALYST

Mostly CICS, some others. Several in Georgia; others in Southeast and Nationwide. Salaries to \$20K.

SYSTEMS ENGINEER

Mini-computer experience. Most makes. Atlanta and other areas. Salaries to \$30K.

SYSTEMS ANALYSTS & PROGRAMMERS

Too numerous to list. All makes and experience levels. Many in Atlanta and Southeast, others Nationwide. Salaries \$12 to \$23K. ALL FEES PAID. Call (404) 262-2566 or send resume with salary requirement and location preference to:

JIM STAAL, Manager Information Systems Division



Whitlow & Associates

3390 Peachtree Road, N.E. - Suite 236
Atlanta, Georgia 30326

Data Processing Professionals

Here's how we can help the job you're looking for find you.

If you're looking to explore career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS • SOFTWARE SPECIALISTS and SALES REPRESENTATIVES for companies nationwide, at no cost to the applicant.

Here's how our service works. After we receive your resume, we (1) can make it instantaneously available, via computer, to our network of CYBERSEARCH® placement offices in major cities across the country. (2) Trained placement consultants at each office can then refer your resume to companies seeking EDP professionals with your qualifications. So instead of one office and one consultant, you can have all the offices of CYBERSEARCH searching the data processing job market for you. To protect your identity, your name and present employer's name are not included in the computer file.

When interest is expressed, your personal CYBERSEARCH consultant will contact you and arrange an interview. This service is available without cost to you now, or upon hire. All fees are paid by the employer. To put your resume into circulation fast, call or write the EDP Dept. at the CYBERSEARCH office nearest you.

CONTROL DATA CYBERSEARCH INC.

a subsidiary of
CONTROL DATA CORPORATION

CHICAGO, IL
214 North Michigan
60601
312-454-8490

DALLAS, TX
8585 Stemmons Freeway
75247
214-688-5810

HOUSTON, TX
2000 West Loop South
77027
713-965-5666

IRVINE, CA
17744 Sky Park Boulevard
92714
714-754-7701

LOS ANGELES, CA
8616 La Tijera Boulevard
90045
213-642-2462

MINNEAPOLIS, MN
6800 France Ave. South
55435
612-830-6650

PHILADELPHIA, PA
Two Balacynwyd Plaza
19004
215-667-2400

SAN JOSE, CA
2025 Gateway Plaza
95110
408-866-3186

position announcements

position announcements

position announcements

position announcements

position announcements

Data Processing Opportunities

San Francisco Peninsula

Siliconix, a growing company in the semiconductor industry for 15 years, continues to excel in profit and reliability, and that means exciting and STABLE career opportunities for qualified professionals in our Information Services Group. Join us now if you qualify:

SYSTEMS ANALYST

Excellent positions for Information Systems Analysts to work with management defining systems objectives, establishing detailed requirements, preparing user documentation and training users in systems operations. BS in Business or Math with 4-6 years' work related experience.

PROGRAMMERS

The successful candidates will participate in the development of on-line manufacturing information systems. You will be working in an IBM/370 environment. 1-3 years' experience will qualify you.

If you're ready for pleasant year 'round weather, easy access to fine schools, theatre and water activities, then join us now. You can expect a good salary and liberal benefits including dental insurance, profit sharing, tuition assistance, relocation assistance, and a stock purchase plan.

For immediate consideration, please send your resume to Professional Employment, 2201 Laurelwood Rd., Santa Clara, CA 95054, or call COLLECT (408) 246-8000, ext. 233. An affirmative action employer.

Siliconix

SYSTEMS DESIGN ANALYSTS

We offer opportunities to participate in the design and development of on-line transaction processing software. You would also be involved with software interfaces to data base management systems. Candidates would be working with a software development team engaged in transaction processing software development for the NCR Criterion processors utilizing VRX.

To qualify for these outstanding positions, candidates would have a technical or computer science degree. One or more years experience in software development projects is required. A thorough knowledge of operating systems, assembler language programming, and real-time concepts are among the qualifications you would possess.

PROGRAMMERS (Assembler Language)

We are seeking programmers with a technical or computer science degree plus one or more years programming experience. Programming experience will be in assembler language.

MANUFACTURING SYSTEMS ANALYSTS

NCR is now involved in the development of an integrated, on-line Manufacturing Control System for use both in our manufacturing divisions and for sale to our customers. The system will address the following application areas:

BILL OF MATERIAL
STORES CONTROL
INVENTORY MANAGEMENT
STANDARD COST
ORDER ENTRY

ROUTING
WORK-IN-PROCESS
PURCHASING/RECEIVING
MATERIAL REQUIREMENTS
PLANNING

This development effort has created opportunities in the following area:

SYSTEMS ANALYST/PROGRAMMERS

Major emphasis will be to prepare the system application software and documentation for external release for use on NCR's new Criterion computer line. To qualify the candidates' background should include one or more years systems and programming experience using COBOL in one or more of the above application areas. Ideally that experience will also include the use of data base and on-line processing.

The ideal candidates will have a bachelor's degree in an appropriate discipline. To investigate these outstanding opportunities, write to:

NCR
Complete Computer Systems

Department VM
Corporate Executive &
Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

SR. SYSTEMS PROGRAMMER

ALBUQUERQUE, N.M.
TO \$30,000

A rare opportunity in a highly visible position, to lead a team in the implementation of a Systems Conversion, an Interactive Data Base Management System and a Multiple Terminal Interface, involving over 300 terminals. This KEY individual will also be in charge of all new releases, training of the user group and the staffing of a new technical organization of systems software talents. This top person reports to a Division Chief of a large, high technology corporation.

U1108 EXEC 8 DMS 1100

The Unique individual to fill this requirement, should have several years experience with Systems, Data Base Management Systems and exposure to High Visibility/User Interface. Prefer a M.S. MATH/COMPUTER SCIENCE/Other Hard Science Degree.

IMMEDIATE INTERVIEWS
CALL COLLECT: (301) 424-1515
This Week-10 a.m. to 7 p.m.
Ask For: ED LOCKARD

If a call is not convenient, feel free to submit your resume, in confidence to:

LOCKARD ASSOCIATES
414 Hungerford Dr., Rockville, MD 20850
Representing an EOE Employer (Agency)

CICS SYSTEMS PROGRAMMER

International Corporation seeks CICS Systems Software Programmer with 1-2 years experience in CICS. Individual will participate in software/hardware enhancements in an expanding 370/148 data center network. Convenient location in Boston suburb. Excellent fringe benefits. Salary commensurate with education and experience. Please send resume including salary requirements in confidence to:

CW Box 1408
797 Washington St.
Newton, MA 02160
An EOE M/F

BUSINESS SYSTEMS ANALYST

WANTED:

A creative individual who has proven ability in business accounting systems design and programming.

Four years experience on PDP-8 or PDP-11 hardware and RT-11, DIBOL-8, or DIBOL-11 operating systems required. Multi-terminal or on line data entry a plus. Company paid benefits package. Send resume including salary history to:

Accurate Data Systems, Inc.
337 Hempstead Tpke.
W. Hempstead, NY 11552

EDP

Explore career positions through our unique in-house computer matching with nationwide coverage. We provide personalized attention, salary consultation and resume writing assistance. NO FEES to applicants. Contact an EDP Specialist at:

Dunhill
OF COLUMBIA, INC.
4700 Forest Dr. Suite 217
Columbia, S.C. 29206
(803) 787-8767

SYSTEMS PROGRAMMERS

WORD & INFORMATION PROCESSING

A unique IBM 360/370 based distributed logic word processing system with powerful front end micro-processor based dedicated consoles and IBM compatible transmission controllers has been developed for a large scale penetration of the rapidly developing word processing industry. We are a NYSE Company located in Westchester County, NY.

We seek systems programmers with knowledge of:

- IBM 360/370 Systems
- Ability to work with IBM/OS, HASP, RJE, Assembler, EXCP, PL/1
- Design of I-O Routines
- Duties will include systems generation and installation, maintenance and updating of software, etc.
- Experience with micro-processor software helpful.

This is an outstanding opportunity to be where the action will be in data processing during the 80's. "INFORMATION PROCESSING" Please send resume with salary requirements to:

CW Box 1419
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

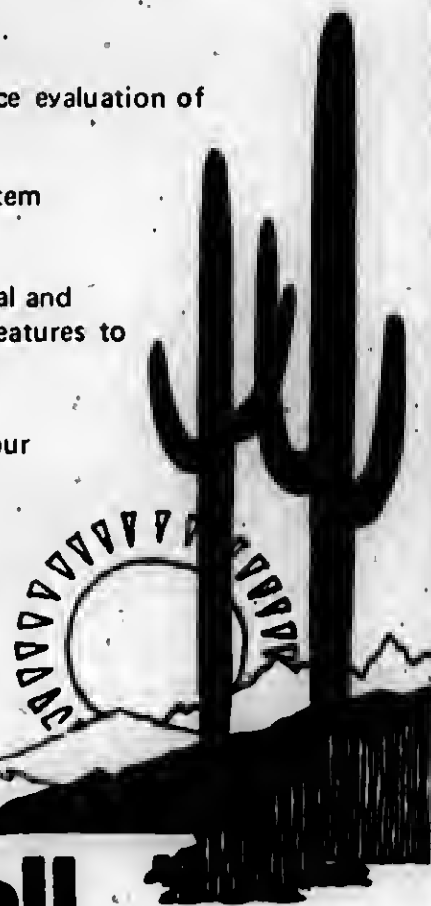
THE SEARCH IS ON AT HONEYWELL-PHOENIX FOR CENTRAL SYSTEMS AND COMMUNICATIONS ANALYSTS

Strong background in computer system measurements or modeling to aid in the design of our future high performance computer systems and distributed processing networks. Ideal experience will include:

- Development of H/W and S/W monitoring methodology.
- Application of H/W and S/W monitors to performance evaluation of current and future products.
- Analysis of H/W and S/W architecture in relation to system performance.
- Design, implementation and application of mathematical and simulation models of proposed system architecture features to provide performance evaluations of design alternatives.

If you have experience in one or more of these areas send your resume and salary history to:

Manager, Recruitment & Placement
Mail Station Y79
Honeywell Information Systems
P.O. Box 6000
Phoenix, AZ 85005



Honeywell

An Equal Opportunity Employer M/F

"COMPUTER PROGRAMMER"

One year of Programming experience, with knowledge of the NCR Century 101, including Neat/3 computer language.

Ability to develop complex programs; write documentation, instructions and procedures.

CONTACT:

Civil Service Office

P.O. Box 71, City Hall
Alexandria, LA 71301
(318) 442-5765
Pay Range \$933-\$1,449/mo

SENIOR SYSTEMS ANALYST

HEALTH CARE

We're a major, northwest Illinois community hospital with a truly exceptional, career-capping opportunity for a Sr. Systems Analyst with the professional and technical expertise to potentially take us from time-sharing to full implementation of an independent, in-house operation. You'll have responsibility for computerizing the entire hospital, developing programs for comprehensive medical and financial information systems which will impact upon every hospital department. Reporting to the Director of Information Systems, you'll coordinate your efforts with Department Managers and computer service bureaus to arrive at project/problem definition, organization and scheduling and to recommend appropriate hardware and software, their costs and effectiveness.

This decision-making position requires a degree in Computer Science or Business Administration seasoned by a minimum of 5 years experience in a health care environment. In return for your contributions, we offer an excellent salary and complete fringe benefit package as well as the unique opportunity to "take charge." To arrange a confidential interview, send your resume complete with salary history and requirements to:

CW Box 1417
797 Washington St.
Newton, MA 02160
An Equal Opportunity Employer

PROGRAMMER

Position available at NSI's Research Triangle Park, N.C. facility for an individual with a minimum of a B.S. in Mathematics/Computer Sciences, and 2 years experience programming in Fortran and COBOL languages. Experience using EPA air quality emission data systems (AEROS & CDHS) desirable, but not required. Responsibilities will include developing and teaching courses on the principles and applications of Data Systems, as well as providing programming, data analysis and debugging support. For further information forward resume, including salary history and requirements to:

**NORTHROP
SERVICES, INC.**

P.O. Box 12313
Research Triangle Park
North Carolina 27709
Equal Opportunity Employer M/F

SENIOR SYSTEMS ANALYST

An exceptional opportunity in a progressive, dynamic, rapidly changing hospital for a Senior Systems Analyst. We offer the opportunity to work with top management in the overall design and implementation of new systems.

Preferred qualifications include Masters Degree plus 4 years experience of which 2 years should be in the health care field.

In addition to competitive salaries and excellent benefits, you can enjoy our smog free, blue skies and unlimited outdoor activities.

Submit resume, including salary history and requirement to Assistant Executive Director - Staff Services, University Heights Hospital, 1127 University Blvd. NE, Albuquerque, New Mexico, 87102. EOE M/F.

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

COMPUTER PROGRAMMERS

Candidates should have a college degree or equivalent, and a minimum of 1 year experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV end/or DBMS and knowledge of JCL for OS/MVT is desirable.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targheel) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If interested and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C

EG&G Idaho, Inc.

Box 1625, Idaho Falls, Idaho 83401

U.S. Citizenship Required

We are an equal opportunity employer M/F/H



Computer Selection Manager

Determine criteria for communications systems, main, mini, 6865 micro and peripheral equipment. Monitor new products and developments programs to assure earliest possible utilization. Coordinate between users and software section to insure smooth product interface.

Salary: \$27 - 32,000

Respond in confidence James Thomas CEC Tech Director

Snelling and Snelling

1415 Directors Row, Suite 12A
Fort Wayne, Indiana 46808

(219) 482-1511

A licensed employment agency

Programmer/Analysts San Francisco Bay Area COMPILER DEVELOPMENT

A working knowledge of assembly languages and knowledge of compiler principles is required.

CYBER RECORD MANAGER

Experience in systems programming with higher level languages is highly desirable.

OPERATING SYSTEMS DEVELOPMENT

Experience in the file subsystem of an operating system is highly desirable.

EVALUATION

Develop tests for PL-1, ALGOL, FORTRAN, BASIC and system utilities. Proven ability as a leader of a technical project is highly desirable.

CUSTOMER SERVICE ANALYST

Interface between the user and the computer system to assist with problem solution. A working knowledge of the CYBERNET SCOPE 3.4 and common products, such as FORTRAN, COBOL, UPDATE, SORTMRG, CYBER RECORD MANAGER, and COMPASS.

For immediate consideration, please send resume and salary history to K. Hardy, Dept. 50-A, 215 Moffett Park Dr., Sunnyvale, Calif. 94086.

**GD CONTROL DATA
CORPORATION**

An Affirmative Action Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

ANALYST - BANKING

Position requires some supervision of junior programmers, application systems designs, and programming. Experience with bank "On-Line" and batch systems desired. Presently using two Burroughs systems. Send resume and salary requirements to: David E. Jones, Vice President.

THIRD NATIONAL BANK

P.O. Box 1270
ASHLAND, KY. 41101

Scientific & Business Analysts/Programmers Rockwell Hanford Operations

is a prime contractor to the U.S. Department of Energy at the Hanford installation located in Southeast Washington State. We have immediate challenging and rewarding opportunities for experienced and creative Professionals. Systems applications range from large scale Interactive/Batch processing through dedicated minicomputers, real-time and on-line systems.

BUSINESS SYSTEMS ANALYSTS are needed for on-line materials management, maintenance management, accounting and personnel systems.

SCIENTIFIC ANALYST/PROGRAMMERS are required for dedicated real-time on-line minicomputer applications for inventory, surveillance and laboratory analytical analysis. Scientific applications background augmented with operating systems experience is desirable. Current hardware includes UNIVAC 1100/44, CDC CYBER 70, Model 74-1B, Data General ECLIPSE C330, NOVA 840 and Varian 76. A number of additional systems will be procured soon.

Talented professionals are encouraged to immediately mail resumes to Gladys Clark, Dept. 6, ROCKWELL HANFORD OPERATIONS, P.O. Box 800, Richland, Wa. 99352.



**Rockwell
International**
Atomic's International Division
Rockwell Hanford Operations
Equal Opportunity Employer M/F

ENGINEERING FIELD SERVICE

Openings Throughout the U.S.

If you possess 1-3 years experience in hardware maintenance of computers and/or related peripheral equipment; or you're an inhouse bench technician or design engineer looking to get into field service, we'd like to hear from you.

The people we seek are thoroughly knowledgeable in the principles of electronics. Requirements include an Associate's Degree, or equivalent electronics experience, and availability for some travel.

Our compensation package is quite competitive, and opportunities for personal and professional growth are unsurpassed. Please call or send resume in confidence to:

Mr. Dan Haynes
(512) 699-7317
9725 Datapoint Drive
Mail Station, 1B

San Antonio, Texas 78284

DATAPoint CORPORATION



The leader in dispersed data processing

An Affirmative Action Employer Committed to Equal Opportunity

PROGRAMMER/ ANALYSTS

Denver, Colorado

Martin Marietta Data Systems offers superior opportunities in a business application environment for senior level Programmer/Analysts with at least 2 years' experience on IBM 370 systems. Your expertise will be challenged in application areas which will include Finance, Manufacturing, and Engineering Systems. Qualified candidates should have experience with OS or MVS, COBOL, and TSO. IMS batch and on-line experience is desirable.

Career opportunities also exist in our scientific applications programming area. Applicants should present a strong engineering/mathematics background and have Fortran IV experience on large CDC computers. Experience on PDP computers is also highly desirable. You must have a minimum of 2 years' experience or a Master's degree in appropriate field.

Martin Marietta provides excellent fringe benefits and relocation to Denver.

For complete information on making your career move to the Rocky Mountain region, please send your resume, including salary history, in confidence to Marvin Crandall, Manager, Human Resources.

MARTIN MARIETTA DATA SYSTEMS

Denver Data Center
P.O. Box 179
Denver, Colorado 80201

MARTIN MARIETTA

An Equal Opportunity Employer M/F

COORDINATOR OF MANAGEMENT INFORMATION SYSTEMS

New position opportunity at West Virginia University. Under the Vice President for Administration, responsible for planning, coordinating and analyzing management information needs for academic and administrative users. Defines new information systems to support policy and administrative decision making. Bachelor's Degree or equivalent with work experience in management information systems, analysis and techniques. Thorough working knowledge of management information systems design and analysis, research methods and techniques and state of the art hardware and software. Supervisory experience. Forward resume of qualifications along with salary requirements to: Mr. E.J. Podewski, Personnel Officer, West Virginia University, Morgantown, W. VA. 26506. Please apply by February 28, 1978. West Virginia University is an Equal Opportunity/Affirmative Action Employer M/F.

Smart & Dumb Data Terminals

Are our Business? We continue to grow and need.

SALESMEN/w

in six locations nationally
**SR. SOFTWARE
Systems Designers**

A Computer Scientists Dream
ENGINEERS

**PRODUCT ENGR'S &
APPLICATIONS ENGR's**

New Product Development

For Detailed Information
Write or Call Personnel

800-631-7050

**data
services**

70 McKee Drive
Mahwah, N.J. 07430

Equal Opportunity Employer M/F

CAREER OPPORTUNITIES

A major offshore engineering and construction company has the following positions available in its New Orleans based office:

TECHNICAL SYSTEMS ANALYST

Responsibilities include developing and assisting in the implementation of technical data processing systems and procedures. Applicants should be degreed with 3 to 4 years in systems analysis, that includes 1 year or PL/1 experience. Knowledge of FORTRAN language helpful.

COMMERCIAL SYSTEMS ANALYSTS

Positions available for degreed individual with 3 to 4 years experience in systems analysis that includes 1 year of CICS exposure. Knowledge of DL/1 is desirable.

Degreed individual with 3 to 4 years experience in systems analysis. PL/1 and COBOL exposure is desirable.

Excellent benefits and starting salary. Send confidential resume to: MELISSA AVERETT.

J. RAY McDERMOTT & CO., INC.

P.O. Box 60035
NEW ORLEANS, LA. 70160

An Equal Opportunity
Employer, M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Customer Engineers

Minicomputers

Join WANG-the company that will give you a bigger bite on a career

Boston & Burlington, MA, & Wethersfield, CT

The growth opportunities with WANG are among the very best in the entire industry. Our 24 year history of new product concepts, outstanding sales performance and excellence in service — all have supported our reputation as THE place to be if you want to move ahead. Qualified individuals must have the following background:

1. Minimum 2-3 years experience repair/troubleshooting CPUs, disk drives and line printers as well as other peripheral devices.
2. An Associate degree in computer technology, electronic engineering or equivalent military training
3. The ability to support district sales personnel with technical assistance

We also have FIELD ENGINEERING positions available for those who meet the above requirements and possess programming experience in addition to knowledge of Operating Systems.

We will provide an extensive training program, excellent salary commensurate with experience, profit sharing and stock purchase plan.

Call Mr. C. Aubin, District Service Mgr. (617) 272-8550 or send resume detailing background in confidence to:

WANG Laboratories Inc.

20 South Avenue Burlington, MA 01803

We are an equal opportunity affirmative action employer.

SOFTWARE PROFESSIONALS

Immediate openings exist at our St. Louis headquarters for qualified Software Personnel.

Qualified candidates should have experience in SYSGEN, PTF application problem determination, and assembler language coding.

Currently we are using the SVS operating system with future plans to move to MVS on IBM 370's Model 158 and Model 145 with HASP shared spool. A BS degree is required and experience with MVS and CICS VS is a definite plus.

We offer an excellent salary, comprehensive benefits and opportunity for advancement. Please send resume and salary history in confidence to:

Anheuser-Busch, Inc.

Manager, Salaried Employment
Department G-5
721 Pestalozzi
St. Louis, MO 63118

An Equal Opportunity Employer M/F



ANALYSTS PROGRAMMERS

We are hiring for several positions in our Development Dept. to take on many new projects in our long range plan. Our diverse international business interests are growing rapidly and need good development teams.

As a professional at any level of experience, we can support your personal growth through In-house training; work in CICS, TSO, Mark IV, COBOL, PL/1, MVS, and data base.

If you are looking for an exciting career in fast moving applications development then we're the people to join.

Call or write Mr. B.M. Robinson to arrange weekday, evening or Saturday interviews. (214) 670-2284, Out of Dallas (in Texas) call toll free (800) 492-6715.

LONE STAR GAS COMPANY

301 South Harwood
Dallas, TX 75201

Equal Opportunity Employer

DATA PROCESSING MANAGER

Previous management experience in a Systems and Programming environment, preferably with a bank. This individual will have the responsibility of organizing, planning and laying the foundation for a new OP center in Georgia. IBM DOS VS background required. 30K+.

All inquiries held in the strictest of confidence.

Fee paid by the employer.

CREATIVE PERSONNEL SERVICES

Data Processing Division
Attn: M. Sullivan
Suite 512-Charlottetown Mall
Charlotte, NC 28204
(704) 372-9393

SYSTEMS PROGRAMMER

Major computer mfr. has a ground floor opportunity for personable tech. Must have strong communication skills + min. 4 years systems software exp. w/VM & internals. \$21-\$28,000 (Fee Paid). Contact Jim Staunton (in confidence).

ROBERT HALF PERSONNEL AGENCIES

140 Federal St.
Boston, Mass. 02210
(617) 423-6440

PROGRAMMER-SYSTEM ANALYST

B.S. in Computer Science or equivalent experience required. 3 years experience preferred. Familiarity with the Univac computer system, using telecommunications. Must be knowledgeable with COBOL and RPGII computer language. Police systems preferred. Salary negotiable. Send resume to Personnel Office, Civic Center Complex, Greeley, Colorado 80631. An Equal Opportunity Employer.

COMPUTER PROGRAMMER

A progressive mid-south utility company needs computer programmer. Individual must have one-and-one-half to five years experience in Cobol and DOS/VS. Send resume and salary requirements to:

Personnel Manager
P.O. Box 2177
Little Rock, AR 72203

An Equal Opportunity Employer M/F

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM II, Assembler and COBOL. Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:

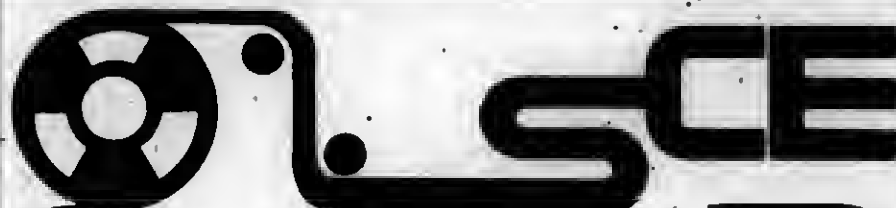
W.M. Jones



Harper-Grace Hospitals

Human Resources Department
3990 John R.
Detroit, MI 48201
(313) 494-8082

An Equal Opportunity Employer M/F



Southern California Edison offers you a career in data processing, where you will become a part of a Data Processing Department with 350 employees involved in a state-of-the-art environment based on the 370/168MP and employing CICS, IMS, and other advanced software packages. Career opportunities exist for:

Programmer/Analysts

Positions require a minimum of 2 years experience as a Programmer/Analyst on IBM 360/370 OS environment using ANS COBOL. Candidates must have the ability to program a wide variety of business applications. TSO experience desired. (Section 205)

CICS Applications Programmer

We seek a CICS Applications Programmer for development of 700 terminal customer information system. Heavy in Assembler, COBOL, MVS, TSO, VSAM. 4-5 years experience required. (Section 206)

CICS Systems Programmer

Position requires a minimum of 1 year current experience as a CICS Programmer with additional years of experience preferred. Successful candidate will take on major responsibilities in the design and development of a large on-line Customer Inquiry System of approximately 800 CRT terminals. Experience in VTAM, NCP, TCAM, EP and TSO is desirable. (Section 207)

Systems Analyst

Position requires experience in design of large scale application systems, extensive user interface, experience in data base design and minimum of 3-5 years experience as an analyst. Good communication skills essential. College degree and long-range planning experience are desirable. (Section 208)

Expect a comprehensive benefits package and salary commensurate with your experience and ability. For consideration, please submit your resume and salary history to Professional Recruitment (please indicate Section Number), P.O. Box 800, Rosemead, California 91770

Southern California Edison

We aggressively support Equal Opportunity & Affirmative Action.



position announcements

position announcements

position announcements

position announcements

position announcements

MANUFACTURING SYSTEMS ANALYST

World's leading manufacturer of automotive batteries is seeking an experienced systems analyst to work in division offices.

The job involves the analysis of manufacturing disciplines to assess information requirements and then translate those requirements into optimum systems designs. Detailed specs will be developed from which programs can be written.

Candidates should have 1-2 years of COBOL programming plus 1 year of systems analysis of manufacturing operations. User contact, good verbal and written communications skills and project achievement are important requirements. A bachelor's degree in computer science or math or the equivalent experience is desired.

Excellent salary and fringes. Call or write:

Robert Rendi
(414) 228-2375

GLOBE-UNION INC.
5757 N. Green Bay Ave.
Milwaukee, WI 53201

Equal opportunity employer M/F



GLOBE-UNION INC.

SYSTEMS ENGINEERING: FIRST IN TRUE 32-BIT MINIS FIRST IN REAL TIME SOLUTIONS FIRST IN CAREER OPPORTUNITY ALL IN FORT LAUDERDALE

We're putting more bytes to work in a real time environment than anyone else in the industry. For almost 2 decades, we've bred a family of pacesetter systems, culminating in the first true 32-bit super mini - not a bridge-the-gap system from 16 bit architecture, but a true 32-bit machine with richer instruction sets and larger directly addressable memory.

This kind of presence means opportunity is here - now along with the resources to really make a name for yourself. It being on the cutting edge of technology, surrounded by year round warmth and swaying palms sounds inviting, consider the many ways available for you to grow at Systems Engineering.

We welcome the professional who is highly motivated in the direction of creativity, fresh conceptualization, and imaginative problem-solving in state-of-the-art design and software development of small to medium real time systems.

CONTRACT ADMINISTRATOR

Senior Level, With Program Management Capability. We require experience, ability and effectiveness at all levels of management in negotiating, drafting, enforcing, and administering fixed-price government and industrial contracts and knowledge of ASPPR, and computer systems. Background is essential in either legal, business, or engineering areas. Some travel.

PROJECT ENGINEERS BSEE

and experience with job costing of customer computer systems.

PROJECT LEADER BSEE

and minimum of four years experience as Group Leader involved in job costing for custom computer systems.

MICROPROGRAMMER

Minimum of one year design experience in FIRMWARE design. Work involves state-of-the-art advanced concepts.

SENIOR ENGINEERS (DIGITAL)

Four years experience in LOGIC DESIGN, Microprocessor or CPU experience highly desirable. Work involves Custom Systems Group.

SOFTWARE TECHNICAL INSTRUCTOR

Two or more years teaching computer software courses in industry or academia. Must have knowledge of ASSEMBLY and FORTRAN language.

MTS PROGRAMMER (DISTRIBUTIVE SYSTEMS)

Must have thorough knowledge of Assembly language programming and some background in FORTRAN. Real Time and Inter-CPU COMMUNICATIONS and Data Base experience preferred.

MTS PROGRAMMER (DATA BASE DESIGN)

D/B Generation software experience for data acquisition and applications programs. Assemblers and FORTRAN required.

MTS PROGRAMMER (CUSTOMER SERVICE)

Minimum of three years in ASSEMBLY and FORTRAN LANGUAGE. Programming background in Real-time and applications environments. Customer contact experience desired. Some travel.

TECHNICIANS DIGITAL

I/O and CPU experience desirable. Will work closely with digital design engineers. Two years experience in troubleshooting and testing preferred.

DESIGNER

Three to ten years experience in electromechanical design for a computer manufacturer.

SYSTEMS offers top starting salaries, relocation to beautiful Fort Lauderdale, a full-range benefits program including dental insurance, savings/retirement plan and 100% tuition refund, and the opportunity to work and advance your career in a stable and stimulating professional environment. For immediate and confidential consideration, please forward resume or detailed letter of information, including current annual compensation to: MR. FRED BRILLANTE, Dept. CW26.

SYSTEMS

ENGINEERING LABORATORIES

6901 West Sunrise Blvd., Fort Lauderdale, Florida 33313

Equal Opportunity Employer Male/Female

RESERVATION SYSTEM- DEVELOPMENT



HOLIDAY INNS IS CURRENTLY DEVELOPING HOLIDEX II,
THE WORLD'S LARGEST HOTEL RESERVATION SYSTEM.

Leading edge technology will be employed in all aspects of this exciting development including distributed processing and intelligent data/voice communications. Operating software will include the Airline Control Program supported by VM and VS. The following positions are available immediately:

PROJECT LEADER PROGRAMMER ANALYSTS

To develop a comprehensive Reservation Information System. Qualifications to include experience in one or more of the following areas:

- Information Systems Development
- 3-4 years VS COBOL
- Data Base Design

Applied business statistics experience highly desirable for one of the available positions.

Enlargement of our staffing in response to need makes these openings attractive for career progress. Will relocate to Memphis, a progressive, colorful city affording excellent living and many advantages. Call collect or send resume with salary indicated, in confidence to:

C.W. HANNA

(COLLECT) 901/362-4452

HOSPITALITY GROUP PERSONNEL

Rm 3480, 3796 Lamar Avenue

Memphis, Tenn. 38118

Equal Opportunity Employer M/F

Holiday Inns

MANAGERS PROJECT LEADERS SENIOR PROGRAMMERS

To develop an on-line reservation system. Qualifications to include experience in one or the following areas:

- 3-4 years on-line application development-ACP environment preferred.
- 4-6 years operating system software experience, ACP, VM, VS preferred.
- Communication network and software development.

Reservation system background preferred.

GAMES DESIGNER MINI SYSTEMS

\$25,000-\$30,000

Exeter Associates

Executive Recruiters

Bruce A. Montville
P.O. Box 623
Computer Park
Hampton, N.H. 03842
(603) 926-6712

PROGRAMMER ANALYST

A progressive mid-south utility company needs a programmer analyst. Individual must have three to five years programming experience, two years Cobol programming, DOS/VS background, JCL proficiency.

Send resume and salary requirements to:

Personnel Manager

P.O. Box 2177

Little Rock, AR 72203

An Equal Opportunity Employer M/F

MIAMI-DADE COMMUNITY COLLEGE

Job opening for experienced PROGRAMMER ANALYST, working with advanced student information systems for a large multi-campus institution. Minimum of three years' applicable experience, OS COBOL, required; IBM Assembler a plus. Salary range: \$13,703-\$18,706, plus liberal employee benefits.

Submit resume to:

Personnel Services
Miami-Dade Community College
11011 S.W. 104 Street
Miami, Florida 33176

An Equal Access/Equal Opportunity Community College

PROGRAMMERS AND ANALYSTS

If you are a programmer, programmer analyst or systems analyst and would like the most individualized job search offered in the data processing field today, either on a local or national level, send your resume in confidence to either location:

CINCINNATI

SEARCHED FOR YOU

DALLAS

SEARCHED FOR YOU

Western Gear Corporation

A major Southern California manufacturer of precision aircraft oriented products has immediate openings for:

SYSTEMS ANALYST

Responsibilities will include developing and implementing scientific programs in support of engineering analysis; control of test equipment and data retrieval. Recent experience in minicomputers desirable.

PROGRAMMER ANALYST

Will perform FORTRAN and assembly language programming on a minicomputer system to perform real-time data acquisition, data analysis and control of a gear box test stand.

Interested qualified candidates please submit resume or apply to Industrial Relations Department.

Western Gear Corporation

APPLIED TECHNOLOGY DIVISION

14724 E. Proctor - City of Industry, CA. 91744

Equal opportunity employer M/F/H

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER SCIENCE CAREER/GROWTH OPPORTUNITY CORPORATE HEADQUARTERS STAFF SYSTEMS DEVELOPMENT ANALYSTS AND ENGINEERS

QUALIFICATIONS:

- Bachelors or masters degree in computer science engineering, mathematics, physics, accounting or business.
- Two or more years experience developing computer based systems
- Ability to identify business problems and develop solutions through use of on-line, distributed, or batch processing systems.

RESPONSIBILITIES:

- Development of marketing, manufacturing, logistics, engineering, accounting and administrative systems for a major worldwide corporation consisting of a petroleum company, chemical company, coal company and construction company. Development includes feasibility studies, analysis design programming, testing and installation of systems on hardware, configurations ranging from minis to 370/158.

QUALIFICATIONS:

SYSTEMS PROGRAMMERS

- 1 year recent BTAM/TCAM experience required. Commercial programming and PL1 or on-line INTERCOM/IMS/CICS desirable.
- BS degree in math or computer science essential.

RESPONSIBILITIES:

- Perform systems programming duties in support of DS/VS2 and IMS/VS/DB/DC systems.
- Systems generation, maintenance assurance testing; tuning including assist end development and implementation of teleprocessing networks.
- Design and develop administrative and management reporting dealing with the teleprocessing systems.

These positions are available in our corporate headquarters in Ashland, KY. Excellent compensation program including: attractive salary and extensive benefits. For immediate consideration please send resume and salary history in confidence to:



Diane Aldridge
Dept. K
ASHLAND OIL CO.
P.O. Box 391
Ashland, KY 41101
An Equal Opportunity Employer M/F

SYSTEMS AND PROGRAMMING

The Trane Company, a leading manufacturer of air conditioning and heating equipment is seeking candidates for openings in the following areas at their Clarksville, Tennessee manufacturing location.

SYSTEMS ANALYST

Will perform analysis work on projects in all areas of material management including forecasting, inventory control, distribution and purchasing. Candidates should have a B.S. degree in a related field and at least 1 year of analysis experience. On-line inventory and purchasing systems experience would be a definite plus.

PROGRAMMER ANALYST(S)

Responsible for the design, coding and testing of programs including systems testing, user training, and preparation of final documentation. Candidates should possess a good working knowledge of ANS, COBOL, and CICS. BAL, DL/I, VSAM and OS/VS1 experience is definitely a plus.

We are a 3 MEG 370/158 shop running under DDS/VS. Present plans include migrating to a VS1 environment this year. Our environment also includes a local and remote TP network of about 40 video terminals. Interested applicants should send resume including salary history to:



THE TRANE COMPANY

P.O. Box 1008
Clarksville, Tenn. 37040
Attn: Jim Coleman

An Equal Opportunity Affirmative Action Employer M/F

BANKING SYSTEMS PROJECT LEADER

Florida Opening with Major Bank Group
Requiring MICR/Transit/Item
Processing Background

Enjoy a solid, challenging career with a DP Center serving more than 50 bank offices, in a growth situation, with the stability of an organization that now has over \$1.6 billion in assets. Enjoy, too, the advantages of Florida living in an area offering metropolitan resources.

Requirements include strong MICR/Transit/Item Processing experience, at least 4 years of IBM assembler language and 2 or 1419 Denny Fast Transit System, plus bulk filing implementation; recent exposure to IBM 370/145 DDS/VS; and working knowledge of proof of deposit systems and proof functions. Ability to work and communicate well with bank operations management will be important.

This is a favorable advancement opportunity. Please send resume, indicating salary record, in confidence to Mr. Jim Madden,

FLAGSHIP SERVICES CORPORATION

Data Processing Division of
FLAGSHIP BANKS, INC.



4720 Cypress Street, Tampa, Florida 33601

An equal opportunity employer, m/f

SYSTEMS SOFTWARE DEVELOPMENT

\$15-35,000

The successful development of large scale, interactive minicomputer systems by this company has led to the doubling of their sales in the last year alone.

In order to continue this record, computer scientists at all levels of experience are needed to create software in the following areas:

- COMMUNICATIONS
- COMPILERS
- TIME SHARED OPERATING SYSTEMS
- DATABASE MANAGEMENT

Please call Ted Chaloner at (617) 426-4180 or submit resume with salary requirements to:

ROGERS & SANDS

100 Federal Street, Boston, MA 02110

Member of Massachusetts Professional Placement Consultants

SYSTEMS PROGRAMMER

We have a challenging position available in this major university medical center. Hardware is an IBM 370/158 with upgrade to an AP planned, and several POP11s doing distributed processing with communications links to the 370. Currently a VS1 shop and beginning conversion to MVS. We are dedicated to continuing development and support of an on-line hospital information system, and are using state-of-the-art software and hardware to achieve that purpose. The person we are looking for will have three to five years systems programming experience, including two years VS1 and/or one year MVS. Experience with CICS DL/I would be a plus. Competitive salary and fringe benefits plus the cultural, recreational, and educational advantages of a university community. Send resume to A.J. Aniello, Systems Development, University of Iowa Hospital and Clinics, Iowa City, Iowa 52242. Phone: (319) 356-2432. Equal Opportunity Employer

MANAGEMENT CONSULTING

Growth of our professional management services has created the need for additional consultants in the area of telecommunications. Send resumes in confidence to: Benton, Schneider & Assoc., 2021 Spring Road, Oak Brook, Ill. 60521. Attn: M.A. Franke. Qualifications include experience; Bachelor degree, Masters preferred. Responsibilities to include voice and data telecommunications, network analysis and configuration, telecommunications planning and controls, etc. Benton, Schneider & Associates Incorporated

EDITOR/WRITER

We're one of America's largest business newspapers, and we have an excellent opportunity for someone with at least one year's reporting and writing experience and a knowledge of computers or the computer industry. You'll be reporting, writing and editing for the leading weekly newspaper for the computer community. Excellent chance to grow as we do. Good starting salary, depending on experience and broad benefits, including profit sharing. To apply, please send your resume or a detailed letter - including salary requirements to:

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

E. Drake Lundell
797 Washington Street
Newton, Mass. 02160
No phone calls please

An equal opportunity employer

ENGINEERING

HEWLETT-PACKARD

Has Need Of

DESIGN ENGINEERS

Capitalize on your professional knowledge and experience in engineering in order to advance your career prospects with Hewlett-Packard's Avondale Division, located 30 miles from center city Philadelphia. We presently seek highly creative and talented individuals to staff these openings:

Software Engineers

Individuals will participate in the design and development of hardware/software systems for analytical laboratories. A background in real time systems design is desirable. A Degree in Computer Science or the equivalent and a minimum of 2 years experience is preferred.

Electrical Engineers

As a Design Engineer, you will participate in the product development of microprocessor-based analytical instruments. This position requires experience in digital design with knowledge of analog circuits. An advanced degree in EE or equivalent and a minimum of 2 years experience is preferred.

These positions offer attractive salaries, comprehensive benefits and paid relocation expenses. Let your hard won skills lead to career success and satisfaction. Send your resume in confidence to: Ms. D. Engel

HEWLETT **PACKARD**
Avondale Division Rt. 41, Avondale, Pa. 19311

An Equal Opportunity Employer M/F

Software Quality Control Engineers

Five to seven years experience required in application of military standards to software quality control, especially MIL-S-52779. A background in the writing of software test plans/procedures and verification of hardware/software compatibility is also necessary. BS in computer science, engineering or math required.

You will participate in an excellent benefits program that includes, but is not limited to, a company-paid, ten-part insurance plan, two pension plans (one company-paid), personal investment plan, stock purchase plan and a 100% tuition refund program.

Please send resume, stating present salary to:

R.A. Richmond, Dept. 365
Westinghouse
P.O. Box 1693
Baltimore, MD 21203

Equal Opportunity Employer

Westinghouse

SYSTEMS PROGRAMMERS

VM/370

BS Degree in Computer Science or equivalent. Minimum 3 to 7 years experience. Must have experience in CP or CMS Internals.

Positions offer attractive salaries and fully paid benefits package.

TO ARRANGE AN APPOINTMENT:

If you qualify please forward a copy of your resume to:

CallData

Systems Inc.
Attn: Mr. Bob Weiss
25 Wells Avenue
Newton, Mass. 02159

An Equal Opportunity Employer M/F

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

a new subscription

new address

new title

new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



797 Washington Street
Newton MA 02160

position announcements

position announcements

position announcements

position announcements

position announcements

OUR PROFESSIONALISM IS FIRST CLASS

We've been successfully placing highly qualified, career-minded data processing applicants with the right companies for some 10 years now. With offices in Kansas City, Tulsa, Houston, Fort Worth and Dallas, we know the industry's needs throughout this as well as other parts of the country. If you're an individual looking for a better opportunity, contact any one of the five offices of Data Processing Careers - providing the personnel needs of the data processing industry!

DALLAS Suite 1109
Stemmons Tower West
Dallas, TX 75207
(214) 637-6360

FORT WORTH Suite 911
One Summit Avenue
Ft. Worth, TX 76102
(817) 336-4565

HOUSTON Suite 960E
4615 Southwest Frwy
Houston, TX 77027
(713) 960-9102

KANSAS CITY Suite 502
6405 Metcalf
Shawnee Mission
Kansas 66202
(913) 236-8288

TULSA Suite 10
Park 21 Building
2626 East 21st St
Tulsa, OK 74114
(918) 747-3621

DATA PROCESSING CAREERS

TIRED OF THE COLD?

Move where these jobs are located! Our clients seek qualified EDP prof's due to expansion. All positions are in the "Sunbelt". Excellent benefits including in-house career progression and state-of-the-art installations. All fees, costs, and temporary living expenses paid by the companies.

24 Systems Programmers	\$20-26K
7 COMTEN's Spec (S/W experience)	\$16-24K
6 Sys. Anal. (Ex. BIG 8 EDP Cons.)	\$20-26K
25 Project Lead. IMS/VS COBOL	\$20-25K
60 Prog/Anal (S); Progs	\$14-24K

Contact Bill Denny, V.P.

CALL TOLL FREE 24 HRS./DAY
1-800-821-2270 EXT. 605

(In. Mo. 1-800-892-7655)

Jim King and Associates

438 Gulf Life Tower Jacksonville Florida 32207
(904) 398 7371

SENIOR COST ACCOUNTANT

Excellent Santa Barbara opportunity for a self-motivated person looking for a challenging career growth opportunity. Requirements include a BS degree plus 3-5 years general or cost accounting experience in job cost systems. Background in the computer manufacturing or peripheral industry is preferred.

AMC is a leading producer of magnetic recording devices for the computer industry, and offers an excellent salary and fringe benefits including:

- Life, medical/dental insurance
- Cash profit sharing
- 4 1/2 day work week
- Smog-free living

Send resume to:
Personnel Administrator

Applied Magnetics
Magnetic Head Division

Equal Opportunity Employer M/F

SYSTEMS and DATA PROCESSING PROFESSIONALS

As a significant leader in our industry and as a \$100 million plus NYSE-listed corporation, we have an immediate need to substantially increase our current systems and data processing staff. Our current and future corporate committed projects require a number of professionals with varied business applications knowledge and experience. Our present hardware configuration centers on an IBM 370/145 using DOS, VS, TOTAL data base with COBOL and BAL. A number of current on-line and batch systems will be enhanced with the addition of several significant and new to the industry on-line systems. Our plan includes systems development using mini-computers and distributed data processing systems. We need people in the following areas:

SYSTEMS ANALYSTS

2 or more years experience in the design, development, and implementation of computer based systems and business applications. Experience in dealing with users staff personnel at all levels.

SYSTEMS PROGRAMMER

Experience in entering and maintaining a VS operating systems in a data base communications environment. Other areas include POWER, job accounting, and certain on-line applications programs. Requires some previous experience in systems programming and software.

PROGRAMMER ANALYSTS

2 or more years experience in COBOL/BAL. You will be involved in a variety of application systems such as: manufacturing, retailing, financial, accounting, marketing and inventory. On-line order entry, distribution, payroll and inventory are just a few of the planned systems.

MANUAL SYSTEMS ANALYST

At least 2 years experience in systems and procedures with exposure to work measurement/work simplification techniques. Experience in form and reports control & management, business & systems procedures and user & vendor contact desired. An industrial engineering background or exposure is highly desirable.

COMPUTER OPERATORS

At least 2 years experience with an IBM 360/370 using DOS/VS, 2nd and 3rd shift positions available.

We are a rapidly growing organization with full management support in the development and application of new systems to increase and improve our business position. We offer the opportunity for professional growth, coupled with excellent salaries and benefits. For more information send a complete work and salary history or call:

(314) 863-0500

PERSONNEL DEPARTMENT

ANGELIC CORPORATION

700 Rosedale Ave.
St. Louis, MO. 63112

An Affirmative Action/Equal Opportunity Employer M/F

ATLANTA & S.E. OPPORTUNITIES

Clients offer rewarding career benefits, challenging environment for advancement & are ready to interview immediately.

O.P. Mgr - Sys 3-15, 5+ yrs, responsible for all OP areas

Sys Engr-Liaison Mini Mtg (User; 2+ yrs; know O/S; Compilers

To \$25,000

To \$24,000

Data Base - Interface Prog. Anal.

3+ yrs. COBOL-IMS Good career step to mgmt mid \$20's

Software Support-Team Player-Support OS/VS Shops - 3+ yrs

Assembler; OB/OC mid \$20's

Field Svc Engr-People Person; know minis/micro processing

Fully paid co cer To \$18,000

Programmers - "thinkers-not coders" COBOL/OS \$13-20,000

Client cos pay all employment expenses. For more info contact

In conf. Ron Spang, (404) 393-0933, or send resume to

FOX-MORRIS
PERSONNEL CONSULTANTS
47 Perimeter Ctr. E
N.E., #540
Atlanta, GA 30346

PRODUCT SUPPORT MANAGERS

Is there an IBM CPU attached to your system? If your service personnel knew more about that CPU wouldn't they be more effective? For years now we have helped companies like yours prove that they certainly would be. Training is our business.

DMA Computer Services

P.O. Box 1116
Brookhaven, PA 19015
(215) 876-0320

MANAGER DATA BASE ADMINISTRATION

Giant conglomerate expanding its OP Department. Plan, lead and control all data base functions. Must have management experience using IBM/VS with at least 10+ yrs of OP experience. 3+ yrs in data dictionary and data base design and analysis. Will supervise over 10 employees. \$33,000 FEE PAID

ROBERT HALF
PERSONNEL AGENCIES

522 Fifth Avenue
New York, N.Y. 10036
(212) 221-5500

PROGRAMMER ANALYSTS

Analysts International Corporation is a leader in the rapidly expanding software services industry specializing in the analysis, design, programming and implementation of systems for industry and government across the nation.

Our Atlanta, Detroit and Philadelphia branches are seeking individuals with a minimum of 3 years experience in either COBOL or PL/1. Knowledge of FORTRAN, ALC, IMS, DMS, TOTAL or CICS is a plus.

We offer an excellent salary and benefit program including fully paid medical insurance. Relocation allowances for those who qualify. Please state location preference.

Director of Personnel ANALYSTS INTERNATIONAL CORPORATION

3000 Town Center, Suite 1030
Southfield, Michigan 48075
(313) 353-7230

An Equal Opportunity Employer M/F

AiC

EDP PROFESSIONALS

• Project Mgrs Low \$30's
Due to unprecedented demands for their service this prestigious New England Service Firm seeks (3) Project Mgrs. Must have heavy on-line, real-time exp. Mini exp very big +.

• Internal Consultant \$30,000
Major NY Bank has position open for high powered technician (OS/VS/COBOL/BAL, on line exp, etc.) to provide application development technical expertise to systems devl groups.

• Mgmt. Consultants Low \$30's
Aggressive, rapidly growing office of a major Management Consulting firm seeks (4) career oriented systems analysts. Must have excel conceptual, problem solving skills & be interested in a fast track oppty.

• Programmer Analysts \$25,000
Well-known Financial firm is experiencing extensive growth in their systems development dept. Multiple openings exist for 370/OS/VS COBOL & BAL Progs & Prog Analysts.

• Sys. Analysts \$26,000
Connecticut Financial firm has positions open for S/A's to design & supervise the implementation of on-line applications. Excel location, good growth oppty & benefits pkg.

For info on these & other career positions, please call or send letter/resume in confidence to:

the jarvis walker group

535-5th Ave, NYC 10017

(212) 867-2650

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER PROFESSIONALS

Our Client, a Fortune 500 worldwide leader in the consumer market, has expanded its Data Processing Department to include ten new professionals ranging from entry level computer science graduates to ten years experience.

Our Client is conveniently located in the foothills of the Adirondack Mountains, just minutes away from the Albany/Schenectady Capital District of New York State.

If you are a computer professional with the following qualifications, please rush your resume to us for immediate attention:

5 Entry Level DP Positions BS and/or MBA desirable	to \$18,000
2 System/Analysts, 3-5 years experience General Business Systems Degree	to \$25,000
Senior Programmer, 5 years experience promotable to Lead Programmer	to \$20,000
System/Programmers, software techniques 370/OS MVT	to \$25,000
Programmer, 2-3 years business applica- tions experience with large equipment	to \$18,000

CAREER ADVISORS

125 Wolf Road-Albany, N.Y. 12203

(518) 458-1810

Our client companies assume all fees.

Mobil

IMS TASK LEADERS SR. PROGRAMMER/ANALYSTS for DALLAS, TEXAS

Planned growth in our information systems activities requires some permanent additions to our systems development staff. The initial assignments will be with a project team in New York, designing the applications systems and special security software for a modern, on-line Human Resources Information System (HURIS) using IMS.

Upon completion of the business systems and computer systems design for HURIS—early 1979, the team will be relocated to Dallas, Texas for program development and systems implementation. Subsequent assignments, which would be in Dallas, would involve either major extensions to HURIS or senior-level participation in other major business information systems now being planned in other Mobil units.

Since these are long-term career positions, we are seeking people with project leadership potential, demonstrated IMS experience and a college degree.

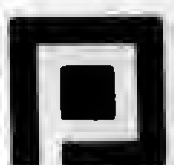
Please send resume indicating experience, educational accomplishments and salary history to: Mr. P.J. Harbaugh, Jr., Manager, Professional Recruitment and Placement, Dept. 4106, MOBIL OIL CORPORATION, 150 East 42nd St., New York, N.Y. 10017.

an equal opportunity employer m/f

SENIOR PROGRAMMER (COBOL) SET UP PART OF OUR MIS SYSTEM AT PHILIPS INDUSTRIES



Working in a rapidly growing and changing project environment, program for cost accounting, production control and order entry in a manufacturing environment. You will be working on independent problems with little supervision, earning an excellent salary and benefits in our expanding corporation. You will have every opportunity to interact with users, provide input into systems design, be involved with our IBM 370/148, and a small team of professionals. If you are ready for major challenge, in our Dayton, Ohio based \$250 million sales manufacturing organization...



**PHILIPS
INDUSTRIES INC.**

FOR IMMEDIATE ATTENTION
CALL COLLECT OR SEND RESUME
TO BONNIE FILOSO

We Are An Equal Opportunity Employer M/F

Programming

SYSTEMS PROGRAMMER/ ANALYST

Research and implement data base. Gear up for VM/370 CMS. Update and maintain existing systems. Requirements: 6 yrs experience in programming and systems, 2 of which should be in software, CICS/VS, POWER/VS, college background. Tell us what you've done.

PROGRAMMER

On-line systems in registration, general ledger, personnel. Take part in educational system development. Requirements: 2 yrs experience in COBOL, and college. CICS/VS, coding and BAL a definite plus. Benefits: 21-27 vacation days, 3 personal days, education, life insurance, medical and dental plans, plus more if you qualify. Environment: Educational with student and administrative services supported on 370/138 DOS/VS system with RJE under POWER/VS. This is a rapidly expanding TP shop using CICS/VS software and microwave transmission facilities.

Contact: Harold Blades
Computer Center Director

ESSEX COUNTY COLLEGE

303 University Ave.
Newark, N.J. 07102
(201) 877-3440

Affirmative Action &
Equal Opportunity Employer

COMPUTER SCIENTISTS

Immediate openings for experienced computer software personnel to work in client-oriented, non-profit applied research organization. Positions involve software engineering, computer system evaluation, software support tools, systems software, inter active computing, computer graphics, real-time systems and microprocessor based systems. The successful candidate will have a B.S. or M.S. in engineering or science with considerable experience in computer science. Excellent educational opportunities and benefits. Salary will depend upon experience and qualifications. U.S. citizens eligible for DOD clearance only. Please send resume and references to: Code EWM/Computer Scientist & Technology Division, Engineering Experiment Station, Georgia Institute of Technology, Atlanta, Georgia 30332, (404) 894-3417. An Equal Opportunity Employer.

H6000 OPERATORS

Prominent PHILA svc co has asked us to recruit for multiple openings at LEAD & SR LEVELS. LGE SHOP H6000 exp ESSENTIAL. Any GECOS a +. Depending upon exp, salary \$9,000-\$14,000. Planned career path.

For confidential attention, call or send resume to:

**ROBERT HALF
PERSONNEL AGENCIES**
2 Penn Center Plaza
Suite 706
Philadelphia, PA 19102
(215) 568-4580

"Christian Organization has openings for Programmers and Programmer Analyst." "Should have minimum of 2 to 5 years experience, preferably in COBOL, VSAM, CICS and a working knowledge of IBM 370/135, DOS/VS." "Please send resumes to Personnel Manager, General Council of Assemblies of God, 1445 Boonville, Springfield, Missouri 65802."

A tenure track faculty appointment of the assistant professor level is available September 1, 1978 in Computer Science at Montana State University. Duties include instruction at the undergraduate level, student counseling and research activities. A Ph.D. in Computer Science is required with an undergraduate degree in Engineering desirable. Candidates with interest and experience in operating systems, automata and languages will be given preference. Send resumes prior to April 1, 1978 to:

Gary Harkin
Department of Computer Science
Montana State University
Bozeman, MT 59717
MSU is an Equal Opportunity/Affirmative Action Employer

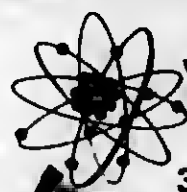
SYSTEMS PROGRAMMER

A southwestern Minnesota company is accepting applications for Systems Programmer, to locate in central Kansas. Applicants should be familiar with Honeywell level 66/05. Utilizing time sharing with GECOS operating system. Applicant will be developing a distributed processing system, mainly in manufacturing operations. MRP experience preferred.

Excellent starting salary and benefits are offered. If qualified, please send resume to:

Schawn's Sales Enterprises, Inc.

115 West College Dr
Marshall, MN 56258



COMPUTER PROFESSIONALS

370 MVS/JES 3, Large TSO & TCAM/CICS

Network Environment

Pennsylvania Power & Light Company, a progressive electric utility headquartered in thriving Central Eastern Pennsylvania, offers immediate openings on its EDP Staff. You will be working and growing in a stimulating, highly professional environment with a company that recognizes and rewards good work. Salary fully commensurate with experience, outstanding benefits package, highly desirable location.

SYSTEMS PROGRAMMERS

Background should include a degree in Business, Mathematics, Computer Science (or equivalent in experience) plus actual systems generation and implementation experience on MVT and/or MVS operating systems. Knowledge of TCAM, CICS, or PL/1 helpful. ASP or JES 3 background preferred, but not required.

TP NETWORK COORDINATOR

Background should include a degree in Business, Mathematics, Computer Science (or equivalent in experience) plus actual TP Network experience including equipment evaluation, troubleshooting and operations interfacing. Duties will include the maintenance of a highly sophisticated TCAM message control program. CICS and PL/1 experience helpful but not required. TCAM/Assembler background preferred.

For prompt consideration, write in confidence to:

Bob Chiodi, Dept. NYT

PENNSYLVANIA POWER & LIGHT CO.

Two North Ninth Street, Allentown, Pa. 18101
An Equal Opportunity Employer M/F/H/V

EDP Professionals

If you've ever said, "This is absolutely the last winter that I spend..." then now is the time to make that change you've been thinking of. Throw away the snow shovel, mothball the winter coat, and discover what life can be like in the heart of the southern sun-belt. Warm ocean beaches, a fisherman's delight, and the challenge of achieving career-oriented goals in a multi-operational banking facility can all be yours if you have what Southeast Banking Corporation needs.

Application Programmers

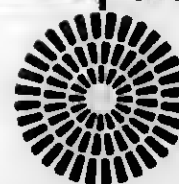
Positions are now available for application programmers proficient in COBOL, OS JCL, and the use of IBM 370/158, OS-VS. On-line experience is helpful.

Planning Analyst

Responsibilities of this position include assisting in the analysis of banking systems, analysis of tactical and strategic planning, and analysis of feasibility studies. Some knowledge of programming is beneficial.

These positions require a bachelor's degree or its equivalent and 2-5 years experience in a banking environment. A salary commensurate with background and experience and an excellent benefit package can be yours.

Send resume with salary history to:



**Southeast
Banking
Corporation**

Mr. R.J. Rowe
Southeast Banking Corporation
1001 N.W. 7th Street
Miami, Florida 33136

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements



PROGRAMMER/ANALYSTS

GROW WITH US

Due to our rapid and continuing growth, we've got growing pains and need positive and ambitious people to grow with us. If you can meet challenge, overcome difficulties and are concerned with performing a task well, we can provide groundfloor career opportunities to qualified applicants offering:

- ★ Large systems development responsibilities
- ★ IBM 370/OS/VS/IMS environment
- ★ Job security with the property/casualty subsidiary of the third largest life insurance company in the world.
- ★ Excellent salary and fringe benefits

There are numerous positions available for candidates with varying levels of experience. If you would like to hear more about this career opportunity call:

Personnel toll free at 1-800-433-7050
If in Texas call: 1-800-792-8951

EQUITABLE

GENERAL INSURANCE GROUP

6300 RIDGLEA PLACE, FORT WORTH, TEXAS 76151

A SUBSIDIARY OF THE EQUITABLE LIFE ASSURANCE
SOCIETY OF THE UNITED STATES
AN EQUAL OPPORTUNITY EMPLOYER M/F

EDP MANAGER

We have an exceptional opportunity which provides high visibility and growth potential for a "shirt sleeves" type EOP Manager. Candidates should have a solid background in CP operations, systems analysis and programming with NCR Century or Criterion processors. Experience with B-3 and/or on-line processing would be considered a definite advantage.

Victory Markets is an aggressive regional supermarket company, headquartered in a rural community in scenic upstate New York. In addition to competitive salary, we offer an exceptional benefit plan and relocation assistance.

Send resume, in complete confidence, stating education, work history and salary requirements to:

VICTORY MARKETS INC.

54 East Main Street, Norwich, New York 13855
Attn: Manager Employee Relations
An Equal Opportunity Employer M/F

EDP AUDIT EXAMINER

We are looking for a person to join our auditing staff who will be involved in reviewing new and existing automated systems.

Minimum 2 years EDP audit experience. Exposure to automated banking systems helpful, as is background in accounting and/or programming. IBM 370/145 OS/VS1 installation.

Please send resume including salary requirement to
Human Resource Dept.

Rhode Island Hospital Trust National Bank

1 Hospital Trust Plaza, Providence, R.I. 02903
An equal opportunity employer, M/F

More Than 75 Outstanding CPE Specialists Now Work at FedSim. Join a Team of Experts!

The Federal Computer Performance Evaluation and Simulation Center (FEDSIM) is seeking both entry-level and experienced CPE analysts. FEDSIM provides consultant services to other Federal agencies in such areas as:

- Evaluating the performance of hardware configurations, operating systems, application programs, data base management systems, and communications systems. Applicants for these positions should have detailed experience in system programming, with such systems as MVS, EXEC-8 and GCDS and must have an understanding of both operating system internals and computer technology.
- Assessing the operational efficiency, management practices, and organizational effectiveness of data processing installations. Applicants for these positions should have experience in EOP management, EOP auditing, or EOP management consulting.
- Performing capacity planning studies, which include workload requirements analysis, configuration sizing and communications network design and evaluation, and providing ADP procurement assistance in such areas as benchmark design, specifications development, proposal evaluation and life-cycle planning. Applicants for these positions should have experience with hardware and software evaluation and with computer and/or communications system modeling techniques.
- Assessing the design and predicting the performance of special purpose computer systems, and analyzing the overall performance of complex systems that contain computers as integral subsystems. Applicants for these positions must be knowledgeable in Operations Research techniques, computer operating systems, and discrete-event simulation languages.

Salaries range from \$15,090 to \$30,750 with excellent opportunity for management responsibility. Advanced degree desired. Send resume of qualifications and salary history to:

Headquarters, U.S. Air Force
Oet S, 1100 ABG/DPCS
Washington, DC 20330
Offices located in Alexandria, VA.

AN EQUAL OPPORTUNITY EMPLOYER

SYSTEMS PROGRAMMER

To \$25,000
Prestige suburban Phila firm has asked us to identify an aggressive, stand-alone EDP pro w/3-5 yrs 370 OS/VS1 COBOL. Ability to communicate effectively w/user depts essential. Outstanding professional growth spot. For confidential attention, please call or send resume to:

ROBERT HALF
PERSONNEL AGENCIES
2 Penn Center Plaza
Suite 706
Philadelphia, PA 19102
(215) 568-4580

Computer Maintenance Specialist having at least two (2) years of actual maintenance experience with Electronic Associates, Incorporated machines including specifically the EAI Model 8945 Hybrid Computer, the EAI SPACER 2000, and the EAI SPACER 2000. This is a professional position on the staff of Michigan Technological University which is an equal opportunity employer. Please address Employee Relations, Michigan Technological University, Houghton, Michigan 49931.

PROGRAMMER/ANALYST

Mainline computer services organization offers professional opportunity to qualified candidates - wide variety of applications and hardware - State of the Art Software - professional environment with planned professional growth - competitive salary and benefits plan - need COBOL or Assembler experience - IMS, CICS and PL1 helpful - positions available in Baltimore, Buffalo, Chicago, Pittsburgh, Rochester and Syracuse locations - call (301) 288-5980 or rush resume to:
Computer Task Group, Inc., Dundalk Professional Bldg., Suite 408, 40 South Dundalk Ave., Baltimore, MO 21222. An equal opportunity employer m/f

SENIOR STAFF ASSOCIATE

Responsible for managing the Health Sciences Data Processing Unit including program development, coordination and implementation of the data base management system, liaison activity with users (administrators and faculty) and supervision of Remote Job Entry station to the University central computer system. Master's degree, 5 years data processing experience with medium scale system (two of which must be supervisory or management). Knowledge of PL/I, FORTRAN and JCL with large scale IBM 360/370 system required. Knowledge of UNIX system for PDP-11 system desirable. Administrative experience or interest helpful.

SALARY \$20,000 +
Excellent benefits

Send Resume to:

Personnel Director

Health Sciences Division
COLUMBIA UNIVERSITY
630 West 168th Street
New York, N.Y. 10032

An Equal Opportunity/
Affirmative Action Employer

PROGRAMMER/ANALYSTS

Fortune 500 Company, Headquartered in St. Louis, Missouri needs programmer analysts for a variety of application systems such as marketing and production control for our large secure growth oriented company.

Must have B.S. degree or equivalent with strong manufacturing experience in marketing and/or production control.

2-5 years programming and analysis experience in COBOL including IBM 370/135, UNIVAC 9480, UNIVAC 1100 series or similar size equipment.

Excellent compensation, relocation and benefits programs, including dental benefits.

Forward resume with salary history and requirements as soon as possible to: E.J. Nelson

7777 Bonhomme Avenue, Suite 1210
St. Louis (Clayton) Mo. 63105

FLORIDA

- Our Client is looking for heavy exp on mini-Basic is a must-TP dlg plus To 16K
- Multiple openings for 370 DDS or OS-IMS or CICS-Cobol or BAL-mig&fnci 13-20K
- Urgent need for systems prog Assembler & system must-DDS or OS-Comm bldg+ To 19K

ROBERT HALF
PERSONNEL AGENCIES
1311 North Washington Blvd.
Suite 309
P.O. Box 22651
Tampa, Florida 33622

DATA PROCESSING OPPORTUNITIES

1978 has just begun, offering countless possibilities for developing your potential and furthering your career plan. Will your present position see you productively through the year?

Richard Gast & Associates

represent a wide range of opportunities with Fortune 500, Midwest based corporations. We also have 70 affiliated offices nationwide to help place you in a professional situation tailored to your personal needs. Current positions range from Programmer/Analyst through management levels in applications, software and data base areas, \$15-30,000 range. If you are seeking a growth opportunity, contact us for professional assistance.

Call or Send Resume in Confidence To:

RICHARD GAST & ASSOCIATES

c/o Mary K. Fruga

2421 N. Mayfair Rd, Suite 216

Milwaukee, Wisc. 53226

All Fees and Relocation Expenses are Company Paid

Licensed Employment Agency, Specializing in Corporate Recruiting

SYSTEMS ANALYST
MOVE UP TO D.P. MGR

\$24-\$35,000 + Career Benefits

New England based division of Fortune 500 corporation continues to expand, due to strong acceptance of their new line of health care equipment. This fast growing division is medium sized, but has the backing of a highly progressive billion dollar corporation. Position requires degree, prefer MS or MBA, with proven record of accomplishment in systems analysis, showing high analytical ability and supervisory experience of about 20 people. Individual will direct all activities of the medium sized EDP operation for this highly successful division. Should have capability to participate with corporate management in the planning of complete business systems requirements for this division.

Executive compensation includes a base salary in the \$25-35,000 range plus complete career benefits. Client company pays all employment expenses, including relocation and our searching fee. Reply in confidence to S. Burns (215) 561-6300.

FOX-MORRIS
personnel consultants

1500 Chestnut Street • Philadelphia, Pa. 19102

New York • Fort Lee • Princeton • Pittsburgh • Cleveland
Wilmington • Baltimore • Charlotte • Atlanta

DATA CENTER MANAGER

Rapid growth of a diversified Fortune 500 manufacturing and service organization in the nearby Maryland suburbs requires a major advance in our data processing systems and computing equipment capabilities. Our EDP improvement program has resulted in an opening for an individual to direct the operations of a state-of-the-art centralized data center. This position offers excellent visibility and opportunities for unusual professional growth and career advancement. Initial assignments will include:

- management of our existing computer facility
 - planning and start-up of a new data center
 - selection of additional qualified staff
 - establishment of all EDP operating procedures
- Requirements include:
- Recent hands-on experience in on-line processing, communications and RJE in a commercial environment.
 - Demonstrated ability in managing operations, technical support and programming personnel
 - Experience in implementing large systems development projects in an on-going data center.

Prior experience in non-IBM systems and equipment, preferably Honeywell, and appropriate college degree(s) are required. Applicants should send resumes and salary requirements to:

CW Box 1423
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer M/F

DIRECTOR OF DATA PROCESSING

The senior data processing line management position in a large Midwest (not Chicago) organization will be filled with an individual who has:

- Several years' experience in supervision of a large data center and/or a disciplined systems development organization.
- A management or technical undergraduate degree.
- Exceptional, proven organizational and administrative skills with ability to manage an \$8 million d.p. budget.

This position is available in March. Our employees are aware of this advertisement. Please forward your resume to:

CW Box 1425

797 Washington St.

Newton, MA 02160

An equal opportunity employer

position announcements

GOULD

position announcements

position announcements

position announcements

position announcements

position announcements

Mini-Programmers... Learn the Intel 8080

Our client, a growing manufacturer of mini and micro computer controlled instrumentation, currently is seeking an experienced mini-computer programmer. The individual should have above average ingenuity because he or she will take a very active part in the development of new hardware/software product lines. Should be able to work well as a part of a small group and also be able to work on other projects with a minimum of direction.

POP-11 assembler language, OOS RSX RT-11 or microprocessor experience would be a plus but is not necessary.

Our staff will be available Monday & Thursday until 8 p.m. All inquiries strictly confidential.

Please Call Collect or Forward Resume To



861-6300

MULTI PROCESSING, INC.

Four Militie Drive
Lexington, MA. 02173
Telephone (617) 861-6300
Our staff will be available Monday & Thursday until 8 p.m.

SYSTEMS ANALYSTS

Continuing expansion in our corporate systems development program has created immediate need for two systems analysts.

Accounting Systems - Fixed assets and construction accounting systems. Accounting or related degree required. Experience in tax, depreciation, W.I.P. as well as general accounting and financial applications desired.

Material and Construction Systems - Inventory control and requirements forecasting; construction estimating and control reporting. Degree in Industrial Mgmt or related field required.

Both positions require a minimum of five years experience with a minimum of three years in programming and systems analysis. Experience with S/370, DOS/VS, PL/I, RPG II, DL/I, VSAM are desirable.

The positions are located at our Boise, Idaho headquarters and present an opportunity to combine a career in a progressive, professional environment with the excellent living conditions available in Idaho. Send resume and salary requirements to -

Mr. John C. Dominick

IDAHO POWER COMPANY

P.O. Box 70

Boise, Idaho 83721

An Equal Opportunity Employer (M/F)

LAS VEGAS BONUS

What a way to start off the New Year

- *New Career upgrade
- *Salary Increase
- *Las Vegas vacation
- *Floor show "Follies Bergere"

It's our way to say thanks for a successful '77 and a prosperous '78. It amazes me the high level talent that has responded to my ads and the success we have had in the total movement, geographical and career at the same time. For the past 5 years we've moved people thru our employment service plus, I was Director Corporate Recruiting for a national consulting firm based in Dallas. I search for top talent and adept your skills, requirements and future to the market place, not vice versa. If you are one of the top people in your shop, are curious about "Sun Belt" locations, call. We have needs for these specific openings.

1. OS COBOL Prog/Anal; group converting to IMS; unique chance for IBM education and OJT in data base upgrade.
2. IMS COBOL development; to \$24K (14 openings)
3. CICS OS COBOL; to \$24K
4. ALC/O.S. Programmers to 22K
5. Project managers to 28K
6. DOS COBOL/ALC.
7. Banking/All analysts.
8. PL-I OS Prog; to \$18K
9. Numerous Consulting/Travel.

If you have data base skills and/or want to step up to "STATE OF THE ART" data base systems and advance your career in 1978, call or forward your resume . . .

JERRY BEATTY

(214) 243-5051

COMPUTER LOGIC, INC.

Personnel Consultant

2655 Villa Creek Drive

No. 287, Dallas, TX 75234

Our parent company, PPS, INC. has permanent long term consulting positions available for OS, COBOL and/or data base professionals, analysts and programmer/analyst. If you've ever wondered what consulting is all about, please contact us!

DIRECTOR OF SYSTEMS AND COMPUTING

Director of Systems and Computing responsible for all administrative and academic computing activities at WASHINGTON STATE UNIVERSITY, commencing July 1, 1978. The Director reports to the Executive Vice President and is the university representative to the state-wide Data Processing Authority and other outside agencies. Applicants should have a doctorate in computer science or closely related field, and significant computing related managerial experience is required - five or more years is preferred. Curriculum Vitae and letters directly from three references should be sent before April 1, 1978 to R.A. Parker, Chair, Search Committee, Room 422 French Administration Building, Washington State University, Pullman, WA. 99164.

An Equal Opportunity/Affirmative Action Employer

PROGRAMMER/ANALYST

Large 370 DB/DC environment. Opportunities in accounting, personnel, or administrative reporting application areas. Innovative information oriented systems. Degree in Business or Computer Science - two to four years COBOL experience. Salary to \$19,000

TEXAS EDUCATION AGENCY

201 East 11th Street

Austin, TX 78701

ATTN: Terry Nathan, MIC

An Equal Opportunity Employer

MANAGER MFG SYSTEMS INTERNAL CONSULTG \$30 to \$40K

Strong experience in mfg assembly, fabrication industries to build corporate planned growth in mfg end met'l control systems. Excellent opportunity.

Multi div, multi plant corp is located Midwest. Immediate interviews.

Call or write

F-O-R-T-U-N-E DATA

agency 505 5 Ave.
NYC 12121 682-8600

Client co assumes fees & reloc

RETAIL MIS DIRECTOR

Prominent PHILA RETAIL chain offers unique oppo to top-notch EOP pro w/proven track record. (370/158) knig RETAIL merchandising, inventory control & warehouse operations reqd. Must be aggressive self-starter w/high degree of technical expertise & creativity. Ability to communicate effectively w/all levels of mgmt essential. \$28,000. FEE PAID. For confidential attention, please send resume to:

ROBERT HALF
PERSONNEL AGENCIES

2 Penn Center, Suite 706
Philadelphia, Pa 19102
(215) 563-4580

IBM SYSTEM/3 PROGRAMMER/ANALYST

Experienced in RPG2 and manufacturing/financial applications. SCP/CCP experience desirable but not required. Excellent employee benefits and a growing systems department. North Central West Virginia Location. Send resume or call:

NATU PATEL

Director Management Systems
FOURCO GLASS COMPANY

P.O. Box 890

Bridgeport, WV 26330

1 (800) 624-3891

OUR STANDARDS ARE HIGH THEY HAVE TO BE

Our vice presidents personally hire each programmer/analyst (over 100 will be in 1978) because they know that a professional service firm's FUTURE IS YOU.

Immediate openings in Miami, Houston, Washington, O.C., and Philadelphia areas. Call collect or send resume with current salary requirements to:

Mr. Fred Tribie

Data Technology Industries, Inc.

6611 Kenilworth Ave., Suite 412
Riverdale, Maryland 20840
(301) 779-8828

CRACKERJACK PROGRAMMER System 32, RPG II

Excellent opportunity for individual looking for freedom and responsibility with growing firm. Our small software company is looking for experienced System 32 programmer with technical experience in business application and user interface. Candidate must have at least 1 year experience in all phases of IBM Systems 32 and RPGII and/or Systems 3 CCP.

Please send resume and salary requirements to:

COMMERCIAL
SYSTEMS PLANNERS

1245 Adams Street
Dorchester, MA 02124

BANK DATA PROCESSING VICE PRESIDENT LARGE CITY IN THE SOUTHEAST

Our client, a medium size bank, is in the initial stage of developing a new data center and requires a manager to take charge of implementation and ongoing operation of the entire facility including systems and operations.

The plan includes the development of an organization consisting of 30 people, 370/138 hardware with on-line teller terminals and CIF and implementation of to-be-selected software packages.

Minimum requirements include systems experience in banking applications at a management level with a bank or bank service company.

This is an immediate requirement. Please send resume including current salary in strictest confidence to: Consultant, P.O. Box 1427, 797 Washington St., Newton, MA 02160.

An equal opportunity employer M/F

Make The Move To Idaho

E G & G Idaho, Inc., the prime operating contractor to the Department of Energy at the Idaho National Engineering Laboratory, has an immediate opening for:

TECHNICAL WRITER/EDITOR

If you combine a fascination with computer technology and a gift for clear, concise writing, we have a place for you. You would work in our Computer Science Center developing a variety of computer documentation media, including a complete user manual system.

This job calls for a professional with a good track record and a bachelor's degree, or equivalent, in a related field.

Idaho Falls is a medium-sized community, located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreational areas (Yellowstone, the Selmon and Snake Rivers, and the Grand Tetons).

If interested and qualified, please submit resume including salary requirements, in confidence, to:

Technical Employment Dept. C2

EG&G Idaho, Inc.

Box 1625, Idaho Falls, Idaho 83401

U.S. Citizenship Required
We are an Equal Opportunity
Employer M/F/Handicapped



data processing careers connecticut

We have over 700 computer installations in the state of CT many of our clients are in need of talented DP professionals today. Following is a partial list of positions we exclusively represent:

- Business systems manager-retail, planning-\$35,000
- Manager Info Systems-mfg. Univac-\$30,000
- Hardware & Software Planning-consulting IBM-\$32,000
- Systems Analyst - Project leader Mfging.-\$26,000
- Sys. Analyst-Project leader-Personnel pkg. to-\$26,000
- Project leader-Data Base administrator Business Systems-\$25,000
- Software Systems-Develop OS/VS, train MVS - \$25,000
- Systems Programmer-OS train IMS internals to-\$24,000
- Programmer Analyst-Cobol/OS Develop on line DB-to \$24,000
- Programmer Analyst-Cobol, any hardware train OS IMS-to \$20,000

Our client is a large scale 370/IMS/VS environment. Extensive interface with users is a requirement for these positions.



3780 Whitney Ave.
Hartford, Ct. 06518
(203) 288-7461

BREEN
DATA

For further information regarding these opportunities, please call or write in confidence Toby S. Brimberg.

Division of the Breen Group, Inc.

position announcements

position announcements

Computer Editor

Major NYC professional publisher requires individual with EE degree and experience in computer industry. Position requires organized thinker, self starter, able to meet deadlines in reporting, researching, writing and editing for international publication IEEE SPECTRUM.

We offer salary commensurate with experience along with an outstanding benefits program. Please send resume including salary requirements to:

Mr. E.G. Logan, Personnel Manager

**THE INSTITUTE OF
ELECTRICAL AND
ELECTRONICS
ENGINEERS, INC.**
345 E. 47th Street
New York, N.Y. 10017

Equal Opportunity Employer M/F



ANALYST/PROGRAMMER

Expanding dental products manufacturer seeks analyst/programmer to design and write standard cost, production planning, inventory control programs. Require COBOL and two years' experience with manufacturing systems. Desire RPG II and Systems 3/Model 12 hardware experience.

Please send resume including salary requirements, in confidence, to:
Nancy Zugehoer

MYERSON TOOTH CORPORATION

66-90 Hamilton St. Cambridge, MA 02139
An Equal Opportunity Employer M/F

NEW ENGLAND

Ideal location. Easy access to skiing, sailing, beaches and varied cultural attractions. Short commute to Boston.

Immediate openings for experienced Systems Analysts/Programmers. Insurance background desirable but not essential. Assembler experience preferred, also interested in Cobol, and PL-1. IBM 370/158-AP (4 meg) computer with MVS, CICS/VS and TSO. Formal career path development program with excellent promotional opportunities. Progress sharing, excellent salary and working conditions, free parking and liberal benefits.

Please send resume and salary history for confidential review to:

Mrs. Pearl Evans, Senior Consultant

**STATE MUTUAL LIFE
ASSURANCE COMPANY
OF AMERICA**



440 Lincoln St.
Worcester, Mass. 01605
An Equal Opportunity Employer M/F

D P PROFESSIONALS

Our client Companies, include Consulting Firms, Manufacturers, Banks, Insurance companies, Oil & Gas companies and Software Houses. They offer career advancement opportunities, strong benefit packages, company paid moving and interview expense and, of course, they pay our fee. We have numerous openings in the Southwest, Southeast, West and Northwest part of the U.S. for the Professional Programmer/Analyst with 1-5 years experience, Project Leaders, System Software Programmers, and Managers.

DUNHILL EMPLOYMENT AGENCY OF FORT WORTH, INC.
901 Ridglea Bank Bldg., Fort Worth, TX 76116

If you don't have a resume, call us. We'll help you write one.
(817) 732-8191

PROGRAMMER/ANALYST

Texas based Manufacturing Division of Multi-national Fortune 500 Company has outstanding opportunities for two aggressive individuals.

Must have college degree and/or minimum of 5 years experience with 2-3 years experience in systems analysis.

Manufacturing and accounting applications will be developed in IBM S/3 in COBOL and RPG II.

Send Resume in Strictest Confidence to:
Personnel Department

Stemco Inc

P.O. Box 1989, Longview, Texas 75601

An equal opportunity employer m/f

**BUY
SELL
SWAP**

IMMEDIATE DELIVERY PDP-11/45 PERIPHERALS VACIC MODEMS

New DEC equipment in original shipping cartons, available immediately: TJU16 9-track tape drive; DB11-A bus repeater; MF-11 UR 64 Kbytes parity core; DD11-A peripheral mounting panel; H960-DH cabinet; 4 DL11-E's and 2 DL11-E's. Vadic: Full duplex dial up modems, power supplies, chassis. Some slightly used, some new: 1616A chassis; 4 3405A 1200 BAUD cards; 2 307C 300 BAUD cards; 2010 power supply; 2022 power supply; 3 1604 stand alone chassis; 3 3405A 1200 BAUD cards.

Contact:
Pat Zimmarman, Case Western Reserve University School of Medicine, Cleveland, Ohio (216) 444-3491.

**FOR SALE
IMMEDIATE DELIVERY
DEC
PDP8E COS300**
System 16K
RK05 Drives
Centronics 101A Printer
VT05 Terminal
DEC Maintained
(516) 433-9191

FOR LEASE
HIGH SPEED I/O SET
1 Year - \$1,700./mo.
3 Year - \$1,500./mo.
ALSO AVAILABLE
360/30 - 128k
2 Channel, 1401 Compat
1 Year - \$300./mo.
3 Year - \$200./mo.
CONTACT: (313) 569-2220
Karen Jackson
3 P.M., Inc.
16250 Northland Drive
Southfield, MI 48075

FOR SALE OR LEASE

IBM 3277-1's or 2's Tubes 2/78
IBM 3271-2's Ctr 2/78
IBM 3275-1's or 2's Ctr & Tube 2/78
IBM 3288-2's Printers 2/78
Call Collect or Write
Berlen Industries, Inc.
1975 Hempstead Turnpike
East Meadow, New York 11554
(516) 794-9722



**FOR SALE
COMPLETE B-700
BURROUGHS SYSTEM
WITH INVENTORY
CONTROL SOFTWARE
UNDER MAINTENANCE**
CW BOX 1426
797 Washington St.
Newton, Mass. 02160

buy sell swap

FOR SALE

NCR Century 200
32K, Dual Spindle
657 Drive
1500/3000 LPM Printer
\$70,000

Available for Shipment
Phone Mr. Bullock
(803) 723-9411

FOR SALE

Used

Modcomp II

11/25 32KW CPU
4214 Printer
4148 Tape Drive
4132 Disk
980 Console
Contact: Mr. Dunlevy
315-797-5800

Wanted PDP 11 45

for immediate delivery, any or all of the following items:

**CENTRAL PROCESSOR
MEMORY MANAGEMENT
BIPOlar MEMORY**
Contact: Morton Cohan
**SCHERING-PLOUGH
CORPORATION**

60 Orange Street
Bloomfield, N.J. 07003
(201) 743-6000, ext 561

Wanted for purchase or lease

IBM 370/145 MOD 2
with 512K Memory
Also Disk 3333/30
MOD 11 (800 MB)
For May 1978 Delivery

Forward detailed
specifications to
CW Box 1422
797 Washington St.
Newton, MA 02160

FOR SALE

Liquidating company. Almost new Datapoint 2200 Processor, 9373 Mass Storage Disk, 9371 Mass Disk Extension, 4 Mass Storage Disk Packs and 3600 CRT. Interdata Carousel 310 Printing Terminal.

For details call
The MortgageBanque, Inc.
W.E. Cole
(713) 797-9899

buy sell swap

FOR SALE

1/2 Megabyte
IBM 370/158 Memory
512K to 1024K increment
Available Immediately

CAPITAL FUNDING CORP.
2175 Lemoine Ave.
Fort Lee, N.J. 07024
(201) 461-3158

FOR SALE

BY OWNER

370/125 192K
With 3411 Adapter
3203 Printer Attachment
Multiplexor Channel
4K Control Storage
Console Adapter

Available Now Feb. 1978

Phone (212) 593-4212
9 West 57th St.
New York, N.Y. 10019

For Sale or Lease

1 Honeywell 62/40
104K of memory
87.6 MB of disk
1 600 LPM Printer
1 300 CPM Card Reader

Make Offer

Reply to CW Box 1424
797 Washington St.
Newton, MA 02160

FOR SALE HP 1000 Model 30

RTE III
128k bytes memory
14.7 Mbyte disc
2465 Console (5k DE & LDS)
(2) 12531 Terminal interfaces
Spare cartridge disc
Power line regulator
\$38,500.00

call:
Bill Miller or Rick Austin
General Time Share, Inc.
(205) 252-9441

(1x8) 3330-1
Telex or Itel
Wanted to Buy
From End User
412.823.3445

**For Sale
IBM System 32**
13.7 MEG Disk, 24K, 64
Character Set, 265 LPM
Printer.
\$37,750
Available 5/78
Bill Bissell
Forney's Inc., Route 18 So.
Wampum, PA. 16157
(412) 535-4341

**WANT TO BUY
EMM memory
Model 50
Model 65**
CALL
Hal Begzos
(313) 352-1040

**PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS**
Bob Russell
Jack Emery
Dave Hepburn
Paul Baillie
SYSTEMS MANAGEMENT, INC.
700 E. Third St., Box 2
Phoenix, AZ 85012
602 254-5600, 744-6071

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE OR LEASE

3350 DIRECT ACCESS STORAGE

3330 DISK STORAGE

ALL MODELS — AVAILABLE FEBRUARY, MARCH,
APRIL & MAY 1978.

Contact:

George Prussin or Dave Wygoda

OPM

O.P.M. Leasing Services, Inc.
99 Wall Street New York, New York 10005
(212) 747-0220

out of state call (800) 221-2674

call... **the**
Match
makers

BUYING • SELLING • LEASING • TRADING

1-800-654-9179

TOLL FREE!

COMPUTER SALES INTERNATIONAL, INC.

DEC
HARDWARE
PDP 11 PDP 8
Processors Peripherals
Memories
VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

We are buying, selling, & leasing!

Buying: 3830, 3420
Selling: 360/65, 360/40
Leasing: 370/155, 360/65

Please contact:

Linda Vaughn / (415) 955-0220
Tommy Talbot / (415) 955-0238

TEL
CORPORATION

WANTED

BURROUGHS "L" Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299

Boynton Business Systems
87 Route 208
Walkill, N.Y. 12584
914-895-2007

MINICOMPUTERS — & SYSTEMS

Don't waste company time or
money. Check with us before you
buy or sell.

New DEC Equipment
Immediate Delivery

RK11-RK05 Disk Systems -
\$8500
PDP 11/04s and 11/34s - 20% off
list
DZ 11
DEC Station 78

New DG Equipment
Immediate Delivery

DG 10 Mbyte Disk Systems from
\$7500
DASHES - 15% to 25% off list
Nova 3/12 or 3D - 20% off list
Immediate delivery for MOS!

Inventory Clearance
call us for free brochure

**MINICOMPUTER
EXCHANGE**

(408) 733-4400
TWX 910-339-9272

BUY • SELL • LEASE • TRADE

PURCHASE LEASEBACK / RENTAL CREDITS

Write or call collect today
to these representatives!

SYSTEM / 3
All Peripherals
call Ted Arbuckle

370's
All Peripherals
call Don Norris

SYSTEM 32's, 34's
3270 CRT's
call Marilyn Morris

EAM EQUIPMENT
Refurbished, eligible for
IBM M/A
call Don Norris
or Duke Crumpton

360's
All Peripherals
call Duke Crumpton

MCC

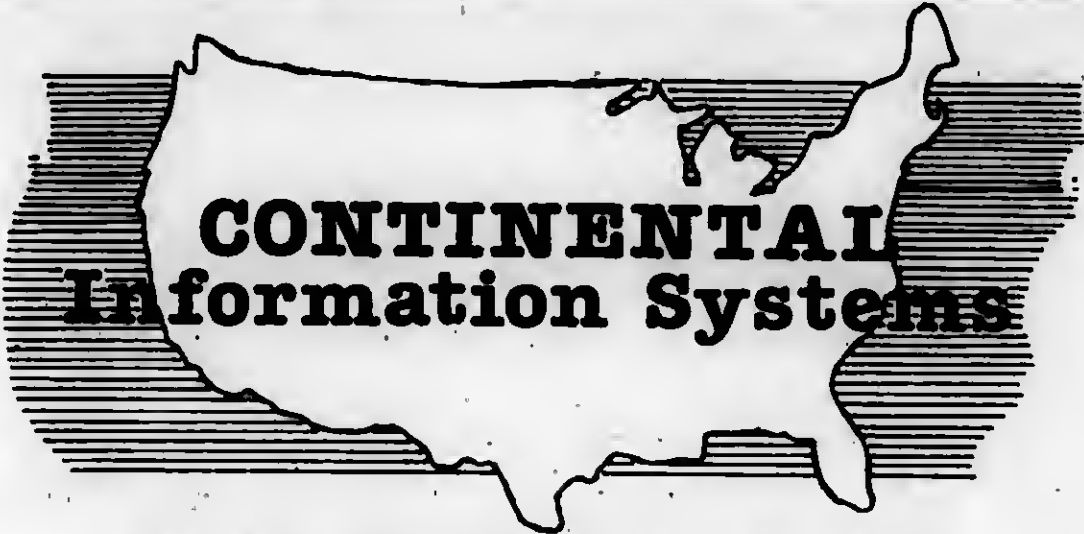
(214) 634-2750
TWX 910-861-4171

METROPLEX COMPUTER COMPANY, INC.

Suite 1208 Honeywell Bldg.
1111 W. Mockingbird Lane Dallas, Texas 75247

Industry's Fastest Growing Computer Dealer



buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap								
BUY SELL LEASE 370, 380, 1401 & 1440 SYSTEMS & PERIPHERALS PURCHASE/LEASEBACK 029, 129, 3741, 3742, 3540, 3803, 3420, 3340's IBM UNIT RECORD EQUIPMENT 026, 082, 083, 084, 085, 087, 088, 402, 407, 514, 519, 548, 552, 557, 029-059-129 Call us for all your needs, we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and govern- ment requirements. Contact ACS for proposal. 7126 Mullins Houston TX 77081 (713) 666-2122 TWX 910-881-1526 ACS EQUIPMENT CORP. 	 CONTINENTAL Information Systems BUY, SELL, LEASE, SUBLEASE, AND TRADE NEW AND PRE-OWNED IBM EQUIPMENT AVAILABLE <table border="0"> <tr> <td>Feb 78</td> <td>155-II, 165-II, 158-new, ITC qualifying 168-new, ITC qualifying</td> <td>Apr 78</td> <td>145-II 155-II 165-II 158-new, ITC qualifying 168-new, ITC qualifying</td> </tr> <tr> <td>Mar 78</td> <td>165-II 158-new, ITC qualifying 168-new, ITC qualifying</td> <td>May 78</td> <td>158, pre-owned 158-new, ITC qualifying 168-new, ITC qualifying</td> </tr> </table> Several 370 systems available beyond May, 1978 We will also take your currently installed IBM equipment in trade on a new system.			Feb 78	155-II, 165-II, 158-new, ITC qualifying 168-new, ITC qualifying	Apr 78	145-II 155-II 165-II 158-new, ITC qualifying 168-new, ITC qualifying	Mar 78	165-II 158-new, ITC qualifying 168-new, ITC qualifying	May 78	158, pre-owned 158-new, ITC qualifying 168-new, ITC qualifying	WANTED NCR 299 - 399 - 499 270-279-775 BURROUGHS All L Series TC Series - TO700 IBM 360-370; 3270; 029; 129 DEC PDP 8 And 11 CPU's Peripherals IOA DATA CORP. 383 LAFAYETTE ST. N.Y. 10003 212 673-9300
Feb 78	155-II, 165-II, 158-new, ITC qualifying 168-new, ITC qualifying	Apr 78	145-II 155-II 165-II 158-new, ITC qualifying 168-new, ITC qualifying									
Mar 78	165-II 158-new, ITC qualifying 168-new, ITC qualifying	May 78	158, pre-owned 158-new, ITC qualifying 168-new, ITC qualifying									
FOR LEASE 3032 (4 MEG) JUNE 78 CONTACT: BOB RUSSELL SYSTEMS MARKETING, INC. 200 E. Thomas Road Phoenix, AZ 85012 (602) 264-5600 TLX 667-334	Call Us! CIS CIS Corp. 600 MONY Plaza Syracuse, NY 13202 315-425-1900 Peripherals and I/O All 360/370 Disk, Tape Printers, Readers, and T/P Gene Chappell CIS is very interested in buying pre-owned IBM 370 systems. If you are thinking about selling, let us make you an offer.			For Sale XEROX DISK SYSTEM MODEL 7275 Controller W/86 MB Disks Call Telefile (714) 557-6660 Ask for Mrs. Weddle FOR SALE One S/32 with 155 LPM Printer computer and one 3742 Model 001 Dual Data Entry Station. Contact Mr. Frank Vaughn. American Manufacturing Company, Inc. P.O. Box 52125 Lafayette, LA 70505 or call (318) 837-9241								
BUY-SELL TRADE For Computer Call Action Write CAC P.O. Box 80572 Atlanta, Ga. 30366 404/458-4425	FOR SALE OR LEASE Immediately Available IBM 3330/001's IBM 3330/011's IBM 3333/011's with features #8150 Contact: Harry Blair 713-524-8249		BUY SELL LEASE SYSTEM/3 Models 15, 10, 8, 6 Systems 32 & 34 All Support Peripherals COMPUTER BROKERS, INC. P.O. BOX 28298 Memphis, Tn. 38128 Phone 901/372-2622 Member CDA	155's BUY-SELL-LEASE CMi CORPORATION GARY SMITH — 313-642-8000								
ISI INDEPENDENT WE BUY - SELL - INSTALL & REPAIR AT REASONABLE PRICES HONEYWELL USED SERIES 200 EQUIPMENT COMPUTER SYSTEMS PARTS — PERIPHERALS Now in stock 2040-64K M7-32K M9 120-1250 — TAPE DRIVES READERS, PRINTERS, PUNCHES 3200-131K Avail. 6/78 CALL NOW Wilson Grabbit (513) 874-8100 INTEGRITY SYSTEMS, INC 4812 Interstate Drive Cincinnati, Ohio 45246	THREE AND FOUR YEAR WALK-AWAY LEASES 1. ATTACHED PROCESSOR FOR 3158 2. 3158 - 3 MEG WITH APU FEATURE SPRING AVAILABILITY 3. 3158 - 3 MEG MOD 3 SUMMER AVAILABILITY THOMAS NATIONWIDE COMPUTER CORPORATION Brian M. Battle — (312) 944-1401 600 North McClurg Court-Suite 4202A Chicago, Illinois 60611 Paul Nortman — (516) 752-1000 1 Huntington Quadrangle-Suite 4S13 Huntington Station, New York 11746			For Sale HONEYWELL H-200-2 64K 4-444KC Tapes; 1-950 LPM Printer; 1-800 CPM Card Reader; 3-259 Disk Drives (9.2M); 1-Typewriter Console Under Honeywell maintenance Complete system Immediate delivery \$20,000 Will consider lease American Heritage Life Insurance Co. Attn: Hal Womersley 11 E. Forsyth St. Jacksonville, Fla. 32202 (904) 354-1776 Ext. 245								

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
 WANTED TO BUY 168 158 165 155's All 370 Peripherals 145-12 and 135 H 360 65 IPS		FOR SALE 165-KII DATED up to 4 mega byte. For Sale or Lease. 158-K Available in March with or without ISC. 155-J available now with or without new DAT 145-12 available now with ISC 3420-7 available now with switching features 158 Memory J to KJ available March 1	FOR LEASE 145-10 available immediately for sale or short term lease 125's We will purchase and leaseback your 125 system. Save rent starting today. Call for a quote. IBM RENTAL CREDITS We will pay for your rental credits on FTP, ETP, and MAC machines. Call us before sending your machine back to IBM. 	FOR LEASE 3138 March 3, 1978 March 24, 1978 April 21, 1978 3148 March 3, 1978 April 14, 1978 May 19, 1978 FOR SALE Burroughs B3500 Computer/Peripherals  Computer Capital Corporation 1351 Washington Boulevard Stamford, Connecticut 06902 Tel 203 357 9663

WANTED TO BUY
IBM 370/155
with or without DAT
Contact: Harry Blair
(713) 524-8249

DEC
PROCESSORS
PERIPHERALS & MODULES
BUY — SELL — LEASE — RENT
\$1, 000,000

NEW & USED DEC INVENTORY
DEC CPU'S
11/04 • 11/05 • 11/10 • 11/35 • 11/40 • 11/45 • 11/60 • 11/34 • 11/70 • PDP8E • DEC 310
DEC DISKS & CONTROLLERS
RK05 • RX11 • RK11D • RP02 • RP03 • RP04 • RP06
DEC TAPES
TU10 • TJU16 • TJE16
DEC TERMINALS
VT52 • VT50 • VT05 • VT20 • LA36 • LA180 • LA120
DEC PERIPHERALS
DH11 • DZ11 • DL11's • LPI1 PRINTERS
MISC. BOARDS & MEMORY
M7260 • M7261 • MM11DP • MM11L • DPL1D • KW11L
MM11U • MS11BM • M792 • DUL1DA • MS11JP • MF11L • MM11F • MF11U

Hundreds of Miscellaneous Modules & Cables Available
CALL FOR OTHER COMPONENTS IN STOCK

SAVE 33%

NEW 11T34 CONFIGURATION
XXXXXXXXXX \$23,333.33 XXXXXXXXXX
FOR FAST DELIVERY AND
SUBSTANTIAL SAVINGS,
CALL THE DATALEASE
DIGITAL HOTLINE
800-854-0350

DATALEASE

700 North Valley Street, Anaheim, CA 92801
(714) 533-3920 TELEX 692439

NOTICE OF SALE

The State of Indiana, acting by and through R.E. Sanders, Commissioner, Department of Administration, for and on behalf of the Data Processing Division, will receive sealed bids on the sale of the following:

2-IBM 3830-002 Storage Control Units, Each have the following features: 2150 Control Store Extension, 2151 Expanded Control Store, 6111 Register Expansion, 8170 Two Channel Switch, 8171 Two Channel Switch Additional.
1-IBM 3830-002 Storage Control Unit with the following features: 8170 Two Channel Switch, 8171 Two Channel Switch Additional.

1) Each bid must be accompanied by a certified check or cashier's check for 20% of the bid. This check is non-refundable to the successful bidder and will be deducted from the bid price. If the successful bidder does not purchase the equipment this money is forfeited. Checks will be returned to unsuccessful bidders within 10 working days of bid opening date. Make check payable to the Dept. of Administration, State of Indiana.

2) The successful bidder will be notified by registered mail within 10 working days from the date of the bid opening.

3) All bids must be firm and held open for at least 20 days from the date of the bid opening.

4) The successful bidder must complete payment before the equipment is removed from the premises. It must be removed by March 15, 1978.

5) A non-collusion affidavit must be signed by the successful bidder.

6) The equipment is sold "as is". IBM will certify, in writing, that the machines are qualified for an IBM maintenance agreement at any location in the United States and Puerto Rico. All three pieces of equipment must be bid on.

7) IBM will disconnect and package the equipment ready for shipment. It will be the responsibility of the successful bidder to remove the equipment from the Indiana State Office Building at Indianapolis, Indiana and provide transportation to its destination. The successful bidder will be held responsible for any damage done to the premises while removing the equipment.

8) Sealed proposals on bids shall be received in the Office of the Commissioner, Department of Administration, 507 State Office Building, 100 N. Senate Ave., Indianapolis, Indiana, 46204, until 10:00 A.M. on the 15th day of February, 1978, at which time and place all bids shall be publicly opened and read.

9) Equipment will be ready for removal by March 15, 1978.

10) For further information contact Mr. Charles Woodward, Data Processing, (317) 633-4690.

11) The State of Indiana reserves the right to reject any and all bids.

FOR SALE
Immediate Delivery

DEC
PDP 8E COS 300
System 16K
2 RK05 Drives
3 VT05 CRT
1 L8JA 300/LPM
132 col 64 char Printer

CONTACT:
Porter Davis
P.O. Box 14887
Okla. City, OK 73114
(405) 751-4880

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Bldg., Jackson, MS 39201, for the following data processing equipment and services:

Request for Proposal No. 335 due 2:00 p.m., March 1, 1978, for the lease or purchase of line sets and line interface bases for an existing IBM 3705 communications control unit.

Request for Proposal No. 336 due 2:00 p.m., March 1, 1978, for the purchase of the software package PDP-11 BASIC-PLUS-2, Version 1 QJ919 or equivalent, to run on a PDP 11/70.

Request for Proposal No. 337 due 2:00 p.m., March 1, 1978, for the purchase of a printer terminal capable of interfacing with an existing DECsystem-10 computer, to be used to prepare typed textual materials.

Request for Proposal No. 338 due 2:00 p.m., March 1, 1978, for the purchase of a communications terminal capable of interfacing with an existing UNIVAC 1106 computer and having interchangeable character sets for use in foreign language projects.

Request for Proposal No. 339 due 2:00 p.m., March 1, 1978, for the purchase of a drum plotter capable of interfacing with an existing UNIVAC 1106 computer.

Request for Proposal No. 340 due 2:00 p.m., March 1, 1978, for the purchase of a micro-computer with graphics display capable of communicating with an existing DEC 1077 computer system.

Request for Proposal No. 341 due 2:00 p.m., March 1, 1978, for the purchase of two microprocessors compatible with existing software written for the Altair 88008 microprocessor.

Request for Proposal No. 342 due 2:00 p.m., March 1, 1978, for the acquisition of the IBM MVS/System Extensions or an equal or better software product.

Frank C. Stebbins, Executive Director
Central Data Processing Authority

Short or Long Term
Leases From
RANDOLPH

370/138
370/148
370/135
370/145

... and all other IBM systems ...
from S/3's and 115's ... to 168's
and all 303X. CPU's or full systems.
Up to 8-year leases available.

CALL THE 370 HOTLINE
800-243-5307

Randolph Computer Company
537 Steamboat Rd., Greenwich, CT 06830
(203) 661-4200

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap																	
 FOR SALE OR LEASE COMPUTERS B6700 Complete System April 1, 1978 B4700 Complete System April 1, 1978 B3700 CPU Only \$175,000.00 B1728 Complete System March 1, 1978 B700's - Several Systems PERIPHERALS B500-B4700-Tape Drives; Disk TERMINALS TC732/735 Teller Terminals TO700's w/Expanded Memory (303) 922-8331 2480 W. Alameda Ave. Denver, CO 80223 Lawrence G. Lyon	CMI BUY LINES BUY-SELL-LEASE-TRADE <table> <tr> <td> 3031/3032/3033 (Lease Only) John Mills (313) 642-8000 </td> <td> 3420 3803 3333 3830 3330 3340 Darryl Hastings (313) 642-8000 </td> <td> 360 30/40/50/65 Gary Smith (313) 642-8000 </td> </tr> <tr> <td> 370/165 370/168 Bob Van Hellemont (313) 642-8000 </td> <td> IN CANADA IBM 360 370 System / 3 Don DuPuis CMI Company P.O. Box 893 Windsor, Ont. N9A 6P2 (519) 258-8910 </td> <td> 3270 CRT's Printers/Controllers Jim Carleton (313) 642-8000 129-029-059-026 </td> </tr> <tr> <td> 370/158 Ron Baker (313) 642-8000 </td> <td></td> <td> System/3 Model 15 Jerry Roberts (313) 642-8000 </td> </tr> <tr> <td> 370/155 Gary Smith (313) 642-8000 </td> <td> 370 148/145/138/135 Pam Hoban (313) 642-8000 </td> <td> 3742 3741 5496 Jerry Sharon (313) 642-8000 </td> </tr> <tr> <td> 370/115/125 Bob Southwell (313) 642-8000 </td> <td> 1403 2821 2501 1442 1443 If you rent any of these and are returning them to IBM call me. I'll show you how to make money using your rental credits. We buy and sell all of these units. Kathy Housley (313) 642-8000 </td> <td> 360/20 1130 Jim Carleton (313) 642-8000 </td> </tr> </table>			3031/3032/3033 (Lease Only) John Mills (313) 642-8000	3420 3803 3333 3830 3330 3340 Darryl Hastings (313) 642-8000	360 30/40/50/65 Gary Smith (313) 642-8000	370/165 370/168 Bob Van Hellemont (313) 642-8000	IN CANADA IBM 360 370 System / 3 Don DuPuis CMI Company P.O. Box 893 Windsor, Ont. N9A 6P2 (519) 258-8910	3270 CRT's Printers/Controllers Jim Carleton (313) 642-8000 129-029-059-026	370/158 Ron Baker (313) 642-8000		System/3 Model 15 Jerry Roberts (313) 642-8000	370/155 Gary Smith (313) 642-8000	370 148/145/138/135 Pam Hoban (313) 642-8000	3742 3741 5496 Jerry Sharon (313) 642-8000	370/115/125 Bob Southwell (313) 642-8000	1403 2821 2501 1442 1443 If you rent any of these and are returning them to IBM call me. I'll show you how to make money using your rental credits. We buy and sell all of these units. Kathy Housley (313) 642-8000	360/20 1130 Jim Carleton (313) 642-8000	BASIC FOUR EQUIPMENT DATA PRODUCTS PRINTER 240 - 1100 LPM \$5900 IOMEC DISK DRIVE 4.2 mb \$6900 HAZELTINE VDT \$2000 GRAPHIC RESOURCES CORP. Offices Located In: Los Angeles, Houston, Denver, Washington, D.C. CORPORATE OFFICE: (213) 598-3318/(714) 898-3584 5442 Research Drive Huntington Beach, CA 92649		
3031/3032/3033 (Lease Only) John Mills (313) 642-8000	3420 3803 3333 3830 3330 3340 Darryl Hastings (313) 642-8000	360 30/40/50/65 Gary Smith (313) 642-8000																			
370/165 370/168 Bob Van Hellemont (313) 642-8000	IN CANADA IBM 360 370 System / 3 Don DuPuis CMI Company P.O. Box 893 Windsor, Ont. N9A 6P2 (519) 258-8910	3270 CRT's Printers/Controllers Jim Carleton (313) 642-8000 129-029-059-026																			
370/158 Ron Baker (313) 642-8000		System/3 Model 15 Jerry Roberts (313) 642-8000																			
370/155 Gary Smith (313) 642-8000	370 148/145/138/135 Pam Hoban (313) 642-8000	3742 3741 5496 Jerry Sharon (313) 642-8000																			
370/115/125 Bob Southwell (313) 642-8000	1403 2821 2501 1442 1443 If you rent any of these and are returning them to IBM call me. I'll show you how to make money using your rental credits. We buy and sell all of these units. Kathy Housley (313) 642-8000	360/20 1130 Jim Carleton (313) 642-8000																			
SUB LEASE Short or Long Term MEMOREX DISC 3330 Type - 6 Spindle 3672, 3673, 3670 Fits IBM 370 w or w/o IFA Avail. 3-4-78 Contact J. McFarlane (714) 546-4220	FOR SALE BY OWNER BURROUGHS B-1714 50% OFF Priced for Immediate Sale System Under Full Burroughs Maintenance Parent Corporation is Consoli- dating EOP Operations: Com- plete System Includes: B1714 Central Processor 49 KB Main Memory A9340 Console Printer A 9419-2 96 Col. Card Reader A 9245-6 Drum Line Printer (300 LPM) 2-A 9480-2 Disk Cartridge Drives 4 Drawers (10 MB Capacity) Principals Only Contact: COMPUTER SYSTEMS CENTRE Subsidiary of Quaker Business Assoc., Inc. 234 N. Sixth St. Reading, PA 19601 (215) 373-5146			3830-2 2150, 2151, 6111 For Sale or Lease. AVAILABLE MARCH TOM ROBBINS (612) 831-6088																	
	UNIVAC S/70 <table> <tr> <th>Type Number</th> <th>Nomenclature</th> </tr> <tr> <td>8002-002</td> <td>Controller 8000-15 Mem. (256k) 3 Sel. Channels 1 Mux Chan. 1401 Emulator</td> </tr> <tr> <td>8057-20</td> <td>Console</td> </tr> <tr> <td>8243-030</td> <td>Printer (Drum) 2 ea.</td> </tr> <tr> <td>8453-002</td> <td>Tape Drive 3 ea.</td> </tr> <tr> <td>8476-208</td> <td>Tape Control</td> </tr> <tr> <td>8237-10</td> <td>Card Reader</td> </tr> <tr> <td>8594</td> <td>Disk Controller</td> </tr> <tr> <td>8592</td> <td>Disk Storage 4 ea.</td> </tr> </table> Rollins Inc. P.O. Box 647 Atlanta, Georgia Telephone: (404) 873-2355 Ext. 518			Type Number	Nomenclature	8002-002	Controller 8000-15 Mem. (256k) 3 Sel. Channels 1 Mux Chan. 1401 Emulator	8057-20	Console	8243-030	Printer (Drum) 2 ea.	8453-002	Tape Drive 3 ea.	8476-208	Tape Control	8237-10	Card Reader	8594	Disk Controller	8592	Disk Storage 4 ea.
Type Number	Nomenclature																				
8002-002	Controller 8000-15 Mem. (256k) 3 Sel. Channels 1 Mux Chan. 1401 Emulator																				
8057-20	Console																				
8243-030	Printer (Drum) 2 ea.																				
8453-002	Tape Drive 3 ea.																				
8476-208	Tape Control																				
8237-10	Card Reader																				
8594	Disk Controller																				
8592	Disk Storage 4 ea.																				
CMI The IBM Specialists CORPORATION 1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000			Member Computer Dealers Association																		

BUY • SELL • LEASE • TRADE

SYSTEM / 3 370 / 115
370 / 125

 **ECONOCOM**

MEMBER COMPUTER DEALERS ASSOCIATION

ECONOCOM
 1255 LYNNFIELD ROAD
 P.O. BOX 17825
 MEMPHIS, TENNESSEE 38117
 901-767-9130

BUY SELL LEASE BROKERAGE

LETTER
 "A" COMPANY LARGE WHOLESALE DEALER

Buy, sell, lease, sub lease, or be your agent in placement
 of your pre-owned IBM 360/370 System 3, or other units

COMPUTER INTERNATIONAL LTD.
 C.W.C. International Division
 experts in foreign markets, foreign customs

BEACH COMPUTER CORPORATION C.W.C.'s Leasing Division
COMPUTER WHOLESALE CORP. (504) 581-7741
 SUITE 502 508 FIRST NATIONAL BANK OF COMMERCE BLDG
 NEW ORLEANS, LOUISIANA 70112
 MEMBER COMPUTER DEALERS ASSOCIATION

Sale or Lease
370/145-12
 Serial #11192
 Available 3/1/78
 Combination 3145 interim to 3031 lease
 Plans also available.
 Will make configuration changes
 to meet your needs
 Contact Jim Jamison

 **(804) 643-9123**

Commonwealth Computer Advisers, Inc.
 707 East Main St. Suite 1650
 Richmond, Virginia 23219

3033
Purchase/Leaseback
 Lessor wanted for our
 on-order system-
 June delivery.
 For RFP contact
 R. Goods
AT&T-Long Lines
 Room 5C160
 Bedminster, N.J. 07921
 201-234-6270

Wanted To Buy

3672-Memorex storage control unit
3673-Memorex disc controller
3670-Memorex disc module
3675-Memorex disc module

Contact:
Harry Blair 713-524-1401

efm computer leasing, Inc.



LEASE • BUY • SELL
 360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40	360/65
360/50	370/135

3000 marcus avenue
lake success, ny 11040
(516) 488-7676

3803-1/3420-7
AVAILABLE FOR SALE OR LEASE

IPS can supply 3420-7 systems of
 any size from inventory. Control-
 lers with or without switching
 features. Attractive sale or lease
 terms available. CALL ED JO-
 SEPH for an immediate quote.

IPS COMPUTER MARKETING
 2460 Lemoine Ave.
 Fort Lee, N.J.
 (201) 947-4200

WILLIAM MARION COMPANY, INC.
P.O. BOX 309 • HACKENSACK, N.J. 07602

N.C.R. 270-299-399-775 31, 32, 41, 42 etc. BURROUGHS "L" TC 500, TC 700 I.B.M. 029-Systems 32/34	029's & 059's immediate delivery Also: 026 - 056 - 082 - 083 084 - 085 - 088 - 402 - 403 407 - 514 - 519 - 548 - 552 557 - Eligible For IBM M/A
---	---

FOR MORE INFORMATION CALL- (201) 343-4554

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

IBM PROCESSORS & PERIPHERALS

PROCESSORS PERIPHERALS

SELLING:

3145
3165
31553420-3
3340-A2

LEASING:

3165-4 MEG
7 Channels-Now
3155K02-Feb.3420-6
Avall. Now
3330-1, 11

BUYING:

3158
31683340A2, B2
3420-8

The Logical Choice

COMDISCO

9701 W. Higgins Rd. Rosemont, Ill. 60018
(312) 698-3000San Francisco
415 944-1111Fort Worth
917 534-1774Atlanta
404 256-5956Minneapolis
612 854-8107New York
201 568-9666Paris, France
374-1130

BUY

Surplus DEC And Data General Hardware

PHIL THOMAS

For Sale

(305) 272-8753

Thomas Business Systems, Inc.

SELL

FOR SALE PDP 11/34

(2) RK05J'S
RSTS/E
96K bytes

IMMEDIATE DELIVERY

\$24,500

CALL M.E. CONGDON

EDUCOMP QUODATA

(203) 728-6777

For Sale

IBM MEMORY

360/65 memory;
2365's370/155 memory;
3360's

Call:

Hal Begzos
(313) 352-1040COMPUTER
Facilities & Offices
25,000 sq ft. lease
Teterboro, N.J.

- *Quality building & construc.
- *8,000 ft. raised computer floor
- *17,000 ft. MOD A/C offices
- *Fully sprinkled plus utilities
- *Excellent location for professional & skilled
- *Nr. Rta. 80, Rta. 46, G.S. Pkwy. 20 min from NYC
- *Parking facilities 50 cars (more avail.)

Brokers invited. Call
MAJESTIC INDUSTRIES, INC.
212/594-7235 201/489-7100

For Sale Or Lease System 3/15 Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.
Also complete inventory tapes — disks.
Printers — CPU UpgradesCall Avery Reynolds 214-630-6700
TWX 910-861-4936Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association



dearborn giveth:

370's: 370-145J (mod 2 & ISC avail.);
3420-7 single.

dearborn taketh:

370-145's; 370-135's; 3420's; 3330's; 3340's.

Call Tom Millunchick: 312/827-9200
or any dearborn office.(for 360 equipment, call Ed Winclechter:
312/827-9200 or any dearborn office.)dearborn
computer companydealer - IBM computers
systems software
leasing1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788

MAGNETIC TAPE SALE

Slightly used, Money-Back Guarantee
U.S. Government Archives
Manufactured to G.S.A. Specs!
2400' 1600'bpi/3200fci
w/Hanging Seal \$4.50 ea.
Freight prepaid on orders over 200
Tapes. Shipped within 48 Hrs.

CALL or WRITE:

Computer Tape Mart

31 Sprague Ave., Amityville, NY 11701

(516) 691-2309

(Brokers Inquiries Welcomed)

BROKER

IN DEC COMPUTER SYSTEMS AND COMPONENTS

C.D. SMITH
730 N. Post Oak Road
301
Houston, Texas 77024
(713) 686-9405

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
AND PERIPHERALS
WE BUY • SELL • LEASE • TRADE

transdata



P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

SELLING

PREVIOUSLY OWNED EQUIPMENT & SYSTEMS

N.C.R. & BURROUGHS

N.C.R. 31, 32 & 151 & 152 Teller Units
735/735 & 745 Mag. Tape Enc. & Line PrintersN.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S

Also B-700 Thru B-4700 Systems w/wo Peripherals

WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS

BUYING OR SELLING-CALL US FIRST.

KEY-EXIMPORT CORP.

756 LIVINGSTON ST. (P.O. BOX 129) NORTHVALE N.J. 07647
TELE. N.J. (201) 767-3444 N.Y.C. (212) 730-7736
TELEX 125149 CABLE KEYEXIMP NORTHVALE NJ

BUYING

FORSYTHE
McARTHUR

(312) 943-3770

Dealer &
Lessor in IBM
ComputersFORSYTHE/McARTHUR ASSOCIATES, INC.
919 North Michigan Ave., Chicago, IL 60611

Member Computer Dealers Association

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

GREYHOUND COMPUTER CORPORATION

For Sale or Lease

Univac 494 CPU with 131K Memory
Full I/O CRT Console

Univac FH1782 Drums-Type 6015-00

Direct Drive-Hard Surface

Call:

John Hallmark

or

Don Haworth

(214)233-1818

**FOR SALE
IBM S/32**

9MB, 24K

AVAILABLE NOW**\$31,000**D.P. Solutions
Mike Stevenson
2101 Poplar Ridge Rd.
Pasadena, Md. 21122(301) 437-1426
(301) 761-5301**FOR IMMEDIATE SALE**Complete H-400 System
4000 word CPU (w/mult div
optional); 6 tape drives
(404-1); 1 422-4 printer; 1
427-1 card reader/punch**IBM 2319 Model A1**Three Spindle Disc
Storage FacilityPurchase Prices
Are Negotiable

Contact:

R.E. Daggett
Dennison Mfg. Co.
300 Howard St.
Framingham, MA 01701
(617) 879-0511**3032 and/or 3033
WANTED**User Wants To
Lease System(s)
For 3rd Quarter 78
Installation (or earlier).

For RFP, contact:

R. Goode
AT&T-Long Lines
Room 5C160
Bedminster, N.J. 07921
201-234-6270**SPRING
CLEARANCE**

360/40 G 128K	\$22,000
360/30 F 65K	6,500
1403-2 Printer	8,000
2415-5 Tapes 1600 BPI	9,500
2401-2's (1x4)	9,000
3340-2 Disk	18,000
3410-2 Tape	7,500
2311 Disks (each)	450

Call: (914) 238-9631
COMPUTER MERCHANTS INC.
75 So. Greeley Avenue
Chappaqua, N.Y. 10514For Sale by Owner
Burroughs B-1714
IBM Unit Record Eqpt.Equipment presently operating
under Burroughs Maintenance
Agreement and priced for im-
mediate sale:Computer System:
B1714 Processor
64KB Main Memory
B9340 Console Printer
B9419 96-col rdr/pch
B9115 80-col rdr
B9481 9.2 MB disk
B1351 Singl Line Cntrl
B1650 Orct con: adapt.
T0802 CRT-online
PC820 80-col. data rdr.
B9240 750 LPM printerKeypunch Machines:
13 IBM 029
5 IBM 024
3 IBM 024, 026, 059Offers will be accepted in total or
by piece. On-location demonstra-
tions available thru 2/22 in Ham-
mond, Indiana.Gallagher Asphalt Corp.
Thornton, Illinois
Contact: J.K. DeMarla
(312) 468-5010**Data Systems Marketing
Delivery from Stock****Microcomputer Systems**Digital: PDP 11/03 Family with Both Floppy and Hard Disks,
VT-78 Micro 8, Word Station 78
Data General: Micronova Family**Printer Terminals**Digital: LA-36, LA-35, LA-180, LS-120
Teletype, Model 43
Data General: Dasher 30 and 60 CPS
Diablo: Hyterm-1620 and 1610
Lear Siegler: Hydra Series 200 180 CPS
Texas Instruments: 743, 745, 810**Video Terminals**

Lear Siegler: ADM-3A, ADM-2, AOM-2B, AOM-1A, VOP-400

User Programmable
A005: Regent 100 and 200

Digital: VT-52

Data General: Dasher 60S3 and 60S2

Data Communications and AccessoriesOSM: Acoustic Couplers, 103F, 113A, 113B
General Data Comm: 113B Direct Connect, Frequency Division
Multiplex Equipment

Sykes: Single and Dual Drive RS-232 Floppy Disk, IBM 5100

Compatible Floppy Disk

Techtran: 815, 8410, 8400, 8420; B421 Single and Dual Cassette
Systems**Software**

General Purpose: Disk Operating System, Fortran and Business

Basic for PDP 11/03 and Micronova Families

Distributed Processing: Remote Job Entry, Asynchronous and

Data Communications for PDP 11/03 and Micronova

Families

Business: Public Accountant Client Write Up and Complete Set

of Business Accounting Packages for PDP 11/03

Call 714-560-9222, 800-532-3717 (California)
or 800-854-2684 for DSM Showroom Nearest You**dataserv**

buy • sell • lease • trade

370
115 and 125
Steve Lacny
800-328-2406For Sale or Lease
Any 115/125 configuration
Sending 115/125
Back to IBMCall us! We'll show
you how to make money
using your rental credits.**370**
135 through 168
Dave Miller
616-637-8481For Sale or Lease
135 - 145 - 155
CPUs — Peripherals —
Memory
**370/138 MEMORY
I-J**
For Sale or Lease
Available in January**370**
Peripherals
800-328-2406For Sale or Lease
3211/3811 3340/A2.B2
3272/3277 3410/3411
3330/3333 3420/3803
STOP! Before you send
any of the above machines
back to IBM call us. We'll
show you how to make
money.**360**
CPUs and Peripherals
Neal Johnson
800-328-2406For Sale or Lease
360/30 - 40 - 50 - 65s
CPU — Peripherals —
MemoryWe'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory**Sys/3**
CPUs and Peripherals
800-328-2406
SYS/32'SFor Sale or Lease
5406 - 5410 - 5412 - 5415
CPUs — Peripherals —
MemoryWe'll Buy
Your 5406/5410
5415 — Rental credit
machines
Peripherals — Memory**Call Toll Free 800-328-2406
or 612-544-0335**Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd
P.O. Box 9488, Minneapolis MN 55440CSA, A NATIONALLY PROMINENT IBM 370 LEASING COMPANY,
is currently in the process of updating its portfolio of IBM 370
equipment.**FOR LEASE
AVAILABLE IN APRIL
370/158 - MP SYSTEM**

3158 M31

FEATURES 1433, 1434, 1435,
78403213 1
3058 1**AVAILABLE NOW**

Short or Long-Term Lease

3145 H2 with 1 1/4 Meg

Intel AMS Memory
FEATURES: 2152, 4660, 6111,
6982, 7855, 8100,
88103215 1
3047 13158 M31 with 1/2 Meg
Intel Memory

FEATURES 1433, 1434, 1435

3213 1

AVAILABLE NOW

1 Year Lease

3138 J

FEATURES 4640, 4655, 4722
4723, 8075**WANT TO BUY**

135 GF

370 Peripherals

Call Marv Berger (800) 225-2036 or (617) 482-4671

**Computer Systems
of America, Inc.**Computer Systems of America
141 Milk St., Boston, MA 02109
(617) 482-4670**BEFORE YOU BUY, SELL, OR LEASE,
TAKE A 'SECOND' LOOK!****FOR SALE**3505-B1 and 3525 P3
3155-J with Dat Box
3158-U36 — Del. 9/78
3158-K — Del. 6/78
3165-K — Del. 6/78
(BUY OR LEASE)**WANT TO BUY**370/145 I2-J2
370/135 GF-I
3-1403 N 1
1442 N 1
3420-5 Single Density
3420-8 Dual Density**COMPUTER
INDUSTRIES
INC.**3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654CHICAGO - 312 298 5650
WASHINGTON 703/525-3074
LOS ANGELES 213 376 4343

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WANTED

RANDOLPH NEEDS:
3340-A2 DISKS
3420-3,4 & 8
MODEL TAPE DRIVES
CALL: MIKE SEEKINGS
TOLL FREE
800-243-5308

RANDOLPH COMPUTER COMPANY
 Division of Firstbank Financial Corporation
 A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
 537 Steamboat Rd., Greenwich, CT 06830 • (203) 661-4200

For Sale
Texas Instruments
Terminals
25-745s @ \$1,395
200-743s @ \$ 975

All terminals 6-8 months
 old and under maintenance
 contract with T.I.
 F.O.B. Tulsa

Call or Write:

Paul L. Goodman

Florafax Intl

P.O. Box 45745

Tulsa, OK 74145

918-622-8415

Quantity discounts
available.

LEASE

SHORT
AND LONG
TERMS

3033

ATTRACTIVE
RATES

360/ 30,40,50,65
 CPU 138,148,158,168/

370/ 125,135,
 145,155

BUY

DISK-
TAPES

SELL

National Computer Rental
415 Madison Avenue
New York, New York 10017
Tel. No. (212) 532-1500

Member of Tiger Leasing Group Member of Computer Lessors Assoc.

IBM UNIT RECORD EQUIPMENT

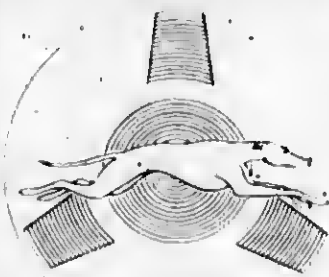
MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.
026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.
029	\$1800	\$55/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.
046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.
056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.
059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.
077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.			

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202 115 Harbor Island Rd.
 Chicago, Illinois 60611 Newport Beach, CA 92660
 (312) 944-1401 (714) 675-2810

SALE **ALL** **IBM Unit Record**
Equipment
129 & 029's
 East Coast
 (717) 564-8870
 West Coast
 (415) 332-6265
 Unit Record
 Leasing Company
 110 Hivista Road
 Sausalito, Calif.

BUY • SELL
TELETYPE
MODELS
43 • 33 • 32
 NATIONAL
 TELETYPEWRITER CORP.
 207 Newtown Rd.
 Plainview, N.Y. 11803
 (516) 293-0444

**GO GREYHOUND**

When you plan to
 Buy or Sell your
 Computer Equipment

For complete information
 call the Greyhound Repre-
 sentative in your area.

FOR SALE

3145-HO
 360/65J

U.S. Home Office
 New York
 Chicago
 Dallas
 San Francisco

INTERNATIONAL Canada
 U.K./Europe
 Mexico
 Austro-Asia
 Eurasia

NON IBM Dallas

WANT TO BUY

3340-A2 & 3340-B2
 3135 w/4655, 6981, 6982,
 7855, 7861

T.A. Tekash 602-248-6037
 Dick Ventola 914-949-1515
 Pete Ahern 312-298-3910
 M.W. "Bill" Tucker 214-233-1818
 Henry Paulson 415-283-8980

Don Maunder 418-366-1513
 Joe Gold 022-61-27-54
 Andres Contreras 905-543-6850
 John Hallmark 214-233-1818
 Don Haworth 214-233-1818

John Hallmark 214-233-1818



INTERACTIVE
INFORMATION
SYSTEMS

HAZELTINE CRT TERMINALS Interested? Contact
 1500 - \$1100 Brenda Baughman
 1510 - \$1300 1-800-543-4613
 5% cash disc. 513-761-0132
 IMMEDIATE DELIVERY P.O. Box 37403
 Cincinnati, OH 45222

370/125's

For Sale * Lease * Purchase
*** Purchase Leaseback ***

Specialists in 125 Systems
 3410's and 3411's Also Available



CORPORATE COMPUTERS, INC.

(203) 661-1500

115 Mason St., Greenwich, CT 06830

SALE OR LEASE

3340-B2

3330-11

3420-3

3411-2

3410-2

WANTED

3277 - 3272 - 3271

Contact: Bernie Gest

215-635-1700

Computer

Marketing Inc.

7704 Seminole Ave

Melrose Park, Pa

19126

Member Computer Dealers Assoc

FOR SALE/LEASE

DEC LSI 11
POP 11V03 SYSTEMS
LA 36 DECwriters
LA 180 * VT 52

In Stock For
IMMEDIATE DELIVERY

UNITRONIX CORP.
 1081 U.S. Hwy 22
 P.O. Box 6516
 Bridgewater, N.J. 08807
 (201) 725-2680

BUY-SELL-LEASE

026-\$ 850 085-\$ 750
 029-1850 514- 800
 082- 650 552- 750
 083-1800 557- 2500

Mohawk-8401-6403

NCR-736

Shredders
 Bursters & Decollators
 Call Stan Pelc



DP
SERVICE
Inc.

5505 N. MENARD AVENUE
 CHICAGO, ILLINOIS 60630
 PHONE 312 / 774-2556

SOFTWARE
FOR SALE**AUTOCODER**

Translations to Cobol. A cost
 effective solution as low as 60
 cents per line. For informa-
 tion brochure

Write:

Diversified Systems, Inc.
Box 2774-A
Champaign, IL 61820

\$100

is all it takes to buy a program
 that will make your COBOL pro-
 grams easy to maintain and under-
 stand:

- assigns paragraph prefix num-
bers.
- reformats all procedure division
statements to a neat, consistent
format.
- 30 day free trial.
- references on request.

Write for a product description of
 NUNPAR.

Robert M. Holroyd II
 122 Williams St.
 Collinsville, VA 24078

RPG II SYSTEMS

- *A/R OPEN ITEM OR 8/F
- *ACCOUNTS PAYABLE
- *GENERAL LEGER
- *PAYROLL AND LABOR OIST.
- *INVENTORY
- *CREDIT UNION MAILING, ETC

Extensive Documentation Provided

Bancroft Computer Systems

P.O. Box 1533, Dept. C

West Monroe, LA. 71291

(318) 388-2236

GENERAL LEDGER
\$400 FULL PRICE

- *Check Register *Journal Register
- *General Ledger *Trial Balance
- *Balance Sheet *Income Statement

Complete bookkeeping system for
 any medium to small company.
 Over 500 customers processed
 during the last ten years. Modular
 parameter design can be adapted
 to any small computer. Written in
 low level IBM Cobol. Price of
 \$400.00 includes Source pro-
 grams, sample JCL with test data,
 and complete operating proce-
 dures.

FREE SAMPLES
& DOCUMENTATION

GENE SUMRALL
 4211 S.W. Freeway
 Suite 106
 Houston, Texas 77027

software for sale

software for sale

software for sale

time & services

time & services

SAVE RPG/RPG II TO COBOL TRANSLATOR

This package accepts all types of RPG and produces ANS COBOL while approaching 100% error free conversion. The resulting COBOL program is modular in design and easy to read and maintain. Several client service options are available: Perpetual Lease, Conversion only, Clean Compile and full implementation including production JCL, test and installation. Over 100 satisfied customers.

For Prompt Reply Write or Call Us Today

DAND

Park Ridge, Illinois 60068, Suite 315
1480 Renaissance Dr., (312) 299-5005

ACCOUNTING SOFTWARE FOR DEC RSTS/E OR CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Completely on-line, interactive systems available for ACCOUNTS-PAYABLE, GENERAL-LEDGER, FINANCIAL-REPORTING, ACCOUNTS-RECEIVABLE and PAYROLL applications.

These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

If you are installing or have installed a Digital Equipment Corporation RSTS/E or CTS-500 system, contact us for cost-effective solutions to your core accounting problems.

Plycom services, Inc.

(219) 936-2183
P.O. Box 180
Plymouth, IN 46583

the rye systems

payrite
pas-rite

PERSONNEL ADMINISTRATION SYSTEM
OPERATES INDIVIDUALLY OR WITH PAYRITE
EMPLOYEE PROFILE
SALARY ADMINISTRATION
JOB SCHEDULING
JOB SCHEDULING
EDUCATION HISTORY
AUTOMATIC SCHEDULING
EDUCATION HISTORY

MR. DON WHITE,
CONDATA, INC., 1809 WALNUT STREET,
PHILADELPHIA, PA. 19103, 215-569-4240

MEDICAL/DENTAL BILLING

Complete Billing and Insurance Processing for doctors, groups and clinics.

- Complete Insurance Forms
- Profile, RVS, ICDA Files
- Bal. Forward, Ledger
- COBOL or RPG II
- 30+ users
- 360/370 or mini-computers
- On line, Real-Time or Batch Processing

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

WE ARE BROKERS OF COMPUTER TIME

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

Computer Time Brokers & Specialists

- On-site or remote processing
- Serving the Tri-State Area

BROOKE COMPUTER CORP.
250 W. 57 ST., NEW YORK, NY 10019
212 586-0923

\$4/HOUR

TIME SHARING
PDP 11/70 RSTS

- 1/2 meg Free Storage
- 8 cents per CPU Sec.
- Basic Plus 2, RMS-11, FORTRAN IV

Contact: Art Scotton
(714) 994-3241.

COMMANO COMPUTER
SERVICE, INC.

14402 Industry Circle
La Mirada, CA 90638

Lowest Computer Rates in Boston

Business-Engineering-Scientific
Extensive Applications Software

Discounts for users purchasing their own minicomputers

Ask about our \$99/month starter package with FREE DECwriter

PDP11 RSTS/E RSX11

Call us at 617/661-6444

Cybertel

334 Broadway Camb., MA.

CONNECTICUT
PRIME COMPUTER TIME
IBM 370/158 OS/SVS
IBM 360/50 OOS

REMOTE JOB ENTRY
BATCH PROCESSING

COMPETITIVE PRICES

Computeristics, Inc.

Benson Rd.

Middlebury, CT 06749

CALL COLLECT

Richard Wood:

(203) 573-2222

TIME AVAILABLE in TORONTO, ONTARIO IBM 370/138 DOS/VS/POWER IM, 2-3420, 4-3340, 1-3203

Available:

Up to 6 hours per day during off-hours and some partition time during prime shift. RJE possible.

Contact:

Ed Hotchkiss

(416) 292-5161

TSX

TIME SHARING FOR
RT-11 and COS-350 *

VERSION 6 NOW AVAILABLE
NEW FEATURES:

- Concise Command Language.
- Extensive Spooler Enhancements.
- DZ11 Support.
- Handles up to ten terminals.
- Runs on any POP-11 with 20k words, program swapping disk, and line frequency clock.
- Supports FORTRAN, MACRO, BASIC, OIBOL, LINK, PIP, AND EOIT.
- Automatic spooling to line printers.
- OL11 and OLV11 support.
- Command file capability.
- Virtual time-sharing lines allow one terminal to control multiple jobs.
- \$1275 distributed on floppy disk.
- \$1350 distributed on RK05 cartridge.
- \$85 for updates.

S&H COMPUTER LEASING, INC.

3709 Trimble Road

Nashville, TN 37215

(615) 385-3875

*Trademark of Digital Equipment Corp.

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Oata Craft, Oata General, COC, DEC, EMM, Febri Tek, Honeywell, GAI, HP, Interdate, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Varian, XOS.

Any Manufacturer's Memory

THREE DELTA CORP.

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

REMOTE JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide incoming Watts lines
- Complete systems and software support
- Full application library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, HASP, INTERCOMM, ROSCOE
- Complete data security including off-site storage

For information
call Walter Czerniak
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

370/158 mod 3 Datacenter

3.5 meg MVS
Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Keriavsky
(212) 564-3030

Datamor

132 West 31 St.
New York, N.Y. 10001

TONE 3

is
TSO FOR VS1
but
without TCAM and the
overpowering overhead of VS2
(check these points)

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with remote support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- Interactive program execution
- Operations additional console support
- Dataset maintenance
- Catalog management
- ISP support
- Remote entry subsystem support
- Enhanced 3270 usability
- Full ASCII terminal support
- Interactive computing
- Data inquiry

TONE
Software Corp.

write
for
details

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our translators, write or call today.

Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

TIME & SERVICES

COMPUTER TIME

- ALL SHIFTS AVAILABLE
- OOS/VS AND GRASP ENVIRONMENT
- COMPLETE DATA PROCESSING SERVICES PROVIDED
- REASONABLE RATES

370/145-256K

PERIPHERAL DEVICES INCLUDE:

- (6) 2314 DISK DRIVES
- (6) 200/400 KB DUAL DENSITY 8 TRACK TAPE DRIVES
- (2) 1403 N1 1100 LPM PRINTERS
- (1) 1442 CARD PUNCH
- (1) 2501 CARD READER
- (1) 2871 PAPER TAPE READER
- (1) 3215 CONSOLE PRINTER

CONTACT JIM GREEN OR LARRY YOUNG
MASS. TEL. (617) 883-8800

Whether you're buying, selling, swapping, hiring or looking,
Computerworld's Classifieds work.

Issue Date. Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/ Swap. (Available upon request Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy.

Cost: Our rates are \$55.30 per column inch. Minimum size is two column inches and costs \$110.60 per insertion. Extra space is available in half-inch increments and costs \$27.65. Box numbers are \$3.00 extra.

Billing: If you're a first-time advertiser, WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad Size _____ Issue (Dates) _____ Section _____

Signature _____

Name _____

Company _____ Title _____

Address _____ Tel: _____

Send this form to:

CLASSIFIED ADVERTISING

COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

Computerworld Sales Offices

EXCH: N=NEW YORK R=RUSSIAN P=PHIL-BAL7-WASH
L=MA710NRL N=NIOWEST O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
ILL TO NEAREST DOLLAR

"MSA's personnel management and reporting system is my first draft choice."

"I learned that it keeps records on more people than live in Atlanta, San Diego, Boston, and Los Angeles combined!"

Francis Tarkenton, MSA

MSA's Personnel Management and Reporting System enjoys widespread popularity in virtually every kind of business all over the country. The System helps management comply with Federal governmental EEO, ERISA and OSHA requirements. And is designed in such a way as to be easily combined with the MSA Payroll Accounting System. Highlights include: comprehensive personal data, skills inventory, salary and performance review as well as termination and leave of absence reporting.

For further information call
Marge Kimbrough at (404) 262-2376
or mail this coupon.



Management Science America, Inc.
3445 Peachtree Road, N.E., Dept E-1
Atlanta, Georgia 30326, (404) 262-2376

Chicago 312-986-2450
Los Angeles 213-822-9766
New York 201-871-4700

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

PHONE _____ COMPUTER MODEL _____

I am interested in:

- ☐ Personnel Management and Reporting
- ☐ General Ledger FICS
- ☐ Payroll Accounting
- ☐ ALLTAX™
- ☐ Supplies Inventory, Control and Purchasing
- ☐ Accounts Receivable
- ☐ Accounts Payable
- ☐ Financial Information and Control
- ☐ Fixed Asset/Property Accounting



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

7

February 13, 1978

75¢ a copy; \$18/year

COPY
SAMPLE
UNIVERSITY MICROFILMS
SERIALS
SECTION
ANN ARBOR MI 48103

NEWSPAPER



By hook and by crook — and even by snowplow — CW staffers struggled to work last week, three days after the Blizzard of '78 hit the Northeast. In top photo, Editor Drake Lundell helps dig a path to the front door; below, those who managed to find a way to Newton use a parking meter to measure the depth of the snow.



CW Photos by J. Edmonston

Better Late . . .

NEWTON, Mass. — If you had a hard time getting in touch with *Computerworld* last week, it's because most of us weren't here.

The worst storm in New England history slammed into the Massachusetts coast Monday afternoon, Feb. 6, leaving behind three feet of snow driven by hurricane force winds into drifts over 10 feet high.

The storm completely shut down the eastern part of Massachusetts for the rest of the week as the governor declared a state of emergency that banned all automobiles from the road.

With 4,000 Army and National Guard troops trying to dig out from under the storm — and more than 10,000 people put up in shelters after abandoning cars on the highways — the state was crippled. More than 5,000 cars blocked roadways and hampered snow removal efforts.

Despite the ban on travel, a few members of the CW staff somehow made their way into *Computerworld's* offices — some skied, a few walked as many as six miles, one even thumbed a ride on a snowplow. And they managed to produce this paper and hopefully get it to you close to the time you would have received it normally.

You will notice a few things are different in this issue, however. For one thing, there is no classified section. All

ads scheduled for this week will run in the issue of Feb. 20, if advertisers wish. In their place is the first part of Chapter II of *Tsunami* by Charles P. Lecht.

Further, also as a result of the storm, the CW Special Report on Distributed Processing, originally scheduled to appear in the Feb. 27 issue, will appear in the March 6 edition.



Lundell joins Peter Holm, assistant production manager, for a rest.

Changes to SSA Law Ease Reporting Needs In Payroll Applications

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — DP managers involved in payroll applications may have to reprogram their systems to accommodate a new data exchange between the Social Security Administration (SSA) and the Internal Revenue Service (IRS) — but not nearly to the extent originally thought necessary.

The SSA-IRS information scheme, approved by Congress more than two years ago in an effort to reduce employer paperwork, was amended with the Dec. 15 passage of the Social Security Amendments Act of 1977. As a result, data fields for quarterly wage information that were to have been added to the familiar W-2 form, the

statement of income tax withheld on wages, are no longer required by law.

The IRS last week issued a press release asking the nation's employers to disregard the four boxes for quarterly wage information on the 1978 W-2 forms. DP managers, too, should ignore the boxes and the need for accumulating four separate data items.

Passed on Jan. 2, 1976, the original law instructed the IRS to simplify the filing of Form 941, the employer's quarterly federal tax return, beginning Jan. 1, 1978. Until this year, the form included a section called Schedule A that required employers to list each employee's name, Social Security number and earnings for that quarter.

The IRS used only the cumulative (Continued on Page 4)

Commerce Warns DP Sites: Beware of Graphite Fibers

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — Fibers so small they can only be detected in the air by a laser beam can wreak electrical havoc on computer and communications equipment, according to the U.S. Department of Commerce.

While they help make such products as aircraft, automobiles and tennis rackets lighter and stronger, carbon/graphite fibers can cause power failures, shorts or arcing that damage electronic equipment, the Commerce Department said.

The fibers are a problem because they are good electrical conductors and light enough to float through the air like ordinary dust particles, the agency said.

When a car crashes near a computer center or a discarded tennis racket is burned at the local dump, the fibers released into the air can find their way through the center's filtration system to short out the computer operation.

DP managers should be sure their air filter systems can keep the fibers from the computer system or terminal environment. Even those filter systems that can resist carbon/graphite fibers may need more frequent maintenance, Commerce said.

Commerce has launched a five-year, \$31.7 million program to study these troublesome but useful fibers because the agency expects them to be found in more and more items made from high-strength, light-weight composite materials. The study will draw on the resources of several government agencies.

Among the agencies to be involved is the National Aeronautics and Space Administration (Nasa), which first observed the effects of carbon/graphite fibers when they are accidentally set loose in the air.

In a technical memorandum, Nasa (Continued on Page 4)

Ansi Getting Near Standard On I/O Interface

By Molly Upton

CW Staff

SAN DIEGO — The proposed standard on channel-level I/O interfaces may at last be nearing consideration by the American National Standards Institute's (Ansi) Board of Standards even though it did not receive the required two-thirds vote of approval from the institute's X3 committee.

The Board of Standards is the body that decides whether Ansi will authorize and endorse a proposed standard. The I/O channel interface draft has undergone several years of consideration by various Ansi committees.

At a meeting here last week, X3 voted to recommend the proposed standard to the Ansi Board of Standards after a 30-day period. During that time, the X3 members will be able to consider responses from the X3T9 technical subcommittee, which has received copies of the negative votes on the X3

(Continued on Page 4)



EDITORIAL

Editor E. Drake Lundell Jr.
Deputy Editor Ronald A. Frank
Managing Editor Nancy French
Associate Editor Donald Leavitt
Associate Editor Esther Surden
Associate Editor Molly Upton
Assistant Editor Frank Vaughan
Washington Bureau Edith Holmes
Staff Writers Catherine Arnst
Jeffrey Beeler
Timothy J. Scannell
Brad Schultz

Chief Copy Editor Cheryl M. Gelb
Copy Editors Barbara T. VanScoyoc
Susan Gerrard

Photography Editor Ann Dooley
Editorial Assistant Denise Petski
Editorial Cartoonist Jim Orton

Bureau:
London Roger Frampton
Munich Hans-Jürgen Ballnath
Asia Hidetsuna Sasaki

Contributors:
Education J. Daniel Couger
Legal Roy N. Freed
Taylor Reports Alan Taylor
Human Connection Jack Stone

SALES

Vice President/
Marketing Roy Einreinhofer
Advertising Administrator Terry Williams
Display Advertising Mary Anne Furlong
Classified Advertising Donna Whalen
Recruitment Advertising Kathy Steinberg
Sales Promotion Director Jack Edmonston
Market Research Kathryn V. Dinneen

CIRCULATION

Vice-President/
Circulation Margaret Phelan
Circulation Manager Barbara Jeannetti
Customer Service Rep Peggy Kelly
Assistant Maureen Burke

PRODUCTION

Manager Lee Vidmer
Supervisor Henry Fling
Assistant Manager Peter Holm
Typesetting Supervisor Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristansrass 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S. — \$18 a year; Canada and PUAS — \$28 a year; Europe and Middle East — \$50 a year; all other foreign — \$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed; write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/
Publisher Patrick J. McGovern
President W. Walter Boyd
VP-Marketing Roy Einreinhofer
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Compliance With Privacy Requirements Can Yield Better DP Security: Novotny

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Many privacy requirements for automated recordkeeping systems, including the individual's right to inspect and challenge his records, can result in improved DP security practices, Eric J. Novotny, senior associate with Computer Resource Controls, said at a recent conference here on the private sector and privacy legislation.

Companies forced by law or through voluntary compliance into designing their DP systems with privacy in mind will find they must examine security in an explicit way — perhaps for the first time, Novotny told industry officials attending the meeting, which was sponsored by AMR International, Inc. Paths of information structured around a privacy-oriented disclosure policy will improve management control of data, for example, the consultant stated. Similarly, storage of information in a form other than a single, complete record not only guards against invasion of individual privacy but also protects against fraud and disaster, he added.

Difficulties in Translation

On the other hand, while privacy may cause security to assume its rightful place as a central organizational concern, conflicting levels of regulations will make privacy difficult to translate into information systems design, Novotny said.

To illustrate his point, Novotny detailed the experience of one of his firm's clients, a large health care organization faced with satisfying the privacy constraints of its local professional standards review organization (PSRO), the Department of Health, Education and Welfare's (HEW) welfare regulations and the Medicare requirements dictated by the Federal Privacy Act of 1974.

These three levels of compliance ranged from stipulations as to the color and data field arrangement of punch cards to the timeliness and ac-

curacy of the information and procedures for accounting for the data's disclosure outside the organization. The burden of satisfying these requirements fell to the DP manager, Novotny said.

The DP manager was faced with "horizontal conflicts" in that the data under the PSRO, HEW and privacy act regulations was of equal importance. "Vertical conflicts" arose over whether he should follow the law, the agency's guidelines, the guidelines HEW provides its contractors or the National Bureau of Standards' security guidelines under the privacy act.

For the manager, "the crux of the problem was translating the horizontal and vertical layers of privacy regulations into something he could implement," Novotny stated. He could divide his organization's information system, segregating parts of the system according to the regulations governing the data contained in them and/or he could identify records according to which regulations applied to them by a system of flags.

The consultant recommended that before doing anything to the information system itself, each organization should assess its current privacy and security posture. Large, mature organizations should do a risk analysis that takes into account both the dollars spent for security and data disclosure inside and outside the operation.

Firms should be sure to include the cost of special DP equipment from applications software to storage devices that may be required. They must also remember they will have to have the ability to store an individual's amendments, rebuttals and corrections to his record, Novotny said.

Data Integrity

Privacy stipulations that information be accurate, relevant, timely and complete are nothing more than assurances of data integrity — something any organization needs to have. The consultant recommended that information be collected directly from the individual,

whenever possible, both to ensure data integrity and to limit third-party sources.

Privacy regulations may require periodic training of the people who deal with an organization's information system in addition to a written security policy, lists of systems and safeguards.

Once an organization has analyzed its privacy status, it must determine what recordkeeping practices need to be added. The trend of legislation both here and abroad suggests that an individual within the organization should be designated security/privacy officer. That person should have some authority to work with, Novotny said.

He further stressed that the organization have a privacy budget. Out of an annual budget of \$250 million, the health care organization that Novotny consulted spends \$100,000 to fulfill the privacy and security requirements of its PSRO, HEW and the privacy act.

Among the specified technical safeguards this organization has implemented in order to comply with privacy constraints of its local Professional Standards Review Organization is the segregation of programmer access to software, Novotny said.

Afips Calendar Lists DP Meets

MONTVALE, N.J. — A calendar of meetings scheduled in the computing and information processing field has been published by the American Federation of Information Processing Societies, Inc. (Afips).

The calendar will list meetings sponsored by Afips constituent societies as well as regional conferences, special interest symposiums, workshops and related gatherings, a spokesman said.

Complimentary copies of the calendar are available through the editor, Afips Master Calendar, 210 Summit Ave., Montvale, N.J. 07645.

Calendar

March 15-17, New York — Terminal-Based Systems, sponsored by American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

March 15-17, Tampa, Fla. — 11th Annual Simulation Symposium Contact: W. Kent Stow, General Electric, P.O. Box 8555, Philadelphia, Pa. 19101.

March 15-17, Washington, D.C. — Data Processing: An Introduction to Concepts and Systems. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 20-22 in Chicago.

March 15-17, Philadelphia — Data Base Management Systems: General Concepts and Planning Guidelines. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd.,

Delran, N.J. 08075. Also being held March 29-31 in San Francisco.

March 20-21, Washington, D.C. — Data Communications: Advanced Concepts and Systems. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held April 3-4 in San Francisco.

March 20-22, Portland, Ore. — Oregon Report on Computing. Contact: Terry Hamm, Tektronix, Inc., P.O. Box 500, MS 60-456, Beaverton, Ore. 97077.

March 20-22, Los Angeles — Project Management for Computer Systems, sponsored by the University of Chicago. Contact: Heidi E. Kaplan, Dept. 14NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

March 22-23, Cambridge, Mass. — Implementing a Transparent Data/-

Voice/Image Communications Net: Packet Switching and Its Alternatives, sponsored by the Yankee Group. Contact: The Yankee Group, Harvard Sq., P.O. Box 43, Cambridge, Mass. 02138.

March 27-29, Dallas — Ninth National Data Processing Security Seminar, sponsored by Data Processing Security, Inc. Contact: Jon Allen, program director, Data Processing Security, 235 N.E. Loop 820, Hurst, Texas 76053.

March 28-30, Paris — Theory and Practice of Programming. Contact: Secretariat de Colloque, Institut De Programmation, 4 Place Jussieu, 75230 Paris Cedex 05, France.

March 29, Toronto — Hardware/Software Evaluation Seminar, sponsored by the Association for Systems Management (ASM). Contact: ASM, Suite 500, 55 University Ave., Toronto, Ont. M5J 2H7, Canada.

CUSTOMER

**Migrating to MVS?
Have a safe trip.
Don't get ambushed
by the wrong sort!**

Call (201) 568-9700.

**SyncSort rescue
parties available
on short notice.**

1978? It's liable to be the *migratingest* year since the old Oregon Trail was closed down for lack of interest.

A lot of solid data-processing citizens — you may be one of them — are going to auction off the old system, pull up stakes and head out for the promised lands of MVS or VS1.

And IBM will be only too happy to help you get there! No doubt you've grown accustomed, these past few years, to the strident yells of their wagonmasters — and mistresses — "Head 'em up! Move 'em out!"

Well, great, we say. For the adventurous data processor with an itch for multi-programming, the streets of MVS and VS1 are paved with gold. Neither system is nearly as wild and woolly as it once was. Why, nowadays, even a sweet young programmer can walk down the streets without any problems at all!

All the same, there are some dangers to keep an eye peeled for in the new land. No. 1 on the list is software that doesn't perform as well out there on the Frontier as it did Back Home.

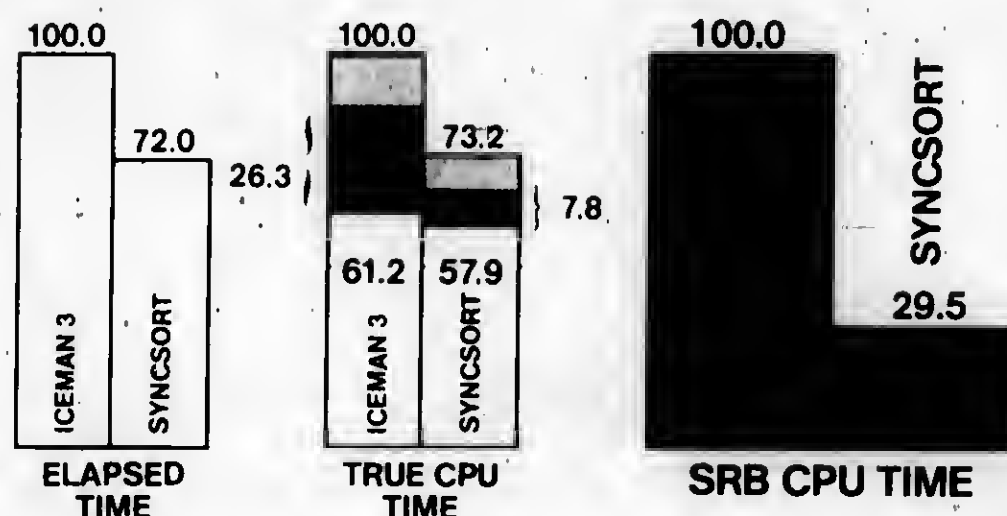
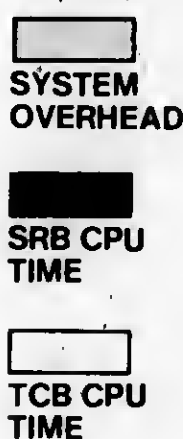
In some sort programs, for example, there's a sneaky little component called "locked-up True CPU Time" — and it can be as paralyzing to a multi-programming system as a rattlesnake bite to a rabbit.

Like the mighty Sioux Nations, True CPU Time in MVS is divided into Systems Overhead and two other territories:

- TCB Time (Task Control Blocks), which is *interruptible*. If the CPU wants to switch signals, the message gets through and the cavalry arrives on time.
- SRB Time (Service Request Blocks), which is *non-interruptible*. The message doesn't get through and another one of those deplorable DP massacres occurs.

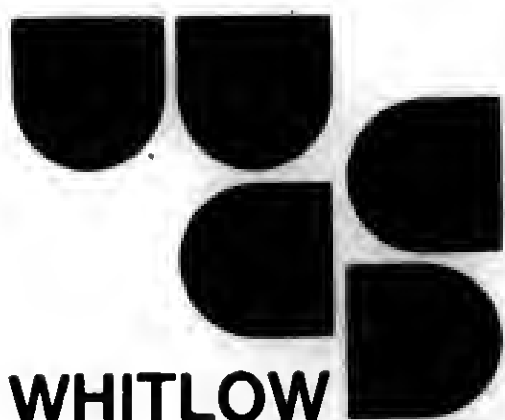
Take a squint at the charts below, particularly the two on the right. They compare SyncSort's overall performance with that of IBM's 5740-SM1, Release 3. SyncSort has 70% less of that venomous locked-up time:

COMPONENTS OF
TRUE CPU TIME



OVERSEAS REPRESENTATIVES —

Brussels CAP/GEMINI Belgium
Dusseldorf CAP/GEMINI GmbH
Geneva CAP/GEMINI Switzerland
Hague CAP-GEMINI/PANDATA
Johannesburg Computing Benefits Ltd.
London GEMINI Ltd
Melbourne Shell Oil Co. of Australia
Milan SYNTAX
Paris CAP/SOGETI PRODUCTS
Stockholm BRA
Tel Aviv ADVANCED TECHNOLOGY, Ltd
Vienna CAP/GEMINI GmbH



WHITLOW

COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

But don't take our word for it! Ask your friendly IBM rep. Chances are, he or she will look embarrassed and try to divert your attention to the shiny hardware goods laid out on the blanket.

If you keep probing, though, Old Straight Arrow will probably whisper, "If I was you pardner, I think I'd go with SyncSort."

And you wouldn't expect Old Straight Arrow to speak with forked tongue, would you?

SSA Amendments Ease Programming Changes

(Continued from Page 1)

earnings and tax data contained on the 941 form itself; the agency previously dispatched Schedule A forms to the SSA, where they were used to update Social Security earnings records, an IRS spokeswoman explained.

Congress decided in 1976 the SSA only needed to update this information annually rather than every quarter. The legislature's more recent amendments to the Social Security laws have

not changed that decision; employers won't have to file Schedule A forms, thus eliminating one DP task.

Employers will continue to file 941 forms with the IRS, but these will simply summarize wages taxed, taxes deposited, income taxes withheld and employee Social Security taxes, the IRS spokeswoman said.

Because the SSA still needed quarterly wage data to determine employee Social Security benefits, Congress in-

itially directed employers to include quarterly employee earnings information in the annual W-2 form; four data fields would have had to be added to the form to represent each of the quarters, requiring major systems work for many organizations.

DP shops would have had to program their systems to accumulate four separate data items representing employee wages for each quarter. Four separate fields would have had to be

added to each employee record.

Programs directing the system to assign back pay to the appropriate earnings quarter, for example, would have had to be written.

These system changes would have had to be in place by the end of the first quarter of this tax year — early in April.

But all these system alterations were swept away by the latest Social Security Act amendments, which automatically assign employees a quarter of Social Security coverage for each \$250 of Social Security wages they earn, up to four quarters in one year.

In other words, if an employee earns \$1,000 in wages taxed under the Social Security laws during January, he has earned his four quarters of benefit credits for 1978. The SSA need no longer account for these funds on a strict quarterly basis.

The DP job facing many organizations has thus been reduced to simple print programs to accommodate the 1978 W-2 forms.

Have many organizations already adjusted their DP systems to meet the requirements of the combined IRS-SSA wage reporting system? "I doubt that many firms have begun to pull their DP operations in line with the new — now old — requirements," Robert S. Willard, director of the Data Processing Management Association's Washington office, said.

"Some of the more advanced firms would have maintained their employee wage information as four separate data items for their own accounting purposes," he added.

DP operations will have to work around the four boxes provided on the W-2 forms. "These boxes obviously will be off the 1978 tax forms," the IRS spokeswoman said. The use of 1977 W-2 forms for this tax year won't be acceptable, however, she warned.

In addition, employers will file W-2 forms with the SSA rather than with the IRS, as has been done in the past. The SSA will forward relevant tax information to the IRS.

Air Filters Urged in Fight Against Graphite

(Continued from Page 1)

said nearly all industrial plants producing and using the fibers have experienced malfunctions of their electrical and electronic equipment. In some cases, the plants have had fires.

These industries have limited such problems by controlling the fibers as they are manufactured and by taking measures to protect their electronic equipment and circuits, Nasa said. The plans have eliminated exposed conductors, often by coating them, and have installed fan filters.

Airborne fibers coming into contact with the exposed electrical circuits of a communications terminal can cause an arc that will melt or erode the terminal, Commerce suggested in announcing its governmentwide study.

Electronic components, too, can be damaged by a momentary short circuit caused by a carbon/graphite fiber. As soon as the energy in the circuit burns the fiber away, the computer or terminal will operate again.

The damage may seem slight, but even momentary shorts can stretch the capabilities of electrical and electronic components so they will no longer operate within the specifications they were built to meet, the agency warned.

Limited research suggests that air filtering is the most effective method of preventing contamination and damage of equipment by carbon/graphite fibers. "Many types of sensitive electronic equipment [such as computer systems], that are cooled by forced air flow already employ dust filters," Commerce noted.

Filter systems for computer equipment can be made to keep carbon/graphite fibers out of the machinery's

air, the department said.

The primary focus of the federal inquiry into these fibers will be an assessment of the risks associated with using them and of modifications to fiber technology that might reduce or remove the threat to electrical and electronic equipment, Commerce stated.

While Commerce looks into the effect the fibers have on commercial and household equipment, including computer and communications systems,

Nasa will attempt to develop alternative materials that do not have the same undesirable characteristics.

If possible, the federal government would like to continue using the fibers. The composite materials the fibers help to make are important to the national economy because of the weight savings and the smaller amount of energy required to use the airplanes, cars and other items made from them.

Ansi Nearing I/O Standard

(Continued from Page 1)

ballot.

In that letter ballot, the proposed standard — which is also being considered by the National Bureau of Standards as a Federal Information Processing Standard [CW, Feb. 6] — received 28 affirmative votes and 14 negative votes from members of the X3 committee. Two members abstained and six did not respond, according to Bill Hanrahan, director of standards for the Computer and Business Equipment Manufacturers Association.

During the 30-day review period before the draft standard goes to the Board of Standards, it is possible X3 committee members could change their votes, Hanrahan said.

Under Ansi rules governing committees, a proposal must be submitted to the Board of Standards if it receives a favorable two-thirds vote. If it receives only a majority vote, however, the committee has the option of submitting the standard to the board, according to C.W. Arnott, Board of Standards secretary.

In its 18-13 vote to forward the draft interface standard to the Board of Standards, the X3 committee recognized the proposal does not have the two-thirds affirmative vote required by X3 procedures.

The Board of Standards reviews all the comments and procedures followed and makes a judgment if there is evidence of consensus, Arnott said. Among the factors considered are the significance of the opposition's comments regarding their involvement and use of the standard.

Of the 11 members of the Board of Standards, eight affirmative votes are required in order to approve the proposal as an Ansi standard. Although the chairman of the Board of Standards is with IBM, he does not vote on matters relating to information systems, Arnott said.

Proposal Book Rocks Industry!

A California publishing firm has literally taken the computer industry by storm with a recently-published "how-to" proposal book. The book, a 4½ pound loose-leaf volume entitled *How to Create a Winning Proposal*, covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top West Coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in commercial, government and OEM proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

Using a step-by-step instructional technique, the authors provide a virtual roadmap to the entire proposal process... including section-by-section checklists to ensure the proposal team of covering all the important bases. Excellent guidelines are given on the contents, structure and methods of preparation for both solicited and unsolicited proposals. A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team, and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's, and IFB's are included.

Copies are available from Mercury Communications Corp., 730-CW Mission Street, Santa Cruz, CA 95060. \$65 (pre-paid) includes 3-5 day delivery inside USA. In Calif. add \$3.90. For outside USA, U.S. \$76 (Int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

CDP Exam Sites Added

CHICAGO — The Institute for Certification of Computer Professionals (ICCP) has announced it will administer the 1978 examination leading to a Certificate in Data Processing (CDP) at additional sites to accommodate the needs of those candidates seeking certification under special conditions.

The examination will be given at locations from White Horse in the Yukon to Sao Paulo, Brazil, including Vancouver, B.C.; Kowloon,

Hong Kong; Saskatoon, Saskatchewan; Juneau, Alaska; and Moorehead, Minn., a spokesman said.

The examination will also be administered in Upland, Ind., and at three different military installations under the guidance of the Defense Alliance for Non-Traditional Educational Support, he stated.

Additional information is available from the ICCP at 35 E. Wacker Drive, Chicago, Ill. 60601.

SUBSCRIBE NOW, PAY LATER

Use your Visa, American Express or
Master Charge card to get yourself off
the routing list and on to the subscription list.

To Pinpoint Weaknesses Systems Help Analyze Athletes' Movements

By Tim Scannell
CW Staff

CENTRE, Pa. — Scientists here at Pennsylvania State University are using computers to study the motion of the human body in an effort to improve athletic performance and reduce the risk of sports-related injuries, according to Dr. Richard C. Nelson, a physical education professor at the university and director of that school's Biomechanics Laboratory.

Biomechanics, a science pioneered by the East Germans, is the study of the forces applied to and by the human body. "By understanding these



Scientists at Penn State used a PDP-11/34 to analyze the stresses placed on running shoes.

phenomena of movement, we can pinpoint a person's deficiencies in certain athletic activities and recommend appropriate corrections," Nelson explained.

One application of this relatively new science was analyzing various types of running shoes for a national sports magazine, Dr. Peter R. Cavanagh noted. "To provide the validation of that study, what we did was attempt to measure what the forces are underneath the foot, when somebody is running, with a piece of apparatus called a 'force-plate,'" Cavanagh, an associate of Nelson, explained.

Data was collected on an analog tape recorder and analyzed at the lab on a Digital Equipment Corp. PDP-11/34. "By measuring the force environment that the shoe has to face, we can define what the shoe has to do as far as absorbing energy is concerned," Cavanagh continued.

Presently, there are many brands of shoes on the market, each one offering various degrees of padding, support and shock protection, Cavanagh said. "Our study has shown that there is a 100% variation in the different running shoes as to how much energy they can absorb" and how much protection they can provide for an individual, he remarked. "By giving the consumer this information" and pointing out the limitations in some shoes, "we can help him to decide which particular one is right for him," Cavanagh stated.

Study of Bicycling

In another study, computers were used to measure the force applied in pedaling a bicycle. "We have some special pedals connected to a computer

that measures the force exerted on the pedals and collects this data on-line," Cavanagh stated. "Supposing we find that a person is asymmetrical (ill-proportioned) in his manner of pedaling or that he is not pulling up on the toe-clips. Then, we're able to make corrections," he said. "As the person tries out the suggested corrections, we can give him visual feedback on the CRT display and let him see what's happening," Cavanagh pointed out.

Through a process called programmed stimulation, a computer can also be used to improve muscle activity, Cavanagh noted. This would involve the introduction of electrical stimulus, cued by a computer, to specific muscle

tissue, Cavanagh said. "By applying electrodes to the surface of a muscle and passing a current through, the muscles can be made to contract," he explained.

In the case of someone who has suffered a spinal injury, the muscles will have no connection with the brain, even though they are completely intact, he said.

Left immobile, the muscles would eventually atrophy and disappear, but if electrical stimulation is begun early enough, this process can be halted, Cavanagh stated.

If, for example, five muscles were affected "and you knew the sequence of their operation was 5-4-2-3-1 and that

these muscles had to be active from 50 msec to 100 msec, then you can easily produce that pattern of stimulation with a computerized device," he explained.

Cavanagh pointed out, however, that the experiment has not been applied to humans and "... the farthest they ever got was to make a frog do something that vaguely looked like jumping."

Russians actually monitor muscles in activities such as weight lifting then try to condition movements by electrically stimulating these muscles at the instant they are used, he said.

Biomechanics can also be used in designing artificial limbs.

DOS/VS USERS COME IN FROM THE COLD

Altergo introduces SPACE/MANAGER, the ultimate Disk Space Management system that makes others look like basic starter products by comparison.

Major benefits include Reduced Disk Space Requirements, Simplified JCL — throw away EXTENT and ASSGN cards, Dynamic Disk Space Allocation, Fewer Job Reruns, Reduced Operator Involvement, Simplified Job Scheduling, Cross Partition File Protection, Reusable Files, Increased Throughput and many many more.

Add to this the benefits of local Altergo technical support, low price, reliability and good documentation, and you have an unbeatable combination of quality and value.

Get the facts behind these claims. Write or call now for a full description of SPACE/MANAGER and what it can do for your installation.

altergo

ALTERGO SOFTWARE, INC.
Wellesley Office Park
55 William Street
Wellesley, MA 02181
Phone: 617-237-6132

DYNAM/T MEANS FILE SECURITY

A Complete Tape
Library Management System
for IBM 360/370
DOS and DOS/VS

**LOW COST - EASILY INSTALLED -
TEST DYNAM/T FREE FOR 15 DAYS!**

If you knew of all its advanced features, you would demand the free 15-day trial of DYNAM/T. The file security alone makes DYNAM/T a Gem for DP Managers. However, DYNAM/T doesn't stop there. Just look at this combination of features that are not available in any other system - features that dramatically improve resource utilization. For example:

- DYNAM/T is DOS and DOS/VS release independent, requires no modifications to the supervisor, JCL language or user programs.
- Automatic Volume Recognition and Early Device Release features eliminate the need for reservation of tape drives for each partition.
- DYNAM/T logs exceptional occurrences for audit trail and accepts alphanumeric volume serial numbers.
- DYNAM/T provides comprehensive reporting of all tape activity.
- DYNAM/T allows for control of unlimited numbers of tape volumes and an unlimited number of tape file generations.
- Automatic rerun facility.
- Fully automatic multi-file, multi-volume handling.
- Allows manual and automatic catalog of tape files.
- Does not allow duplicate tape reel numbers.
- Provides control of unlabeled tapes.
- Automatic release of tape sort work files.
- Allows use of alternate data sets for input.
- Total tape file security assured by matching password that prevents both accidental erasure and unauthorized access to confidential data.

Those are just a few of the features that make DYNAM/T a major advance in software systems.

**MAIL THE COUPON OR
CALL COLLECT TODAY!
(212) 355-3333**

YES! Please rush the free DYNAM/T
Information Kit and details of
the FREE 15-day trial.



Name _____
Title _____
Company _____
Address _____
City _____ ST _____ Zip _____
Telephone (_____) _____
Computer Model _____ System _____

655 Madison Avenue, New York, NY 10021

COMPUTER ASSOCIATES

U.S. OFFICES: New York, Georgia, Illinois, Ohio, Texas,
Connecticut, California, District of Columbia, Missouri
WORLD WIDE OFFICES IN 20 COUNTRIES

Other Crimes Alleged Agents Charged With Data Theft

By Jeffrey Beeler
CW Staff

BRIDGEPORT, Conn. — Two agents of the U.S. Drug Enforcement Administration (DEA) are standing trial here for their roles in an alleged conspiracy to sell computerized data about individuals associated with the drug world and DEA investigations.

Government prosecutors in the case charge that when the agents, Paul A. Lambert and George E. Girard Jr., illicitly removed data from the DEA's Narcotics and Dangerous Drug Information System (Naddis), they were trying to ensure the success of a cocaine smuggling operation the agency had been investigating for some time [CW, Sept. 12].

Besides being charged with conspiracy to sell secret investigative data, the two men are accused of conspiring to sell cocaine and to commit murder.

Attorneys for both the government and the defendants declined to answer specific questions about the case while the trial is in progress. For this reason, they failed to say exactly what kinds of data Lambert and Girard are accused of trying to sell, to whom they allegedly planned to sell it and whom they are charged with conspiring to kill.

AEDS Plans Programming Contest

WASHINGTON, D.C. — The Association for Educational Data Systems (AEDS) has announced plans for its Fifteenth Annual Computer Programming Contest for students in grades 7-12.

The grand prize winner will receive a \$100 U.S. Savings Bond plus a minimum \$300 grant for travel to the 1978 AEDS Convention in Atlanta, Ga. on May 15-19, 1978, the spokesman said. Deadline for entries in the contest is March 1, 1978.

Details on the contest and application blanks can be obtained from Ben Jones, AEDS Programming Contest, OTIS 1200 Highway 99N, Eugene, Ore. 97405.

Britons Laud HIS' Bachman

WALTHAM, Mass. — Charles W. Bachman of Honeywell Information Systems, Inc. has been named a distinguished fellow of the British Computer Society.

Bachman also won the Association for Computing Machinery (ACM) Turing Award in 1973 for his data base system research.

The principal architect of HIS' IDS data base management system and a founding member of the Codasyl Data Base Task Group, Bachman is a current chairman of the American National Standards Institute's X3/Sparc study group on data base systems.

Bachman joins nine others who have been elected distinguished fellows of the society since 1957 for outstanding contributions to the computer industry.

That self-imposed silence, however, has not prevented certain details about the case from becoming public as the trial has unfolded.

DEA Set Trap

Recounting the main events preceding the two agents' arrests, U.S. Attorney Richard Blumenthal, the chief prosecutor in the case, told a trial jury here recently that the DEA had suspected someone of removing data from its central computer long before it discovered the alleged thief's identity.

Unable to prove any wrongdoing, the agency created a fictitious file for a nonexistent individual named Richard Lumiere. It then entered the false data into the IBM 370/155 and waited for the unknown thief to take the bait.

At about 10 p.m. last July, Lambert, unaware that a trap had been set for him, returned to DEA headquarters and removed from the agency's central computer the Richard Lumiere file, which he believed to be authentic, the government charged in its indictments. As he visited the computer room, however, the drug agency secretly videotaped his actions — a procedure made possible with the help of a DEA undercover informant named — appropriately enough — James Bond.

Lambert then passed the data to Girard, who in turn tried to sell it to Michael Levine, another DEA agent masquerading as one of the co-conspirators, Blumenthal said.

Elsewhere in its indictments, the gov-

ernment accused Girard of passing a kilogram of cocaine to Levine and later discussing with him the possibility of murdering someone whose identity has not yet been publicly disclosed.

No Legal Precedents

Commenting on the charges, Girard's attorney, Robert Collins of Boston, denied that his client had committed a crime, primarily because existing statutes governing the unauthorized disclosure of data cover only defense secrets and hard-copy records. "If someone removes a ledger book, a piece of paper or some other piece of tangible information from a premise without authorization, you might have a crime," he explained.

Intangible

"But there are no legal precedents for the theft of intangible property like computer information."

Collins also accused the drug agency of trying to "frame" his client. He attributed the alleged conspiracy against Girard to ill will the agent had engendered among staff members at the DEA's Boston office, where he used to work. Some of Girard's former colleagues at that office resented his public criticism of the agency and his efforts to start a union there, Collins claimed.

Lambert's attorney, Charles Shaffer, who defended John W. Dean III in the Watergate trials, declined all comment on the charges against his client.

ADAS relieves the agony of "slipped disc"

Too much disc space can slip into wasteful reserve with IBM 360/370 DOS and DOS/VS installations. ADAS can make available this wasted space, increase your processing power, eliminate a DASD up-grade.

ADAS is a simple-to-use, highly transparent system for efficient disc space management. ADAS automatically assigns file space from available areas on disc, eliminating the manual task of locating unused space; returns to use up to 30% of overall disc space, up to 100% of SORT and compiler work space; prevents over-estimation of space needs by truncating space automatically after files are created. ADAS supports 2311, 2314, 3330, 3340, and 3350 compatible disc drives; supports all file types; reports when and where each file is used; offers disc pool management facility; provides automatic secondary allocation; prevents deletion of unexpired files; makes JCL completely partition independent. And new Version 3.0 of ADAS adds other major up-grade features. Write or phone for more facts and a free trial offer.

ADAS: chosen by the U.S. Army over competitive systems for 74 installations around the world.

GSA CONTRACT NO. GS-00C-01200



Universal Software
systems have
earned the
DATAPRO AWARD
five times in
the past three
years.

Universal Software

Main Office:
Brookfield Office Park
Brookfield, CT 06804
Tel: (203) 792-5100

Action Follows Study

FBI Moves to Comply With U.S. Privacy Act

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Federal Bureau of Investigation has moved to ensure that the indexes it uses to manage and conduct investigations — including 15 computerized file systems — are maintained in compliance with the Privacy Act of 1974.

The FBI's actions followed a two-year study by the General Accounting Office (GAO) that found more than one-fourth of the bureau's "special" indexes could not be fully retrieved through the manual Central Records System.

Because 63 of the indexes were not completely obtainable through any system of records the public knew existed, individuals using the Privacy Act to learn what information the FBI had assembled about them may not always have received full responses, the report concluded.

"The FBI should comply as quickly as possible with the Privacy Act by publishing the required information about its indexes," according to Rep. Richardson Preyer (D-N.C.), chairman of the House Government Information and Individual Rights Subcommittee, which requested the study.

No Notices on 63

In its report released here this month, the GAO described its examination of 239 special indexes or records systems kept at FBI headquarters, field offices and foreign liaison offices. The study did not cover 28 classified indexes dealing with foreign counterintelligence or records systems used for internal administration.

The information contained in many of the 239 indexes surveyed is available through the Central Records System, the GAO found. But the material in 63 of these special records systems was not obtainable through Central Records or described anywhere in the bureau's notices to the public about the filing systems it maintains, the report said.

In answering Privacy Act requests for information, the FBI searches only the Central Records System unless an individual identifies some additional system or index to be searched, the GAO noted. Without public notices of records systems maintained by the FBI — notices required by the Privacy Act — the individual probably wouldn't know enough to ask that additional indexes be checked, the study stated.

The GAO recommended that the FBI either publish Privacy Act notices in the *Federal Register* for the files not retrievable through Central Records, incorporate the material in these indexes into the records systems already described in the *Federal Register* or destroy nonretrievable information contained in these indexes.

Data on 20 Million

At the time of the GAO study, the FBI had published information on 12 systems of record, including the Central Records System and the National Crime Information Center (NCIC) files.

The index to the Central Records System contains more than 59 million cards representing an estimated 20 million individuals. The GAO did not estimate how many individuals might

be listed in the files not retrievable through Central Records.

Thirteen of the 15 computerized records systems not fully retrievable through the Central Records System or any other system the FBI publicized in the *Federal Register* are maintained at bureau headquarters here. They include the index on associates of the Drug Enforcement Administration's (DEA) Class I narcotics violators and computerized listings of data related to 12 major investigations conducted by the FBI.

Because the FBI assists the DEA and state and local narcotics control agencies by developing and disseminating intelligence data on illicit drug traffic, the DEA supplied FBI headquarters

with a computer printout of its Class I narcotics violators — people known to manufacture, supply or distribute large quantities of illicit drugs.

The DEA also supplied the FBI with a printout of known associates of these violators, and the bureau sent all this information to its field offices.

While included in the FBI's and the field offices' general indexes, the names of narcotics violators and their associates are not retrievable through Central Records, the GAO said.

Investigations Computerized

Because of the complexity of some of its major cases, the FBI computerizes these investigations to keep track of all the information gathered on them, the

GAO found. These 12 files, which include the assassination of President John F. Kennedy, the Patricia Hearst kidnapping and the disappearance of James Hoffa, were found by the audit office to contain some names that could not be retrieved through the Central Records System.

Forty-nine out of the 159 indexes maintained by FBI field offices were determined by the GAO to be "not fully retrievable" through any published system of records.

Of these 40 records systems, only two were computerized — a real estate listings file and a white-collar crime index dealing with Small Business Administration loans. Both were maintained by only one field office.

How do you know if your system is really doing the job?

We'll tell you. With PLAN IV and PLAN IV:MVS, program products for system management from Capex Corporation.

If you're operating an IBM OS, OS/VS, or MVS system, PLAN IV and PLAN IV:MVS will let you know where you've been, where you stand now, where you're going next. You'll get the information vital for making informed decisions quickly. In clearly understandable form. With as much depth and detail (or as little) as you demand.

Information For Decision Making

PLAN IV and PLAN IV:MVS provide the information needed for all levels of decision making. Whether you're concerned about turnaround and response time, balancing system resources and load, tuning system performance, scheduling, IPS tuning, or capacity planning, PLAN IV and PLAN IV:MVS provide the information you need. You get immediate access to key information, presented in a concise, highly readable

format, without smothering in extraneous detail. Yet when you need comprehensive information to support detailed analysis or problem solving, that too is available.

Proven Techniques

PLAN IV and PLAN IV:MVS apply proven management techniques to DP: Management by Exception. Nobody likes to wade through stacks of reports. PLAN IV and PLAN IV:MVS pinpoint what you need to know first, what you need to know most. They automatically spotlight bottlenecks and significant changes. You identify problem areas quickly, get to work on them immediately. Information in Perspective. You can make immediate comparisons between shifts, with last month, last year, see where you're doing better... or doing worse.

Efficient, Effective, Proven

Both PLAN IV and PLAN IV:MVS utilize data from facilities already built into your system (SMF, RMF or MF/1)

to efficiently gather information about overall system operation. They bring information about past and present performance into focus, providing the perspective you need to manage your system now and plan intelligently for the future.

With PLAN IV and PLAN IV:MVS, you know where you stand. No wonder these tools are already in use at more than 150 sites throughout the world.

To arrange a demonstration contact us today.

Capex Corporation
2613 N. 3rd St., Phoenix, AZ 85004
Phone: 602-264-7241. TWX: 910-951-1594

Offices nationwide: Atlanta, Boston, Chicago, Dallas, Los Angeles, New York, Phoenix, Washington, D.C.
Other offices worldwide.



Capex Corporation Info. Dept. BW
2613 N. 3rd St., Phoenix, AZ 85004

- ☐ Please send me more information on PLAN IV and PLAN IV:MVS.
☐ Please contact me to arrange a demonstration.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

Model _____

System: ☐ MFT ☐ MVT ☐ VSI
☐ SVS ☐ MVS

Clues to Killings Overflow Mini's Memory

By Tim Scannell
CW Staff

OAKLAND COUNTY, Mich. — An overflow of clues may be hampering police in a search here for a child killer who has already taken the lives of four area youngsters.

The large number of tips received from concerned citizens has exhausted the memory of the minicomputer used for storing and comparing them, according to a police spokesman here.

Overflow data is being recorded on magnetic tape for later retrieval and analysis, a spokesman said. However, because this new data is held separate from the facts on the system's disk file, police officials claim that investigative efforts to find the killer "could slow up tremendously."

Already, more than 14,000 clues have been collected with additional tips pouring in at the rate of 100 per day, the

spokesman said. The case, going into its third year, involves a series of related homicides in which four children were kidnapped, sexually molested and then murdered.

The Hewlett-Packard Co. volunteered use of its minicomputer to the Oakland County Homicide Task Force in February, 1977, according to State Police Lt. Philip Hogan. Hogan, a member of the Uniform Crime Section, and an associate are responsi-

ble for programming the HP 3000 system. They were aided in their efforts by students from a nearby college, he said.

The State Police access the HP 3000 system, located about 30 miles away, via dial-up lines and acoustic coupler, a spokesman said.

Before the law enforcement offices had access to a computer, clues and information on the case totaling more than 5,000 pieces of paper were kept on cardboard boxes on

the floor, Hogan explained.

The system is programmed to work in three ways: As a management tool; an investigative aid; and for criminal analysis, Hogan said.

Keeping Track

In a management sense, the minicomputer keeps track of the volume of data received, how rapidly tips are being followed and cleared, the extent of the workload on investigators, and the number of leads yet to be followed, he stated.

Regarding investigations, the computer searches for and isolates similar aspects of various crimes and compares the modus operandi of each one. In this case, the system would try to pinpoint cases involving child molestation and compile a victimization file. Presently, the file contains a record of every reported molesting from a year prior to the first homicide, Hogan related. Unreported attempts, obtained from school counselors and teachers, are also included in this file.

Crime Profiles

As an analytical tool, the HP 3000 constructs a profile of that particular type of crime and the psychological makeup of the individual behind such an offense. Investigators can then match different suspects with the methods used in each molesting case, Hogan said.

The computer helps eliminate the redundancy involved with investigations of this extent, Hogan stated. "When you get multiple tips on given people, it isn't uncommon for four or five investigators to visit the same place," he said. "In a parameter driven system, such as ours, we can go in and selectively categorize our tips so that when we send a team of investigators to the area, they go in with a knowledge of all the tips coming from that region."

Nothing Overlooked

Hogan also points out that no matter how trivial a tip may seem, nothing is thrown away or overlooked. "If there are 20-different people who think a certain guy is weird, that carries some weight in itself."

The State Police filed a request through State purchasing for a computer over a year ago, Hogan stated. Threatened with having to erase information from the already swollen memory banks of the HP 3000, the State has agreed to purchase a system. But, although the money has been set aside, police have had difficulty in trying to cut through bureaucratic red tape to "introduce minicomputer technology into a mainframe world," Hogan said.

Getting and keeping timeshare business:

Remote computing services and batch service bureaus face a number of problems.

Problems which, if not solved, could mean the beginning of the end for most of them.

Maybe even your company.

Batch, but only batch.

There's no denying the demand for on-line services. (Look how some of the remote computing services have prospered.)

So there's the problem of adding a timeshare capability. At low cost, so you can offer a low-cost service. But with the capability to grow with your business.

There's the problem of security for proprietary software and data. The problem of delegating control of system resources, without losing overall control. The problem of accounting for system use—especially use of added-value software. And the problem of knowing what is happening anywhere in the system, at any time.

Solving these problems could make you successful in timeshare as well as batch.

Remote, but losing business.

For remote computing services, keeping customers is often the biggest problem.

After a time, many customers begin to feel they're putting out too much money for your service. They check out your competitors. Or think about an in-house system.

Finding a way to extend your services downward in cost could turn your biggest problems into even better customers.

Small, or just starting out.

You may already have a small timesharing company. Or you're planning to start one. Your first problem is finding a computer you can afford. Once that's also a real timesharing computer. With the management features the big timeshare computers offer.

Solving this problem could make your small company a big success.

Problems solved here.

These problems you're facing in your firm, timeshare or batch, large or small, can be solved with the computer made by us:

Basic Timesharing, Inc. We're the computer manufacturer with timeshare experience. We understand the unique problems of your business.

And that's what has helped us produce a computer so uniquely right for the timesharing business.

The BTI 4000 Interactive Timesharing System.

A remote computer's computer.

The BTI 4000 was built from the drawing board up for timesharing. To maximize operational capabilities. To minimize operating costs. To give you more.

You can start for just \$35,950. For that you get a ready-to-go system with 10 megabytes of storage and 8 ports—just add terminals.

You also get BASIC-X, an unusually powerful extension of the BASIC user language, enhanced for business programming.



The BTI 4000 Means Business.

Basic Timesharing Inc., 870 W. Maude Ave., Sunnyvale, CA 94086. Sales Offices: East: Cherry Hill, NJ (609) 662-1122; Midwest: Minneapolis, MN (612) 854-1122; Chicago, IL (312) 298-1177; South: Dallas, TX (214) 630-2431; West: Sunnyvale, CA (408) 733-1122; Anaheim, CA (714) 533-7161



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

NAME (circle): Last four digits above your name)

First Initial	Middle Initial	Surname										
Your Title												
Company Name												
Mail To:												
City			State		Zip Code							

Computerworld's Index:



THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

- 30 Other

Detach here, fold, and place in post-paid envelope attached through window

State Seeks Welfare Cheats

Ohio Legislators Debate Data Cross-Checks

By Jeffry Beeler

CW Staff

COLUMBUS, Ohio — Debate began here recently over a proposed state law that would allow authorities to catch welfare cheaters by cross-checking computerized income tax records with Ohio's relief rolls.

State Rep. Eugene Branstool, a Democrat from Utica, introduced the measure in the Ohio House of Representatives on Jan. 24. If passed and signed into law, House Bill 1032 would require the state's tax commissioner to make taped copies of income tax records available to the Ohio Department of Public Welfare.

Using a central computer in the office of State Auditor Thomas E. Ferguson, the welfare department would then compare the information on the tapes against its computerized list of the state's relief recipients.

By noting the individuals whose names, addresses or Social Security numbers appear in both sets of data, authorities could identify employees who are possibly receiving state welfare illegally.

Well-Established Practice

Computer cross-checking of the sort contemplated here is almost certain to spread to other parts of the nation in coming years as government officials intensify their efforts to eliminate welfare abuses that cost taxpayers millions of dollars annually, observers believe. Already the practice is well established in the federal government and in several states, notably California and Michigan.

Last November, the Department of Health, Education and Welfare used a computer to compare its payroll records to federal relief rolls and found more than 13,000 of its current employees on the dole [CW, Nov. 21]. In Michigan, a similar cross-checking program, begun over a year ago, has focused on workers in eight state government agencies and, more recently, on employees of five private firms, including the Big Three auto makers [CW, Jan. 23].

Advocates of cross-checking computerized records to uncover welfare fraud usually point to the practice's potential economic benefits. Ferguson estimated the proposed comparison of welfare rolls and tax records in Ohio could save state taxpayers \$20 million a year.

A similar comparison audit, involving state relief records and a list of contributors to the Ohio employee retirement plan, found 666 public employees last year illegally received \$1.6 million in welfare benefits, Ferguson recalled.

Opponents of the practice usually argue that computer cross-checking poses a possible risk to personal privacy; if allowed to spread uncontrollably, it could result in a nationwide surveillance network that could rob citizens of their civil liberties, they contend.

ties, they contend.

The administration of Gov. James A. Rhodes has stated its intention to preserve the confidentiality of state tax returns, but thus far has declined to say whether it favors or rejects the idea of making tax data available for comparison with welfare records, according to administrative aide Chauncey A. Cochran.

Two Clashes

Norman C. Schmidt, assistant state tax commissioner, has been more vocal in his opposition to the proposal. He warned that passage of Branstool's bill could undermine the state's working arrangement with the Internal Revenue Service (IRS), which supplies data from its files to only one state agency, the tax commissioner's office.

If House Bill 1032 passes, the tax commissioner's office might have to relay some of the IRS' confidential tax records to the welfare department in violation of its agreement with the federal agency, Schmitt explained.

The tax commissioner's determination to preserve his department's relationship with the IRS has twice led him into conflict with Ferguson and the state auditor's office.

The first of these clashes occurred more than two years ago, when Ferguson requested access to the state's income tax records, which he

planned to use in a statewide search for welfare cheaters. That request was rejected, as were subsequent appeals to appellate courts and the Ohio Supreme Court.

The other run-in occurred later, when Ferguson tried to gain access to the state's motor fuel tax claims — an effort that also was stymied.

Whether Branstool's bill will pass the state legislature is the subject of some debate here. Although Ferguson claims the proposals enjoys widespread support in the Ohio House, action on the matter could be seriously delayed by a planned April recess and by campaigning in preparation for the state's November elections.

FDR-DSE 2000 USERS

Fast Dump Restore

- Dump/Restore Full Volumes
- Diagnostic Processing

Data Set Functions

- Dump/Restore up to 250 Individual Data Sets
- Restore Data Sets from FDR Full Volume Backups

Volume and Data Set Level Password Protection Performance — Reliability

Supporting

2314 • 3330-1 • 3330-11
3340-35 • 3340-70 • 3344 • 3350



For further information or Free 30-day Trial,
call or write to:

INNOVATION
DATA PROCESSING

970 Clifton Avenue, Clifton, NJ 07013 • (201) 777-1940

**Look ITT Up
in the
CW Index**

Measure of Management

Productivity Discounted as Employees' Worry

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Too few DP and top employers and managers understand the productivity of their organizations is their responsibility — not their employees', according to David Skeen, director of DP in the Office of Naval Research.

Employees should have their

performance measured in terms of achievement; productivity is the creation against which management should be assessed, Skeen said during the Federal DP Expo held here recently.

At the same time, employees need to understand what their skills are, to upgrade those skills and to seek broadening experiences on the job, Ronald

N. Koontz, computer specialist in planning for the U.S. Forest Service, said at the seminar sponsored by the Federal ADP Users Group and the Association of Computer Programmers and Analysts.

Match Skills, Tasks

"There's a lot more to managing people than collecting time cards," Skeen stated.

He suggested management consider as a key measure of productivity how well the tasks that define the organization are matched to the skills of its employees.

"People shouldn't be hired until the organization has been defined," Skeen said. A supervisory program can then be established and, from that, a career development program

should be formed, he added.

Every individual in an organization should have a career plan. Skeen recommended career counseling that takes into consideration an employee's background, goals and self-assessment.

The counseling should include a career development program that leads to a career plan for the employee, he said.

The DP director stressed the importance of involving the individual in his own career path development and in evaluations of his performance.

Nearly every DP manager could do more in this area, he suggested: "We don't do this kind of human resources evaluation enough."

Skills Chart

Koontz urged the employees in the audience to clarify their skills and understand their job responsibilities and how they relate to the organization's mission and objectives.

A skills chart can be useful in helping employee and employer understand what tasks the employee might perform best — in terms of his goals as well as the organization's, Koontz said.

Such a chart asks the employee to rate his level of competency on a scale from 1 to 10 in such areas as analysis, art, budgets, figures, follow through, imagination, people, persuasiveness, showmanship, troubleshooting, words, writing and negotiation.

"Make sure the quality of your work is good and take advantage of training opportunities provided by your organization," he added.

Koontz identified trade journals and professional groups — with their lectures and meetings — as additional sources of knowledge.

Job experience should be progressive, he noted. If an employer's present organization doesn't include the next job step he feels he needs to take, consider moving on.

"Nixdorf showed us complete distributed processing capability and growth flexibility with its ENTREX systems—and saved us money, too!"

General Telephone Directory Company

Bob Aireed, Director
of Data Processing

ENTREX Series 600. A Nixdorf Product.

"Tight schedules, last-minute changes and absolute accuracy are ways of life in directory publishing," asserts Wills. "Now we can finalize data at seven coast-to-coast offices, and transmit much faster...to give our customers more lead time, while meeting publication deadlines!"

"With Entrex Series 600 systems from Nixdorf," states Aireed, "we don't compromise cost or capability. They perform multiple functions simultaneously. They're extremely easy to program and operate. And these flexible, clustered systems allow us to simply add terminals at about \$80 per month, vs. spending \$250-\$300 with our previous system!"

See what The Nixdorf Challenge can do for you.

Take The Nixdorf Challenge: Let us demonstrate our system capabilities—then compare! In data entry, distributed processing and data communications, Nixdorf is a worldwide mini computer leader...with over 100 sales and service centers coast-to-coast—dedicated to excellence and customer satisfaction.

Small business systems, too, with applications software.

That same dedication pays off if you need a stand-alone system and applications aid. Challenge us to show how NIDAS/8870 systems can provide more manageable management data than you thought possible.

Call Toll Free or write, Nixdorf Computer Corporation, 168 Middlesex Turnpike, Burlington, MA 01803.

More than 60,000 systems installed.
All over the world.

NIXDORF
COMPUTER

Zeta.
CalComp.

Great Names.
Great Plotters.



Zeta Research

CALL TOLL FREE 800/225-1484.
OR MAIL THE COUPON.

Please send information on:
☐ Entrex Series 600 Systems
☐ NIDAS/8870 Systems
☐ Have a sales person call.

To:
Nixdorf Computer Corporation
Dept. CW28
168 Middlesex Turnpike
Burlington, MA 01803

Name _____ Title _____
Firm _____ Phone _____
Address _____
City _____ State _____ Zip _____
Type of Business/Industry _____

Private Sector Staffs 40% of DP Revamp Team

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Office of Management and Budget (OMB) had hoped to strike a balance between the numbers of government and private-sector people participating in the federal DP reorganization project, but that goal has not been achieved, according to Walter Haase, Deputy Director for Information Systems Policy at OMB and director of the project.

Haase told a capacity audience of the Federal DP Expo here recently that instead, 40% of the people on task teams looking into such vexing areas of DP as standards, acquisition of equipment and personnel come from user companies and nonfederal organizations.

That percentage actually isn't bad, considering that OMB wanted users, rather than vendors, of computer and communications equipment who had to be senior people in their organizations and willing to volunteer their time to the federal effort.

Out of approximately 50 people serving on OMB's 11 task teams, 20 are from the private sector and 30 hail from federal agencies, Haase said. He added that OMB is still looking for five or six more task team participants.

Several of these volunteers from the nonfederal sector have been named to head the task teams. Paul Strassman, director of information services for Xerox Corp., will chair the Central Policy Task Team; Robin Hough, a professor from Oakland University, will lead the Human resources team — which includes DP reorganization in the Department of Health, Education and Welfare/ and Larry Dreeman, Coca-Cola's director of information systems, will head the National Security Task Team — which has as part of its responsibility the examination of DP in the Department of Defense.

Other private-sector participants chosen to lead task teams include Herb Pier,

director of corporate planning for Allstate Insurance Co., who will head the task team on DP in small agencies; John Stucker of the University of South Carolina, who will be in charge of the task team on general government DP; and Louis Haire from Lockheed, who will chair the science and technology task team.

The teams on standards and personnel are moving more slowly than the others, Haase

reported at the expo meeting. They're still under the acting directorship of Kenneth Allen, a member of the OMB Information Systems Policy Staff and of the Reorganization Project Management group.

Harris Reiche of the Department of the Interior has been chosen to head the acquisition team and Phil Kiviat, who heads the Federal Simulation Center (Fedsim), will lead the operational management

team.

Haase promised that a revised study plan for all these teams will be available in the next couple of weeks. The revised plan would update the time schedule set forth in the initial Aug. 30 plan.

The reorganization project still hopes to have its recommendations to President Carter by mid-September. Haase continues to promise three public comment periods fol-

lowing the initial recommendations of the central policy team at the end of May.

Some of the project's recommendations, however, will be incorporated in the reorganization dealing with administrative services, and that group's final report goes to Carter in June. Haase said he believes the public will still have ample time to comment on the DP-oriented recommendations.

If you haven't
COM with Datagraphix
you haven't talked

When you evaluate computer output microfilm, the word from the people who started it all—Datagraphix. We invented COM back in the 50's. Today our new on-line, off-line, and minicomputer-controlled models give you the COM performance you need at a price you can afford. Cost of a complete system of recorder and duplicator starts as low as \$85,000*. And because Datagraphix offers more than equipment, you're backed by the largest, most experienced COM service, software and supplies network in the world. When you decide to implement COM, get the word from Datagraphix.

Datagraphix

Datagraphix, Inc., a General Dynamics subsidiary
P.O. Box 82449, Dept. C2A
San Diego, CA 92138, Phone (714) 291-9960
Please send me the word on COM.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Phone _____

*Purchase price FOB San Diego, applies only to continental U.S., subject to change without notice. Maintenance available at additional charge.

**Zeta.
CalComp.**

**When
Experts Choose.**



Zeta Research

Free samples of continuous mailers in form/envelope combinations that reduce preparation costs and help stop errors.

Don't waste time and money collating, inserting, sealing, and metering a mailing, running the constant risk of human error, when our *Envu-Mailer*® continuous self-mailers can reduce these preparation costs and help stop errors.

Use them for notifying, billing, persuading, polling, or contacting customers, prospects, members, subscribers, voters, patients, students, alumni, or anyone else.

Specify as many message copies as you need, outgoing and return envelope, even inserts such as checks, ID cards, labels, coupons.

Mail postage-free card for free samples



business forms, envelopes, supplies

CW-278

Name _____
 Title _____
 Organization _____
 Street Address _____
 City/State/Zip _____



Free samples of continuous forms from a company big enough to sell you a zillion.

Or a thousand, fast.

Curtis 1000 has long been big in forms. Long enough and big enough to be fourth nationally, with our parent company, among firms principally in that field. And that's enough to make us a dependable source for you!

Whether you need a large quantity. Or just a thousand of our special *Quik-Tab* continuous forms — fast. Or if you need cut forms, pegboard forms, snap-apart forms, or unique combinations of envelopes and forms available only from us. Custom designed. Or imprinted — fast — from stock.

Mail postage-free card for free samples.



business forms, envelopes, supplies

CW-278

Name _____
 Title _____
 Organization _____
 Street Address _____
 City/State/Zip _____



Free samples of expanding envelopes for bulky forms, accumulated mail, fat catalogs, merchandise.

Mailing something bulky? Our *Expanding Mailer* envelopes save on special wrapping materials and eliminate wrapping time.

Try accumulating daily mail to salesmen, branches, or dealers in our *Expanding Mailers*. Save on individual envelopes. On addressing, inserting, and sealing. On postage and separate fees (registered, insured, etc).

All popular sizes, plain or printed, with dry or moistenable glue. Tough, economical kraft paper. Or tougher and lighter Tyvek® material from Du Pont, for better protection and to save costly ounces.

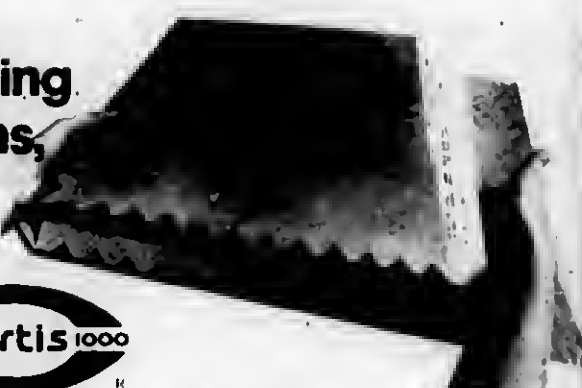
Mail postage-free card for free samples.



business forms, envelopes, supplies

CW-278

Name _____
 Title _____
 Organization _____
 Street Address _____
 City/State/Zip _____



Free information on printout filing system. Tough covers in colors. Flexible posts. Insert single bar against posts and hangfile. Simple.

Our *Flex-O-Post* system for printout binding and filing has tough polyethylene covers in a full range of colors and sizes, with cover imprinting in colors. And rugged polyethylene index sheets that won't tear out.

Strong posts of flexible aircraft cable can be flexed repeatedly without distortion, stretching, cracking, or breaking. Tough plastic slides lock posts in aluminum channel with safely deburred ends.

Single, steel hanger bar supports file in suspension rack. Just insert this exclusive bar against the posts and hangfile. The simple way is often best.

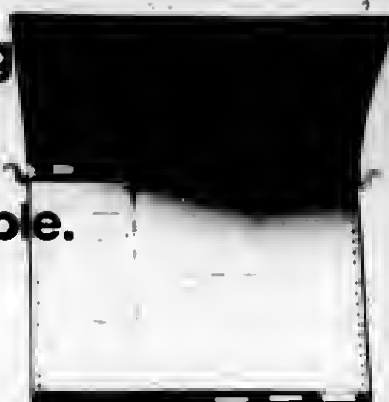
Mail postage-free card for more information



business forms, envelopes, supplies

CW-278

Name _____
 Title _____
 Organization _____
 Street Address _____
 City/State/Zip _____



Free samples of regular letterheads and envelopes on carrier sheets. They make personalized mailings look, and pull, like correspondence.

The basic marketing appeal of a personalized mailing is the computer's ability to insert words that make the message read like personal correspondence.

To make the most of that appeal, your mailing must look like correspondence too. So we offer your regular letterheads and envelopes mounted on carrier sheets—not substitute stationery that looks like continuous forms.

Our *Chain-O-Letter*® continuous letterheads and *Envu-Matic*® continuous envelopes give you nice cut edges, any paper you want, and your choice of most modern printing techniques.

Mail postage-free card for free samples.



business forms, envelopes, supplies

CW-278

Name _____
 Title _____
 Organization _____
 Street Address _____
 City/State/Zip _____



FIRST CLASS
Permit No. 1000
Smyrna, Georgia

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

Postage Will Be Paid By—

Curtis 1000

1000 Curtis Drive
Smyrna, Georgia 30080

FIRST CLASS
Permit No. 1000
Smyrna, Georgia

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

Postage Will Be Paid By—

Curtis 1000

1000 Curtis Drive
Smyrna, Georgia 30080

FIRST CLASS
Permit No. 1000
Smyrna, Georgia

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

Postage Will Be Paid By—

Curtis 1000

1000 Curtis Drive
Smyrna, Georgia 30080

FIRST CLASS
Permit No. 1000
Smyrna, Georgia

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

Postage Will Be Paid By—

Curtis 1000

1000 Curtis Drive
Smyrna, Georgia 30080

FIRST CLASS
Permit No. 1000
Smyrna, Georgia

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

Postage Will Be Paid By—

Curtis 1000

1000 Curtis Drive
Smyrna, Georgia 30080

DEPTH IN DEPTH IN DEPTH IN DEPTH IN TRANSNATIONAL DATA FLOW: THE NEED FOR ACTION

The interdependence of nations has never been more apparent than today, when the traditional sanctity of national borders holds no meaning for technological capabilities. Indeed, the acts or policies of any nation in the area of information policy set off reverberations that are felt globally in this information age.

The United States, with approximately one-half of its labor and gross national product hopelessly immersed in information products or services, virtually rises and falls with each appreciable extraterritorial legislative act or policy pronouncement in the area of information.

Nineteen European nations have so-called "data protection" laws on the books or in the making. Other nations have similar laws in force under consideration.

These laws — which allegedly preserve "sovereign" rights to collect information within national borders, control what enters and otherwise protect the privacy of citizens and the security of the respective nations — in effect block the free flow of information throughout the world.

It is incumbent upon the United States to be concerned with these developments, for our economy and way of life are increasingly dependent on the free flow and privacy of information.

Canada, for example, has expressed dismay about the volume of information flowing into U.S. computers and about the impact of the U.S. media on Canadian life. Responding to their concern about electronic data flowing to the U.S., some Canadian provinces will not let credit information out of their boundaries. The national Canadian government seems equally committed to keeping such information in the country and has forced one U.S. facility to establish a Toronto subsidiary just for Canadian data.

India, the world's largest democracy, reversed itself three years ago in an attempt to tax our news-gathering organizations out of business there. The Indian government also filed a discriminatory tax claim against *Time Magazine* that brought an end to the Indian edition of that publication. *Time*, incidentally, is now banned or has been taxed out of existence in 18 countries.

If the United States continues to ignore the need for a national policy on transnational data flow, the unhappy result will be — at best — a severe recession with massive unemployment, the former acting director of the White House Office of Telecommunications Policy believes.

For the United States — increasingly dependent on the export of information products and the import of news and other information from other parts of the world — these developments could cripple our economy and severely influence the kind of life we lead in an ever-shrinking, interdependent world community.

Almost half of our gross national product is already derived from information services and technology, according to a recent study completed for the U.S. Department of Commerce by Marc Porat of the Aspen Institute. Even more impressive, this study was based on 1967 statistics. In the next few years, by another estimate, 70% of our labor income will be from such "information activity."

Wide-Ranging Definition

What this means is we are now no longer merely approaching the much heralded "Information Age." The Information Age is here.

The current meaning of the word "information" is broad. "Information" no longer refers to conventional bodies of statistics, facts, academic knowledge, scientific data or daily news, but instead now includes anything from the electronically sensed and transmitted, recorded and computer-analyzed human heartbeat or the electrical impulse measuring physical phenomena in space, on the ground and beneath the sea to numeric digits holding your seat on a plane or transferring funds to and from your bank account.

We are increasingly dependent on

this broad definition of information for the growth and health of our economy, the smooth functioning of our institutions and the quality of our individual lives. Information means national and individual income and well being. It means money and profit to producers and employers and jobs to workers — over half of our income, jobs and gross national product in America today.

The Information War

Unfortunately, the term "communications revolution" has become blurred by excessive use and, as a result, has lost its penetrating edge. The revolution, however, is a very real event in our history, and one that may have more profound significance for Americans than the political revolution 200 years ago that created our political democracy.

This revolution is one of human affairs, perceptions and relationships, with profound significance not just for America but for the world.

This is a revolution that has altered our sense of time and distance. It is shrinking our traditional conceptions of both and, therefore, the world. With increasing pressure, it is forcing social, political and economic changes within and among the nations of the world as well as in our own individual lives.

The changes may be occurring, as some have suggested, too fast for us to comfortably absorb. Future shock may be a very real phenomenon. And, for whatever reason including future shock, the changes and thus the revolution itself are being resisted.

Perhaps the resistance to the information age comes solely from the fact that, as history demonstrates over and over again, for every revolution there is a counterrevolution.

For the U.S., dependent as we now are in terms of jobs and the national economy on the production, use and transfer of information, that counterrevolution is producing what amounts to an information war.

It is analogous, in many ways, to the cold war of a generation ago, except that this war is far more complex.

What we face today is warfare on many fronts. The Soviet Union, a traditional antagonist, is only one of the many seeking to block or otherwise impede our trade in information. Others, like Canada, are long-standing friends. Still others, including many Third World countries, have previously seemed too remote and too little concerned with us to be either.

Taken together, however, these nations represent a serious threat, even though they do not always act with common design or accord. As in the Indian wars of the American frontier, there are temporary alliances by individual nations in what is, in a sense, a classic trade war. Dismissing the dilemma as a mere trade war, however, fails to fully describe this information revolution and counterrevolution.

Fear of Annihilation

Many of the countries resisting or blocking the export of our information are not concerned with competition in any literal sense. They have no information technology or industry of their own and therefore cannot hope to presently compete with technologically rich nations such as the U.S.

In that fact may lie the reason for their opposition and their fear.

What many fear is cultural inundation or annihilation. They are afraid we will overwhelm their culture and their national identity with our own. They are resisting what they call "electronic colonialization" or "electronic imperialism." They do not want their minds, banks, governments, news, literature, music or any other aspect of their lives to be Americanized. Neither do they want to be Anglicized, Sovietized, or otherwise victimized by advanced technology and information

(Continued on Page 16)

IN DEPTH

(Continued from Page 15)
that freely flows across their borders, thus possibly causing their own identities to become extinct.

It is lamentable but undeniable that while we see ourselves as offering the

developing nations of the world information they need to survive, such as medical and other scientific data, they perceive beyond the images and print-outs of data bits, a threat of vast and unwelcome change. More specifically,

they see changes in their governments and their leadership groups.

Our information, particularly when it is delivered via the computer-satellite link to a battery-operated TV or radio receiver, appears as an immediate threat to national status, power and life styles.

These and similar fears are also shared by many of the developed nations in the world. For some, the fear stems from the fact not that we are technologically advanced or information-rich; but that we believe in and are insistent upon freedom of information — freedom of action in and out of the marketplace. Although this type of freedom is a doctrine of American life, it is not commonly ascribed to on a global basis.

For these reasons we face an array of nations, to a greater or lesser degree, intent on blocking the flow of our information across their borders and possibly into the minds of their citizens. Add to this the normal competitive practices of the international market, and it is easy to see why we find ourselves opposed in this information war not only by the Soviet Union and its allies, satellite nations and Third World countries, but also by our more traditional allies, such as England, Sweden, France, Germany, Italy and Japan.

In the United Kingdom, for example, there is a British Post Office requirement that any transmitted message must be able to read by postal officials. This requirement may be applied to electronic data; as a result, encryption codes and data compression algorithms, when handed over to a government agency, will be useless

since the privacy value will be voided.

These are the codes that, in any conceivable field of international business or finance, protect or safeguard credit, design, research, manufacturing, marketing and other privileged business information from competitors.

Elsewhere in Europe, too, for a variety of reasons, we have few friends and any opponents on the issue of the free flow of information.

The Swiss, to protect the privacy — and the attraction — of their numbered bank accounts, would throw an electronic screen around their country.

The Swedish government, prodded by their trade unions' concern with the fact that more than 3,000 computer systems holding personal data on Swedish citizens are located in other countries, blocked the transmission of some personal files out of Sweden.

The Western German Federal Data Protection Act, passed last November, attempts to set standards (restrictions or controls) on the movement and use of data stored in data banks. It's a confusing law that in essence obliges data processors to prevent unauthorized access to their facilities, to provide controls over "data linkdate" and to take technical measures to stop the "improper input, access, communication, transport and manipulation of stored data."

Belgium and France are making it a criminal offense to record or transmit some information. In France, the penalty for recording or transmitting what is vaguely defined as "sensitive" data may be a fine up to \$400,000 and up to five years in jail.

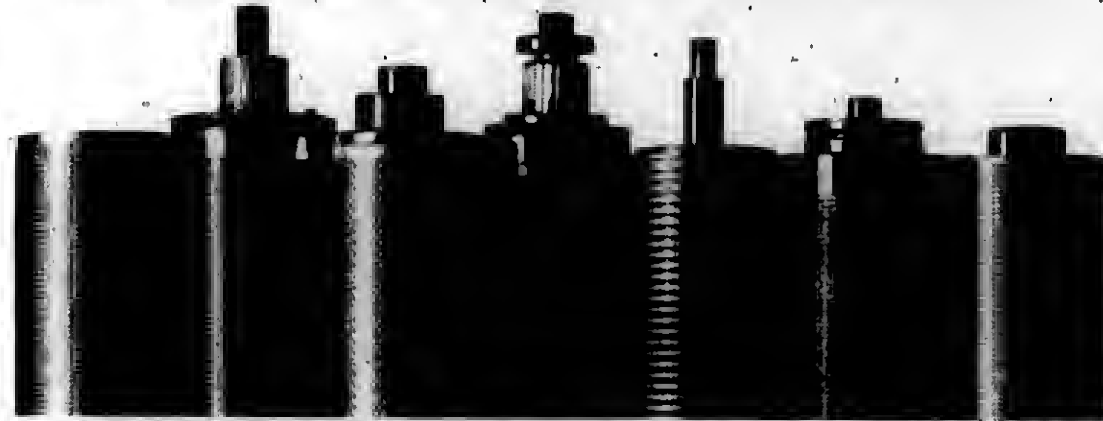
Italy's communications authority has floated a proposal agreeable to the end
(Continued on Page 19)

PRINT DRUMS

●REPLACEMENT ●SPECIAL SEQUENCES ●CUSTOM CHARACTERS & ASSEMBLIES

Our custom-designed character print drums and print-drum assemblies can fill your requirements. Industrial Engraving Company, Inc., P.O. Box 311 Easton, Pennsylvania 18042. Phone (215)253-3541

IE
INDUSTRIAL



OUTPERFORM A PDP 11/70 FOR \$4,850

Yep. Given the same disks, memory and terminal load, a PDP-11/34 RSTS/E with GIANT/11 and BASIC PLUS can outperform a PDP-11/70 RSTS/E with RMS-11 and BASIC PLUS II.



And the one-time \$4,850 license fee for GIANT/11 gives you DEMAND REPORTING.

You can have QUERY automatically built in to every report you write with no effort and no extra code.

AND —
ISAM, MACRO SORT, DATA ENTRY, SECURITY, REPORT GENERATION AND TRAINING TOO!

Write for our Apples and Oranges comparison. We'll respond fast-always.

SECOND SOURCE
P.O. Box 310
Menlo Park CA 94025
(415)323-6117

retread payroll?

Lots of retreads around . . . they do well on a 1401 not so on a 360/370 . . .

How to spot a retread? Easy . . . 50, 60, 100 small programs, old-fashioned multiple read/writes, segmented records, lots of redundant files, no real ERISA/EEO capabilities . . .

If you have 1960 software staggering under 1978 payroll/personnel/ERISA problems, all is not lost . . . just call Joe Nestor (617) 851-4111, Wang Laboratories, Inc., Lowell, MA 01851.

WANG



The reason Epoch 4 has stood the test in America is because it deserved to.

Quality. When you have it, the word gets around.

With a computer tape like Epoch 4, America is the perfect place to introduce it if you want to find out exactly how good it is.

We were certain it would fulfill a long standing need in the EDP

industry. So certain, that we included a 20-year warranty with every reel.

And we were right about Epoch 4. Its quality has been confirmed time after time. Through

billions of error-free passes.

Today, millions of reels of Epoch 4 are in use. Because Epoch 4 is the proven one. The patented one. The one that delivers exactly what we promised it would.



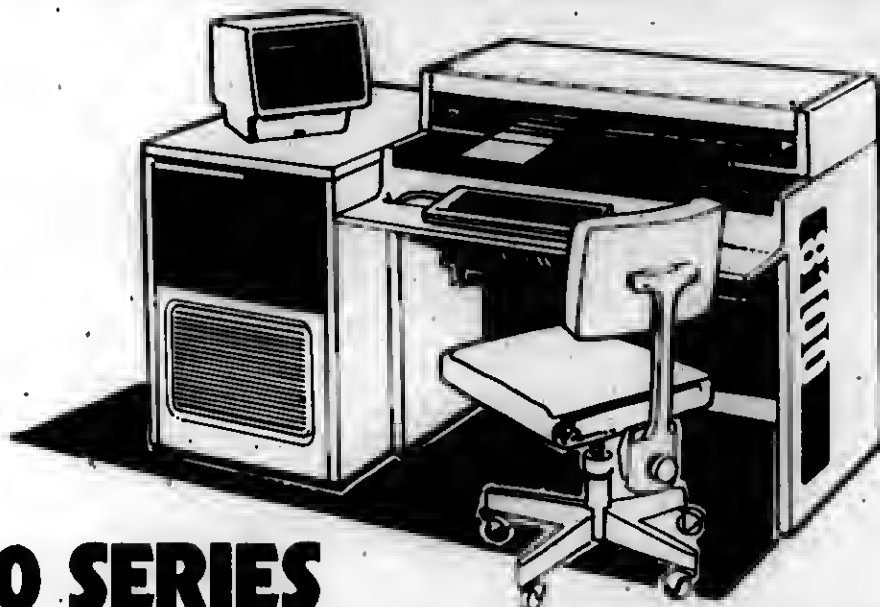
GRAHAM MAGNETICS *Proven around the world.*

Graham, Texas 78048



COMPUTER DEVELOPERS

**WE ARE ONE OF THE KEY LEADERS TODAY,
HELP US BECOME "THE LEADER" TOMORROW...**



NCR 8100 SERIES

NCR Corporation has just developed a powerful family of computer products that offers smaller businesses hardware and solution-oriented application software at a readily affordable cost. The 8100 System is just a part of the advancement and involvement of NCR in solving mankind's problems for today and tomorrow.

Our current involvement at the Data Processing Division of NCR in Wichita in the 8100 series requires experienced and knowledgeable personnel to work on future and similar development.

These positions offer excellent income commensurate with your experience, a liberal benefits program and unusual and challenging opportunities for both professional advancement and personal growth with NCR Data Processing Division.

ARCHITECTURE DESIGNER

We need you to define and design processors and their interface for operating systems. Such a challenge requires a thorough knowledge of various design approaches. It also requires the ability to effectively interface with peers and management. Minimum qualifications are a CS degree and 5 years design experience in compilers and work utilities.

UTILITY DEVELOPERS

You are needed to develop utility programs in high level or assembly languages. Example programs are SORT/MERGE, Media Copies and Media/Memory Printouts, Dynamic File Inquiry, etc. You must have a CS or Scientific degree and a knowledge of assembly level programming and utility design.

COMPILER DESIGNERS/ANALYSTS

Would you like to lead or serve on one of our teams in Compiler Design from definition through programming and systems test? Do you know high level programming languages, assembly level languages, and PASCAL based languages? If your answer is "yes" and you have a BS degree or better with 3 to 5 years experience, we are interested in you.

SENIOR SYSTEMS ENGINEER

You will be responsible for the development of small business systems architecture. Special applications will be in the area of distributive processing and communications. EE or CS degree plus a minimum of 8 years experience needed.

DESIGN ENGINEERS

We challenge you to be responsible for logic and firmware design for micro processor based EDP systems. Specific experience with Peripheral Controllers desired with an EE and a minimum of 3 years experience.

SOFTWARE DEVELOPMENT DESIGNERS

You'll be responsible for operating system software design and implementation. Micro processor assembly language experience desired. Your assignments will be in Logical I/O, Physical I/O (including communications), systems internals and generation. CS plus 3 years experience required.

Please call (316) 687-6192 or send your resume to:
Ms. Dee Walker or Mr. Rick Veldhouse
Professional Placement Office, Dept. CW-213
3717 North Rock Road, Wichita, KS 67226

You'll get complete details either way.

NCR

Engineering and Manufacturing Group

An Equal Opportunity Employer



THE NEED FOR ACTION IN DEPTH

(Continued from Page 16)

tire European Economic Community to eliminate flat-rate charges for private telephone lines on which volumes of data are now transmitted at an affordable cost. Italy, instead, would use a fixed rate plus an individual character or message charge. This, users say, would boost costs prohibitively — by as much as three to five times the current rate.

All these protectionist steps are leading to some other potentially serious problems. First, there is the very real possibility that those countries opposing the free flow of information may be constructing a body of contradictory international law that will only lead the world from confusion to chaos in communications, perhaps blocking information flow altogether.

There is also the real possibility that in a world where the flow of information is regulated and controlled almost everywhere, "data havens" or "data refuges" will spring up in countries with either few or no laws restructuring the storing, transmission and use of data.

Because computer-communications technology is too attractive to be denied, laws will not end the information revolution. Instead, data banks located in countries where it has become impossible, too expensive or cumbersome to operate, or where privacy of the data cannot be secure, will move to such a "data haven."

The resulting loss of revenue as much as the loss of control over information is unthinkable to most nations. Unwilling to free the process, they think only in terms of escalating their response to the perceived threat, possibly by banding together to harmonize, as they put it, their laws and put teeth into their determination to block the free flow of information throughout the world.

World forums, in addition to individual nations, are beginning debate over communications issues. The United

States' mere physical presence and influence in the world is a source of concern to the 19-member Council of Europe

in its debates over human or individual rights in the collection and dissemination of credit, health, employment

and other personal information by international data networks.

(Continued on Page 20)

Our Remote Computing Services fit your needs.

If you're now a remote computing user, consider Martin Marietta Data Systems' Remote Computing Services (RCS). For a number of reasons:

If you need more computing power, or if you're concerned with what your *not getting* from your present RCS supplier, look at what we have to offer.

ECONOMY OF USE

- Nationwide data communications network: you're linked to our nearest network node point by leased line or dial-up access, depending on load or application.
- Simultaneous processing of batch and interactive data: now moving one billion characters a day.
- Unique application packages: accessible free, but only when needed.
- Let us show you: we're often 20% to 60% less costly than many of our competitors.

UNEQUALLED SERVICE

- Highly responsive Customer Service and technically creative Account Management: including specialist back-up, extra program products and training courses, available as needed.

○ You're in control: you get the turn-around and flexibility you require. You control priority and costs. In fact, your cumulative cost data is dynamically accessible from your own terminal.

- High reliability: twin 370/168's and an optimally configured nationwide data communications network.
- Distributed entry and output of your processing.

STATE-OF-THE-ART

- Virtually limitless capacity: multiple Host Data Centers (twin 168's, a 148, a CYBER 172); 25 billion characters of on-line storage.
- Industry recognized software: MVS, IMS, System 2000, TSO, TONE, CICS; plus software for plotting, text editing, graphics display... and much, much more.
- Use of any programmable terminal, minicomputer or mainframe, supplied with HASP/JES software.

If you're not currently using a remote computing service, we can still help you. As a planned and/or interim supplement to your own in-house computer. As a replacement for an under-utilized computer. As an economical alternative to acquiring your first computer. Or as a pipeline into our Modular Application Systems software packages.

To find out more, send for our free Remote Computing Services brochure. Please contact Dick Nemerson at MMDS headquarters, 300 East Joppa Road, Baltimore, Md. 21204. Phone (301) 321-5744.

NAME	TITLE
COMPANY	
ADDRESS	
CITY	STATE ZIP
PHONE	

Martin Marietta Data Systems We Build & Run Systems

BULL!

Subscribe to:

The General Bull News Sheet, a quarterly compendium of computer satire, irrelevant nonsense, and outright lies.

24 pages/issue. Good stuff... back issues available.

\$3/single issue, \$10/year.

BULL, Box 2623
Menlo Park, CA 94025

IN DEPTH

(Continued from Page 19)

The 24-member Organization of Economic Cooperation and Development (OECD), whose members consist of the developed nations of the free world, including the U.S., is concerned with the economic and technological aspects of the same issue. Ostensibly concerned with the privacy aspect, but with a more fundamental interest in

data trade and related economic issues, OECD recently established a subcommittee to deal with "information, computers and communications."

There are other organizations variously concerned with the issues of data privacy, trade protectionism, national sovereignty, cultural identity and technological advancement, as well as the protection of the individual

from the abuses of computer banks that deny access to those on whom they gather information and thus deny their rights. Such concerned organizations include the European Economic Community (EEC), which has begun actively considering some disturbing proposals to curb the flow of information; the Nordic Council, with equally disturbing proposals of a similar na-

ture; the United Nations Educational, Scientific and Cultural Organization (UNESCO), now seeking curbs on direct broadcasting from satellites, and the U.N. itself, where all these issues are subjects of discussion and concern.

Need for Policy

These developments — the laws, the proposed legislation, the debate — may not be viewed by some as tactics in an information war whose strategy is to weaken the United States and cut back our long-established lead in the field. They do, however, amount to the same thing since that will be the precise result if these and other such developments continue.

It does not matter whether the acts are sovereign actions in concert or the short-sighted policies of individual nations merely seeking preference in the marketplace or protection from a threat we really do not pose. The result will be the same.

The U.S. must have a national communications policy and use this as a basis to bargain for the free flow of information in every international forum, conference, meeting, discussion or agreement in which we participate.

Why is a national information policy so critical? For one thing, we alone in the world do not perceive the direct relationship between the control of information and foreign policy — and, therefore, our own national survival.

Because of our lack of understanding, we have no national communications or information policy, and we therefore find ourselves at a disadvantage in dealing with other nations which are much more aware, no matter how undeveloped they may be, of the political, economic, military and social significance of information and of our high information technology.

George McGovern pointed out that here in the U.S. "the economic ramifications of international communications and the movement of information have gone virtually unnoticed," even though in this new information age "the control of information can be a new economic weapon in the arsenals of both developing and developed nations."

"One way to 'attack' a nation such as the United States, which depends heavily on information and communications, is to restrain the flow of information, cutting off contact between the headquarters and overseas branches of a multinational firm, taxing telecommunications crossing borders, building information walls around a nation," McGovern noted.

The truth of the matter is that this is happening now. The attack has been under way for several years and, as McGovern said, the time has come "to take a broad look from an international perspective." McGovern says the reason why the U.S. does not yet have an overall communications policy

(Continued on Page 22)

The world's best DBMS announces the end of the chain-pointer generation.

**Adabas has broken the chain-pointer barrier.
For the first time in history, an inverted list DBMS is No.1
in both throughput/efficiency and ease of use.**

For years, others have said you could have *either* throughput *or* ease of use. Adabas has always said you can have *both*.

Datapro '77, conducted with *Datamation*, is the latest in a long series of surveys that proves our point. The user community also gave us the highest average rating for all categories. Who could ask for anything more?

Every day, more people realize that the rigid hierarchical structures of the past are giving way to

the relational approach of tomorrow.

The trend is clear. The future is here. It's Adabas. Combined with Com-plete, Software ag's teleprocessing system, Adabas is the most powerful DB/DC system available anywhere.

Seeing is believing.

We've just made a lot of claims, and we want to prove them. That's why we'd like to give you a free presentation at your convenience. Simply call us, or return the coupon below.

software ag
OF NORTH AMERICA, INC.

Reston International Center, 11800 Sunrise Valley Drive
Reston, Virginia 22091. Phone (703) 860-5050

1. ☐ I'd like more information on Adabas.
2. ☐ Please send more information on Com-plete.
3. ☐ Please call to arrange a free presentation.

Name _____ Company name _____
Street _____ City _____
State _____ Zip _____ Phone _____
Type of computer _____ Operating system _____

Available Worldwide



213

Member SIA Software Industry Association

From CalComp, what you get is what you see.

It's a sample plot from one of our three, brand-new, 1030-Family drum plotter models.

And it's all yours to prove a single, simple point.

CalComp makes the best drum plotters in the world. Period.

Case in point: When it comes to medium-priced drum plotters, the new 1030's literally outdraw the competition. In terms of accuracy, line quality, speed and, in short, good old fashioned price/performance.

Better yet, all three new plotters are perfectly suited to a wide range of graphics applications. In fact — outputted graphically — any data now in your computer can work even harder for you.

For starters, we made all three new models completely d.c. servo-motor driven. For increased accuracy in every mode — on line, remote/time-sharing and off-line.

Then, we gave them a newly-designed linear drive pen mechanism. For the kind of pen force control that produces consistently superior line quality. In every application.

Next, we greatly increased overall throughput — especially in on-line environments — by implementing "smarter," micro-processor-based controllers.

Finally, there's even greater built-in versatility. Because both the 1037 and 1038 can be field-upgraded — all the way up to a new 1039 — without ever leaving your office.

The one thing we haven't changed is CalComp service and support. It's still worldwide and second to none. For field service personnel. For in-place field systems analysts. For the kind of help you expect from the world leader in computer graphics. Need we say more? When it comes to drum plotters, it pays to set your performance sights a little higher.

THE NEW 1030 DRUM PLOTTER FAMILY

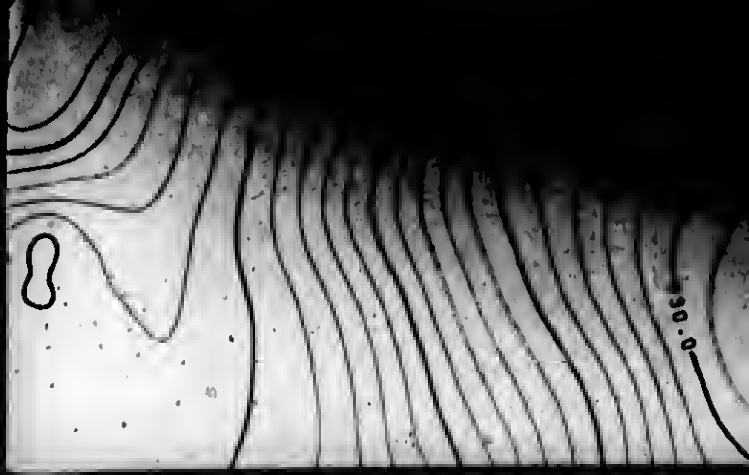
Plotter Model	mm-per-second	Pens	Step size in mm
1037	50.0 (≈ 2.0 in.)	1	.05 (≈ .002 in.)
1038	112.5 (≈ 4.5 in.)	1	.05 (≈ .002 in.)
1039	112.5 (≈ 4.5 in.)	3	.05 (≈ .002 in.)

Draw your own conclusions...

It's easy with a free CalComp sample plot. For your own evaluation copy, call: (714) 821-2011. Or write: CalComp, 2411 W. La Palma Avenue, Dept. MS-3, Anaheim, California 92801.

CALCOMP

WEST: Anaheim, CA (714) 821-2683 / Santa Clara, CA (408) 249-0936 / Houston, TX (713) 776-3276 / Dallas, TX (214) 661-2326 / Englewood, CO (303) 770-1950 / Beaverton, OR (503) 646-1186. **SOUTH:** Norcross, GA (404) 449-4610 / Huntsville, AL (205) 533-6260. **MIDWEST:** Southfield, MI (313) 569-3123 / Rolling Meadows, IL (312) 392-1310 / Dayton, OH (513) 276-3915 / Cleveland, OH (216) 362-7280 / Shawnee Mission, KS (913) 362-0707 / Bloomington, MN (612) 854-3448. **EAST:** Wal-tham, MA (617) 890-4850 / Union, NJ (201) 686-7100 / Bala Cynwyd, PA (215) 667-1740 / Rockville, MD (301) 770-5274 / Pittsburgh, PA (412) 922-3430.



IN DEPTH

(Continued from Page 20)

is because there is no drive to develop policy or because we don't even know the right questions to ask.

A more plausible reason, however, may be that until just recently, for all our wealth, our freedom, our knowledge, we were so inexorably and rightly bundled in national, cultural, racial and economic security blankets

that we never came to grips with the reality of how very much indeed the world has shrunk and how desperately our own survival as a free nation depends upon what kind of global information policy is promulgated.

There is no widespread awareness, however, as Secretary of State Cyrus Vance said upon his return from the North/South dialogue in Paris, that

"we have concluded an era when the central question was whether to cooperate. We have begun a period in which we must develop the means and institutions for cooperation."

We have also concluded an era when the piecemeal approach to policy formulation and policy implementation is not only obsolete but dangerous. In earlier times, the expansion of new

technology was welcomed without much concern for future foreign or domestic impact. Regulation and policies could easily be developed on a case-by-case basis. In fact, policy often was no more than an accumulation of regulatory decisions.

This method of policy formation is no longer effective. The quickening pace of technological advances in communications has outstripped the ability of our existing institutions to deal with emerging communications issues, and now the threat of a massive assault on our place in the world's economic system compels a reassessment of our approach to policy formulation and the institutional framework in which policy is made and implemented.

The events taking place in the world's parliaments and policy forums compel the admission that cohesive planning for the future is essential so that crises, such as those recently experienced in the energy field, will not be repeated in such an important area as communications and information.

First, A Commitment

What is needed first is a commitment to a comprehensive national information policy that will have as its foundation our traditional belief in the freedom and free flow of information throughout this nation or any other nation determined to be free, subject only to individual privacy rights.

We must also develop a unified approach to the making and the implementation of that national policy. This approach can only be taken by the highest level of government since it will be necessary to cut across long established lines of bureaucratic organization and channels of thought that have caused us to fail to recognize the interrelationship of computers, communications, information and power, and of international telecommunications and our foreign affairs and international economic policies.

Communications and policy issues must be viewed as dealing with problems that, however apparently dif-

(Continued on Page 23)

THE ONLY COMPUTER TERMINAL SYSTEM BETTER THAN COURIER'S 270 IS COURIER'S NEW 270.



We have some good news for IBM customers. Courier has improved its 270 computer terminal system. Again.

Courier is completely compatible with IBM's entire 3270 terminal product line.

And we're introducing two improved terminal controllers—with advanced communications capabilities and extended device support.

New features include expanded capacity (up to 3440 characters), additional program function keys, and operator status information at the bottom of the screen.

And that's just for starters. Courier has other advantages that no one can match.

Debugging features to help check-out new applications. Diagnostic features to help isolate network problems.

Redundancy features to provide unmatched availability. And productivity features to improve ease of operation.

With all this added value, Courier's 270 ought to cost more than IBM's 3270.

But it doesn't.

Go ahead, compare IBM with Courier. We think you'll find there's really no comparison at all.

Call our toll-free number and we'll deliver to you the complete story on Courier's new 270 computer terminal system.

Excellence is the only solution.

Courier

Call Toll-Free 800-528-1400, Ext. 274
P.O. Box 29038, Phoenix, AZ 85038
TWX 910-951-0685
In Canada Call 416-251-3335

Software Salesperson

To open another midwestern office (Chicago). Due to the unprecedented demand for our Project Management and Cost Control System—Project Control/70 and our Systems Development Methodology—SDM/70, we are expanding our midwest operations. Excellent financial and growth opportunity. Write, telling me why you think you're the "Right Person."

Dick Thatcher, President
Atlantic Software Inc.
5th & Chestnut Sts., Phila., Pa. 19106
215-922-7500

IN DEPTH

(Continued from Page 22)

ferent, are interrelated; decisions directed at one specific problem will have consequences for others.

At the present time, no government unit or agency has the authority to respond to that reality. Only the President and Congress can give that authority, and only with a national information policy that has this authority can we survive.

Policy Integration

The task of integrating our national policy on communications and information with our domestic policies regarding competition, copyright, privacy and the like must be settled and the interweaving of those policies without foreign aid, foreign affairs and our international economic policies must begin.

For the developing nations, concerned with cultural as well as economic inundation, let us share our technological wealth, indeed give our satellite technology such as our Advance Technology Satellites (ATS), for example, in lieu of or in addition to existing aid and assistance programs, for these countries to use and experiment with as they wish without U.S. intervention.

We can no longer "throw money" at the developing nations. We must develop for them, or with them, an overall economic strategy and encourage their development with dollars, food, technology and, most importantly, information. In return, let us hope and, where necessary, bargain for the freedom and free flow of information and for the export of our information products.

On another scale and another level, we must bargain for the free flow of information and information products through multinational trade negotiations and bilateral agreements with Europe, Japan and other developed nations. Since the export of information products and the import of raw information is essential to our growing information economy, we must treat these efforts as we would any other industrial sector of our economy important to U.S. economic health.

First, however, we must either establish that the 1974 Trade Act is big enough to house our concept of "information trade" or build a legislative addition to accommodate it. At the

same time, we must ensure that our system of software protection, whether by patent, copyright or trade secret, is well established. Then we must make sure our governmental machinery is adequate and has the tools to weed out and eliminate the nontariff barriers to information trade wherever they are found.

All this, of course, requires a balance-

ing with other important trade programs and, of equal significance, requires understanding of the trade needs of the developing and developed world alike. This becomes a bitter pill for the U.S. when it means attrition and perhaps a consequent loss of jobs. This, however, is the inevitable result of free trade, of we are to have it, in an ever-expanding world economy.

We can and should prepare for these shifts domestically with full recognition by the affected industries, compensation if appropriate or necessary and job training and employment opportunities uppermost in our thinking — but protectionism is not part of the formula.

A large part of our negotiations will (Continued on Page 24)

"MARK IV/Reporter taught us what real productivity is all about!"



"We purchased a General Ledger accounting system from a major vendor. After investigating, we found that we were going to have to drastically change the Cobol programs in order to generate all the required reports.

"Rather than this, we concluded that it would be far better to start from scratch and use MARK IV/Reporter for the 75 to 100 daily, weekly, monthly end year-end accounting reports that we produce. We made the right decision. If we had tried to modify the Cobol report writer that came with the system, it would have taken us at least two months longer to complete the project.

"MARK IV/Reporter was installed on our 370/145 within a few hours. The four people who attended a basic MARK IV/Reporter class were using it comfortably within a week. We also have a competent Cobol programmer who took the MARK IV manuals home and read them over a weekend. He started using MARK IV/Reporter the next Monday morning.

"It runs very efficiently and it's helped increase the productivity of our systems and programming staff. With the confidence we've gained in MARK IV/Reporter we can commit to new projects now that would have been impossible before. We'll be using it for 50% of our new work, which includes a new student records information system. MARK IV/Reporter will be a key part of this new system. As for Informatics Support, our staff here is very impressed; their people have been extremely competent and the systems engineering support has been excellent."

WHAT IS MARK IV/REPORTER? MARK IV/Reporter is an information processing system which handles all reporting requirements for existing file and/or data base systems. Although extremely flexible and powerful, the system allows non-programmers to produce error-free reports in a fraction of the time required with conventional programming methods. MARK IV/Reporter can be installed and implemented in the U.S. and Canada for as little as \$306.00 a month. MARK IV/Reporter is upward-compatible to MARK IV whose 1,300 installations worldwide make it one of the most successful software products of all time.

informatics inc. Software Products

World's Leading Independent Supplier of Software Products

Member SIA Software Industry Association

Informatics Inc., Software Products, Dept. 1177D
21050 Vanowen St., Canoga Park, Calif. 91304

Name _____
Title _____
Dept. _____ Computer _____
Firm _____
Address _____
Phone _____
City _____
State/Province _____ Zip _____

The acquisition of Mark IV was made possible by a grant of the University of Kansas Endowment Association. Mr. Magnuson oversees administrative DP activities for the Lawrence campus. The views expressed are those of Director Jerry Magnuson and not necessarily those of the University of Kansas.

165-II

With a DAT this is almost a 168! Machines available now. With tie-in leases to your 3033

MDISCO
312-698-3000

IN DEPTH

(Continued from Page 23)

probably result in cooperative efforts to harmonize trade perspectives and monetary policy, foster market expansion and full employment, improve custom procedures and develop a full and understanding set of codes for business, cultural, educational and humanistic development. We can initiate this process by playing a sub-

tantially upgraded role in helping the OECD develop an international set of principles for the protection of individual privacy and, in the process, encourage non-OECD nations, particularly developing ones, to associate themselves with the process.

OECD countries can likewise join together to bridge the North/South gap with the developing nations by in-

itiating programs enhancing understanding of computer-communications and space technology and assisting their development by transferring technology and promoting its useful application to their national needs. This, of course, will require some reorienting of foreign aid, closer cooperation by the World Bank, Asian Bank, International Monetary Fund and

other transnational institutions, but this too is overdue and may well begin here and now.

On yet another and more complex level, the dilemma presented by communications censorship, information theft, sabotage, and manipulation requires that efforts to achieve a sort of "information detente" be undertaken. There must be reasonable limits established for certain kinds of communications tools for national defense in the same way the Salt talks seek to curb weapons escalation between the U.S. and Russia.

To date, the U.S. has no position on the international privacy issue; the Privacy Act of 1974 applies only to the government matters here at home. But the process of developing an international privacy policy has nevertheless begun.

There is every reason to believe that harmonization of privacy law — while to some a sincere and admittedly meritorious undertaking — is a shibboleth for a new form of cartelization designed to harness U.S. industry. We are ill-prepared to deal with this looming disaster.

The unhappy alternative to national policy preparedness will be economic defeat for us and, at best, a severe recession with massive unemployment. This eventuality cannot be denied when the nature of our present and future economies are clearly understood.

And, sadly for those who would block the free movement of information in the world, there would probably be even greater adverse consequences within the national borders they are now so anxious to close.

Eger, an attorney and consultant in communications law and regulatory policy in Washington, D.C., served President Gerald R. Ford as acting director of the White House Office of Telecommunications Policy from September 1974 until August 1976.

Prior to that appointment, he spent four years as legal assistant to Federal Communications Commission Chairman Dean Birch.

Eger's first exposure to communications problems came in the mid-1960s, when he was employed as a data communications specialist with Illinois Bell.

The communications attorney received his law degree from John Marshall School of Law in Chicago.

flexible disks

Verbatim

The superb quality of Verbatim™ removable magnetic storage media is now on a dealer's shelf not far from you.

The reason Verbatim is now so accessible is that so many of you like the Verbatim idea: noticeably better quality and durability that show up in tough everyday use. The reason? We make almost everything ourselves, because we found that we could improve on the quality that we were getting from our suppliers.

Being demanding isn't always easy. But it's good for the people who buy and use Verbatim, and it's good for the scores of companies who specify Verbatim for the equipment they make. And we enjoy doing business that way.

For your nearest sales office call toll free: (1) 800-821-7700, Ext. 515 (in Missouri call: 800-892-7655, Ext. 515)

Information Terminals Corp., 323 Soquel Way, Sunnyvale, CA 94086. (408) 245-4400. TWX: (910) 339-9381.

In the Far East:
ITC—Far East
404 Roppongi Skyheights
3-2-21 Roppongi, Minatoku
Tokyo, Japan
Telephone: (03) 583-1981
Telex: J 47879

In Europe:
Information Terminals S.A.
Case Postale 296
1215 Genève 15
Switzerland
Telephone: 41 (22) 34-90-55
Telex: 22647 ITGE CH

data cartridge

Verbatim

Ask for it by name.

Verbatim

minidisks

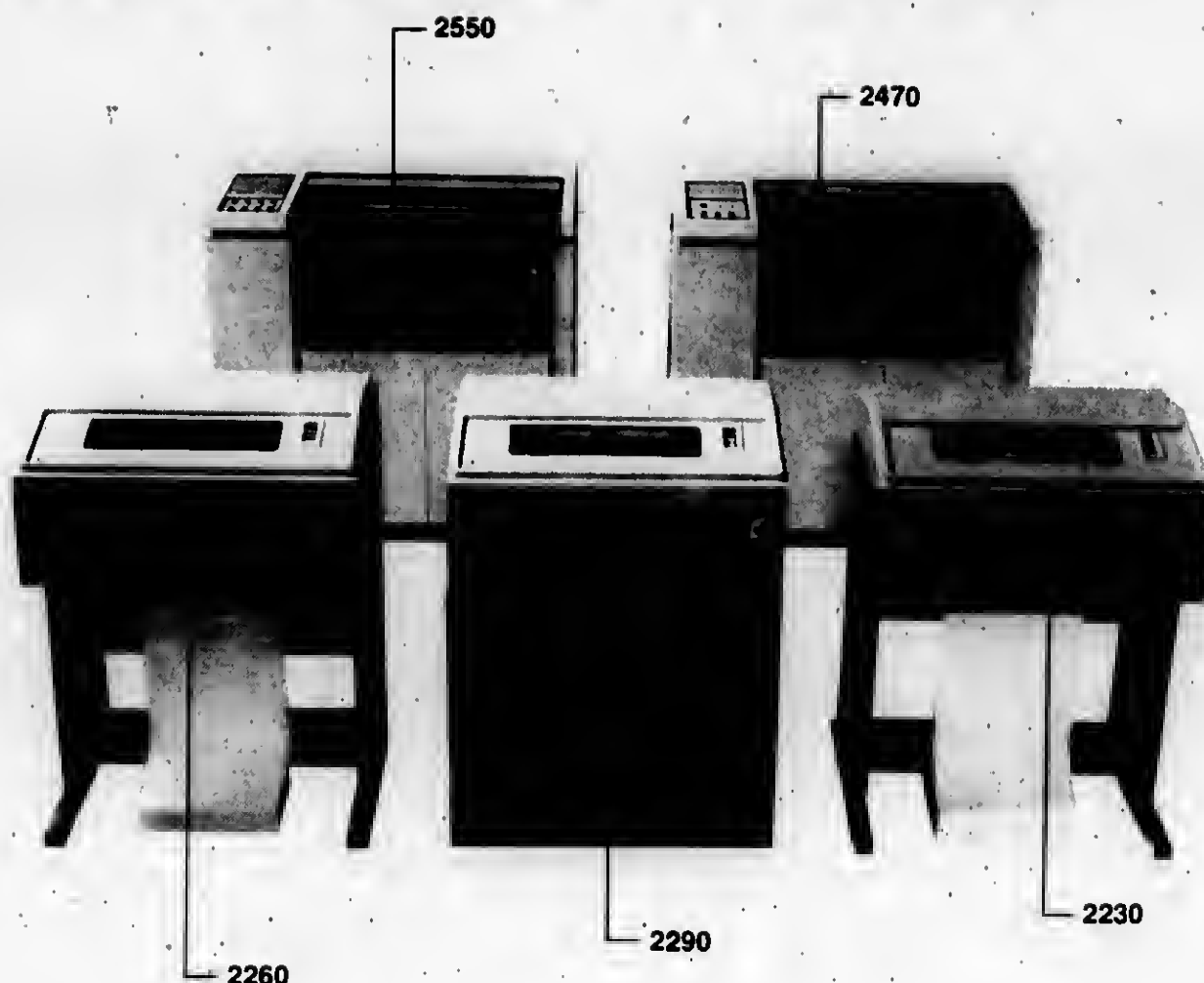
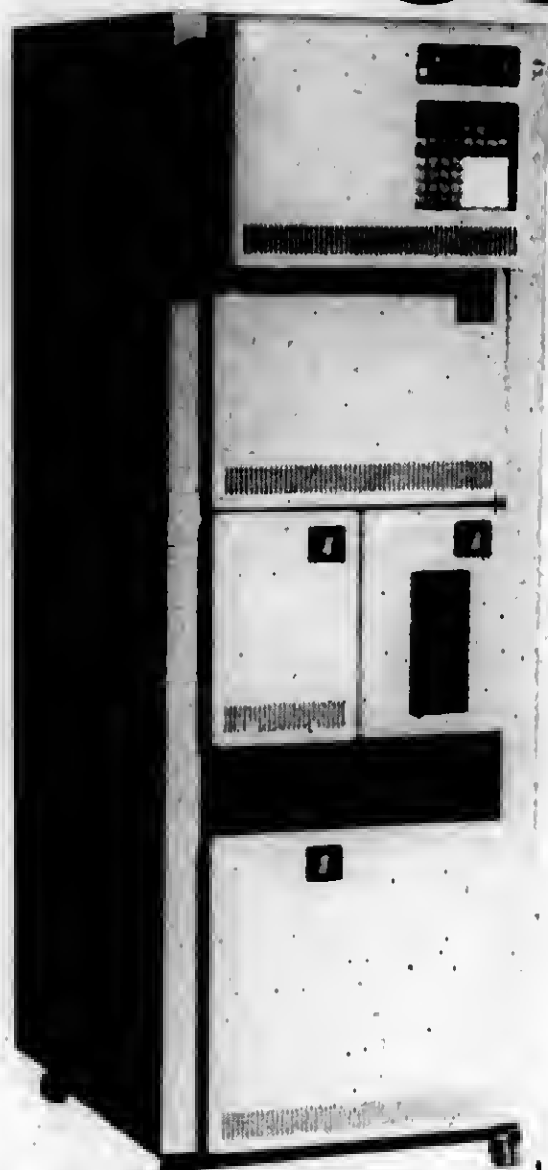
Verbatim

Dear Verbatim people:
Tell me where my nearest Verbatim dealer is. 89-2-13-78

My name is _____
Title _____
Department _____ Tel. _____
Organization _____
Address _____
City _____ State _____ Zip _____
And while you're at it, send me literature on _____

Information Terminals Corp., 323 Soquel Way, Sunnyvale, CA 94086. (408) 245-4400.

IBM SERIES/1 USERS, NOW BDS HAS A LINE PRINTER JUST FOR YOU!



BDS has the cost effective answers to your printer requirements. We've got Dataproducts printers with speed ranges from 300-1500 LPM which are 100% compatible with the IBM Series/1. These printers offer true plug compatibility.

There are absolutely no conversion problems. We supply the printer, controller and cable. You simply plug the controller into the I/O

channel of the IBM 4953 or 4955 processor and you're ready to print.

When you buy a Dataproducts printer from BDS you buy more than just a printer. You get economy, efficiency, promptness and reliability.

Economy—BDS prices offer an attractive price/performance alternative to the limited and expensive IBM offering.

Efficiency—Our full IBM compatibility enables you to *really* plug in and go. We offer the complete speed range so you may match the right printer to your print load.

Promptness—BDS delivers in 30-45 days.

Reliability—As the largest supplier of Dataproducts printers to the end-user and system houses, we have delivered hundreds of

printers to hundreds of satisfied users. More than 50,000 Dataproducts printers are in daily use throughout the world.

BDS Computer Corporation, 1149 Chestnut Street, Menlo Park, CA 94025 (415) 326-2115.

BDS

DATAPRODUCTS PRINTER FEATURES

MODEL	2230	2260	2290	2550	2470	
Speed—64 char.	300	600	900	1250	1500	lines/min.
Speed—96 char.	240	436	660	905	1200	lines/min.
Paper slew, ips	20	25	30	60	35	
Characters/line	136	136	136	132	132	

In addition to these specifications, the following features are common to all Dataproducts printers:

- Impact, full character
- IBM compatible VFU
- 6-8 lines/inch
- 6 part copy
- 10 characters/inch
- Paper receptacle
- Variable width tractor
- Fault indicator
- Self-test
- Full line buffer
- 500,000 cps transfer rate

PRICE/PERFORMANCE

Speed (LPM)	Dataproducts Model No.	Price
300	2230*	\$ 9,100
600	2260*	13,100
900	2290*	16,000
1250	2550**	29,500
1500	2470	27,500

* 96 character optional, add \$2,000

** 2 character sets standard—96 and 64

MORE FOR LESS? I LIKE IT!

The computer system I use _____
My line printer requirements are _____

Name _____
Title _____
Company _____
Street _____
City _____ State/Zip _____
Telephone () _____ Ext. _____

BDS

BDS Computer Corporation
1149 Chestnut St.
Menlo Park, CA 94025
(415) 326-2115

Editorial

U.S. Will Be the Loser

In this issue, former Acting Director of the Office of Telecommunications Policy John Eger argues cogently for the development of a national policy on transnational data flow.

Yet just last week, another report said the only four members of the 35-member Subcommittee on International Data Flow of the Advisory Committee on Transnational Enterprises bothered to show up for the first meeting of that group.

The U.S., which is the largest exporter of information, has been viewed in international circles as the main stumbling block to the development of international policies in this area.

Apparently, that reputation is deserved, judging from the atten-

dance at the first meeting of the State Department group responsible for trying to develop a U.S. position on the issue.

Eger effectively argues the reasons we need such a policy, so we won't repeat those reasons here.

The problem, however, is that few people take the issue seriously. It is time that it is treated as an important matter — perhaps the State Department or White House should focus more attention on the area. If not, the U.S. is going to be shut out of many trade opportunities and American businesses are going to be hampered in dealing with foreign subsidiaries.

The issue just will not go away, so hiding from it will solve nothing.

Wrong Way to Stop Abuse

Matching one computerized record with another in order to detect welfare cheats is really catching on in Washington and has now been expanded from matching just governmental records to matching records of welfare recipients with those of employees of private firms.

Clearly, no one can be against reducing welfare fraud; any savings in this area will benefit the taxpayer and the legitimate recipients of welfare. However, the practice raises concern over privacy. Should records developed for one purpose

be matched with others developed for other purposes? Does the state, in the interest of efficiency, have the right to access records of private firms or individuals?

We don't think so. Primarily, we are against the practice because once started, it is hard to see where it will stop. Matching of records could lead to a national data bank by slow stages — and the people and Congress have rejected such a notion for years.

Welfare abuse should be stopped, but matching is not the way to do it.

Data Past

Five Years Ago
Feb. 14, 1973

MONROEVILLE, Pa. — The Data Base Language Task Group of the Conference on Data Systems Languages (Codasyl) Programming Language Committee released its recommendations for the inclusion of a data base facility in Cobol. The proposal was based on the concepts and facilities described in the Codasyl data base task group report of April 1971.

NEWTONVILLE, Mass. — A search for some of the contents of the Control Data Corp. data base, compiled for use in its antitrust action against IBM, produced a picture of the gross profit margins used by IBM in manufacturing, maintenance and rental.

An analysis of the data indicated that maintenance and labor costs, as of February 1972, were being marked up by IBM approximately 300% (the users of the models 20, 1600 and 1130 getting slightly less of a markup than the users of the other 360 and 370 machines).

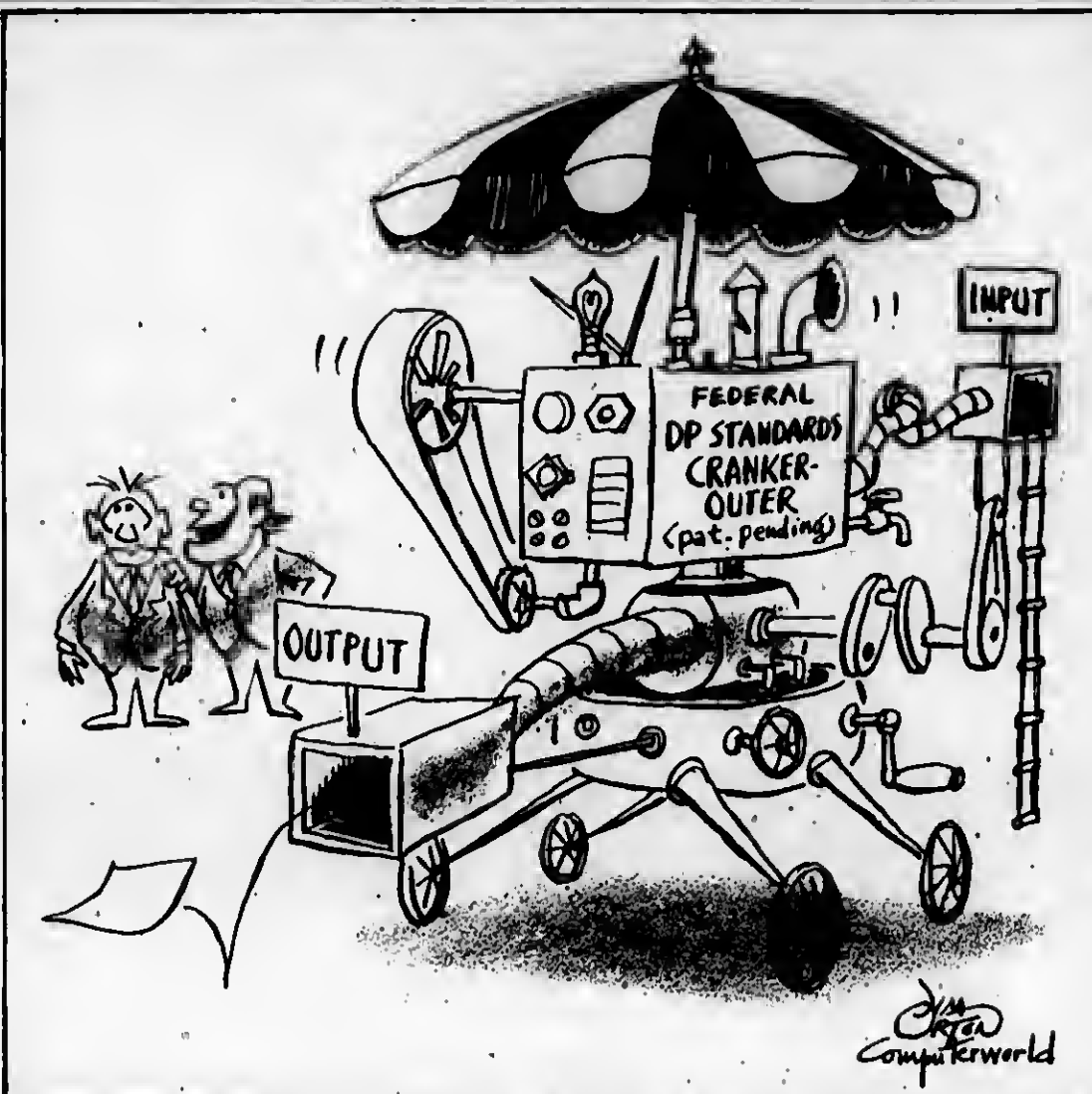
Eight Years Ago
Feb. 18, 1970

NEW YORK — Only about one-third of the small IBM users had signed up for IBM systems engineering (SE) services, under post-unbundling terms and most of the firms that signed the general SE contract did not plan to make much use of the services, a poll conducted by Computerworld indicated.

The most commonly voiced complaint by 360/20, 360/30 and 360/40 users contacted concerned the degradation of IBM services in "the new world," especially the loss of free education services.

GAITHERSBURG, Md. — IBM introduced an I/O device for the 360 that could read as well as write 35mm photographic film.

The IBM 4461 Film Reader Recorder was said to speed the transfer of illustrations, photographs and other graphics data from film to a 360. The unit could also reverse the process and record the data in its original form on film.



'For a Lousy Half-Billion a Year, What Do You Expect — Mass Production?'

Letters to the Editor

Sorry, CW, It Won't Work

Regarding the editorial, "Come Now, Mr. Barr" [CW, Jan. 30], my response is, "It Won't Work, Mr. Editor."

The nature of what I said was and is that you report nonfacts, speculation and stories from unnamed "sources" about the IBM lawsuits, and when that runs out, carp at those of us who know the facts for wearying of your fantasies.

The editorial ploy to goad me into a retort by asserting that I may not know what is going on is creative — sort of — but it won't work. However, it is certainly better conceived than your usual reports on the facts.

Maybe if you would drop your coverup and reveal your "source" — if you have one — and what you or it really knows — if anything — your readers could judge for themselves who is being "cagey."

Thomas D. Barr
Cravath, Swaine & Moore
New York, N.Y.

Different Vantage Point

I can't resist commenting on the letter "Bionic Blooper" [CW, Jan. 30]. It is apparent to me that Lee Mulder must view the computer world from the vantage point of large systems.

If he had any amount of experience with carefully constructed hobby or home computers, he would readily recognize that plug-in read-only memory (ROM), programmable Prom or erasable Eprom chips can contain a significant amount of application program logic including enough to "divert funds" from a normally running package of application software.

In the case of these systems, it is usually necessary to use a screwdriver to get at the board con-

taining the chip(s). Using a screwdriver to remove the chip(s) — well, ugh! Pocketing the chip, sure.

W.B. Helgeson

Sudbury, Mass.

More Meaningful Survey

I disagree in several respects with the new Datapro survey results on small business systems and minicomputers [CW, Jan. 30]. I guess everyone with some range of exposure goes through this game every time — "What!! An IQ3000 runs like a slug. How did it get a high rating?" or "My HAL9000 loves me, so how dare they say bad things about it?"

Some of the disagreement is the result of local service or sales support, of course. But the survey should remove most of that by averaging over a wide range.

I would put forth the premise that not all users' opinions are of equal weight. A person who is used to having a manual system on index cards would think any computer is wonderful; a person with experience in only one produce line would be prejudiced toward that line; a person with more experience would tend to give a rating that is more balanced.

A method for incorporating ratings of the raters would give some real meaning to these surveys.

Joe Celko

Atlanta, Ga.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Personal Liability Creeping Up on DPer's?

By Jack Stone
And Ida Mason
Special to CW

"Willful negligence!" This is the charge starting to echo around courtroom corridors which could have severe repercussions for the DP management force.

For example, the Federal Deposit Insurance Corp. (FDIC) recently made this charge in a suit against the former directors of the now defunct Hamilton National Bank of Chattanooga. The FDIC is holding them personally and collectively responsible for nearly \$12 million in losses resulting from bad loans made by the bank.

Such proceedings are beginning to be widely publicized as a result of a dramatic increase in the number of bank failures. FDIC officials report that another dozen willful negligence suits are pending against bank directors and they expect that number to increase in the coming months.

There were 29 bank failures in 1975-76 compared with only 24 in the entire period from 1969-74. Further, four more banks have closed recently and 18 others are in deep trouble. If the FDIC wins these cases, many ex-bank directors may wind up paying for corporate financial losses out of their own pockets.

Thus, managers who were previously shielded from their accounts ability under commonly accepted corporate legal practices are coming under the gun in unprecen-

dented numbers. Fines and even jail sentences may be just around the corner for many individuals who previously thought themselves immune.

And regulatory agencies are uniting to impose stiffer penalties for proven negligence: the Justice Department, the Securities and Exchange Commission and the Consumer Product Safety Commission, among others, are developing tougher regulations that are making the individual manager an increasingly attractive target for personal liability suits.

Parks Case

The famous Parks Case may be taken as a case in point. In 1975, John Parks, president of the Acme Markets Co., was held personally accountable and fined for mismanagement because he did not keep rats out of his Baltimore warehouse. In addition, drug companies are required to identify specific individuals who are responsible for quality control so that negligence charges can be pinpointed; an officer of one of these firms was said to be thinking of hiring a "vice-president in charge of going-to-jail."

Emotional tension among managers is also growing because of the darkening clouds over the legal horizon. They are bothered, for example, by sometimes ill-defined or contradictory guidelines that result when agencies rush the job of modifying guidelines as they

try to impose heavier fines and other penalties for personal negligence.

Perhaps an even greater threat is that it is difficult to gauge if, when, or where the axe of liability may fall, since different agencies in-

The Human Connection

interpret the law and regulations in different ways, take varying amounts of time to analyze their cases and prosecute within a broad range of vigor.

And as if government agencies aren't causing enough loss of sleep in the management population, it is now much easier for individuals to file personal liability suits in cases of alleged managerial misconduct.

It doesn't take much imagination to visualize just how all of this affects the DP manager. (Perhaps the issue should better be framed as the question, "How doesn't this affect the manager?") DPer's are closely woven into the organizational fabric at all levels of the hierarchy. They are associated with management decision-making throughout the firm, be it a large multinational company, a small retail store or anything in between.

Are there cases where DP managers may be accused of personal negligence? Consider these

hypothetical but realistic situations and draw your own conclusions:

A systems manager, working for a software firm, designs and installs a multi-million-dollar system that, because of an incomplete spec, doesn't work. Can he be held legally liable?

An operations supervisor allegedly mismanages an on-line facility, causing a death in a hospital's intensive care unit. Is he personally responsible?

A service bureau maintains confidential records of many customers, including personal health data, debts and liabilities, political affiliations. Security is breached and data volumes are stolen. Is the chief operating officer legally responsible?

Perhaps the day is not too far off — it may already be here — when malpractice insurance may be a way of DP life, as it may be the only practical strategy for keeping DPer's out of the courtroom. But this is speculation. We do know this: Questions of how far cases of DP personal liability will go, how many DPer's will be involved and what the regulatory agencies will do may prove critical to the future careers of DP managers.

Ido Mason, a professor of DP at Lehigh (Pa.) Community College, is currently on sabbatical doing research on women in management.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave., N.W., Washington, D.C. 20007.

Duplicate Licenses a Problem in Florida

The Florida State Attorney uses drivers' license numbers to find out who is passing bad checks and the police use them to find out who has been speeding. In addition, the Florida courts use them when issuing summonses. Yet, it now turns out that there are thousands of cases of duplicate license numbers — for the sake of DP convenience in a conversion 10 years ago! And, what is more, while the dimensions of the problem have been known for years, nothing has been done about it.

It all started in 1968, when the files were automated. At the time, they were being handled manually by "old ladies," according to Randy Walford, director of the data center involved. "It was easier to convert by using the code that the old ladies were used to," he told me.

The code used a Soundex process, which brings all similar names together. (See box as to how Florida assigns the numbers.)

This becomes a problem, however, when there are millions of people being identified by precise computer matching.

Over the years, this confusion has caused problems, particularly with common names such as Jose

Rodriguez. In Miami alone, there are 217 people with this name — more than three times the number of John Smiths and John Joneses combined.

One Jose Rodriguez, an auto worker in Hialeah, knew about this duplication of license numbers and the potential problems. Another man of the same name had the same license number and, despite the secret tie-breaking number concerned, kept on being brought before judges, the State Attorney and others.

While the authorities think that duplicate numbers are "no problem," neither Jose nor his relatives think so.

The climax came after Christmas. One Jose wrote bad checks totaling \$293.76, and the "innocent" Jose was asked by the State Attorney's office to explain why his license number was on the back. After he explained, a warrant was put out for the other's arrest. Like the State Attorney's office, the police also used license records to trace the offender, but arrived on the doorstep of the innocent man the day after Christmas.

"I was screaming in Spanish, 'Don't take him away!'" his wife remembered. Eventually, after causing confusion in the home, the police left.

The affair was written up in the local Knight-Ridder newspapers by two reporters, Barry Bearak and Kate Wheeler. Doug Powless, a re-

view officer for the Bureau of Driver Improvement, reportedly said he could not change the innocent Jose's number because of the computer system. The report was reprinted in the Houston Post on Jan. 22 and subsequently to me by a reader.

Randy Welford told me there had been no investigation of the incident, but that he would look into it. He did and later said that he had stopped checking when he found that the Rodriguez duplicate was accidental.

He agreed with Powless that nothing could change the innocent Jose's number, although that would be a solution. He also told me there was no elected officer — except the governor himself — that I could consult to find out why thousands of duplicates were considered to be

"no problem."

So that is where the Florida driver license problem stands. Perhaps there are duplicates in other states, too. And perhaps some people haven't been as lucky as innocent Jose, who at least has managed to talk himself out of everything from his insurance policy cancellation to court appearances and arrests. After all, there have been instances of police shooting people as a result of car registration errors.

So there are many questions. If you think of more, or have any comments on the situation, please let me know. Write to me c/o Computerworld, 797 Washington St., Newton, Mass. 02160.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

The Taylor Report By Alan Taylor CDP

How Numbers Are Assigned

There is a 15-position driver's license number as follows:

ANNN	Soundex version of last name. Many names have same coding.
NNN	Coded version of first name. Twenty codes are given to each major letter, starting "A" at 000, "B" at 020, "C" at 040, etc. Nineeen of these are given to common groups; thus, Alice and Albert have the same code; Arbur, Anne, Ann have another code. The other names, like Alan, coded 000, 020, 040, etc.
YY	Year of birth.
M/S	Month of birth, coded 00 for January, 04 for February, etc.; Plus 50 if female.
DD	Date of month of birth, added to M/S to give three numerics. Thus, a man born on April 26 will be coded 120 + 26 = 146, while a woman born the same day would be 646.
XXX	Unpublished tie-breaker, from various sources. Currently 000 for first identical published number, 001 for second, etc. Only accessible in the computer.

Not in Concept Problem With MIS Lies in Implementation

By Arthur L. Slotkin

Special to CW

Yet another advocate of distributed processing has attacked the concept of centralized management information systems (MIS). Assessing the MIS currently available, Jacob Sternberg has concluded that they are plagued by "voluminous planning reports, much wasted management time, millions of dollars down the drain and eventual disillusionment of users" ["MIS Called 'Disease' of Centralized Systems," CW, Dec. 26-Jan. 2].

This is a harsh assessment, but not really an unfair one. Certainly, the experience of business with MIS has not been notably successful. Indeed, we could add a number of other disagreeable symptoms to Sternberg's list.

However, while we concur with Sternberg's assessment of current MIS, we are convinced that the problem lies in the implementation — not in the basic concept. Abandoning the obvious advantages of integrated MIS because of imperfect implementation is akin to throwing out the baby with the bathwater.

Conceptually, the advantages of an integrated MIS are unarguable. So much of any company's data base is used by several different

functions that distributed data entry is inherently wasteful of both equipment and people.

More seriously, it creates baseline problems. An integrated MIS is essential if all

functions and control advantages of centralized MIS, it is undeniably true that they have been notoriously unresponsive to the needs of the using departments. Again, I am convinced that these

Reader Commentary

users are to make business decisions based on the same currency of data. The interrelationships between using functions are often not obvious, and the central data base is the one assurance that every department is operating on the same data.

Better Control Inevitable

By controlling the input of data, moreover, an integrated MIS minimizes the probability of spurious data being entered. Better management control is inevitable. Equally important, a manager knows what data is available; he doesn't have to have a priori knowledge of what reports are being generated at the local level in all the using departments.

Thus, he can avoid generating needed reports that are largely redundant with others being used elsewhere in the company. Despite the inherent effi-

ciency and control advantages of centralized MIS, it is undeniably true that they have been notoriously unresponsive to the needs of the using departments. Again, I am convinced that these

problems have nothing to do with the concept, only with the implementation. The problem has not been so much that the systems analysts have not tried to work with the using departments to understand their needs. Rather, they usually have tried to understand the business too well.

Understandably, viewing MIS as a companywide resource, they have attempted to define all requirements and design a total system that would meet all requirements of all departments of the company when first implemented.

With this approach, it was not at all surprising that the systems analysts would spend two years or more trying to develop an MIS system. Not only did this approach represent a heavy investment before the system could provide any payoff, but the time lag caused problems of its own.

Since the requirements of the company and its departments usually change over a period of two years, the system often didn't meet current requirements.

Moreover, the software design typically was so rigid that making the necessary changes was an equally painful — and expensive — project.

This implementation approach, I submit, caused the problems Sternberg described. However, an integrated MIS does not rely upon this implementation approach.

We have concrete evidence to this effect, for we designed and implemented an integrated MIS for our own use at System Development Corp. By taking an entirely different implementation approach, we have preserved the advantages of an integrated system, while avoiding the classic problems.

One at a Time

While we designed the overall system structure at the outset of our development program, we did not attempt to program all business functions at once. Rather, we segregated our business functions into discrete modules and implemented them one at a time.

Development of a single

module is a manageable software task that can be completed rather quickly — and can be productive quickly. Attempting to develop and program a total business system at one time would have left much more room for error and would have substantially delayed the day we could have benefited from any part of our system.

The first module we developed was our personnel module, which incorporated the functions of payroll, personnel status, stock and savings plans, pension plans, skills inventory, insurance reporting and applicant resources.

Next, we developed our finance module — accounts receivable, fixed assets and the like. This module was integrated smoothly, without disrupting operation of the personnel module, even though it shared much of the same data base.

The system is on-line with interactive capability, so our managers can immediately get the information they need without waiting for report printouts.

Since we wanted the system to be operable by business people, not programmers, we incorporated capabilities which let users modify either inputs or outputs, query the computer and modify programs. Our managers can access the system through on-line interactive or data collection terminal entries in either conversational or structured formats.

Total development of our system certainly wasn't inexpensive. We spent considerable time in developing the basic programs and in analyzing the detailed requirements to ensure that the system would be responsive. However, we started benefiting from the system when the first module was operational and each module has been useful and responsive to the using departments.

Slotkin is vice-president and general manager of corporate services at System Development Corp., Sonto Monico, Calif.

SOFTWARE AGENCY

The world's leading software packages require agents in South America

SDI are international leaders in system software for IBM DOS and DOS/VS installations.

We are a major organisation with branches throughout the world. We now wish to maximise the vast potential of the market in Venezuela, Brazil and Argentina for GRASP, GRASPVS, FLEET and EPAT. Our products are proven amongst the best selling independent software packages in the world.

Applications are invited from well-established computer service companies involved in the IBM marketplace who can prove their abilities to successfully sell our products and provide full sales support in this highly lucrative area.

Please write in the first instance to:-

SDI HQ, P.O. Box 563, 3000 AN Rotterdam, The Netherlands.

SDI

DECscopes

For Sale

• VT52

800 323 2288

Any Advice for DP Grad Looking for Job?

By Barry Starkman
Special to CW

A short time ago, I graduated from a university with a data processing degree. I assumed that I would be able to get a job as a computer programmer. I was wrong.

Basically, what I found out about the programming field is that, while there is a large demand for experienced programmers, there are almost no entry-level jobs available.

Or, to put it another way, you can't get a job as a programmer unless you have already had one.

When I explained this problem to a number of supposedly knowledgeable people, most gave me what I call "conventional wisdom," which can best be summarized in those immortal words: "Try banks."

In addition, five people suggested I visit an employment agency, two told me to go to my university placement center and one recommended that I move to South America.

Recently, I decided to take some of that advice. I visited my university placement center and met with a counselor. He suggested that I try banks.

He was not too keen on South America. He suggested Australia instead.

There is one problem with conventional wisdom. Most of it is hearsay. A part of it is probably accurate. But which part?

After a great deal of investigation, I am now at the point where, even though I have no answers, I at least know what questions to ask. A sample of these questions follows:

(1.) Is a beginning computer programmer more likely to find a job? If so, where?

(2.) Is there a certain geographic area or areas where an entry-level programmer is more likely to find a job? If so, where?

(3.) Is there a particular entry path which leads to a career as a programmer, as there are in such fields as law or medicine? If so, what is that path?

(4.) Did most programmers get their first jobs because

of similar circumstances, or does the average programmer become one by chance? If there are similar circumstances, what are they?

(5.) Are there any companies which are now offering training programs for beginning programmers? How would one find them?

(6.) Is there a particular academic credential which an individual looking for a first job as a programmer should have? If so, what is

it?

(7.) The most consistently mentioned academic qualification for a career in

or university. An individual cannot hope to become a doctor without a medical school diploma or a lawyer

to a programming career as degrees in law or medicine have with their respective professions?

(8.) Many accredited colleges and universities are offering two-year degrees in computer programming. Many unaccredited schools are also offering programming degrees. Some schools teach programming by mail. Are these degrees useful? For What?

(Continued on Page 30)

Reader Commentary

data processing is a bachelor's degree with a major in computer science from an accredited college

without a law school degree. Does the bachelor's degree in computer science have the same relationship

Smile, when you say pussycat!

Pussycat. Perkin-Elmer's \$795, 100 cps CRT Page Printer.

Pussycat. That's what we call our new 100 cps thermal printer, The Model 650 CRT Page Printer.

Pussycat. People who make 30 cps printers will think it's an incredibly funny name. Until they realize our meek little Model 650 is half the price of their machines, three times faster, and a whole lot quieter and easier to maintain.

In quantity 75, the Model 650 is only \$795 each. Which means you can buy a CRT and a Pussycat printer for what you're now paying for a printing terminal alone.

The Model 650 is fast. It prints an entire screen full of characters in 20 seconds. And, because it's the only printer in its class with a full-screen buffer, the Model 650 can free the CRT in 2 seconds or less. So the operator can go back to work while the printer is printing.

The Model 650 connects to any CRT terminal with an RS232 port—a Perkin-Elmer terminal or, perish the thought, someone else's. No need to replace existing hardware or software.

And no need to worry about noise or maintenance. The Model 650 has only one moving part—the platen.

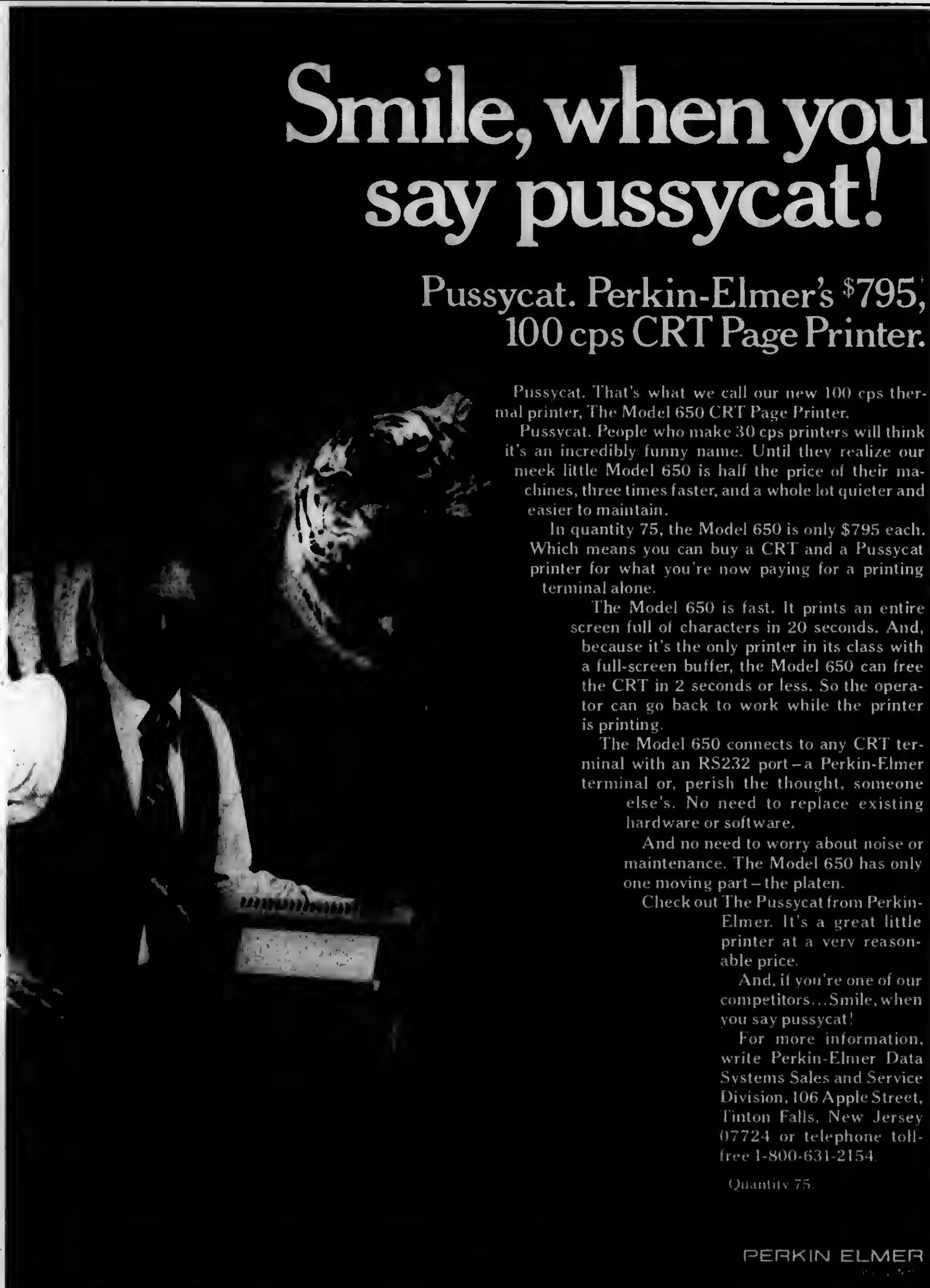
Check out The Pussycat from Perkin-Elmer. It's a great little printer at a very reasonable price.

And, if you're one of our competitors...Smile, when you say pussycat!

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free 1-800-631-2154.

Quantity 75.

PERKIN ELMER



BLIS COBOL
MULTIUSER OPERATING SYSTEM

SYSTEMS
WORLDWIDE
in the USA and 14 countries

For information call today



Phone (305) 647-2200 USA
TWX/Telex 810-853-5033
1850 Lee Rd., Winter Park
(Orlando), Florida 32789

Health Care Group Seeking Software

I am interested in learning how I could go about compiling a fast but exhaustive listing of all vendors of software packages for health maintenance organizations (HMO) and similar ambulatory health care programs.

"HMO" is the recent federal designation for prepaid group medical practice organizations, such as the Harvard Community Health Plan in the Boston area. There are many such operating and many more in various stages of development throughout the country.

We, for example, have had federal development support for several years. By the time we become operational in September 1978 we will need to have installed at least some modules of a data system to

maintain membership, utilization and financial files and produce a variety of mandatory reports as well as daily operations information.

Whatever assistance you could offer in providing an inventory of this vendor market would be appreciated.

Harvey Schaffler
Associate Director

Community Health Plan of Suffolk, Inc.
Stony Brook, N.Y.

Other HMOs or vendors involved with this market can contact Schaffler through P.O. Box 778, Stony Brook, N.Y. 11790. Ed.

Letters to the Editor

Irrelevant Information

As a reader of Computerworld for many years, I am used to your various techniques to stimulate reader interest and stir up controversy. It is an essential feature of newspaper marketing.

However, I am shocked and dismayed at the transparent tactic in the Jan. 16 issue — using Edward H. Elkind's long harangue in the letters to the editor column.

In my opinion, it was the most irrelevant item of information to appear in your paper. I hope you are overwhelmed by the huge volume of letters in protest to this most blatant attempt to cash in on calamity.

Robert R. Hamilton
Winchester, Mass.

Anyone Have Advice For Job-Seeking DP Grad?

(Continued from Page 29)

If they are not useful for anything, shouldn't the government require that warnings be issued as they are

with cigarettes?

Any Answers?

These are the questions I would like to ask. If you have the answers to any or all of these questions, and proof that your answers are correct, I would like to hear from you.

I have an answering service that uses Wats lines. If you live anywhere in the continental U.S., except New York State, you can call my answering service toll-free by dialing (800) 448-4511.

In New York State, please call (800) 982-1480, which is also toll-free. These numbers can be called 24 hours a day, seven days a week.

When you call, please say that you want to leave a message for Barry Starkman. Give your name, phone number and what time you can be reached.

If at all possible, please leave a number at which you can be reached at night, when the phone rates are cheaper.

But wouldn't it be expensive for me to call people all over the country? Yes, but not as expensive as you might think. A three minute call from New York City to Los Angeles made after 8 p.m. (Los Angeles time) costs two cents more than a ride on a New York City bus.

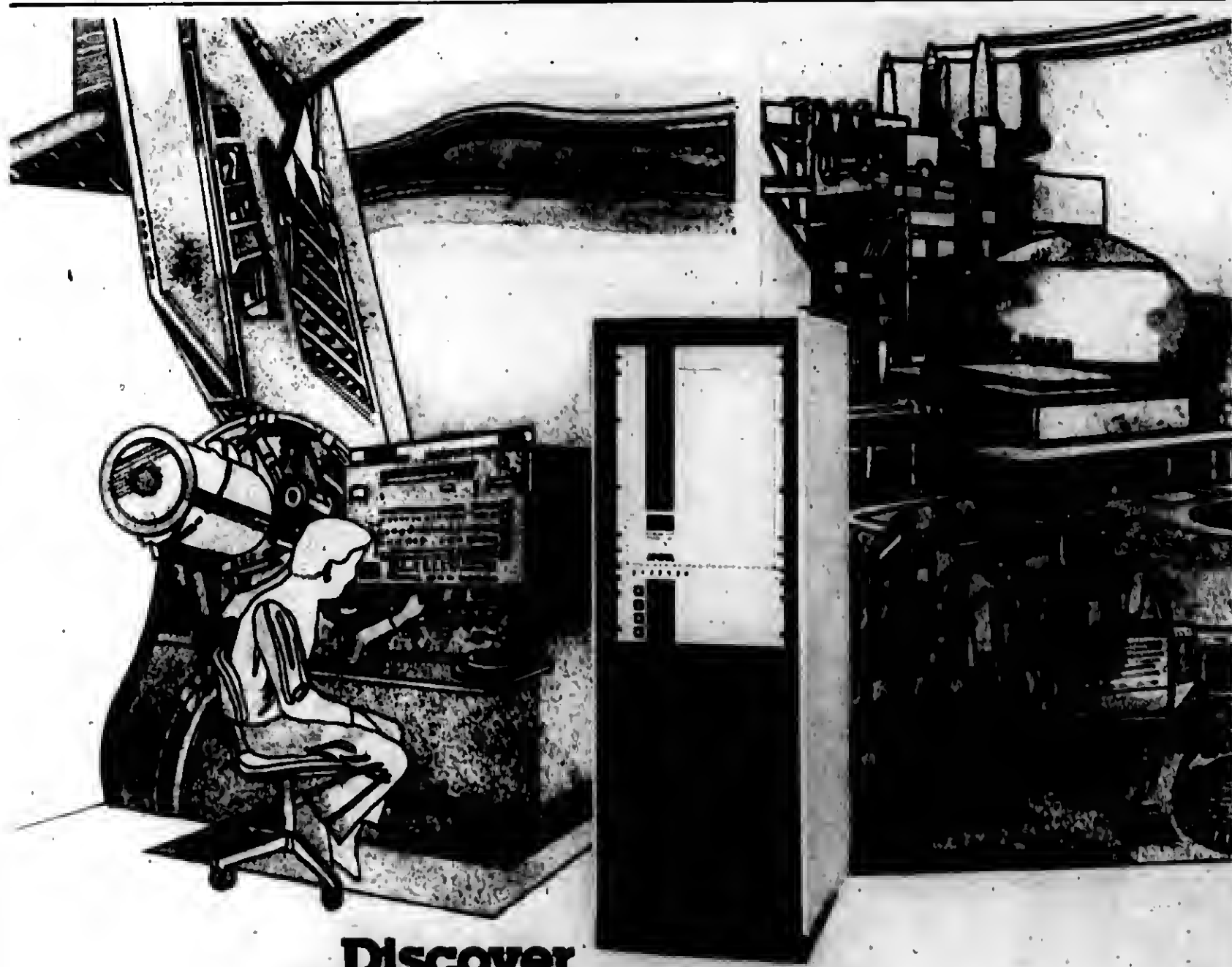
Want to Talk

If you have information on entry-level programming positions, I want to talk to you. A future article in this publication will contain whatever information I have been able to find.

If you have recently gotten your first job as a programmer, please contact me. I would like to know how you got that job.

Last, and definitely least, if you just want to give me advice, I will speak to you anyway. But if you want me to try banks, I would appreciate it if you could give me specific names and addresses.

And if you want me to travel to some distant place, please make sure that I can get there on a Greyhound bus.



Discover FPS Innovations for your Scientific Processing Systems.

The key to unequalled systems solutions for scientific processing is available from FPS for users of large computers such as IBM 360/370 and Univac 1100 Series.

FPS offers users of large computers the technical innovations, applications development, and systems support in Array Processors that have created a worldwide reputation for this emerging company.

Hundreds of FPS Array Processors are in use today. We invite you to investigate the company, the product line, that has had such impact on technology.

You can share in the benefits of FPS involvement in nuclear core phenomena, vibrational and structural analysis, weather modeling, hydrodynamic modeling, power flow simulations, and more.

SYSTEM FEATURES

- FORTRAN level user interface to the array processor
- System software interface to the operating system
- Hardware interfaces to the CPU via an I/O channel

APPLICATION SOFTWARE

- Scientific algorithms
- 200-function general-purpose Math Library
- Higher level program to link several algorithms together

Less than \$97k buys you a fully operational AP-190L Array Processor System interfaced to your large computer system.

Contact Floating Point Systems directly, or use the coupon below.

The Age Of Array Processing Is Here...and FPS Is The Array Processor Company.



CALL TOLL FREE 800-547-1445
P.O. Box 23489, Portland, OR 97223
TLX: 360470 FLOATPOINT PTL
In Europe & UK: Floating Point Systems, SA Ltd.
7 Rue du Marché, 1204 Geneva, Switzerland
022-280453. TLX: 28870 FPSE CH

Floating Point Systems, Inc.

☐ I have an immediate need. Please have a technical consultant contact me.

☐ Please send me an FPS Array Processor brochure.

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

My Computer System is _____ My application is _____

COMPUTER WORLD 2/78

Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3

800 323 2288





Introducing the reel shape for things to come.

Memorex SuperReel.™ A new approach to computer tape reels. The approach that's right for tape drives here now, and for the new generations to come.

SuperReel gives you a uniquely-shaped I-Beam hub, making it 90% stronger than conventional reels, giving SuperReel the strength to withstand the higher tensions of both your current and future drives. SuperReel also has a specially-shaped tape wind surface, to prevent edge damage during rewinds. And all SuperReel components are ultrasonically welded—no glues or solvents—for improved strength, product uniformity, and lasting performance.

SuperReel is the only reel specifically designed to meet the demands of advanced drive technology. The one reel that surpasses all published specifications for high-performance drives. The one reel that performed reliably in stringent testing conditions at 15 ounces of tension and speeds up to 220 ips. The one reel with no flange expansion or contraction under stress conditions. The one reel balanced to prevent hub-to-drive fit problems.

Memorex SuperReel. A better reel, to give you better results. Better winding. Positive autoloader functioning. More accurate data transfer. Greater reliability. On the drives you're using now, and the new generations of drives to come.

Memorex SuperReel. The new shape that'll put your data processing in great shape.

Ask your Memorex representative to explain how SuperReel can dramatically reduce your data processing costs. Locations in principal cities worldwide. Or contact us at 1200 Memorex Drive, MS-0064, Santa Clara, CA 95052. Phone 408-987-1043.



MEMOREXCELLENCE

Believe. And \$5,950 is for a quantity of one. Now you can afford a genuine Datapoint for those applications where computer power was needed but couldn't be cost-justified.

A Real Computer

Don't let the price mislead you. The 1500 contains a powerful fully programmable business computer with 32,000 bytes (8 bits & parity) of memory. Add to that an integral keyboard, video display and dual diskette drives (over 500,000 characters on-line) and you have a complete system. And there's more. A standard, built-in communications interface requires that you add only a modem to start communicating.

With Comprehensive Software

There's much more than just hardware, too. You get a comprehensive Diskette Operating System with a utility library including sort, index and index sequential access method (ISAM), a data entry language (DATAFORM®), a data processing language (DATABUS®). Like all Datapoint systems there's a common, dynamic file structure. No time consuming file format conversion necessary. You start writing application programs immediately.

Easy Concurrent Communications or Printing

The 1500 will communicate in IBM 3780 discipline, or DATAPOLL® for Datapoint-to-Datapoint communications. Auto-answer is standard. You needn't halt an ongoing data entry operation to communicate — with the 1500 you can communicate while an operator continues to enter or process data. Or, you can elect to do concurrent printing on an optional Freedom Printer™.

More Features — And a Growth Path

You'll find the 1500 full of those features you've always wanted. Inverse video for display highlighting, user program defined function keys, simple installation, and easy operator training. Programs can be remotely loaded from a central site. A system that you can adapt to your needs, not the reverse.

Since the 1500 is part of the Datapoint family, you can easily move your application programs to larger Datapoint systems without another investment in software.

Fully Supported

Each 1500 is backed by the nationwide Datapoint Field Service organization with over 90 service centers. And when you need systems or other technical advice, the Datapoint Account Managers and Systems Engineers are ready to help.

Learn More

Call your local Datapoint Sales Office. They'll send you information on how the 1500 can start saving you money now. Or write Datapoint Corporation, Marketing Communications, 9725 Datapoint Drive, San Antonio, Texas 78284.

Hard to believe:

A powerful Datapoint business computer for just \$5,950.



DATAPoint CORPORATION



The leader in dispersed data processing™

Home Office: 9725 Datapoint Drive, San Antonio, Texas 78284 (512) 699-7151

Sales Offices: Atlanta/(404) 325-2212 • Boston/(617) 890-0440 • Chicago/(312) 298-1240 • Cincinnati/(513) 481-2600 • Cleveland/(216) 351-1775 • Columbus/(614) 457-1722 • Dallas/(214) 661-5536 • Denver/(303) 321-8286 • Des Moines/(515) 225-9070 • Detroit/(313) 855-2900 • East Hartford/(203) 289-9364 • Greensboro/(919) 299-8401 • Honolulu/(808) 833-2110 • Houston/(713) 680-2200 • Indianapolis/(317) 299-4253 • Kansas City/(913) 321-5802 • Los Angeles/(213) 385-0395 • Memphis/(901) 761-3080 • Miami/(305) 621-4335 • Milwaukee/(414) 453-1425 • Minneapolis/(612) 854-4054 • Nashville/(615) 361-5981 • New Orleans/(504) 831-8101 • Newport Beach/(714) 752-9073 • New York/(212) 971-9270 • Oklahoma City/(405) 840-4475 • Orlando/(305) 896-1940 • Philadelphia/(215) 667-9477 • Phoenix/(602) 265-3909 • Pittsburgh/(412) 344-6800 • Portland/(503) 644-5575 • Richmond/(804) 353-3858 • Rochester, N.Y./(716) 248-2616 • San Antonio/(512) 734-8982 • San Francisco/(415) 398-2888 • Seattle/(206) 455-2044 • Stamford/(203) 359-4175 • St. Louis/(314) 878-6595 • Tulsa/(918) 664-2295 • Union, N.Y./(201) 964-8761 • Washington, D.C./(703) 841-7600 •

Also sales offices in 29 international cities.

Even With Packages

Teamwork Needed to Get Project Up

By Don Leavitt
CW Staff

LOCK HAVEN, Pa. — It's a cliché to talk about how to get a good, well-considered project "off the ground," but that phrase seems particularly apt for an implementation team here.

The step-by-step efforts now under way at Piper Aircraft to get a manufacturing control system designed and operational — yes, "off the ground" — by Aug. 1 illustrates what a serious implementation may involve.

Project manager Robert Elrick and his team began the work at Thanksgiving time and he still foresees a "lot of nights" because of the "tight schedule" they have.

Much of what's in the system isn't new to him or to Piper. Material requirements planning (MRP) is the prime application, shop floor control is secondary and purchasing will follow that. The current work is needed because Piper "just outgrew the system it had in place," he said.

Elrick wasn't involved in the selection of Martin Marietta Data Systems (MMDS) — and its Modular Application Systems (MAS) — but he endorses the move. The software has the ability to handle multiple locations (Piper has four) and MMDS "has a good reputation for support, which is awfully important when you're putting in a system of this magnitude," he explained.

He doesn't anticipate a lot of customization work, however, because the software allows users to pick from a number of pre-coded options to handle any phase of the work.

They spent several weeks starting the end of November just setting schedules for the various phases, planning so the work could be done realistically and seeing what the team would have to put into it, he said. After that, there were two weeks of education and training for members of the project team.

The functional system design phase, half completed early this month, started with a more detailed review of the MRP logic, seeing where Piper needed any

custom work. "We had options, but like any installation we also found some problems we had to solve," Elrick noted.

Once those problems were solved, the project team spent a week out in the users' areas asking questions.

So now the team has been reassembled and they are considering the new user input, getting ready to refine what they've already done.

As the team leader, Elrick sees himself as a user. He said he didn't know what kind of computers Piper has — "IBM, I know, but aside from that..."

The six Piper staffers on the project team presumably know the company's interests. And the two MMDS members of the team bring detailed knowledge of the system to the implementation effort.

Elrick is satisfied with the software. "To be perfectly frank, the basic MRP isn't really different from anyone else's but, he was quick to emphasize, "it has a few bits of logic in there that allow multiple locations to run fairly smoothly."

'Magic' Runs DEC-Based Graphics

GREENSBORO, N.C. — The Machine Aided Graphics for Illustration and Composition (Magic) software, developed by Western Electric (WE) to meet increasing demands of the Bell System for technical documentation, is now being offered to non-Bell System parties.

Magic is described as an interactive computer graphics system for preparation, editing, production and storage of diagrams and technical documentation.

The basic Magic package runs on Digital Equipment Corp. XVM minicomputers based on DEC's PDP-15, equipped with disk units, magnetic tape drives and paper tape reader/punches. Linked to this is DEC's Graphic 2 display processor.

For installation with multiple Magic workstations, a related piece of software installed in a Decsystem-10 time-sharing mainframe provides data base support and control for up to 11 of the XVM configurations.

In addition to the automation of book-quality production of line drawings and text copy with

multiple fonts, Magic system advantages cited by WE include reduction of the costs of drafting, floor space and overall documentation, storage and distribution.

The terminal-level Magic is available under license for \$30,000 for the first XVM and

\$20,000 for each additional mini. The Decsystem-10 data base/control software costs an additional \$30,000.

Product distribution is handled by the Patent Licensing Manager, Western Electric, P.O. Box 25000, Greensboro, N.C. 27420.

For Data Entry

TSI Moves 'Key/Master' to CICS

NORWALK, Conn. — The Key/Master package from Turnkey Systems, Inc. (TSI) enables IBM-based data centers to support "programmerless" development of on-line data entry routines under CICS.

The logic behind this product was developed — and is still available — as part of Turnkey's own teleprocessing monitor, Task/Master, a spokesman said.

The package is said to support interactive definitions of data formats and editing criteria, allowing nonprogrammers to design and test IBM 3270 display formats at the terminals and to

begin to use them immediately.

Many data entry applications can be implemented with no involvement by a CICS-trained programmer, TSI claimed. For others, Key/Master provides program exits for the addition of user-written logic, the spokesman added.

The software includes a data base for storing entered data, and utilities for extracting and reformatting the data later.

New Displays

Key/Master's Format Definition Language allows new dis-

play formats to be created in minutes, from a terminal, he claimed. With high-level commands, a variety of data editing and field manipulation operations are available.

These include arithmetic operations, field generation, automatic duplication, range tests, table lookup and extraction, he said, adding that check digit calculation as well as alpha and numeric tests are also possible with the software.

Users can lease the package for \$295/mo or purchase it for \$12,000, TSI said from 111 East Ave., Norwalk, Conn. 06851.

SOFTWARE & SERVICES

PUT THE RIGHT PARTS IN THE RIGHT PLACE WITH OUR MANUFACTURING PLANNING AND CONTROL SYSTEM.



Now you can have close control over inventory levels and costs through manufacturing priority planning and scheduling. Software International's practical end user-proven Net Change Material Requirements Planning computer software package provides substantial support of

**INVENTORY MANAGEMENT
MASTER PRODUCTION
SCHEDULING
BILLS OF MATERIAL**

**ENGINEERING CHANGES
WORK-IN-PROCESS CONTROL
OPEN PURCHASING AND
MANUFACTURING ORDERS**

Extensions to this system give you additional performance in the areas of **SHOP FLOOR CONTROL, ADVANCED COST, CAPACITY PLANNING** and **ADVANCED PURCHASING.**

In the complete, yet modular, Manufacturing Requirements Planning system, you get the control and performance you want — when you need it. Call or write. Today.

Please help me get our manufacturing system together. Send me more information about:

☐ Manufacturing Systems	☐ Financial Accounting Systems
☐ Master Production Scheduling	☐ General Ledger and Financial Reporting System
☐ Material Requirements Planning	☐ Accounts Payable
☐ Capacity Planning	☐ Accounts Receivable
☐ Shop Floor Control	☐ Comprehensive Report Generator
Name _____	☐ FILETAB
Title _____	State _____
Company _____	Zip _____
Address _____	Phone _____
City _____	Computer _____

SOFTWARE INTERNATIONAL

Elm Square, Andover, Mass. 01810 (617) 475-5040
Toronto • Atlanta • New York • Washington, D.C. • Philadelphia
Chicago • San Diego • Houston • Columbus, OH • San Francisco

'Universal' Basic Compiler Serves Micro Range

LOS ANGELES — A "universal" Basic compiler that produces code which can run on Intel 8080 and 8085, Motorola 6800 and Zilog Z-80 microprocessors is now available from Futuredata Computer Corp.

The package includes a high-level debugger, a spokesman noted.

The compiler eliminates the need to rewrite programs when switching from one microprocessor to another; in addition to the four micros already supported, versions of the compiler will be generated to support other processors as demand indicates, he said.

All standard Basic statements are included as well as

string variables, array variables, bit functions, PEEK/POKE for write/read to direct memory addresses and INP/OUT for moving data from and to I/O ports.

The debugger allows the user to set and clear breakpoints with Basic statement numbers and, once the execution has stopped, to display variables in memory using the Basic variable name, he said.

Futuredata Basic has the option of outputting an Assembly language source code of the compiled program to an editor file. Each Basic statement becomes a comment in the assembly listing; this allows the user to optimize sections of the program by edit-

ing the Assembly language, the company said.

The compilers run in systems with at least 32K bytes of memory and are available for any of Futuredata's disk-based Microsystems which include a microprocessor, CRT, 53-key Ascii keyboard, peripherals, operating software and a set of manuals.

The compilers cost \$300 each, Futuredata said from 11205 S. LaCienega Blvd., Los Angeles, Calif. 90045.

SEL 32 Cobol Introduced

FORT LAUDERDALE, Fla. — Systems Engineering Laboratories, Inc. (SEL) has introduced a Cobol compiler, the multiprogramming environment provided by the company's 32-bit SEL 32 minicomputers.

The software will be available for demonstration and benchmarking in April, with delivery 30 days later, a spokesman said.

The compiler was designed

to meet the ANS X3.23 1974 and Federal Information Processing Standard 21-1 specifications.

The purpose of introducing Cobol is to enable SEL 32 users to enhance their software capabilities, but SEL does not plan to pursue the business data processing market, he stated.

SEL is at 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33313.

SAN DIEGO — The EPA Compiler Basic package, now available from Electronic Product Associates, Inc. (EPA), is said to help Motorola 6800 microcomputer users build business applications, perform heavy computations or control processes.

The business-oriented user is provided decimal arithmetic for amounts up to \$100 million, including formatted output, string processing and multiple disk file I/O. The compiler also supports the use of long — presumably meaningful — names, a spokesman added.

Software-based floating-point logic supports the user with heavy computational needs. So does the creation of compiled, rather than interpreted, code and the system's integer optimization on arithmetic operations, he asserted.

Instruction set extensions include PEEK/POKE for writing/reading to specific memory locations and I/O commands for specific ports recognize the needs of the process control programmer, he said, noting that this user would also benefit from the floating-point software.

Generated by the compiler,

code for read-only memory (ROM) can be coated, placed in the user's microprocessor and forgotten, the spokesman continued.

Program generation for the EPA Compiler Basic is done using whatever text-processing system is available, he said. The compiler processes the text and produces an immediate Assembler-level source file, which then becomes input to the EPA Assembler.

The EPA Compiler Basic costs \$330 and is available from stock, the company said from 1157 Vega St., San Diego, Calif. 92110.

PDS Used for JCL

SACRAMENTO, Calif. — A utility package that enables IBM OS and OS/VS users to create and execute their own JCL procedure libraries from partitioned data sets (PDS), Easy Rider is now available from Software Module Marketing (SMM).

The primary benefit to be gained with this package, according to SMM, is the protection it provides against SYS1 crashes brought on by typical JCL errors. Since Easy Rider checks procedures on the PDS before committing them to the job stream, disasters are averted, a spokesman explained.

Developed by Subsystems, Inc. of San Jose, Calif., the utility costs \$3,000 for U.S. and Canadian installations and \$4,000 in all other countries.

SMM is in the Crocker Bank Building, Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

EPA Has Basic for Motorola User

We know you've got everything

But... what happens to your schedule when the unexpected job hits you?



BCS can take the overload off your back... and help keep you right on schedule.

But... what do you do while you wait for the equipment you need to bring your capacity up?



BCS has the hardware you're waiting for... use it until yours is delivered, and up and running.

But... what do you do when you can't find people with the critical skills you desperately need?



BCS has the experts in all areas... they'll fill in until your search is ended.

On-Line Bank Logic Offered by Vendor Trio

• Bills Paid With 'ABPS'

WHITE PLAINS, N.Y. — Utilizing a pair of Installed User Programs now available from IBM, financial institutions with 370s and System/7 CPUs can manage customer account transfers, including bill payments, triggered by calls from almost any phone.

Under this Automated Bill Payment System (ABPS), customers designate in advance those merchants and services they expect to pay through this capability. Then when they want to make the actual payments, they can call in the payee number and the amount to be paid.

The financial institution records the individual requests and daily generates a single check covering all payments and a tally sheet detailing which customers and amounts are included.

When the customer calls in, the transaction is routed to a service clerk at a 3270 CRT station, who keys in each request made by the customer and advises the caller of any problems.

Customer calls from Touch-Tone phones can, however, be handled directly by the system through the System/7 front-ending the 370 mainframe. Software in the System/7 monitors the accuracy and acceptability of the caller's requests, calling for resubmission of those that fail the edit checks or transferring the call to the

3270 operator if more customer contact is required.

In addition to providing the vendors with lists of whose payments are in the collective check, ABPS also creates monthly descriptive statements for each customer showing what vendors, and what account at each vendor, has been paid during the reporting period.

ABPS operates under CICS/VS and DOS/VS Release 34. The basic software (cataloged as program 5796-ANX) requires 256K minimum memory and costs \$1,425/mo for 12 months. The System/7 interface program (5796-NLZ) requires 24K memory and an audio response capability. This software costs \$450/mo for 12 months.

• 'TCS' Ties to IBM 3600, Others

OAK BROOK, Ill. — The Terminal Control System (TCS) software from The Weiland Computer Group was designed to support mini-based bank teller systems by executing demand and savings transactions, including passbook maintenance, in a real-time environment with operational, balancing and audit controls.

Described as combining the advantages of video, passbook and commercial terminals, TCS produces both CRT screen displays and printed reports.

All debit and credit activity is monitored continuously and monetary control features are said to insure that any out-of-balance conditions are

• SSI 'Teller' Handles Calls

ATLANTA — Although designed to interface with Stockholder Systems, Inc.'s (SSI) Paperless Entry Processing (PEP) software, the company's PEP Telephone Teller program package will also work with other automated clearinghouse systems, a spokesman said.

Supporting telephone bill paying and other electronic funds transfers, the Teller accepts value-dated consumer payments, or transfers entered on rotary or Touch-Tone telephones or

flagged.

The software functions with a number of terminal systems, such as the IBM 3600, Bunker Ramo Corp. BCS90 and NCR Corp. MTS; it can be modified to support others, a spokesman added.

TCS itself resides in an IBM 360 or 370 and runs under DOS or DOS/VS. The package has a base cost in the \$10,000 range, but actual cost is very much installation-dependent, he said, noting that machine configuration, workload and volume of transactions must all be taken into consideration.

The Weiland Group is at 1515 W. 22nd St., Oak Brook, Ill. 60521.

mailed into the financial institution. The software produces vendor payments either electronically or by check, the spokesman noted.

In common with other, similar systems, Teller handles the Touch-Tone-based calls directly while those coming from rotary equipment are switched to a clerk at a CRT, who can enter the transactions, or to a recording device, which will be transcribed — and the transactions entered — periodically.

Customer Statements

The system is capable of producing daily or cycled accounts receivables tapes in vendor-defined formats and customer statements sequenced by customer-defined budget codes. It can provide same-day or next-day vendor credit and produce positive funds verification prior to vendor payments, the spokesman added.

The system accepts customer-assigned vendor and personal identification numbers and can generate customer turnaround documents for customer payment instructions to be entered through the mails, he said.

The system is based on IBM's OS/VS environment and runs in interactive or batch mode. Interactive work is keyed to the availability of an audio response unit, SSI said.

The basic Teller costs \$30,000 including batch and video support; the audio subsystem costs an additional \$5,000.

SSI can be reached through P.O. Box 41321, Atlanta, Ga. 30331.

under control

But... where can you find time to check all the applications systems to find the ones best for you?



BCS has most of them in operation... try us and see which ones work for you.

Most of the "Buts..." are the result of things going so well that you need more capacity, more people, more software now.

We know your problems, because we've been there... and solved them. We offer our experience and capabilities to help you when you need it the most. For example:

- MAINSTREAM®, our unique timesharing service. Only BCS offers you this choice:
- IBM 370/168's... remote batch and interactive... geared to large volume. MAINSTREAM-TSO.
- IBM 370/168's... interactive and overnight processing. MAINSTREAM-CTS.
- CDC CYBER 175's... interactive and remote batch for scientific and engineering applications, MAINSTREAM-EKS.

More than \$160 million in the latest hardware and peripheral equipment all linked by one of the world's largest privately owned telecommunications networks.

But, BCS offers you more than just time on MAINSTREAM.

There's a range of products like PROJECT/2® to help you repeal Murphy's Law; SARA to diagnose your configuration... and EIS, the most comprehensive and innovative management planning tool around. Plus people — to give you critical skills now... and to train your staff for your future needs.

Now, while you have things under control, find out about the many ways BCS can help you when things get to be hard to handle. Maybe tomorrow?

The best reason to go outside.

BCS

BOEING COMPUTER SERVICES COMPANY

A Division of The Boeing Company

177 Madison Ave., Morristown, NJ 07960 (201) 540-7700

O.K. BCS, maybe you are an extra resource I should know about.

Name _____

Title _____

Organization _____

Address _____

City/State/Zip _____

Phone _____

INTERACTIVE USER REPORTS

"Growth without growing pains."

Expandability. "Computer programs developed in support of U.S. Navy combat systems projects include a comprehensive data reduction and analysis system and dynamic system simulations. A powerful, flexible and easily expanded computer was required to accomplish these computer programming tasks.

"We selected a DECSYSTEM 2040 with 128K words of computer memory and 40 million words of disk storage and quickly expanded to 256K words and 80 million words of disk storage.

"Our experiences show that growth doesn't have to be accompanied by growing pains; no software to re-write, no obsolete hardware to replace.

"The people here are really impressed by the maturity and scope of the 20's Operating System and high level languages. For us it has been a superior, cost effective system."

Software. "Information Consultants, Inc., ICI, is a computer service and consulting firm specializing in time-sharing, primarily for the Federal Government.

"When we selected our computer system last year, our customers' requirements were important criteria. To satisfy those needs, our interactive system had to offer a variety of user-oriented languages. It had to be compatible with other manufacturers' equipment. And it had to operate in a secure environment with high reliability. The DECSYSTEM-20 met all of these requirements and then some.

"Compatibility is especially important in our case. ICI develops proprietary software — like ADMIT, a financial modeling, budgeting package. This software is developed on the DECSYSTEM-20 and is implemented on other

Merle Garvis, President, Information Consultants, Inc., Washington, D.C.



R. Micklas, Project Manager, ADAR System, RCA Corporation Missile and Surface Radar, Moorestown, New Jersey



digital

LARGE COMPUTER GROUP

manufacturers' hardware.

"Finally, we had to be sure that our future needs would be met. We determined that the DECSYSTEM-20 represents the state-of-the-art in interactive computing today and has the growth potential we require."

Productivity. "At Dorsch Consult, we were faced with an extremely sensitive problem. All our programs were running on a Univac operating system and obviously our programmers were comfortable with it. But, because we had to share the Univac with other customers, turn-around time was increasing and we needed more productivity.

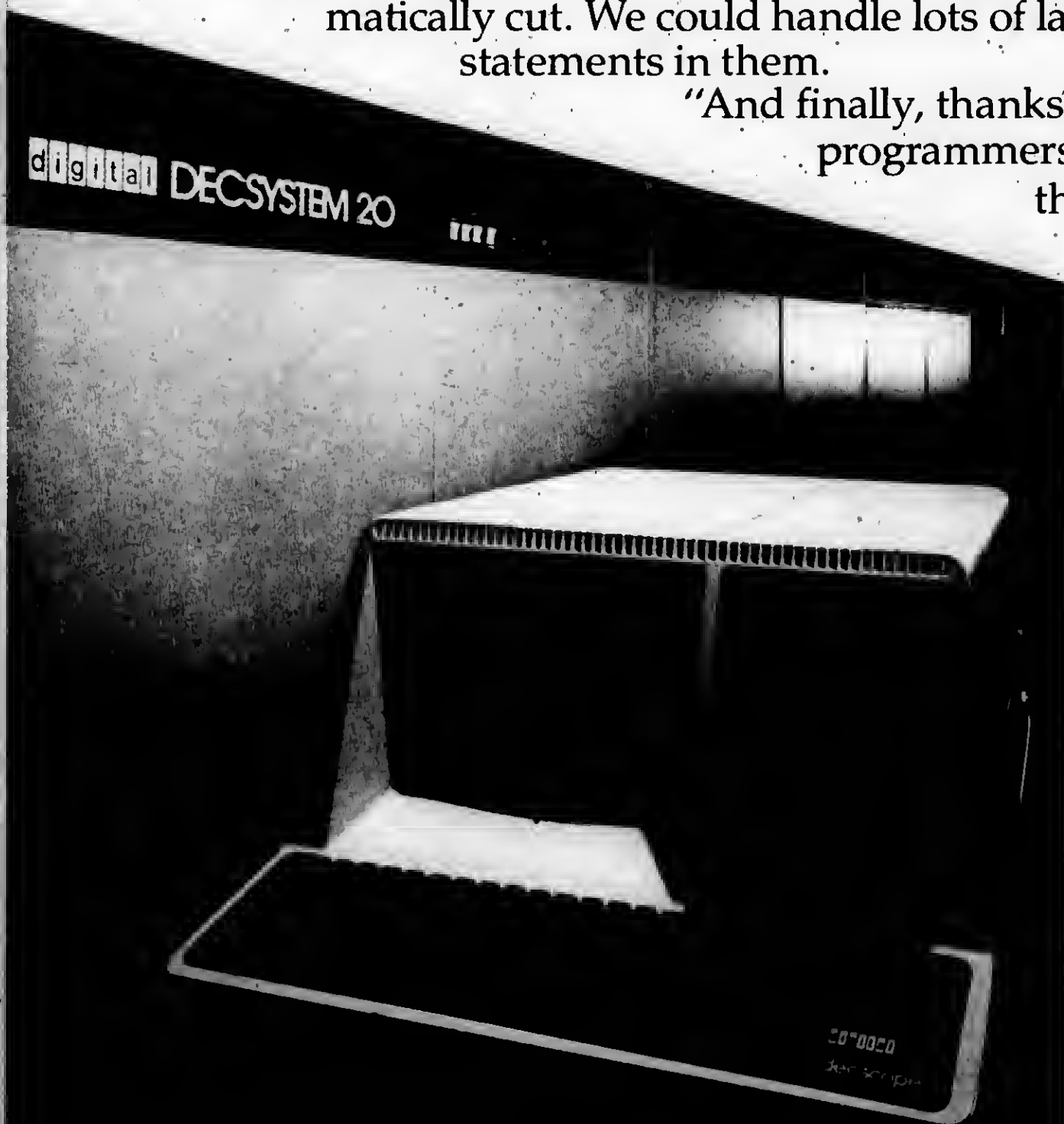
"In our search for more computer power, we became tremendously enthusiastic with the speed and capacity of the interactive DECSYSTEM-20.

"Once we had installed one, we were truly amazed. Turn-around time was dramatically cut. We could handle lots of large programs — some with up to 50,000 statements in them.

"And finally, thanks to the TOPS-20 operating system, our programmers had very little trouble switching to the new system."



*D. Kornblicher, EDP Manager
Dorsch Consult, Munich, West Germany*



- ☐ Please send your Interactive User Reports information packet.
- ☐ Please have a sales representative contact me.

Name

Title

Company

Address

City

State Zip

Telephone

Send to: Digital Equipment Corporation, MR1-1/M49,
200 Forest St., Marlborough, MA 01752.
Tel. 617-481-9511 ext. 6885.

B-2-13

DECSYSTEM-20

The interactive computer
for the big system jobs.

Seattle Institution Banks on Modeling System

Special to CW

SEATTLE — A time-sharing computer model for financial management has been developed by Rainier National Bank to calculate and analyze profit potential in any anticipated economic environment.

Rainier Financial Management Model (RFMM) analyzes and reports operating results, produces trends and compares fund levels between current and prior years, according to James Vatn, assistant vice-president.

"The key attributes of the system are its user control, flexibility, variety of reporting formats and interaction of the data base through time-sharing terminals," he said.

Written in a data base handling and reporting language provided by

Tymshare, Inc., the RFMM was designed to produce results quickly through terminals connected with the remote computing service vendor's facilities in Cupertino, Calif.

"The model evolved out of a request by our asset and liability committee for a system to prepare detailed forecasts speedily. Reports from our time-consulting manual forecasts were often late," Vatn explained. "Having the model enables our senior management to test 'what-if' scenarios on paper before making an investment in the actual marketplace."

Continuous Use Since '74

Rainier began developing the model in 1974 and has used it continuously since then. The bank recently made the

program available to other banks.

The model, which Vatn has priced at \$15,000, or roughly one-third the usual cost of such a forecast and reporting system, is relatively simple to use. The time-sharing connection involves only a local telephone call and access is by means of typewriter-like terminals.

A system of passwords protects data base security.

Many reports can be initiated by clerical staff, untrained in the use of computers, since the system is designed to assist authorized users by prompting commands. More sophisticated users and managers can specify special report formats or plots and can generate nonstandard or one-time reports using the data base language.

The model was designed for Rainier's own use, but adapts to any size bank.

The data base parameters are controlled by bank management at the time the data base is built. To construct the data base, a bank spells out the account categories to be used in analyses and supplies the information that will be included in the base. User experience determines which forecasting formulas will be established.

Based on data accumulated in the data base, the model then provides access to experience history, recent operating results, budget and forecasts in the form appropriate to a particular analysis.

Model's Functions

The RFMM has four major segments: a forecast module, a reporting module, a data base structuring and handling module and the plotting package. All are included in the program.

Once the data base is constructed, bank management can obtain the information needed to forecast results of a plan, monitor progress, control costs and raise and invest funds.

For each of the numerous kinds of loan accounts or sources of income, the model prepares reports for any specified period — month, quarter, year, biennium. It reports rates, margins, return on assets, return on equity and changes in rates for each period.

Each report presents dollar and percentage differences between forecast, actual performance and budgeted levels by account on a monthly, quarterly or annual basis.

The model can determine income changes resulting from variations in volume, rate, balance sheet mix and accrual of loans. It can also determine the effect of "what if" alternatives in investment policy, fund sources, interest rates, special marketing strategies and aggregate cost control policies.

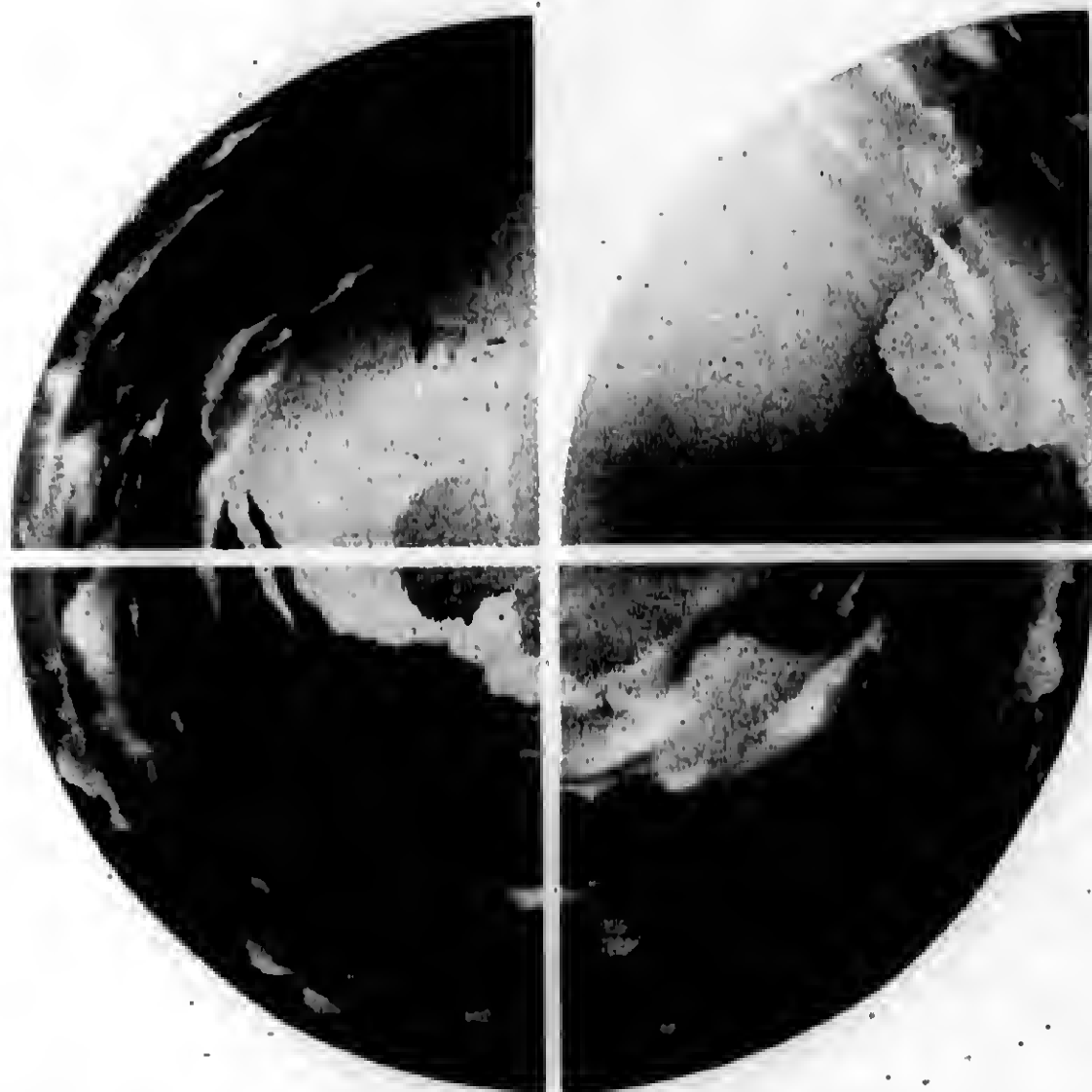
To assist senior management, the RFMM simplifies the process of reviewing and controlling such items as margins, rate spread, return on assets and return on equity levels.

Drawing from the data base, bank management can determine the effects of changing rate environments on the balance sheet mix of investment. Data can also be used to monitor progress toward achieving policies previously set in terms of rate level, portfolio mix and volume of activity.

The primary focus of the model is on forecasting. The model reports and analyzes the combined effects of expected changes in account types. The program's analytical tools provide significant information and insight during the forecast process.

Human judgment comes into play in directing what is to be forecast and confirming whether the prediction has been fulfilled.

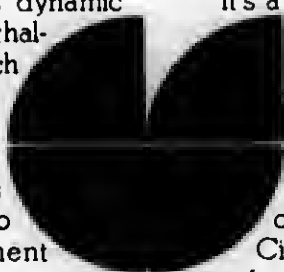
The mathematical approaches to forecasting available in the model are numerous. They include simple moving averages, exponential smoothing of curves, linear multiple regression, trend fitting, historical seasonal variation (based on a routing developed by the U.S. Census Bureau), and the sophisticated Box-Jenkin method for time-series-related data using probabilistic structures.



IT'S A CHANGING WORLD

And nowhere has major change been more evident than in the data processing industry. We have experienced generations of expensive equipment conversions. Frequent programming language changeovers. And increasingly complex operating systems. This dynamic environment has created an unprecedented challenge for top management to insure that each data processing dollar yields the maximum return to the organization.

Over 2,000 clients, in 18 countries, have utilized Cincom Systems' software products and services to harness that change and to provide the foundation for their management information systems.



Cincom's TOTAL Data Base Management System is a prime example, a proven DBMS, serving a large diversified installation base with one common denominator—the stability of the information resource.

It's a changing world. And that's good. Because if change is constructive and anticipated, if it is implemented in a managed environment, progress, productivity and improvement will result.

If you are concerned with your organization's position in the world of data base/on-line information systems, contact any one of Cincom's 35 worldwide support offices or write for further information.

Cincom Systems, Inc.

2300 Montana Avenue, Cincinnati, Ohio 45211 513/662-2300

Get Smart.

ADDs Regent • Smart for the price of Dumb.

Time was, if a man bought a Dumb terminal, he was considered pretty smart. Times change.

ADDs Regent family of Smart terminals is making Dumb look dumb.

For under \$1000* our Regent 100 has features no smart man can resist.

You get cursor controls for operational simplicity and extensive remote commands that make it easy to control the Regent from the computer. Optional function keys customize Regent to your specific application.

You get a Status Line that provides current information on the terminal's operating status. And, you get visual highlights such as blinking, zero intensity, half intensity, underline and reverse video.

You also get self diagnostics.

In other words, you get Smart. Or Smarter: Our Regent 200 has everything our 100 has plus buffered transmission, auxiliary port and editing options.

You can't get a whole lot more.

Get Smart. Get ADDs.

Quality, Reliability and Integrity. It all adds up to ADDs.

*In moderate quantity.

ADDs Applied Digital
Data Systems Inc.
100 Marcus Blvd., Hauppauge,
New York 11787 516-231-5400

Name _____

Firm _____

Title _____

Address _____

City _____ State _____

Phone _____

Manufacturer Makes Series of APT Decisions

By Bob Altom
Special to CW

Halliburton Services is the root organization of the Halliburton Company which employs over 83,000 people worldwide and manufactures equipment for the petroleum industry, railroads, construction and computerized graphics.

Located in Duncan, Okla., Halliburton Services has 45 of the company's approximately 200 pieces of numerical control equipment. It is a world leader in assisting petroleum and other energy-producing companies from initial exploration through production and maintenance.

A firm this large simply couldn't do without computer-assisted programming and expect to keep its leadership

role in the industry.

Our experiences and growth in computer-assisted programming are rather unique in that we did not commit to one language; but went with several until we found one that suited our needs. We gave each language a fair chance. It was not until we had outgrown a language that we made a change. (It should be noted, however, that each change was economical on a cost per tape basis.)

Over 10 years ago, Halliburton Services had a Sunstrand Omnimill. With that machine tool came the Split language in Fortran source.

Even though we didn't know much about computer assist programming, we did know it had to be an advantage over what we had been doing.

I got with some people from our DP department and we began programming using Split on our IBM 360.

Needless to say, things were a little primitive at first.

We had to run back and forth to process the tapes and it was slow going, but the programming — the ability to define points and to repeat point patterns — was a definite advantage in part programming.

We had to modify Split after we purchased a Cincinnati CIM-X Changer, since the Split processor didn't output tapes that would run that machine. I wrote a Split-type processor using the Split vocabulary words for input and that worked quite well.

Halliburton now had two machine

tools using Split.

In 1969, General Electric time-sharing came to Halliburton Services. One of its packages was the Remapt programming language. Remapt was a big advantage in that it had more geometric definition capability than Split. It also had continuous part programming for two-axis and two-and-a-half axis machine tools. Remapt was used to program American and Monarch lathes.

However, we had obtained a third lathe — a J&L NCTL with a modified Bunker-Ramo controller — and could never get the parameter file worked out for it. It was the modified controller that was creating the problem.

As Halliburton Services continued to grow, we obtained a fourth lathe. This time it was a Warner Swasey SC-25 with a modified GE 100S controller.

Again, because it had a two out of a four-axis merging capability, the postprocessor in Remapt was unable to merge those axes satisfactorily.

We went on to try Adapt Plus in 1970. Not long after that, we were going with MDSI's Compact II.

By this time, we had four lathes we could program with Compact II and two machining centers that were still being programmed with Split.

As we developed our programming skills and as our engineering department began to send us more and more complex parts, we ran into trouble. Compact II language in a multi-axis situation wasn't satisfactory.

What we wanted and needed was one language that would work for all of our machine from two axis through four and five axis contouring.

Finally, a technical representative from MDSI told us that for our programming problems, we needed APT.

I began looking at various APT systems. I also went to an APT class held by University Computing Co. (UCC).

In 1971, we decided on UCC's APT system for our IBM 370 and went remote batch through a Cope terminal to UCC's Univac 1109s in Dallas.

Future Needs Satisfied

By going to APT with its geometric capability, each machine tool was just a postprocessor requirement and not a new language requirement. Therefore, APT would satisfy our programming needs for the future.

Also, UCC's APT seemed to offer more programming flexibility and capability than any of the other systems we looked at.

At this point, our in-plant computer power was insufficient to install a good APT system, so we continued as a remote batch user until early 1972.

UCC offered us, in addition to its APT system, its numerical control experts to work with us. They worked with me, in particular, to teach me what I needed to know about APT, the postprocessor and just how the system as a whole worked.

Having this information gave us the ability to work with UCC as a remote batch customer and also enabled us to plan to buy the system and go in-house.

UCC's specialists took the IBM APT system (360 APT) and put in their enhancements such as LATHSQ, THRD SQ and UTURN. These enhancements made our lathe people

(Continued on Page 59)

ZERO FROWN TIME.



Ven-Tel announces the one-and-only, two-in-one Asynchronous Line Driver.

It's our exclusive Zero Downtime ALD, a single unit that houses two, not one, asynchronous line drivers.

The idea? Should the primary ALD fail, the back-up takes over. Your communications system stays up. And, just as important, your costs stay down. Because this package isn't just more efficient than two independent ALD packages, it's more economical as well.

But our ALD feature list would be mighty impressive even without the Zero Downtime option, what with 0-9600 bps asynchronous transmission, 2-wire half duplex or 4-wire full duplex, point-to-point or multidrop. Furthermore, Ven-Tel offers four different stand-alone or rack-mounted ALDs, all conforming to Bell specification 43401 and all featuring easy-to-operate controls and LED performance indicators.

Of course, Ven-Tel is making a few things besides the most innovative ALD on the market. Low and medium speed modems, for instance. Frequency division multiplexors. Even a little history, thanks to the first five year warranty option on a complete line of acoustic couplers.

Call Mr. H.K. White at our toll free number, (800) 453-2400, for the name of your nearest Ven-Tel distributor. We think our Zero Frown Time story will put a big smile on your face.

VEN-TEL

Maybe not number one. But the one to watch.
2360 Walsh Avenue Santa Clara, California 95050 (408) 984-2727

Upgrades in NC Machines Handled by APT Decisions

(Continued from Page 58)

happy. They just could not use any APT system that didn't have LATHSQ after having operated with it for a year.

The problems we had during this installation amounted to only the problems one would expect from a software purchase when it is tailored to an individual company's needs.

A crucial decision we made was that our language processor (APT) must be able to produce a standard CLFILE. This meant we could either purchase or create our own postprocessors.

We did purchase an initial five postprocessors along with the APT enhancements from UCC since it had debugged them on the Univac 1108. They just copies the postprocessors over for an IBM machine.

Postprocessor Problems

But there can be problems when you purchase postprocessors. The machine tools may arrive before the postprocessor is ready. Or you can have difficulty locating sources who have the time to write the postprocessor. Then there's always the problem each time of justifying the postprocessor to go with the machine tool, since a different postprocessor must be written for each machine tool and control.

However, since we had the resources and knew the capabilities of our machines, we decided to produce the next 65 postprocessors in-house at a considerable savings.

Installation 'Fairly Easy'

When we decided to go in-house in 1972, the installation was fairly easy. I had four postprocessors written from the time we installed in November 1972 to the end of January 1973.

By going in-house, we felt we could develop some modifications and improvements of our own and keep them as our competitive edge.

It's not an easy decision to go in-house and there are a great many things in the costing of one language against another language that you have to dig out to see just how much you will be paying.

In the second half of 1977, Halliburton Services decided that additional numerical control capabilities would be desirable. We chose once again to go to UCC and license its latest product, UCC-APT, a relatively new APT processor available on both large main-frame computers and Digital Equipment Corp. minicomputers.

UCC Support Tops

The support and training of our people has been excellent. UCC sent one of its analysts to help with the installation and to make modifications to the package.

Here at Halliburton Services, besides the IBM 370/158s we are using for the UCC-APT package, we also have a PDP-11/34 minicomputer that we use as a backup.

We have the best of both worlds. We've got the big IBM, but if we're in a hurry and don't want to go through job queues or should our data link be unavailable, we can go to the minicomputer to process APT.

Halliburton Services is a constantly growing company in a rapidly growing

area of industry.

Without computer assist programming and without APT in particular, we would have never met programming demands without huge staff increases.

Although there are problems and difficulties going in-house and implementing software packages, justification was always necessitated by future needs.

Implementation was always as expected — a few problems, not unanticipated, but good training and support solved them.

Alton is supervisor, software analysis, for Halliburton Services, Duncan, Okla.

Cybernet Adds Packages

MINNEAPOLIS — Two interactive packages — one for graphics work, the other for report generation — are available for business-oriented users on the Cybernet remote computing service of Control Data Corp.

Plotpac, the graphics facility, is said to support the production of time plots, bar charts and scatter diagrams on ordinary time-sharing terminals, while IPS Report Writer is described as an easy-to-use program for creating business reports.

Controlled by a set of commands, Plotpac lets the nonprogrammer control the format, labeling and placement of the graphic output, a CDC spokesman explained. Data to be displayed can be entered directly

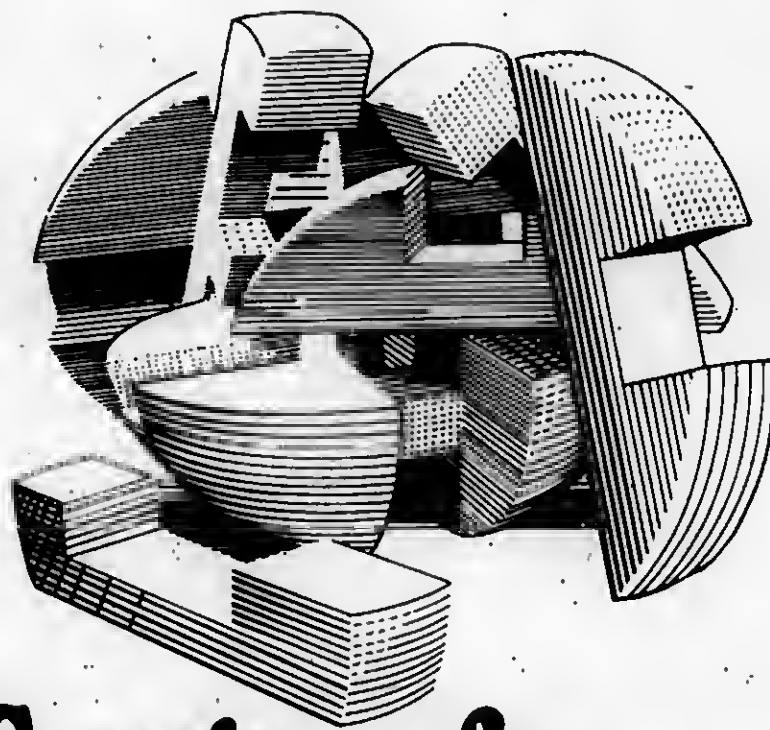
from a terminal or extracted from the output of the Cybernet Interactive financial planning system (IFPS), he said.

IPS Report Writer is a data management product, the spokesman continued. It delivers "a wide range of reporting capabilities" to the user.

The commands are flexible enough so the user can set up "what if" and "look up" procedures. The user-created strings of commands can be stored and retrieved for reuse, according to CDC.

Additional information about these packages is available from the appropriate product manager, Control Data Corp., Box 0, Minneapolis, Minn. 55440.

Puzzled by Database?



Free DBMS Seminar for Problem Solvers. Don't miss it!

If you're a manager, senior DP person or user who needs to put the database puzzle together, you shouldn't miss our free one-day seminar.

It's all about INQUIRE®, the Problem-Solver's DBMS from Infodata Systems.

We'll show you how easily INQUIRE can put all the pieces—data management; on-line processing; built-in flexible reporting; a true user's language; even

full text retrieval— together into one unpuzzling package!*

*INQUIRE operates in IBM 360/370 (OS, VS, CMS) plus Amdahl and ITEL environments.

INQUIRE DBMS SEMINAR

Place: Houston, Texas.
The Galleria Plaza Hotel

Date: March 9, 1978

Time: 9:00 a.m.-3:30 p.m.

Reserve now—space is limited. Fill out the coupon and mail immediately, or call us at (703) 578-3430.

INQUIRE®

Infodata Systems

© COPYRIGHT 1978 * INQUIRE REGISTERED U.S. PATENT OFFICE TO INFODATA SYSTEMS INC., ROCHESTER, NEW YORK, U.S.A. COVERED BY U.S. PATENT NUMBER 3670310

Infodata

Infodata Systems Inc.
5205 Leesburg Pike
Falls Church, Virginia 22041

Please register me for the free INQUIRE seminar in Houston, March 9th.

Name _____

Title _____

Company _____

Street Address _____

City _____

State _____

Zip _____

Telephone _____

Sorry, I can't attend the Houston seminar in March, but I'd be interested in one planned for:

☐ Boston

☐ New York

☐ Chicago

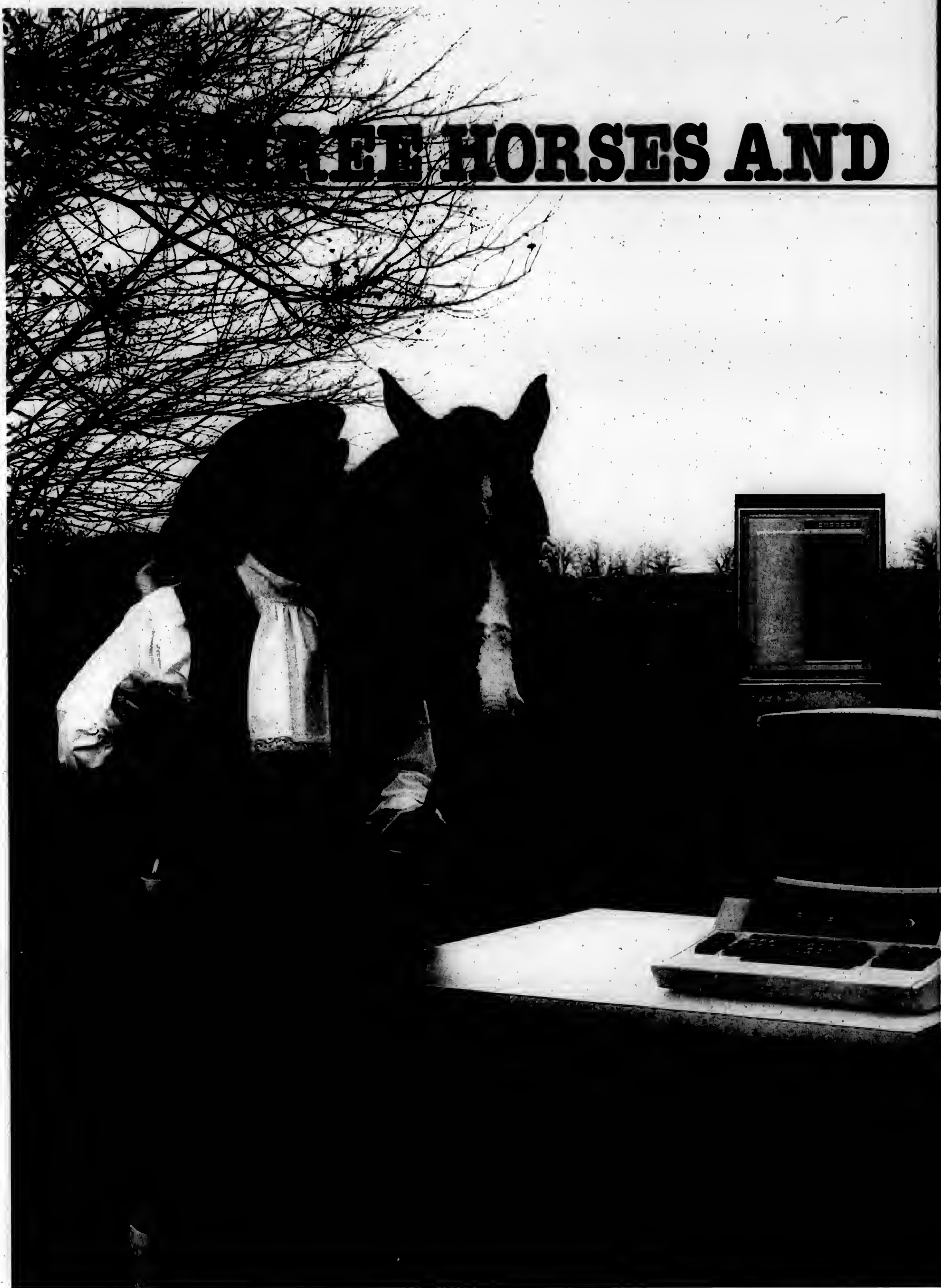
☐ St. Louis

☐ Philadelphia

☐ Washington, D.C.

☐ Your City

FREE HORSES AND



A GOOD NIGHT'S SLEEP.

That's what Cummins Distributed Processing Systems would have saved me that dark, brisk night in April, 1775. With the Cummins technology that's available to you today, independence would have been achieved much sooner. That's for certain.

Cummins Key/disk and KeyScan® Multimedia Systems are designed to meet the needs of business management. Whether in a centralized or distributed environment, these systems can be configured to meet your data processing requirements in the most efficient, cost effective manner.

In my day, we'd have had a Series 5400 as our host system in Boston, Series 4400 Systems in all major colonial centers and Series 2400 Systems or remote terminals in outlying towns and villages.

Keep in mind that Cummins Systems can be configured with MICR, OCR, punch card and OMR reader-sorters as well as CRT/keystations. No other systems offer such data entry flexibility. So as your needs change, your Cummins System can be upgraded simply and economically.

State-of-the-art hardware.

Comprehensive, easy to use software. Communications. Reliable, user-oriented data processing power. So don't wait 203 years to realize what you might have done for your company. Take a close look at the Cummins family of distributed processing systems. Do it today and make history with Cummins.

Write our Corporate Headquarters for more information.

CUMMINS
CUMMINS-ALLISON CORP.

Data Systems Division
800 Waukegan Road
Glenview, IL 60025-312/724-8000



'Qedit' Aids HP-3000 Sites

DELTA, B.C. — A fast program editor for the Hewlett Packard Co. HP 3000, Qedit speeds on-line programming while "dramatically reducing" system load, according to the vendor, Robelle Consulting Ltd.

Since the Qedit workfile can be directly compiled, a spokesman explained, there is no need to copy to and from a separate source file every time the program is compiled.

Qedit is tailored for programmers, he said, citing as an example the fact that once the editor is notified of the language of a source program, it performs "smart" searches, selecting only those occurrences of a string where it is a valid identifier in context.

Qedit costs \$100/mo or \$960/year, including maintenance, where the spokesman noted from 130-5421 10th Ave., Delta, B.C. V4M 3T9, Canada.

APL Packages Handle Ledger

NEW YORK — Installations with APL-oriented systems, including IBM's 5100 or 5110 desktop computers, can run their accounts payable work with a pair of programs from APL Systems, Inc., according to a spokeswoman.

Developed by Think, Inc., the Accounts Payable Ledgers package (AM52) allows a business to maintain records of all accounts payable. Although sold separately, the Accounts Payable Check-

writer package (AM53) uses files generated by AM52 for operation.

The ledger package is said to create a permanent audit trail of all payments against an individual invoice. It also generates a number of managerial and operational reports, as needed, the spokeswoman added.

These include vendor history, lists of open invoices, purchase activity in a given period and aging of accounts.

Cost center disbursements using the accrual method and account number disbursements on a cash basis are also reported, she said.

The package also provides the user with information on cash requirements, she added.

The checkwriter package allows an organization to control and selectively produce checks from its accounts payable files.

The ledgers package costs \$1,500; the checkwriter, \$1,000.

APL Systems, Inc. is at 310 E. 46th St., New York, N.Y. 10017.

SYSTEM 2000 Puts your resources to work

DATA is a valuable resource. With the proper management, it can become a powerful tool to improve productivity, efficiency and profitability.

MRI's SYSTEM 2000 puts your data to work for you. It saves your company money in many beneficial ways and can take a heavy workload off those other valuable resources.

SYSTEM 2000 is a versatile data base management system designed for users of IBM, CDC, Univac, and Amdah computers. Working with a wide variety of applications, with data bases ranging from 300,000 to more than 1.5 billion characters, with non-data processing personnel as well as highly skilled programmers, SYSTEM 2000 provides flexibility and efficiency in even the most complex environment.

To find out how hardworking your resources can be, contact our nearest marketing representative or MRI corporate headquarters. Find out how resourceful and hardworking our people are in ensuring that your needs are met. Ask about the new DOS/VS version and CONTROL 2000 MRI's data dictionary.

Put your resources to work
and take advantage of ours



SYSTEMS
CORPORATION

HARDWORKING
THE DATA BASE MANAGEMENT COMPANY
12675 Research Blvd., Austin, Texas 78759, (512) 258-5171



(402) 392-2606

**VOLUME DATA ENTRY
SERVICES ...
TAPE OR CARDS**

"QUALITY AT A LOWER COST"

AMERICAN

KEY DATA

Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Takes Corrective Action

System Diagnoses Private-Line Net Ills

By Ronald A. Frank
CW Staff

BURLINGTON, Mass. — Intertel, Inc. has introduced a microprocessor-controlled network control system that performs intelligent diagnostics of private-line data communications networks.

Event Management System One (EMS-

Smart Front Ends Enhance Usage Of Firm's CPUs

WARRENVILLE, Ill. — Western Electric Co. has installed three programmable communications front ends to replace hard-wired terminal control units.

The programmable 1380 communications processors from Memorex Corp. handle communications for an IBM 370/168, a 370/158 and two Amdahl Corp. 470V/6 systems at the data center in Warrenville, Ill.

The CPUs support an IBM Information Management System (IMS) data base, time-sharing option (TSO) and a management information and text system (Mits) for report generation and sophisticated word processing.

Communications to the data center include at least 12 50 kbit/sec wide-band lines, 20 9,600 bit/sec lines and more than 150 additional lines ranging from 2,400 bit/sec down to 300 bit/sec dial-up connections. The communications network links Western Electric operations from New York westward to Omaha, Neb., and southward to Dallas.

Coupled CPUs

All the CPUs at the Western Electric center are coupled to provide load sharing. The Memorex 1380s serve as front-end processors for the connections, with four channel adapters connecting each of the 1380s to the IBM and Amdahl CPUs. The communications processors are connected to provide backup in the event any one CPU has to be taken out of service.

Within the communication network, there are 15 remote job entry terminals and more than 150 interactive transaction terminals, all capable of accessing the computers.

Although the Memorex 1380 is designed for eventual support of the IBM Network Control System (NCS), the processors at Western Electric are fitted with host channel adapters attached to single byte multiplexer channels to provide the necessary interface and control logic to emulate the channel interface characteristics of IBM 270X transmission control units.

One) includes both attended and unattended operating modes to monitor the performance of data nets for users who cannot afford to use dedicated front ends or customized software for this function, the company said.

EMS-One can anticipate and diagnose network problems and then take corrective action and initiate restoration of a communications link, the company said.

The system has a special-purpose plasma display with a 320-character screen that is used to initiate diagnostic commands at a central monitoring site. The EMS-One is designed to operate on four-wire, private-line 3002-type links without conditioning. Transmission speeds up to 9,600 bit/sec can be supported, Intertel noted.

An EMS-One system is designed for networks that have at least 100 drops and is presently restricted to analog links although future upgrades could support digital facilities, a spokesman said.

Four Operating Modes

The system has four operating modes. The first of these, called Self-Learn, allows the control system to automatically determine the addresses of all active sites in the user's network. This mode is initiated in response to a single command entered at the system console.

The Automatic Monitoring mode sets up the system to continuously poll all active ports or lines. Any change of status is reported to the console operator with both displayed and audio alarms. The polling protocol allows for fast scanning, and a network of 10 lines and 20 drops can reportedly be scanned in less than 60 seconds.

The Automatic Predictive Maintenance mode can be programmed by the operator at the system console to automatically initiate on-line and off-line testing at predetermined times when the network is operational or nonoperational. Results are recorded on the system printer, allowing unattended testing during off-hours.

The fourth test type is Manual Model, which allows the user to initiate a particular test with control codes entered into the display console.

Automatic Monitoring

In Automatic Monitoring mode, 14 tests are continuously performed at each remote drop and each remote site would typically include a microprocessor-controlled remote test processor (RTP).

The central system controller is based on a firmware-driven multiple processor design. The central processor is connected to a system bus, and the operate console, printer and other I/O devices are interfaced to the central processor through serial interface ports. A total of 160 ports and 6,400 sites can be serviced by a single EMS-One system.

The control system can be used only with Intertel modems, but users of earlier network control systems can upgrade to the EMS-One without changing their installed Intertel modems, according to a spokesman.

System prices will range from \$125,000 for a small EMS-One accommodating 10 lines and 55 drops to \$375,000 for a large configuration having 30 lines and 160 drops. First deliveries are scheduled for early 1979 from Intertel, Inc., 6 Vine Brook Park, Burlington, Mass. 01803.

Purchasing's Edge Over Lease Leads to Independent Modems

DAYTON, Ohio — Independent modems with built-in Data Access Arrangements (DAA) are playing a role in on-line DP systems supplied to automotive dealerships by Reynolds & Reynolds, a service company with headquarters here.

Since 1974, over 3,600 of the VIM-II systems have been sold to dealerships throughout the country, providing on-line accounting, payroll, inventory management, car leasing and service merchandising for the automotive accounts. The dealerships have dial-up access to over 180 minicomputers located in 80 Reynolds & Reynolds offices nationwide.

Until recently, Reynolds & Reynolds rented 113B modems from the Bell System with

an annual outlay of nearly \$250,000. Then, early in 1977, Vadic Corp. introduced the direct-connect VA317S, which has been approved by the Federal Communications Commission for attachment to the dial-up network.

Reynolds & Reynolds has purchased over 1,000 of the Vadic modems, which do not require a DAA from the phone company. Using 300 bit/sec dial-up lines, the modems connect terminals in the dealerships to the 80 Reynolds & Reynolds computer sites. Some locations have as many as 35 Vadic modems.

"We chose Vadic VA317S modems for a number of reasons," according to Franklin

(Continued on Page 64)

COMMUNICATIONS

BUDGET

DECWRITER II & III
3 MONTH LEASE

THEN ONLY MONTH TO MONTH TO MONTH TO
WE SHIP FROM OUR NEW STOCK IN 1 DAY

AMERICAN TERMINAL LEASING • 617-261-1100
P.O. BOX 68, KENMORE STATION, BOSTON, MASS. 02215

Modems Designed to Suit Microwave, FM Systems

BOHEMIA, N.Y. — The Series 1260 QPSK data-over-voice or group band modems from American Modem Corp. are designed for terrestrial microwave links and satellite FM systems.

The series has solid-state integrated circuitry and self-checking features for fast maintenance, the firm said.

The modems interface directly with the baseband input of the FM above the highest voice frequency or at any place within the operating FM baseband. Data services can be provided from 1,200 bit/sec to 10M bit/sec.

The modems consist of an RF

transmitter on which the data stream is modulated using a quadrature modulation technique.

The equipment has interchangeable interface options allowing the use of RS-232, Bell 303, V35, or other special interface arrangements. Operating modes are full duplex, half duplex or simplex. The transmit and receive frequency ranges are 60 kHz to 50 MHz with a minimum carrier-to-noise ratio of 14 decibels. An optional error-correcting code can be provided.

The 1260 costs \$4,975 from American Modem Corp., a unit of Intech Laboratories, Inc., 160 Wilbur Place, Bohemia, N.Y. 11716.

User Discovers Advantages In Independent's Modems

(Continued from Page 63)

Smith, communications research manager for Reynolds & Reynolds. "Most important, we can purchase and have them paid off within a few months. This is a much better environment than renting from the phone company.

"Also, we knew Vadic had a good, proven modem, and through purchase we'd be assured that equipment would be available when we needed it.

"The clincher was that with the VA3175 we wouldn't have to rent a DAA from the local phone company. We're quite pleased with our decision. Everyone with dial access into the VIM-II system is happy with the ease

of installation and uptime on the Vadic modems," he added.

Continual Updating

The key to the capabilities of the VIM-II information system lies in the minicomputer installed in each Reynolds & Reynolds office. A variety of terminals (printing and/or CRT) are located in the dealerships and are connected to the minicomputers using the 300 bit/sec dial-up lines.

All reports are printed out right at the dealerships, eliminating mailing delays. Since the minicomputers are local, long-distance transmission problems and costs are eliminated.

Daily accounting transactions are entered through the terminals at the dealership. Reports and records such as general ledger, management schedules and daily operating control are printed out at the dealership, and accounting information is available almost 24 hours a day.

Dealers can ask for the account balance of a charge customer, the book balance of a used car or a general ledger account balance. Also generated are management reports such as an aged listing of new or used car inventory, a listing of all past-due receivables and cash in bank.

Since all input of daily business operations is handled at the dealership, records are continually updated. For example, using the VIM-II, the dealer can enter the last day's business and tell the minicomputer it's the last day of the month. Journals, schedules and the general ledger are printed out on the dealer terminals at night. The next day, the business manager is ready to pull the financial statement.

Other leasing reports include a monthly lease audit, which provides a total audit of every active unit for the month; note payable report, which shows the loan balance per unit after monthly payments have been applied; and unit replacement analysis, which indicates the most profitable month for a customer to sell a vehicle by comparing book value with the current market value.

The VIM-II system prepares and prints payroll checks in the dealership at the push of a button, Smith said, and also provides the dealer with management information as well as the payroll records such as the payroll register, the deduction register, the labor distribution report and 941a and W-2 forms.

The latest addition to the VIM-II package is the Service Merchandising System (SMS). A terminal in the write-up area of the service department enables the service manager or advisor to meet the customer with information personalized to his particular vehicle, such as customer name, address and phone number, delivery date, mileage, serial number, car description and suggested service.

Also available is pertinent information from the customer's last visit. This up-to-the-minute information reduces shop comeback costs, speeds repair order write-up and minimizes customer file upkeep, Smith said. A new or used car prospect list can be generated since the age, mileage and condition of the present vehicle is instantly retrievable.

SHORT MEMORY?

Improve it
with a CIG memory system

When your information outruns your memory's storage capacity, you need a CIG add-on main memory.

CIG memory systems are plug-compatible with IBM 370 and 360's and are offered on short-term leases—one or two years—as well as on longer terms and purchase.

Our products include the latest 13X/14X UMS memory up to 4 megabytes, 158 and 168 memory to 16 megabytes as well as memory for the 360's.

CIG Computer Products has been a leader in the development of plug-compatible computer memory products for nearly a decade. Because we are not tied to the products of any one manufacturer, you can be sure of getting the latest equipment available. And, thanks to our own Technical Services Center, you'll receive reliable technical support and back-up maintenance from a single source.

If your memory capability is running short, talk to us about a CIG add-on main memory to enhance your present IBM system. We can help you bring your memory capacity into line with your present needs... at a cost you'll want to remember.

CIG

CIG COMPUTER PRODUCTS, INC.
303 Cameron Street,
Alexandria, Virginia 22314

Call CIG at (703) 683-4606 or mail
this coupon today

Tell me more about CIG add-on main memories and how they can help solve my short memory problems.

I'm also interested in:

☐ Block Multiplexer ☐ Computer Leasing Channel

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone number _____

Type of system now in use _____

Mail to: CIG Computer Products, Inc.
303 Cameron Street,
CW213 Alexandria, Virginia 22314

Check-In System Eases Airport Growth Problem

LONDON — A system built on programmable terminals is helping British Caledonian Airways solve the problems of maintaining optimum customer responsiveness in the face of significant business growth and airport expansion.

After evaluating two types of check-in processing — centralized mainframe and stand-alone distributed processing — British Caledonian selected Raytheon Data Systems Co.'s Raycheck system as the most cost-effective solution. Raycheck was installed at London-Gatwick Airport last year.

According to S. Thomas, British Caledonian's manager of communications services, the airline required a system that would allow complete check-in activity at any of the 46 airport and town check-in terminals, yet would permit control of overall check-in operations. Also important was simplicity of use by check-in personnel.

"We wanted to take staff members who had airport experience and expect them to understand the system in a very short time," Thomas said.

"As for technical objectives," he recalled, "we wanted a true user operation — we were not interested in any system that required day-to-day technical support from anyone other than the vendor maintenance staff."

"Also, the processors had to work in the normal airport environment without extra special facilities, and we wanted dual processors for backup in case of one processor failure. Finally, we wanted a single vendor, already in the airline market, to take total responsibility for hardware and software."

The Raycheck system installed includes two PTS-1200 system processors with redundant disk memory storage and more than 50 PTS-100 intelligent, programmable terminals. The PTS-1200 computers hold permanent and semipermanent data — aircraft weights and configurations, cargo-hold limitations, flight schedules, excess baggage rates, currency conversions and instructions on how specific flights should be checked in.

Other, "working" information is fed to the host systems from the remote terminals on a day-to-day, hour-by-hour basis. This information includes passenger reference numbers, names and service information, departure gates and fuel and cargo specifications.

How It Works

In operation, the check-in procedure starts when a passenger presents a ticket to the British Caledonia check-in agent. The agent types in the flight number and passenger name and hits the "Enter" key.

The Raycheck system immediately presents all pertinent information about the flight and displays the final destination, then searches its files to find and display any related passenger information — if the passenger has requested a special diet, for instance.

If the passenger has a common name like "Smith," the agent can request Raycheck to display all the same names at the bottom of the screen so booking accuracy can be confirmed by agent and passenger. If the name does not exactly match, Raycheck also displays similar names for the agent to select.

The British Caledonian agent then weighs the passenger's baggage and

enters the result into the system. Raycheck computes, for the passenger's ticket class and destination, the total baggage weight and displays any excess baggage charges to the agent. Charges are displayed in local currency, but Raycheck can automatically convert rates to any of more than 25 different currency types if necessary.

If a seat has not been preallocated, the system displays the complete aircraft seating configuration, showing available seats, smoking and no smoking sections, film screen visibility and proximity of emergency exits so the agent can select the most suitable seat for the passenger.

Once these details are completed, Raycheck automatically prints the correct boarding pass. If there is an error,

the boarding pass will not be printed until the agent corrects the information.

According to Thomas, "This is where personal service has a real meaning — with individual information about

Terminal Transactions

passengers available at every check-in point and not just at one specific, dedicated desk."

While check-in agents are processing passengers for an upcoming flight, the British Caledonian load controller is also using Raycheck to figure aircraft

weight and balance. Here, Raycheck calls up pertinent operating specifications for the flight-to-be, including flight date, aircraft type, version and registration, basic weight and index and standard taxi fuel.

To this the load controller adds information concerning adjustments to the basic weight, numbers and distribution of crew and bags, pantry weight and distribution, planned cargo and mail and any other miscellaneous items, along with "ramp" fuel and any required amendments to taxi fuel.

When all passengers have been signed in, the Raycheck system validates the data, flagging any errors, then calculates and displays final operating weight and take-off fuel.

(Continued on Page 66)

How to choose between the two best tape filing systems you can buy.

Sperry Remington makes your life a little more complicated. To make it a little easier! By giving you a choice of handsome, convenient, efficient computer tape filing systems. One of them will fit your needs best, and help you get the Boggles out of your tape file system.



Lektriever® 110 System lets you locate your computer tape files directly adjacent to your computer for maximum convenience. This compact, easy-to-use, automated tape file features unique T-Bar tape carriers that let you store hanging-type computer tapes where they're available in seconds. And you can store literally hundreds of tapes with the Lektriever 110. Over 1200 1" tapes in only 34 square feet of floor space. For convenient, efficient, secure, point-of-use tape filing, the lockable Lektriever 110 is the obvious choice.



Elecompack System V makes high-volume computer tape filing easy and economical. And saves you a tremendous amount of space, as well. This fully automated shelving system uses 46% less floor space than conventional shelves to store the same amount of tapes.

And they're all available at the touch of a fingertip. Plus, System V gives you something no ordinary shelves can: complete lockable security. For high-volume tape filing with space-saving efficiency, your best choice is Elecompack System V.



THIS IS A BOGGLE.

It could be the bug in your tape file system.

Send me literature: CW213

☐ Lektriever 110 System ☐ Elecompack System V

☐ Have salesman call

NAME _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

Lektriever 110 and Elecompack System V — two great ways to unBoggle your computer tape filing. The choice is yours — call your Sperry Remington dealer now or write to

SPERRY UNIVAC
OFFICE EQUIPMENT,
PO BOX 500
BLUE BELL, PENNSYLVANIA 19422
SPERRY UNIVAC IS A DIVISION OF SPERRY RAND CORPORATION

Steel Maker Gains Responsiveness to Customers

LATROBE, Pa. — Drills, reamers, taps and cutting tools used to shape metal products require special alloys known as high-speed and specialty tool steels. Teledyne Vasco here is one of the world's largest producers of high-speed steel, and its need to be responsive to customer orders recently led to automation of its order entry system.

Within 10 minutes after an order is received at a sales office, shipping papers are now ready at the appropriate stocking point or a production order is entered on a plant schedule, thanks to the system, which uses Bell Dataspeed 40 terminals.

Orders generally come in by telephone to a sales office. Working from inventory listings which are updated daily from Latrobe, a sales engineer prepares an order for delivery out of local stock, prepares an order for shipment from another warehouse location or issues a production order.

If more than one source is involved, separate orders are entered for each source.

The Dataspeed 40 terminals include the CRT, dual print stations and a Sykes dual diskette preprogrammed to store a data base of order forms, customer accounts and stock description information.

Orders are prepared by calling up different pieces of information from the disk and fitting them together on

the CRT. The terminals handle administrative message traffic when not in use for order entry.

The terminal operator starts by displaying an order form in protected format on the CRT and entering a two-digit alpha code to designate the facility to which the order is to be directed. An account information data mask is retrieved from the diskette and superimposed onto the order form.

The next retrieved entry is an item description which adds inventory codes, descriptive information and unit prices to the display. The operator completes the order by entering quantities and visually checking all entries.

Order preparation complete, the operator presses a Bell rapid dial switch which places a call to a Mitron

Systems Corp. MDRS-9 message forwarder terminal located at the Latrobe DP center.

Order transmission to the message forwarder terminal is complete 10 seconds after the connection is established.

The message forwarder converts the two-character alpha routing code to an area and station telephone number and dials a Dataspeed printer terminal at the designated facility, which is preloaded with appropriate forms. The order is ready for processing a few moments after its acceptance.

Besides redirecting incoming orders to the appropriate stocking point, the MDRS-9 copies them onto its computer-compatible tape. This tape record is processed at night to update in-

ventory and the financial data base.

Not all orders are sent forward. Production orders and others destined for Latrobe have an address code which limits the MDRS-9 to recording the information onto magnetic tape.

Some orders have invalid routing codes or cannot be sent forward because it is not possible to access the recipient terminal. These are directed to a Bell 4210 magnetic cartridge terminal so they can be recalled to a CRT and corrected or retransmitted when the destination terminal is able to collect traffic.

After order traffic is complete, financial data tapes generated by the corporate computer center are mounted on the MDRS-9 for transmission to the field.

System Matches Airport Growth

(Continued from Page 65)

The load controller can then distribute "dead" loads according to normal practice and check them against a balance form displayed by Raycheck.

When final weight and balance have been reconciled against allowable maximum specifications shown by the balance form, a loadsheet is printed, checked against the Raycheck display and approved. A load message is sent automatically to the route stations along the flight.

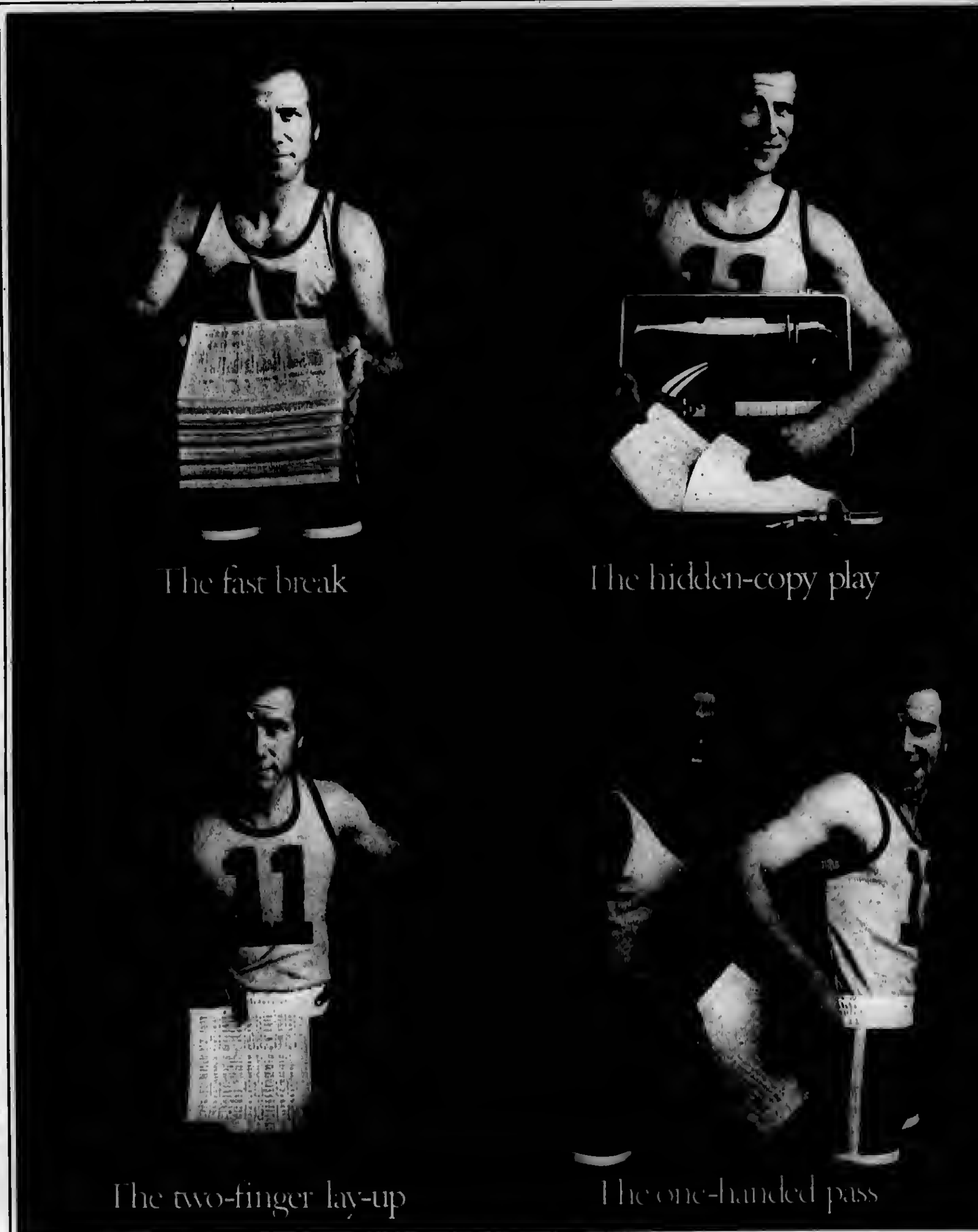
Report for Supervisors

In addition to check-in and load/balance procedures, Raycheck provides flight information for authorized supervisors whenever requested. A typical supervisor display will list flights according to takeoff times — to show current "workload" — and will list flight number, status of flight at terminal or airport, aircraft configuration and available seats and predicted total load of passengers by class. If this is greater than the seats available, a remark "overbook" is written under the flight data.

Other Advantage

Besides the economic advantages of Raycheck — British Caledonian projects total cost-justification within five years — an important benefit to the airline is Raycheck's ability to tie in to a standard airlines reservation system whenever necessary.

Operation of the British Caledonian Raycheck system began last May and "second-phase" installation, consisting of additional check-in terminals, was completed in late 1977.



Processor Terminal Bows

HOUSTON — CMC Marketing Corp. has announced the availability of another model in the Processor Terminal series. Designated the MCS-PT112/32, the system includes a display, disk storage, a full keyboard and a 12-slot motherboard. It may be used either as a stand-alone processor or as a processor terminal in a larger system, the company said.

Features of the MCS-PT112/32 include a 15-in. monitor with a face plate of smoky plexiglass which reportedly reduces glare and enhances type visibility; a full upper and lower case Ascii keyboard with eight user-designated special function keys; and a 16-key numeric cluster pad. One Shugart SA-400

minifloppy disk drive is standard, the firm said.

A 32K static random-access memory (RAM) is provided with additional RAM as an optional item, and a disk controller handles three minidrives.

The I/O board provides three parallel and three serial ports with selectable transmission rates of 75 to 9,600 bit/sec. Outputs are standard RS-232C or TTL.

Software provided with the system includes the CP/M operating system and Superbasic.

The Processor Terminal Model MCS-PT112/32 assembled and tested is priced at \$4,795 from CMC Marketing Corp., Suite 515, 5601 Bintliff, Houston, Texas 77036.

Mini-Based EFT System Runs Alone or With CPUs

GARDEN CITY, N.Y. — Instant Transactions Corp. of America is offering the IT-2100, a minicomputer-based electronic funds transfer (EFT) system.

The IT-2100 may operate as a stand-alone, self-contained EFT switch and transaction processor, or may interface with one or more central DP systems.

Features incorporated within the IT-2100 system consist of network control, message routing, transaction application processing and multibank settlement and reporting. The system is designed to accommodate "all popular" point-of-sale (POS) terminals as well as automated teller machines, (ATM) the firm said.

At the conclusion of each processing day, a multibank settlement is initiated, which includes settlement reports, cash letters, merchant statements, and customer descriptive statements as well as marketing, statistical and operating reports.

Features incorporated within the IT-2100 system offer the capabilities to operate as a switch and/or transaction processor; support POS terminals and ATMs; operate in a multibank environment; interface with major credit card networks and stand alone or interface with mainframe systems.

The system provides electronic paperless processing, supports customer- or clerk-operated terminals and prepares customer descriptive statements, the firm said.

The IT-2100 utilizes most high-level software. The hardware configuration consists of a main processor operating at 2 MHz, one or two data communication processors, up to 147,000 bytes of memory and nine channels for I/O devices.

Peripherals include a 33 msec disk pack, magnetic tape, card reader, etc.

Arrangements are available for a one-year lease at \$6,000 per month from Instant Transactions Corp. of America, 1035 Stewart Ave., Garden City, N.Y. 11530.

ID System Designed As NCR 270 Upgrade

SUNNYVALE, Calif. — An Identkey card reader and customer identification system designed to upgrade the NCR Corp. Model 270 teller terminal has been introduced by Atalla Technovations.

The Identkey system is said to extend the life of the Model 270 by providing the terminal with plastic card and personal identification number (PIN) capabilities. The system is designed to let banks and thrift institutions modernize their NCR 270 terminals when switching to a plastic card environment from a passbook program, a Technovations spokesman said.

The Identkey/NCR 270 system consists of a card reader console, two customer PIN pads, intelligent controller and built-in electronic interface package, the spokesman added.

The Identkey system reportedly connects directly into the teller terminal without hardware or software changes. The system is also said to be designed for easy operation by teller and customer. During a transaction, the customer's account number is read by the card reader. This process replaces manual entry and avoids possible key stroke errors, the company said.

The Identkey system allows Model 270 users to replace signature verification, "test questions" and other customer verification methods with a secure PIN system.

According to Technovations, the Identkey/NCR 270 system has both on-line and off-line positive identification capabilities. It can reportedly verify a customer's identity even when the CPU is busy or down.

The Identkey/NCR 270 system costs \$1,750 from Atalla Technovations, 505 W. Olive Ave., Sunnyvale, Calif. 94086.

The Xerox Executive Printout makes it a whole new ballgame.

Back in the old days, a big, clumsy, hard to read computer printout was the only game in town.

But since the Xerox Executive Printout entered the league, everything's changed.

With the Xerox 1200, you get letter-sized reports that won't make you fumble every time you have to read or hold on to one.

And, because it works both on or off line, local or remote, you can run with the results a lot faster than if you had used a clattery old line printer.

In fact, the 1200 speeds everything up. It eliminates bursting, decollating and special binders. And overlays let you print forms and data at the same time. So there's no need to play with preprinted forms ever again.

For more information about the 1200 Computer Printing System, call 213/679-4511, Ext. 2409, or write Xerox Data Systems Division, Dept. A1-15, 701 Aviation Blvd., El Segundo, CA 90245.

With the Xerox 1200 you save time, money and space every time you use it.

And that's the final score.

XEROX

Tektronix 4020 Series

How can the first name in graphics come up with the last word in alphanumeric?

By turning both to your advantage.

From Alphanumerics to Graphics ... now your terminals can keep pace with your needs. Our new 4020 Series terminals let you plan for the day when alphanumeric isn't enough. Without trading in terminals or buying more capability than you need right now.

Our 4025, for example, is a smart, refresh device that starts with alphanumeric and grows. First into forms ruling. Then into graphics. All without one capability compromising the other. As a complement, the 4024 offers data entry and forms capabilities. So you can prepare for the future with maximum economy and Tektronix quality.

Begin with the basics: alphanumeric at its best. Both configurations include expandable memory. Complete editing. Fields. Scrolling. Familiar, user-definable keyboard. Easy-on-the-eyes screen.

Plug in the forms ruling option and either terminal can recreate just about any source document. With one keystroke entry. Easy information call-up. Ideally proportioned 34-line deep screen.

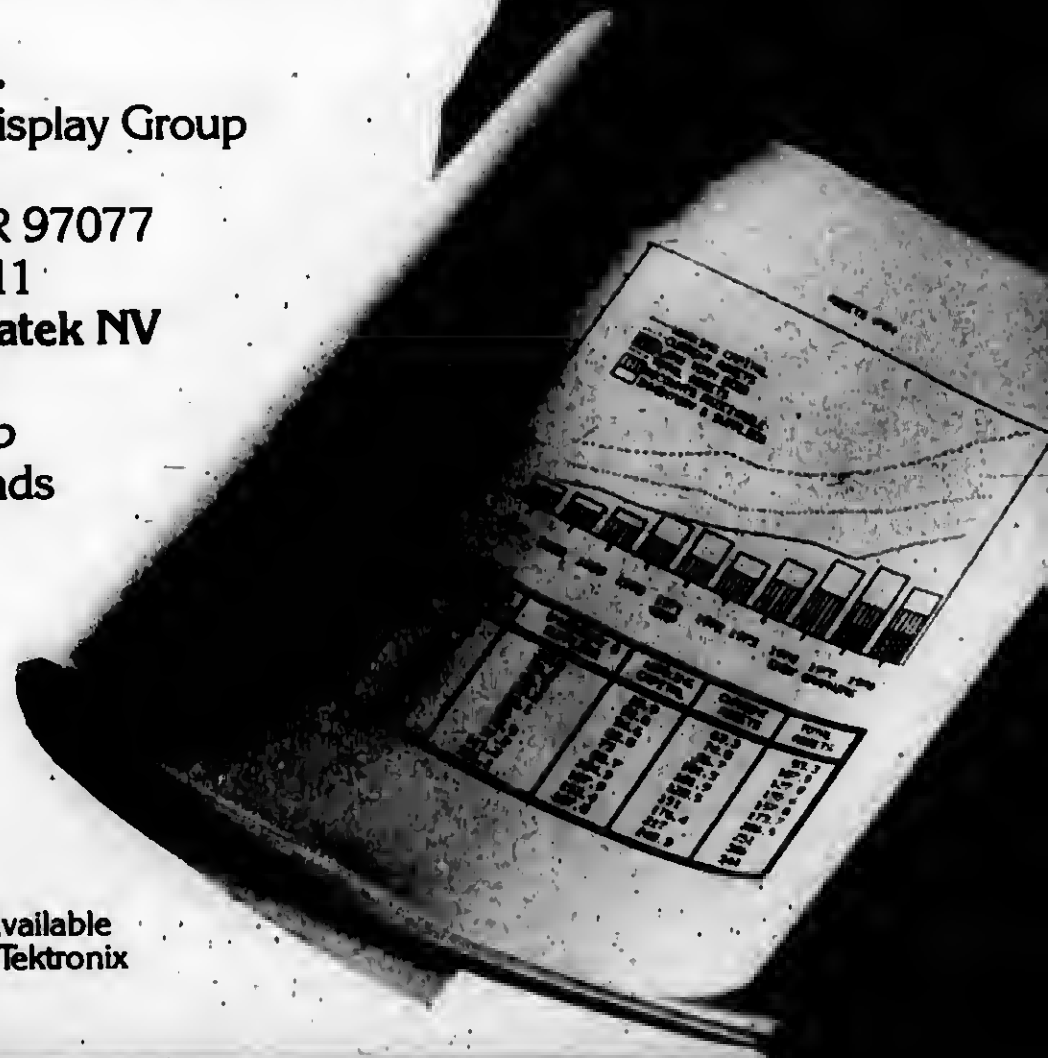
And when you're ready to add data analysis and report generation, just add our low-cost graphics option to the 4025. Almost anyone can sit down and create bar charts, pie charts and histograms, and command 8½"x11" facsimiles off our optional copier. Our PLOT 10 Easy Graphing host software is designed for the nonprogrammer. For minimal core consumption.

Best of all, the 4020 Series comes with Tektronix reliability and support. All the more reason why they're a great long-term growth investment. Ask your local Tektronix Sales Engineer for a demonstration. Or write:

Tektronix, Inc.
Information Display Group
P.O. Box 500
Beaverton, OR 97077
(503) 682-3411
Tektronix Datatek NV
P.O. Box 159,
Badhoevedorp
The Netherlands

See us at INTERFACE - BOOTH #644

OEM information available
Copyright © 1977; Tektronix
All rights reserved





Tektronix
ANALYTICAL ELECTRONICS

"I can give you ten reasons why our OMEGA 480 is the better business decision."



Donald E. Roepke, Control Data President,
Peripheral Systems Center, Data Corporation

First of all, there's the *price*. Our OMEGA 480-1 has greater *throughput* than a 370-138—yet it costs about the same. And our 480-11 exceeds 370-148 performance but costs substantially less!

And an OMEGA 480 system requires about one quarter the *power* and one half the floor space of the comparable 370.

Of course we designed it to be *field-upgradable*. That means you can start with the smaller OMEGA 480-1 now, and upgrade to the larger processor when your needs require the higher performance.

And there's software. OMEGA 480 supports, without modification, most IBM operating systems, program products and user programs.

Financing can be important, too. Several attractive options are available through our *Installment Sales Plan* or from a selection of 3- to 7-year *leases*.

But most importantly is the *service, experience and support* you want. You

get it from Control Data. Our support organizations have more than 8,000 dedicated hardware and software specialists—including many with years of IBM system experience.

That experience comes from servicing more than 1,400 current IBM users, and maintaining such Control Data plug-compatible peripherals as Disk, Tape, Memory, Printer and Mass Storage Systems.

Why not decide for yourself whether the OMEGA 480 is the better business decision for you. Call 612/853-7600. Or contact your local Control Data representative. Tell him Don Roepke sent you.

GD CONTROL DATA
CORPORATION

More than a computer company

By International Data Sciences

Desktop Switching Units Offered

PROVIDENCE, R.I. — International Data Sciences, Inc. has added three desktop switching devices for communications applications.

The Model 8574-D A,B,C,D,E,F CRT Selector Switch is an addition to the series 8500 EIA patch, monitor and switching modules. The Model 8574-D allows the user to switch any two-wire input to any one of six 2-wire outputs. All connections are made at the rear panel.

The desktop module allows the user to manually select any one of six CRT displays. The unit is suited for switching the IBM 3270 interface or any 2-wire telephone line, according to the vendor.

A six-position rotary switch on the front panel instantly switches any two-wire input from a rear panel BNC labeled "Common" to any one of six BNCs labeled A to F, a spokesman noted.

This module is available for desktop switching only, and no power is required, he added.

Backup Switch

The Model 8509-D Spare Modem Back-Up Switch was designed to switch the combined EIA RS-232 and telephone line interface of a faulty on-line modem to a backup system.

The Model 8509-D incorporates a "chaining" feature which allows a single spare modem to be switched in to replace any one of a group of on-line modems, according to the spokesman.

This capability can reduce downtime to almost zero by

eliminating the need to immediately replace a faulty modem.

The company also has the Model 8506-D A,B Selector Switch which is used to switch the 25-pin EIA RS-232 or CCITT V.24 interface to either of two outputs.

The unit can switch one modem to either of two front-end processor data channels or to either of two data terminals. The unit can also be used to

switch a data channel from its on-line modem to a back-up modem or for switching from a leased line modem to a dial-up modem.

The Model 8574-D costs \$175; the Model 8509-D is priced at \$250 and the Model 8506-D costs \$140. Delivery is 30 days except for the 8506-D, which is available immediately from International Data Sciences, 100 Nashua St., Providence, R.I. 02904.

CPU Terminal Compatible With 16-Bit Minicomputers

GAITHERSBURG, Md. — CPU, Inc. has introduced an intelligent terminal operating within the CPU Text Management System (TMS), a stand-alone and/or shared logic word processing system.

The Ph.D., is reportedly one of the first intelligent terminals to offer 16-bit processing power and architectural compatibility with large minicomputers. The system is based on the Digital Equipment Corp. PDP-11/03 processor with 4K (16-bit) words of random-access storage, a serial I/O interface, a CRT capable of displaying 24 lines of 80 characters, plus systems software. This minimum configuration sells for \$3,399.

The Ph.D. was designed as both a stand-alone system and a component in a distributed network. It uses the same 16-bit architecture as large minis and offers the same instruction set as the PDP-11/35 and 11/40.

It is program compatible

with the PDP-11 series, according to the vendor.

Standard software includes a selection of PDP-11 operating systems and languages.

Other software offerings include the SSP-11 scientific subroutine package RSX-11S operating system and TMS.

Communications options for Ph.D. features asynchronous, synchronous, Synchronous Data Link Control (SDLC) and programmable communications interfaces.

CPU is at Suite 130, 4 Professional Drive, Gaithersburg, Md. 20760.

Compact CRT Comes Same Size As 15-In. Monitor

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc. has introduced a compact teletypewriter-compatible CRT terminal, the Model 400E.

The 400E was described as the size of a standard 15-in. monitor. The terminal utilizes a low number of components so that display and monitor electronics, plus power supply, have been mounted directly on the monitor chassis, the firm said.

The unit is standard with a 2,000-character memory. The display format is 24 lines by 80 characters, with an additional line of memory that can be accessed in either Roll or Scroll modes.

Three character accents — blink, dim and reverse video — are standard, as well as RS-232 data interface and RS-170 video output for driving auxiliary monitors.

The Model 400E includes a 72-key detachable keyboard which generates the full 128-character Ascii set. The keyboard is standard with a separate numeric pad and individual cursor control keys.

All command and control functions can be executed from the keyboard.

Prices begin at \$1,200. Ann Arbor Terminals is at 6107 Jackson Road, Ann Arbor, Mich. 48103.

Intertec Teleprinter Features Micro Control

CHARLOTTE, N.C. — A 120 char./sec teleprinter from Intertec Data Systems Corp. makes use of microprocessor control and reportedly includes such features as an RS-232C interface, current-loop interface, an IBM Selectric-configured keyboard with a numeric keypad, 132-column width printing, horizontal and vertical tabs and a keyboard lock out feature.

Field-upgradable options for the Superterm include 180 char./sec printing and a microcassette for off-line data collection.

A variety of print and character control features provide the user with the opportunity to configure a Superterm in many ways, Intertec said. The basic terminal prints at speeds up to 60 char./sec with a 120 char./sec option available.

Printing is performed by Intertec's impact matrix print-head, which is guaranteed for a period of one year.

Options include an APL character set and 32 programmable characters which can be designed by the user. The terminal has full forms control capability, according to a spokesman.

The Superterm costs \$1,995 from Intertec at 1851 J-85 South, Charlotte, N.C. 28208.

LOCATE MINICOMPUTER SOFTWARE

EVALUATE — NOW TWO VOLUMES —

MINICOMPUTER SOFTWARE QUARTERLY

WITH
• Over 500 detailed program descriptions
• Indexed by: Application —
Hardware — Language

Subscription Includes:
Base Volume Set + 4 up-dates
\$85. US/Can. + 5% Tax in Mass.
\$110. Foreign (prepaid only)



INTERNATIONAL MANAGEMENT SERVICES, INC.
215 Oak Street, Dept. C, Natick, Mass. 01760

For Sale

\$299.00 each

(in quantity)

Numeric Data Entry Batch Communication Terminals

Over 300 available (used)

Call Toll Free 800-323-2288

in Illinois 312-279-1960



Upgrade to IBM 6250 BPI tape drives now!

SAVE IBM RENT — ELIMINATE DOWN-TIME

caused by field conversions on

We will purchase your IBM 800 1600 BPI drives now & install 3120 1 1/2 1/2 drives immediately from inventory

Call Nick Dibari
312-698-3000

or your nearest Comdisco office

COMDISCO

PROFESSIONALS WANTED

Our rapid success in implementing Data Terminal Management Programs at Fortune 500 companies necessitates additional personnel in our Boston, New York/New Jersey, Philadelphia and Washington offices.

Eighty percent of our business is generated from our existing customer base and we need Area Managers, Account Managers, Sales Persons and Electronic Technicians. Qualified Computer Professionals are invited to join in our success — We double revenues every other year, and earn 10%+ profits. Contact Eric S. Taylor, Personnel Manager.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300

AN EQUAL OPPORTUNITY EMPLOYER M/F

ECONOMY and POWER

IN STOCK!

Teletype® Model 43



- Display 24 lines, 1920 Characters
- Addressable Cursor
- Keyboard may be cleared remotely
- Ma Bell Compatible



- 110-300 Baud, 132 Characters
- Upper-Lower Case
- RS232 Compatible 20ma option
- 9 x 6 Dot Matrix
- Height 5 1/2", Width 18", Depth 21 1/2". Weight 30 lb.

ADM-3A

Multiterm® Teletype® Data General® Lear Siegler® Data Media®

Sales - Service - Rentals



TERMINAL SYSTEMS INC.

213-769-6772 415-573-7723

For All your Mini Computer and Tele-Communication Needs

For Free Catalog of Products 800-672-3440

Introducing the Honest Mistake



PANSOPHIC

PANSOPHIC
709 Enterprise Drive, Oak Brook, IL 60521
YES. I'd like to have my Honest Mistake Protection Kit.
NAME _____
TITLE _____
COMPANY _____
CITY _____ STATE _____ ZIP _____
PHONE _____
HARDWARE _____
OPERATING SYSTEM _____



Remex Punched Tape Systems Offer Serial Link

IRVINE, Calif. — A series of desktop punched tape systems for data communications and microprocessor applications has been announced by the Remex Division of Ex-Cell-Q Corp.

Called the Remex 8050 series, the systems were designed to meet Underwriter's Laboratories requirements. They feature push-button controls for automatic tape feeder preparation with feed holes or all holes punched and tape duplication, the firm said.

The perforator motor is idle during nonpunching time to provide silent stand-by operation, a spokesman added.

Remex 8050 systems are available in reader/perforator or perforator-only configurations. Both styles are also available with a built-in RS-232C

serial interface for compatibility with "most terminals, modems, printers and other communications peripherals," the company said.

The perforator mechanism operates at 50 char./sec, and the circuitry includes a 128-byte buffer to allow true asynchronous operation in a parallel mode or burst operation up to 1,200 bit/sec in the serial mode, the spokesman said.

The reader mechanism can process standard 5-, 7- and 8-channel tape and 6- and 8-channel typesetter tape in both directions at a rate of 300 char./sec or up to 2,400 bit/sec with the serial interface, he noted.

The RS-232C interface adds two serial ports, allowing the unit to be connected to both a modem (or com-

puter) and another peripheral device, such as a CRT terminal or printer. A 20mA current-loop interface is also accessible.

Interface send and receive rates are independently selected by two movable jumper plugs. Send rates can range from 110- to 9,600 bit/sec. Receive rates can be set at 110- or 1,200 bit/sec, the firm said.

Other interface functions can be remotely controlled by standard Ascii control characters, the firm said.

Prices for Remex 8050 systems start at \$1,900 for a perforator-only unit without the Remex RS-232C interface. Remex is at 1733 E. Alton St., P.O. Box C19533, Irvine, Calif. 92713.

Prices for Remex 8050 systems start at \$1,900 for a perforator-only unit without the Remex RS-232C interface. Remex is at 1733 E. Alton St., P.O. Box C19533, Irvine, Calif. 92713.

Transactor Has Gas Display

GRANDVIEW, Mo. — Computerwise, Inc. has added a series of small alphanumeric data terminals called the Transactor III. The terminals utilize a microprocessor.

Available features include synchronous or asynchronous line support for

both dedicated or polled multidrop environments, the firm said.

The Transactor III includes a single-line 32-character gas discharge display and a 53-key, teletypewriter-style keyboard. It can be directly attached to "any" computer with an RS-232 or 20mA current loop interface or to a communications line through a modem, a spokesman said.

Switches allow the user to select the operating mode, including 110- to 9,600 bit/sec transmission speeds, full or half duplex, even/odd/no parity and the station address, the company said.

The standard unit supports Ascii-coded data, with Ebcidic-coded data available as an option. Other options include an expanded 256-byte data buffer to allow up to eight lines of data to be accessed off-line.

An addressable RS-232 port can be provided to allow devices such as printers, badge readers, optical character recognition or bar code wands to be attached.

The terminal can be provided with any line protocol for direct replacement of IBM 2260, 3275 or other types of terminals, the spokesman said.

The standard terminal is available for \$995 from Computerwise at 4006 E. 137th Terrace, Grandview, Mo. 64030.

ATTN: 3270 USERS

Here's a *tailor-made* system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. Systems Programmers, in particular, find the following features very valuable.

Both Local and Remote 3270 are available, of course,

PLUS

Local Job Entry. Line printers up to 1200 LPM with 1403 addresses and card readers with 2501 addresses can be placed next to any BRAEGEN CRT. These "hot" printers and readers are located in the users' areas up to 7,500 feet outside the computer room. Most popular uses are for programmer listings and accounting work. Users get the benefits of increased productivity because turn-around time is reduced to minutes.

PLUS

Address Switching. Any BRAEGEN CRT terminal provides as many addresses as required for Console, TSO, Applications, etc. Any CRT can have both Local and Remote addresses. This feature can reduce the number of CRT's required and will eliminate NCP,

VTAM type software overhead requirements.

PLUS

Multiple Controller Interfaces. The BRAEGEN controller allows multiple channel and remote interfaces. Any CRT can access multiple local IBM CPU's or remote CPU's. Just 2-3 seconds to switch a CRT between CPU's or addresses.

PLUS

Fast Cursor, Programmable Keyboard, 7500' Coax,

Multiple Drops per Coax, Wide range of speeds in 3286/3288 compatible printers; from 45 cps to 1200 LPM, Offline Data-Entry, and our Offline TSO Editor.

PLUS

Features others have promised for 1978-1979 are AVAILABLE NOW . . . Local Copy, 128 character set CRT, Typamatic keys, Home key, etc.

PLUS

Low Prices — 1, 2, 3 year leases available.



Customers throughout the U.S. are benefiting from these features now. For more information please write or call; The BRAEGEN Corporation, 20740 Valley Green Drive, Cupertino, California 95014. (408) 255-4200.



BRAEGEN

Device Doubles Decwriter Speed

SKOKIE, Ill. — A device said to double the speed of the Digital Equipment Corp. Decwriter II has been introduced by Larks Electronics and Data.

The Larks Accelewriter reportedly allows any LA36 Decwriter to operate at 600 bit/sec. The adapter converts the standard 110/150/300 bit/sec Decwriter to 110/300/600 bit/sec.

The Accelewriter changes the internal timing of the Decwriter and causes it to print at 60 char./sec, a spokesman said.

Installation typically takes less than one hour and requires the removal of two integrated circuits from the logic board of the Decwriter, he said. These are replaced with low-profile IC sockets.

The device is then installed in the board in place of the two original ICs, and the logic board is reinstalled in the Decwriter, he explained.

The Decwriter can be reconverted to its original configuration by unplugging the adapter and installing ICs of the original types in the sockets, the spokesman noted.

The Accelewriter costs \$95. Installation is available in selected areas, Larks said.

The company can be reached through P.O. Box 22, Skokie, Ill. 60077.

To Real-Time Order System

Forms Analysis Integral to Conversion

By Robert H. Blackwood
And Elizabeth Welch

Special to CW

PALM BAY, Fla. — Making the changeover from a manual order entry-shipping-invoicing system to a real-time computer system requires a lot of detailed, specialized paper systems work. When Harris Corp. decided to take this major step, we called on a forms manufacturer to work with our own specialists in formulating our documentation needs.

Our rapidly expanding business had simply overwhelmed our former manual order entry and shipping system. Incoming orders were manually edited or such things as customer address confirmation and credit check. Then, a spirit process duplication master was typed. From that master, as many as 18 sales order copies were run, depending upon the type of order and destination. These provided copies for various scheduling, order status and line functions in the plant.

At the time of shipment, plant clearance personnel used the order information to initiate shipping documents. This necessitated preparation of another spirit process master and printing of a second form set. To prepare invoice papers, the original master was used to run off invoice form sets.

There were variations of this same procedure to fit unique order, production and shipping needs. Consequences of this system were duplication of data recording, error potential and paperwork bottlenecks which adversely affected production

scheduling, order tracking, customer service response and many other vital functions.

In addition, the procedures created a wide margin for making errors in calculating

price extensions and back order quantities. The extent of clerical effort needed to support this type of system made it difficult to handle increasing business volume without adding staff.

Obvious Solution

The obvious answer for us was to create an automated data base, with the ability to operate in a real-time mode from order entry through final shipment and invoicing. A study had indicated that this approach would be both cost-effective and timely. The result was an intelligent terminal system with on-line printers, keyboard input and CRT display units, through which information could be transmitted and retrieved from the system's data base.

To assist in the preparation of system documentation, we called on specialists from Standard Register Co. to conduct a review of the new system's requirements, to study the old methods and documents and to develop the best forms and designs for the new system. They worked closely with Harris personnel in accomplishing these objectives.

A series of four multicopy continuous forms was designed: a six-part sales order/acknowledgement, a three-part plant clearance authorization, a six-part packing list and a six-part invoice. The basic format and layout of each form is standard, with slight design variations to fit unique functional requirements.

Immediately beneath the heading area of each form is a section in which data base in-



Multipart forms play an important part in Harris' changeover from a manual order entry-shipping-invoicing system to a real-time system.

System Aids Money Order Reconciliation

Special to CW

DENVER — The American Express Co. is using a multimedia data entry system at its accounting center here for the reconciliation of the firm's money orders. The operation is currently processing in excess of 60,000 documents monthly, a figure that continues to grow.

"Our worldwide sources and the success of our marketing program have increased the demands on our accounting center," Gary L. Davis said.

Davis is director of document processing for American Express Money Order Operations. "The data capture section currently

has a staff of 27 operating on two shifts, and we expect to expand our capability within the next year.

"Our present system became operational in July 1976, but our processing requirements have more than doubled since that time, forcing us to look at expansion in the near term," Davis said.

Old Key-to-Tape System

Prior to July 1976, American Express reconciled money orders on a key-to-tape system. "We found that our increasing volume simply exceeded the limits of the system in use at the time," Davis said. "We needed an

economical scanning capability with the potential to meet our growing processing needs."

Davis and Pansy Willings, manager of data capture, reviewed available alternatives and narrowed their selection to four systems. "The decision to utilize the Cummins-Allison Corp. Series 4400 Keyscan multimedia system was based on best value. No other system offered the features of the Cummins package within its price range," Davis said.

The Cummins-Allison 4400 includes a 128K processor; 9.8M-byte disk drive;

(Continued on Page 76)

SYSTEMS & PERIPHERALS

You Get the Best Compact Terminals from CDI Because That's All We Make.

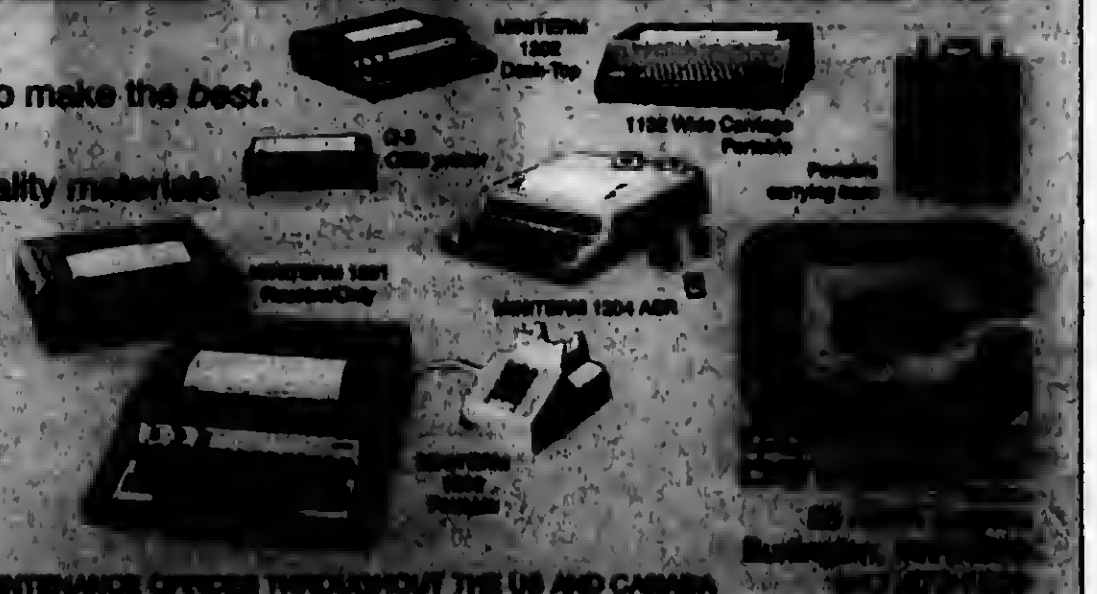
When it comes to compact printing terminals, we only know how to make the best. The MINITERM family!

We put extra design and engineering effort, plus the highest quality materials into our products so you get the most out of them.

You get more features and more value in every CDI model. It all starts with the 8-3 Thermal printer for CDSs, known for its reliability, followed by the 1102 Wide Carriage Portable printer. And introducing the 1204 ABR, with its unique design, and the 1204 ABR, with its unique design, and the 1204 ABR, with its unique design.

Get them all — or just one — from CDI. Call or write today for the CDI office nearest you.

SALES AND MAINTENANCE OFFICES THROUGHOUT THE US AND CANADA



System Helps Firm Handle Money Orders

(Continued from Page 75)

9-channel, 1,600 bit/in. tape drive; 16 CRT/keystations; 13-pocket reader-sorter with magnetic ink character recognition (Micr) read systems and optical character recognition (OCR) read systems.

According to Davis, the decision has proved beneficial since the firm is able to meet its volume processing requirements with a rejection rate of less than 1%. "However, our growth has far exceeded our expectation and we are fast approaching the limits of our present Cummins system. We plan to upgrade to a faster, more powerful Series 5400 Keyscan system within the immediate future," he added.

Retail and financial institutional money orders are processed separately by the data capture section. Following preparation, money orders are scanned on the Cummins system to capture Micr-encoded serial numbers. Key operators then retrieve data records from the disk and insert the proper dollar amount.

After each batch has been completed, data is transferred from disk to magnetic tape. The data is input to an IBM 370/145 and edited against a master file. An edit listing is generated and sent to a balancing section. Balancing/edit errors are researched, corrections are key entered and the correction data is merged into the input files.

The OCR read system is used to scan "trust receipts." These documents are used to control the distribution of money orders to the issuing institutions.

Keystation Functions

Fourteen of the 16 CRT/keystations are used solely for keying data, one is used for utility/supervisory functions, and one is used as a scanner control console.

"During the transitional period from our old key-to-tape system to the Keyscan System, we experienced typical startup problems, but the

system is running very well for us now," Davis said.

Key entry operators had no problems with the transition to the Cummins system, according to Willing.

Although the current Series 4400 is approaching capacity, Davis is confident the more powerful 5400 Keyscan system will meet the projected needs of American Express.



American Express has an extensive data capture section.

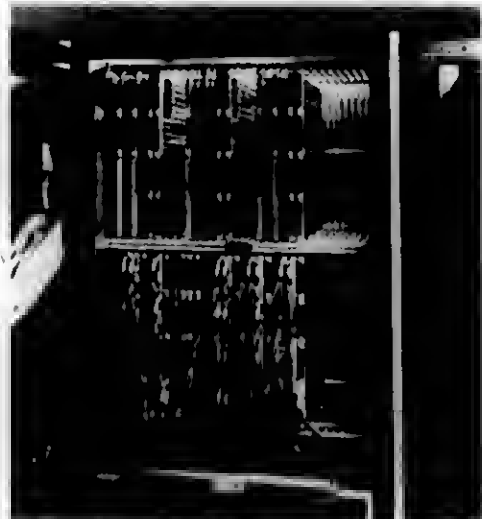
There's only one thing non-It's non-stop.

Where others fail. It's simple. You must have a non-stop system to have non-stop COBOL. And only Tandem has it. A unique multiple processor on-line system which ensures protection of the data base, and that no transactions are lost or duplicated, even if a processor, I/O channel, disk controller or disk should fail. Best of all, the system keeps running.

Multiple Processor COBOL Easy.

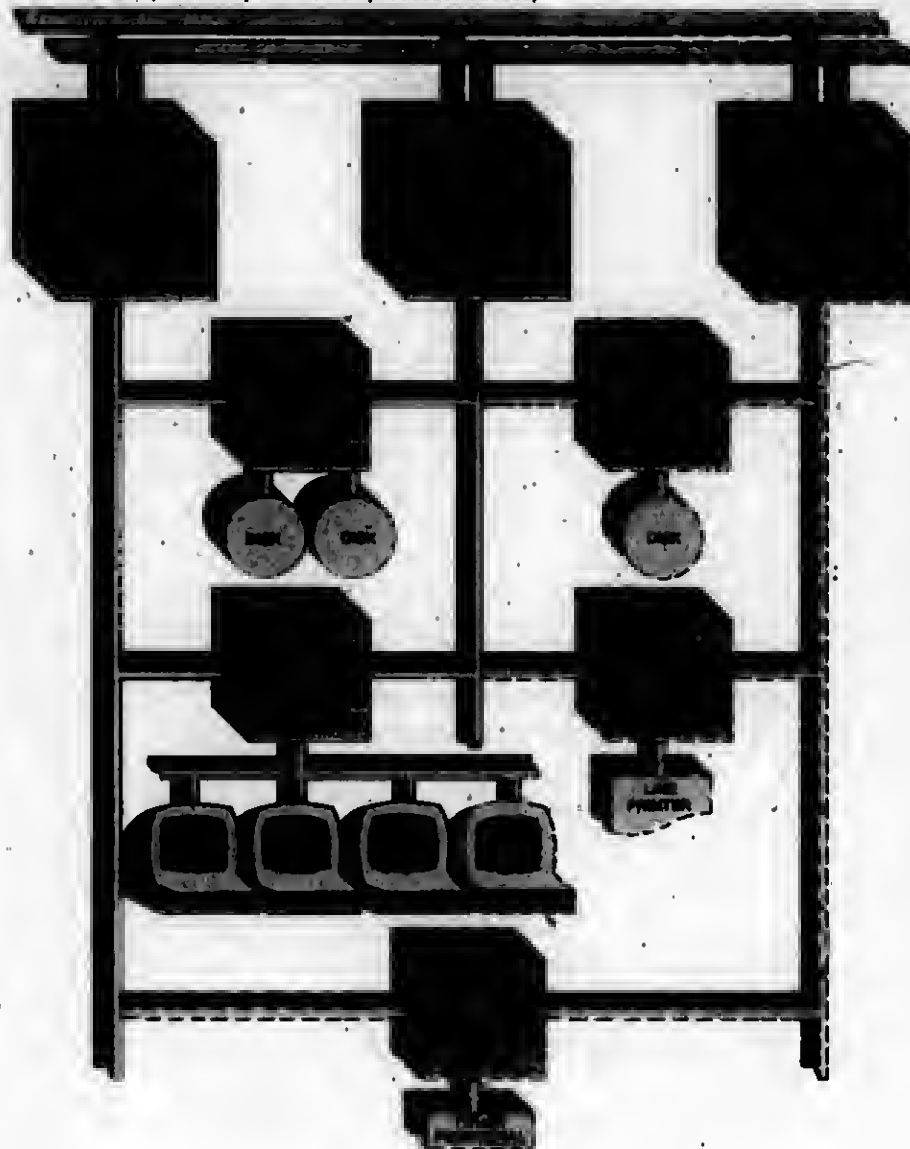
Bearding the Lion. You'd think that programming for a multiple processor on-line system would put you in a jungle, but Tandem COBOL purrs. Completely standard.

Because Tandem COBOL runs under our Guardian Multiple Processor Operating System, no custom system software is required. No special development tools are required. None. Our COBOL program development is standard. Our run-time software is standard. Everything you've always liked about COBOL, easy to use and trouble-free. And COBOL programs can run concurrent with other languages.



Four BILLION bytes per file. With no limit on the total data base size. Key sequenced, entry sequenced or relative file structures. With up to 255 alternate keys per file. And optional mirror copy by disk volume. It's incredible storage and tremendous flexibility in a mini-based system. And of course, it's non-stop.

DYNABUS™ (Dual Independent Interprocessor Busses)



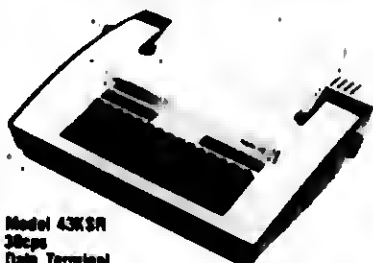
The Tandem NonStop System is composed of up to 16 multiple, independent processors with dual communications paths between all system modules. The result is not only continuous operation, but throughput unmatched by any other system of comparable cost.

Sharing a common data base. Three new verbs, LOCKFILE, UNLOCKFILE, and UNLOCKRECORD have been introduced to the Tandem COBOL I/O facility to permit the use of corresponding system file and record locking routines, and allow separate processes to share a common data base. READ and REWRITE verbs have been extended to allow specification of LOCK or UNLOCK operation. OPEN syntax has been

extended to specify the file access, EXCLUSIVE, SHARED, or PROTECTED, and to permit the SYNC-DEPTH for files opened in the OUTPUT, I/O or EXTEND mode.

With STARTBACKUP and CHECKPOINT. These are logical extensions of Tandem COBOL which implement the NonStop™ features of Guardian Multiple Processor Operating System. STARTBACKUP is called once at the

TELETYPES®



Model 43KBR
30cps
Data Terminal

**New and Reconditioned
Models 28 • 32 • 33 • 35
40 • 43**

FEDERAL Communications Corporation

11105 Shady Trail #107
Dallas, Texas 75229 U.S.A.
(214) 620-0644 TELEX 732211

Off-Line Printing Nets State \$90,000 Savings

Special to CW
MIDDLETOWN, Pa. — A conversion from standard on-line printers to off-line non-impact units at the Central Management Information Center (CMIC) here should save taxpayers \$90,000 the first year, according to Pennsylvania secretary of administration James N. Wade.

The information center is part of the Commonwealth of Pennsylvania Governor's Of-

fice of Administration. It handles DP for 37 departments and agencies, including accounting and budgeting systems, personnel management, payroll and retirement/annuity plans.

In addition, the center provides contract services to commonwealth agencies.

The decision to change printing equipment was the result of a study conducted by Kenneth H. Kase, CMIC

director, and Frederick A. Wieseman III, assistant director of the operations division.

"We handled about 30 million sets of forms a year, a lot of it multipage work. The big computer printouts were cumbersome to work with and users often had difficulty reading the fourth or fifth copy of a carbon set," Kase said.

"We were getting a lot of repeat orders. When we asked

why the first report wasn't kept, we were told that there was no place to store it," he added.

Two Systems

For reasons like these, the study indicated a switch to other methods and CMIC installed a Xerox Corp. 1200 printing system in January 1977. A second unit was added in July. The 1200 prints on plain 8-1/2 by 11-in. paper at

the rate of 1 page/sec.

Now, CMIC reported, output is produced faster, more clearly and at one-half the cost. Also, Kase said, "the removal of high-speed printing from the computer room allows computer operators to dedicate themselves to their primary function. Throughput has improved. We're getting more jobs in because the operator isn't worried about the peripheral work."

There are by-product advantages in using ordinary paper instead of a variety of pre-printed computer forms.

"In state government, there's red tape involved in purchasing supplies," Wade explained. "You need a purchase requisition for almost everything, and when you're using different size and weight papers, it can be a real headache."

"With the 1200 system, we can submit a single purchase order for almost a year's supply of paper. Buying less frequently, we can order direct mill shipments at a reduced price. And we have considerably reduced the amount of storage space we need," he added.

Less Demanding

The switch to off-line printing has also reduced demands on CMIC's Univac 1110 computer system giving it more time to process other applications.

"Calculations show we save three hours of overhead time every 24 hours with the off-line system," Wade said.

At CMIC, the first six working days of the month are the busiest. During this period, the second 1200 is necessary to meet deadlines.

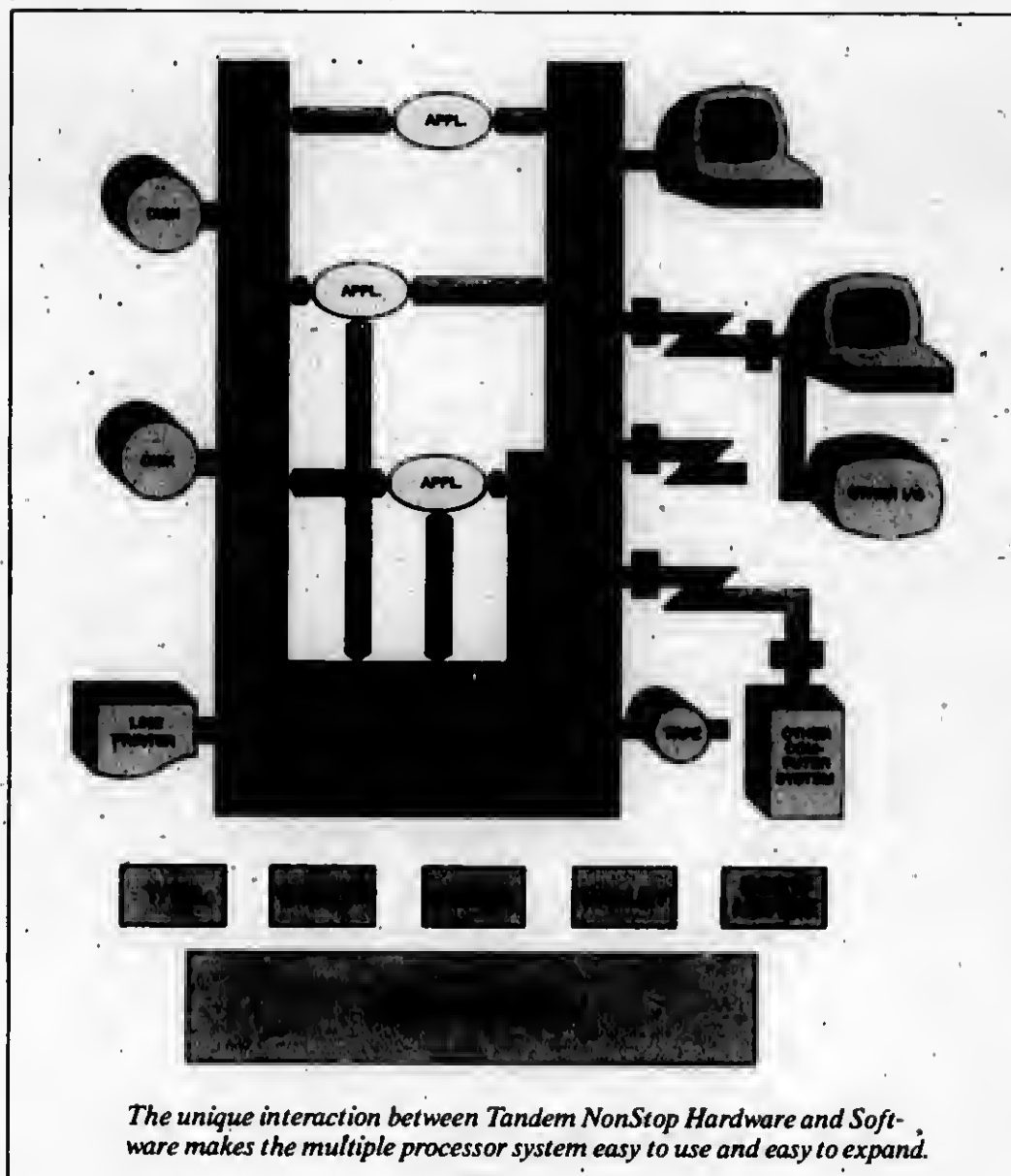
"We have due-in and due-out dates for everything we handle," Wieseman said. "That's why our host computer is redundant, across the board. If a path goes down, we have another to bring up."

"We need the same backup for off-line printing. The second Xerox 1200 system enables us to add more volume for the other 16 working days and still meet due-out dates. One operator can easily operate both systems at the same time."

"The center operates on a 100% charge-back system," Kase said. "We budget what we think our costs will be for the year and then collect that much revenue from services rendered. We are very cost-conscious about performance and the use of resources."

"We are running 30,000 jobs a month now," he added. "A year ago it was closer to 20,000. The fact that we have increased productivity and lowered costs to the end user is significant."

standard about our COBOL.



beginning of the program to set the NonStop mode. From then on, CHECKPOINT controls passing information to the backup process at critical points. CHECKPOINTS occur automatically at any OPEN or CLOSE after the backup is established. These two simple instructions eliminate the downtime, restart, and revalidation which plague any user without the Tandem NonStop capability.

ANSI X3.23 '74 to Level 2 in Nucleus, Table Handling, Sequential I/O, Indexed I/O, and Sort-Merge right now. With Communications to Level 2 this Spring. Completely standard with CVSS and that means portability.

Compiles more than 1,000 statements per minute. And that's only average. In some benchmarks, we've topped 1,250 statements per minute. It's big system COBOL at mini-based prices. And non-stop, too. Not even the largest computers can match that.

It's working now. There are more than fifty Tandem NonStop Systems installed in a variety of applications. In banking, distribution, department stores, utilities, legal firms, hospitals, universities, steel mills, even a municipal network emergency system. Wherever downtime or a system failure means a potentially unrecoverable loss.

There's only one NonStop System on the market today. It's expandable without penalty. Without reprogramming. Without one cent of loss on the original investment. And it's easy to use as COBOL. Good old standard COBOL without the operational difficulties or special expense you'd expect in an on-line multiple processor system which won't quit.

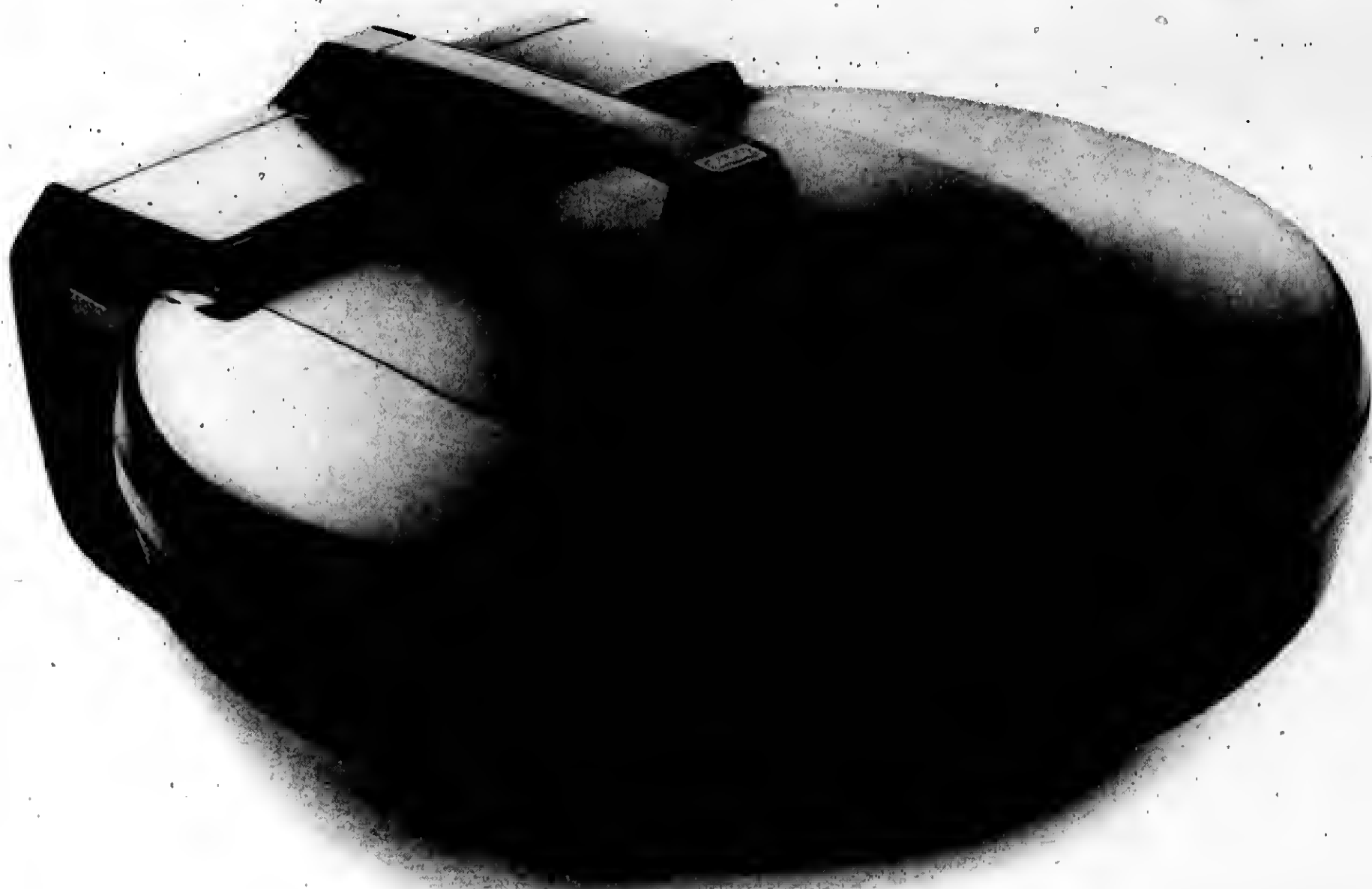
For further information, contact Tandem Computers, Inc., 19333 Valco Parkway, Cupertino, California 95014 or Tandem Computers GmbH, Bernerstrasse 50, Frankfurt 56, West Germany.

TOLL FREE 800-538-9360 or (408) 996-6000 in California.

TANDEM



Compare...
BASF offers you
a 30% saving,
lifetime guarantee,
free field service,
and immediate delivery.



The first name you think of in computers may not be the best choice in data modules. While still completely compatible with existing 3340 drives, BASF data modules cost far less than the drive manufacturer's modules, are guaranteed for as long as you use them, offer free field service, and are available for immediate delivery nationwide.

Before you write your next order for data modules, find out why BASF has more to offer.

Call our nearest regional office: in Bedford, (617) 271-4007; in Los Angeles, (213) 451-8781; in Chicago, (312) 343-6618; in Clifton, N.J., (201) 546-9111; in Dallas, (214) 233-6607; in Toronto, (416) 675-3611; and in Montreal (514) 341-5411.

 **BASF** The Original.

Computer Tape Disk Packs Diskettes Cassettes Mag Cards

Analysis Aids Conversion To Real-Time Order System

(Continued from Page 75)

formation relative to order identification, shipping instructions and customer number is shown. On shipping documents, the first line of this section carries shipper identification, weight and waybill number. On the sales order/acknowledgment copy, that section is used for a preprinted message of acknowledgement to the customer.

The body of each form, used for the display of line items ordered, is uncommon in that it separates each line item entry into two horizontal bars of equal depth, one screened in the form's ink color and the other in white. The column headings are similarly treated and indicate the type of information contained in each bar.

In the main descriptive column, for example, the screened bar carries the customer part number and revised quote number, while the white segment carries the Harris part number and the specification number. Subsequent columns contain delivery requested, delivery scheduled, quantity ordered, unit price and extension.

Real-Time Forms Preparation

With the exception of the invoice, which is processed in batch mode on a high-speed printer, all the forms are prepared real-time on terminal printers in the customer services (order entry), finished goods (production control) and shipping areas.

Customer orders are normally received in plant by TWX, occasionally by mail. An order-entry clerk enters the necessary information from this order to the computer data base via keyboard input. This includes a new order number for the customer, the customer account number, shipping location and coded shipping instructions.

The system returns verification information, identifying the customer by name, checking on shipping data, credit status and other pertinent information. The order entry clerk then enters the line items detailing product quantities and requested shipping dates. From this point, the computer system tracks the order status to completion.

An "action report" is provided to Production Control, listing new orders to be scheduled. The scheduled ship dates are entered via keyboard on-line to the data base and when the computer system recognizes that all items on an order have been scheduled, it triggers printing of the sales order form on the customer services (order entry) terminal printer. Under normal circumstances, the time from original order entry through order confirmation and generation of customer acknowledgement is no more than 24 hours.

Clearance Form Produced

Daily and prior to scheduled shipping dates, shipments are initiated in the finished goods department when a plant clearance form set is produced by the computer system. In that transactions, inventories, order status, backlog and current credit status are confirmed by the computer system. The finished goods area pulls the product from inventory for shipment and en-

ters this transaction into the system.

The three-part plant clearance form moves with the product to the quality assurance section for appropriate inspections. System inputs are made to indicate tests made and passed and the form set is separated for copy distribution. The original, "traveler," moves with the order to the shipping department. A second copy is for production control's scheduling section and the third copy is retained in the quality assurance area.

It took us about one year to move from conception to implementation. Coordination and detailing of forms design and development spanned approximately six months.



Using the on-line system, operators can now enter order scheduling information on CRTs.

A THIRD "OPEN LETTER" TO THE

UNDER-EMPLOYED

COMPUTER INDUSTRY PROFESSIONALS....

Executive and Professional **SEARCH FIRMS** should play a major role in your search for the **BEST JOBS**. It is important that you understand the Search Firms and use them effectively in your campaign.

ABOUT SEARCH FIRMS...

There are over 1,100 Search Firms listed by Consultants Newsletter in its "Directory of Executive Recruiters." Known by various names (many disrespectful), these Personnel Consultants, Headhunters, Executive Recruiters, Flesh Peddlers are extremely important to you as an **UNDER-EMPLOYED** Computer Industry Professional or Executive. Disrespectful names notwithstanding, these Search Professionals do an outstanding job for Management and can do an outstanding job for you.

HOW THEY OPERATE...

Search Professionals are paid by their client companies to identify, screen, and recruit candidates for their **BEST JOBS**. They are never paid by the individual seeking employment alternatives.

Search Professionals maintain high level contacts within the Computer Industry and are often the first to learn of the availability (or future availability) of the **BEST JOBS**. Their business is built upon their ability to identify and screen a high quality list of prospective candidates for their client companies.

It would, therefore, seem logical that you should submit your resume to the 1,100 Search Firms, or at least to some subset. **WRONG.**

Search Professionals receive literally hundreds of unsolicited resumes each week. While your resume might be read, might be acknowledged, might be filed, it is highly unlikely that a given Search Professional will be searching for a person with your background at precisely that moment. It is

equally unlikely that your resume will be filed in a manner that it is retrievable at some future time.

Search Professionals rely heavily on "industry sources"—contacts within the industry—to identify prospective candidates for an on-going search. Files of resumes rapidly become un-manageable. Names (and talents) are rapidly forgotten. Search Professionals want your resume **ONLY** at the time they are looking for a person with your background, talents, and interests.

PROFESSIONAL REFERRAL SERVICE has been established as a master source of Computer Industry talent for the nation's Search Firms. PRS does not charge Search Firms for this service, thus assuring maximum activity for **OUR CLIENTS**.

PRS serves you by making your resume (and supplemental information you provide) available to Search Firms at the time they want it. The benefits you enjoy include:

THE BEST JOBS—Only those worthy of Search Firm involvement are represented.

PROFESSIONAL—You are sought, not a job hunter and.

PERSONAL—Individuals and opportunities are matched by industry professionals, not by computers.

PRS is not an employment agency or a Search Firm. Our service is that of improving communications between **YOU** and the nation's **SEARCH FIRMS**. Our service is available on a "subscription basis" to Computer Industry Professionals with 5 or more years of experience, earning at least \$20,000 per year. Please, send for complete information concerning our plan. Subscriptions cost \$45 per quarter; \$75 per half-year.

PRS

PROFESSIONAL REFERRAL SERVICE, INC.

Please send me information about the PRS Plan.

Name: _____

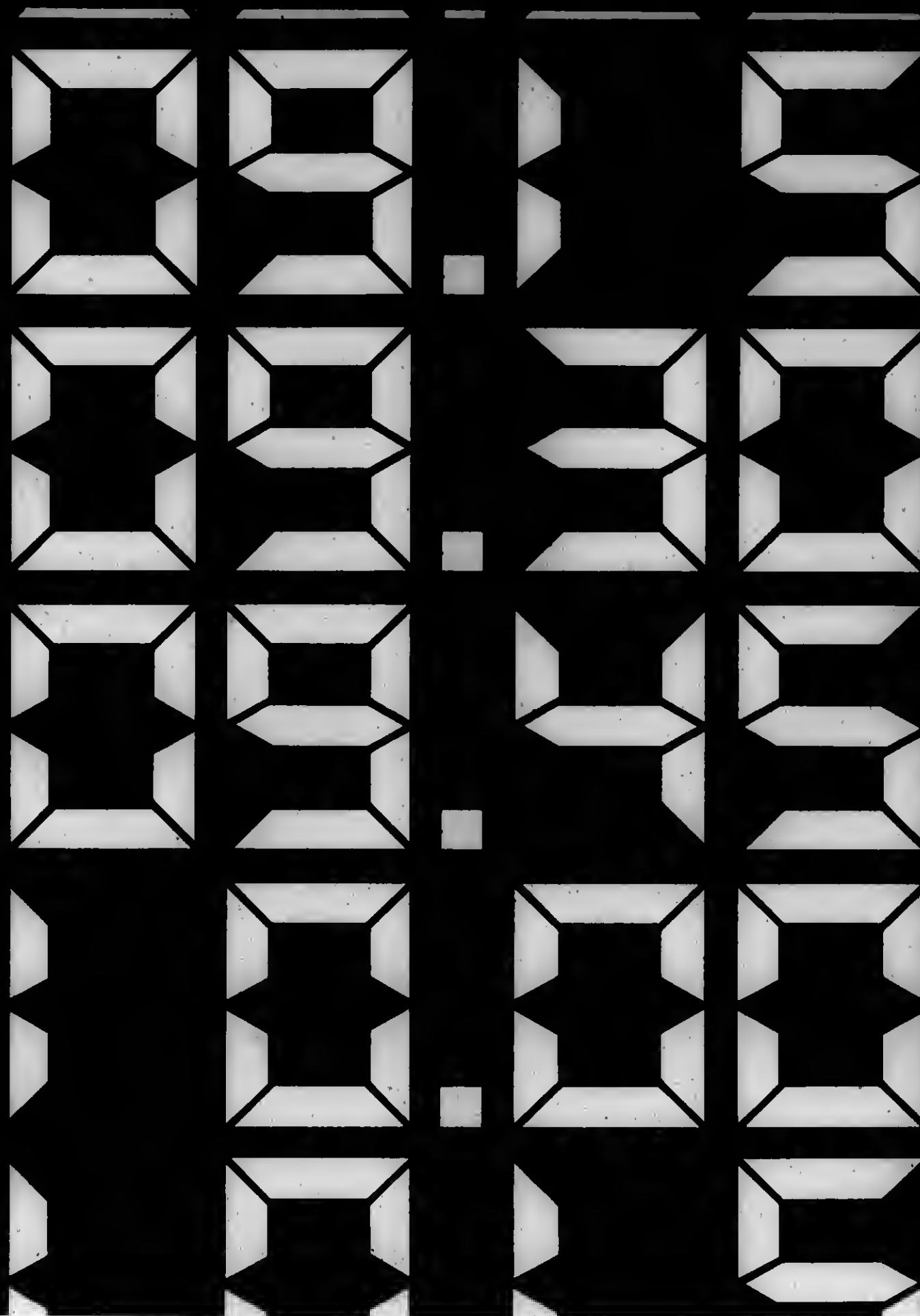
Address: _____

City: _____

State: _____ Zip: _____

672 Silver Spur Road, Rolling Hills Estates, CA 90274

CW/3



EVERY 15 MINUTES A COMPANY LIKE YOURS ORDERS ANOTHER TERMINAL FROM DDI.

Isn't it time you found out how much we can increase your purchasing power?

As America's leading terminal supplier, we are able to serve you in a way no manufacturer—or any other distributor—can match. Through our financial strength and mass purchasing power, we provide unbeatable prices for both large and small users...with Rent/Lease/Buy Plans, Volume Discounts, and a unique DDI Combination Savings Plan.

We offer you quality and freedom of selection—a single, dependable source of

supply for DEC, TI, ADDS, DIABLO, OMNITEC and TECHTRAN. All backed by nationwide maintenance service.

You are assured fast delivery by our large warehouse inventories. And our nationwide branch network provides trained professionals to respond quickly, whatever your need.

FREE TERMINAL SURVEY

Challenge us. Let us do a terminal survey for you. No obligation. Just call your nearest DDI branch office. Or contact our home office: Data Dimensions, Inc., 51 Weaver St., Greenwich, CT. 06830 TEL: (203) 661-1700.



America's leading terminal supplier.

BRANCH OFFICES: New York City (212) 687-2030 • Morris Plains, N.J. (201) 267-2311 • Philadelphia (609) 662-2833 • Washington, D.C. (202) 686-5150 • Detroit (313) 358-2600 • Chicago (312) 858-3770 • Atlanta (404) 433-2023 • Dallas (214) 387-2222 • Houston (713) 961-4711 • Los Angeles (213) 990-9200 • San Francisco (415) 349-7262

Plotter-Produced Maps Aid Police by Pinpointing Crime

By Tim Scannell
CW Staff

KANSAS CITY, Kan. — Police here have replaced pushpins with computer-generated maps in their efforts to spot potentially troublesome areas and keep abreast of criminal trends.

The maps, produced by a plotter that is driven by a medium-scale system, show the exact location of every crime and automobile accident in the city. Police commanders use the drawings to look for crime patterns and draw up manpower and patrol schedules.

Under the previous "pin-mat" system, "everybody got different colored pins that were stuck into a map on the wall" to mark the scene of a crime or an accident, according to Police Lt. Paul Hornbeak, commander of departmental data systems. This manual system, however, was plagued with inaccuracies and subject to "the forces of gravity," Hornbeak said.

The plotter system, operational since Jan. 15, 1977, is centered around an IBM 370/145 located outside the police department. The computer, linked to the police station via an on-line terminal, is mainly used by the county for tax records and city administration.

The validity and accuracy of the mapping system depends upon "the guy in the street," the police officer himself, Hornbeak stressed.

Data supplied by the various policemen on patrol and at the scenes of crime is collected and written onto

dispatch cards, then fed into the mainframe through an IBM terminal. The 370/145 categorizes each incident according to the type of crime, location, severity and time of occurrence, then transfers the information to magnetic tape.

The tapes are used to guide a California Computer Products, Inc. 936 plotter located at the city planning department. The Calcom plotter draws the street network for particular sections of the city or the whole city, if necessary.

Each incident is assigned an identifying symbol and plotted on the map, usually "within 50 feet from where it was actually reported," Hornbeak said.

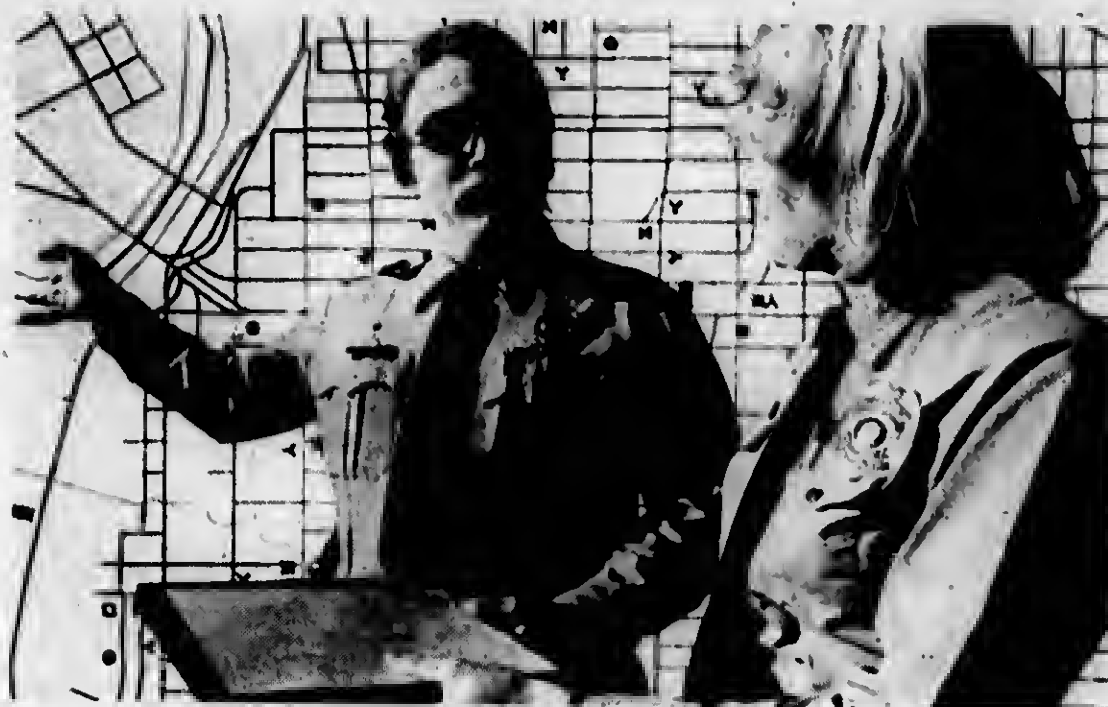
Natural boundaries such as lakes, rivers and creeks are also outlined on the finished map.

Drawings Circulated

The plotter-produced maps are reproduced on typewriter-size paper and circulated to members of the department. Drawings are updated once each month.

"We feel that with maps going out to the guy on the street, he'll have a better viewpoint of not only what's going on at his location, but also of the adjoining districts and the district across town," Hornbeak said.

The maps also help to plot criminal patterns and activities, he added. "If we wanted to illustrate the correlation



Photos of two police officers are superimposed on a map produced by a plotter driven by a medium-scale system. The map shows the exact address of every crime and automobile accident in Kansas City and helps police spot trouble areas and crime trends.

between aggravated assaults and homicides, I can run that through and it would show the location of that particular kind of incident," he stated. "If I wanted to, I can generate one map for several crimes, plotting the location of each one."

If a pattern did exist, "it would stand right out at you," and the police might be able to predict where a criminal would strike next, Hornbeak said.

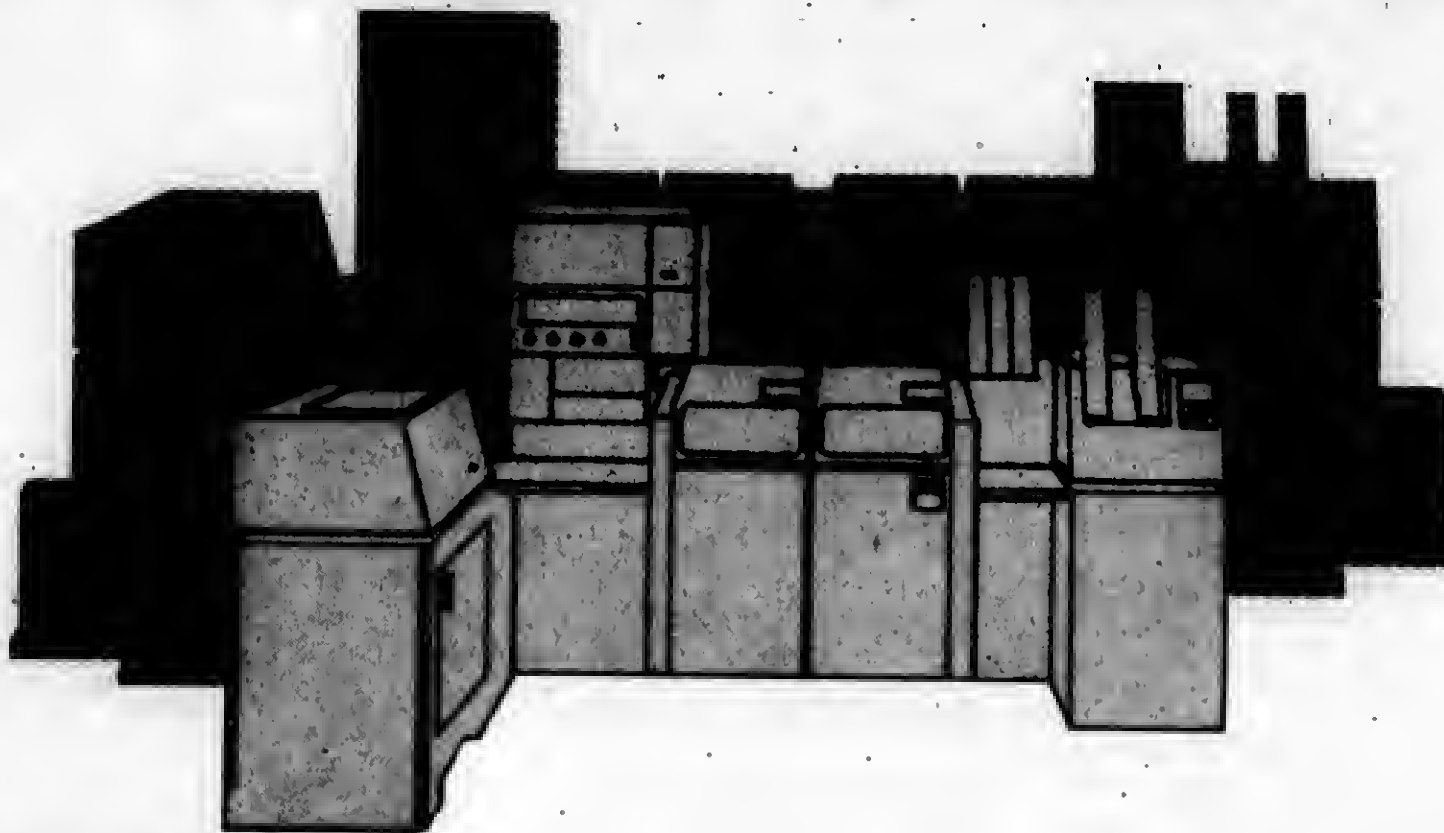
Before heading the data systems section for the police department, Hornbeak had no exposure to computers or graphics. He told programmers from the city planning department what was needed to facilitate crime prevention and they, in turn, supplied the technical expertise.

Although the system is only a little over a year old, Hornbeak already has plans for expanding its use into other areas. In the city's traffic engineering department, for instance, his maps could be used to substantiate or refute a request for something as simple as the installation of an additional stop light.

"If people say their particular block has been subject to an unusual amount of traffic accidents, we can show them in fact, if it really has" or if their claim is an exaggeration, he said.

Also, "if the mayor or crime prevention unit goes out to present a program, we can supply them with a map and data" to illustrate the area they are discussing, he added.

More System/3 for the same money!



easy to implement...
easy to upgrade leasing...

All IBM Hardware & Service. Amplicon leases only IBM equipment. All equipment refurbished to new equipment specifications. IBM provides all maintenance.

No Conditional Sales Contract Lock-In. Amplicon gives you true leasing flexibility. Upgrading is easier with an Amplicon lease than with an IBM contract.

Nationwide Specialists. Amplicon has System/3 specialists in most major U.S. cities. They can structure leases to meet your data processing, financial, and upgrading needs.

AMPLICON
INCORPORATED

505 North Tustin Avenue, Santa Ana, California 92705

(800) 854-0217, In California Call: (714) 834-0525

Economical and Flexible Alternatives from . . .

OUR ECLIPSE SPEAKS FOR ITSELF.

	DATA GENERAL COMMERCIAL ECLIPSE	11/70 RSTS/E	11/70 IAS	3000 II MPE
COBOL	✓	✓	✓	✓
RPG	✓	✓		✓
DATA CAPTURE LANGUAGE	✓			✓
BUSINESS BASIC	✓	✓		
EXTENDED BASIC	✓	✓	✓	✓
FORTRAN IV	✓	✓	✓	✓
ASSEMBLER	✓	✓	✓	✓
DATA FILE ACCESS	✓	✓	✓	✓
FORTRAN 5	✓		✓	
SYSTEM PROGRAMMING LANGUAGE	✓			✓
ALGOL	✓			

Comparisons based on most recently available information supplied by vendors and an independent industry research group.

Call (617) 366-8911, Extension 4735 or write for more information.

ECLIPSE is a registered trademark of Data General Corporation © Data General Corporation, 1977.

Data General

We make computers that make sense.

Data General, Westboro, MA 01581 (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61 rue de Courcelles, Paris, France, 766.51.78.
Data General Australia, (03) 82-1361. Data General Ltda., São Paulo, Brazil. © Data General Corporation, 1977.

System Gives Central Access, Security Control

CHATSWORTH, Calif. — A central control access and security system capable of providing visual or printed recall or both entered and acquired data is being offered by Greer Hy-

draulics, Inc.

The Programmed Access/Security System (Pass) displays in detail the corrective action to be taken in cases of unauthorized intrusion or environ-

mental equipment malfunction and then assures that such action is taken, a spokesman said.

The heart of the system is the firm's Cardkey Interrogator 880 microprocessor that works in conjunction with a dedicated computer system. Security cards are used to access the system, with all transaction data formatted and sent to the processor for sorting and recording on storage disks for later retrieval, according to the spokesman.

Pass allows for the investigation of card transactions as they occur, changing of an employee record, adding new employees to the file or performing a search by using the associated CRT display, the firm said.

The actual location of an alarm con-

dition or the exact whereabouts of employees who have passed control points can be displayed on the video screen in the event of an accident or emergency, the firm noted. Personnel access can also be regulated at up to 128 separate and remote locations within 1-1/2-mile radius of the central controller — or at any distance through the use of telephone lines, the firm stated.

The price of the basic system, including the 880 microprocessor, dedicated computer, card reader, graphics display, alarms and programming, is in the range of \$25,000 to \$40,000, according to a spokesman. The Cardkey Systems division of Greer Hydraulics, Inc. is at 20339 Nordhoff St. Chatsworth, Calif. 91311.

Products Aid Site Cleaning

PARAMUS, N.J. — HGH Industries has introduced two products designed to aid computer maintenance and contamination control within the DP environment.

Power Duster is an aerosol-propelled, compressed gas contained in 16-oz. disposable cans. The cleaner is non-flammable, nontoxic and noncorrosive

and is compatible with most materials, a spokesman said. It sells for \$24.75 per box of 12 cans.

Disc Wipe is a "waffle-like" cloth impregnated with 91% isopropyl alcohol. Packaged individually, it reportedly removes residues from disk surfaces with no adverse effects.

In boxes of 100, the cloths are priced at \$11.75 from the firm at P.O. Box 313, Paramus, N.J. 07652.

Course to Cover Staff Relations

NEW YORK — A five-day course designed to improve communications and develop better coordination between management and staff personnel will be offered by the American Management Associations on March 27-31 in Chicago.

The seminar will focus on such topics as managing time more efficiently, resolving corporate conflicts, coping with change and supervising minority workers, a spokesman said. The format of the course will be a combination of lecture and participating during which participants will work in small groups and be asked to evaluate one another's performance, he noted.

The course will be repeated in New York on April 3 and in San Francisco on April 24. Price for association members is \$505; nonmembers will be charged \$580; team discounts will be available for larger groups. Information can be obtained from the group's headquarters at 135 W. 50th St., New York, N.Y. 10020.

Silencer Encloses Teleprinter Units

LOS ANGELES — The TMS 1111 is a silencer enclosure for Teletype Corp. 33 ASR and Telex Corp. 32 ASR machines distributed by Telex Marketing Co.

Complete with built-in fan, the TMS 1111 is reportedly designed to fit the contour and noise output of teleprinter machines. Features of the TMS 1111 include installation without special tools or fasteners and unimpeded machine visibility through a hinged plexiglass lid, the company said.

The TMS 1111 costs \$359.50, and is available from Telex Marketing Co., 6464 Sunset Blvd., Los Angeles, Calif. 90028.



'I'd Like Something With a Good Durable Finish That Won't Mar When Kicked.'

The \$6,000* DP Center.



IMSAI Introduces the VDP-80

Until now, owning real computing power meant paying unreal prices. Announcing the IMSAI VDP-80 Video Data Processor, a complete computer, intelligent terminal and megabyte floppy disk mass storage system. All in one compact cabinet. All for just \$5995*. A complete desk top DP center.

For small business applications, the VDP-80 places a stand-alone computer at your fingertips. And, our full line of add-on peripherals, assures that the system can be expanded as your needs do.

For the large business user, with an existing central mainframe, the VDP-80 is the ultimate remote processor. You have the advantage of powerful local processing capability, plus the epitome in cost-effectiveness for implementing a distributed data communications network.

Take a close look at the following features. Then you'll know why we call our VDP-80 the desk top DP center.

Powerful, High-Speed, Central Processor. 3 MHz Intel 8085 microprocessor. 32K RAM memory (expandable to 196K). Parallel and serial I/O. Asynch, synch and bisynch communications. Programmable baud rates (.05-56 KB).

Megabyte Mass Storage. PerSci dual floppy, double density disk drive standard. One million byte storage capacity. Three floppy disk drives can be added-on, providing 4 million bytes of on-line storage.

Drives Printers, Plotters, Terminals, Modems and Tape Drives. Supports up to six terminals or modems, and four tape drives. Drives plotters, serial printers and line printers (up to 300 lpm).

12" CRT, 24x80 Field, User Programmable Font. Character and line insert/delete allows fast program correction and text editing. Inverse video and programmable field allows highlighting or enlarging graphics of information display. Titled fields protect information blocks from being written over accidentally. Programmable font (up to 256 different characters) allows foreign language and special purpose character forms.

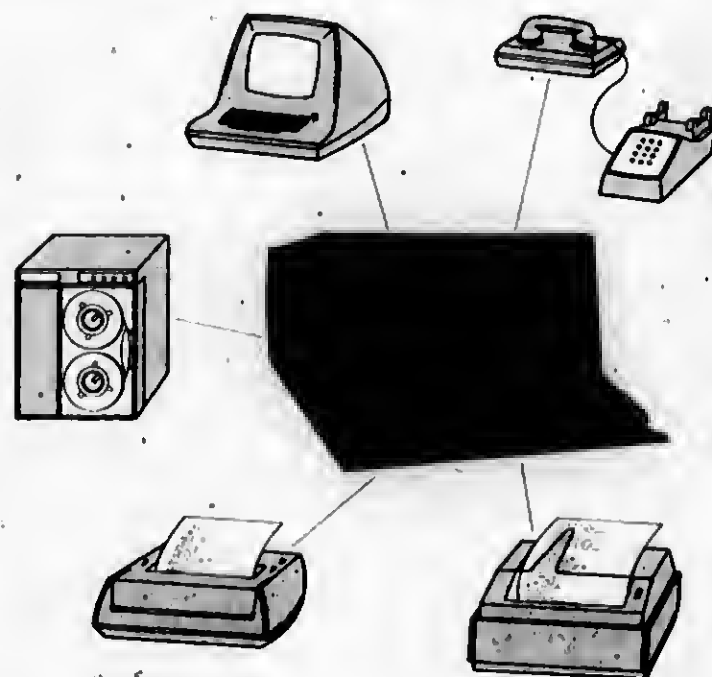
Alphanumeric Intelligent Keyboard. 62-pad main keyboard. Programmable 12-pad numeric keyboard. 12-pad control keyboard. Standard typewriter and calculator keyboard layouts. "N" key roll over reduces operator error during high-speed data entry.

Commercial BASIC, FORTRAN IV, DOS Software. Built-in ROM monitor allows extensive debugging and diagnostics. BASIC, interactive or compiler version. FORTRAN IV level 2 ANSI compiler. DOS-enhanced CP/M.**

Distributed processing, financial reporting and analysis, word processing, whatever your application, the VDP-80 is your answer.

Dial (415) 483-2093, and we'll tell you how you can put our \$5995* DP Center on your desk top. When it comes to small business computers, Just Ask IMSAI.

*Base price VDP-80/1000, \$5995, with 32K RAM memory and dual double density floppy disk drive. U.S. Domestic Price Only. Features and prices subject to change without notice. **CP/M is a trademark of Digital Research Corporation.



IMSAI
The Standard of Excellence
in Microcomputer Systems

IMSAI Manufacturing Corporation
14860 Wicks Blvd.
San Leandro, CA 94577
(415) 483-2093 TWX 910-366-7287

ITEL'S ADVANCED SYSTEM/6.

UNTIL NOW IT ONLY EXISTED IN THE FUTURE.

A revolution in price/performance alternatives, the Advanced System™ 6 processor complex is ITEL's most technologically advanced large-scale computing system. It's not a copy or re-engineering of any other system. In terms of price/performance, the AS/6 outperforms both the IBM 370/168-3 and the newly announced 3032. And utilizing high-speed Large-Scale and Medium-Scale Integration circuitry, the AS/6 is three to four times more powerful than our AS/5.

Like the AS/4 and AS/5, ITEL's AS/6 is designed to be a direct replacement for its IBM equivalents and is fully compatible with IBM 360 and 370 software. But our AS/6 has several clear advantages over its IBM counterparts.

For example, the AS/6 Model 7032 Central Processor takes the concept of High Speed Multiplication one step further and gives you High Speed Arithmetic, including High Speed Divide. And the 48K expandable Reloadable Control Storage is a standard feature on this

new Advanced System. In addition, the AS/6 is air cooled, so there's no need for the costly, intricate water cooling systems required by comparable IBM CPU's. Dramatic technological advances also permit the AS/6 to be lighter, take up less floor space and consume less power than equivalent systems.

With the new AS/6 and the rest of our Advanced System computer line, ITEL offers a broad range of sensible alternatives with substantial price/performance advantages. But then, when it comes to price/performance, ITEL has always had a considerable edge. Our AS/4 and AS/5 are alternatives designed for the future. And now we're taking the future a step further.

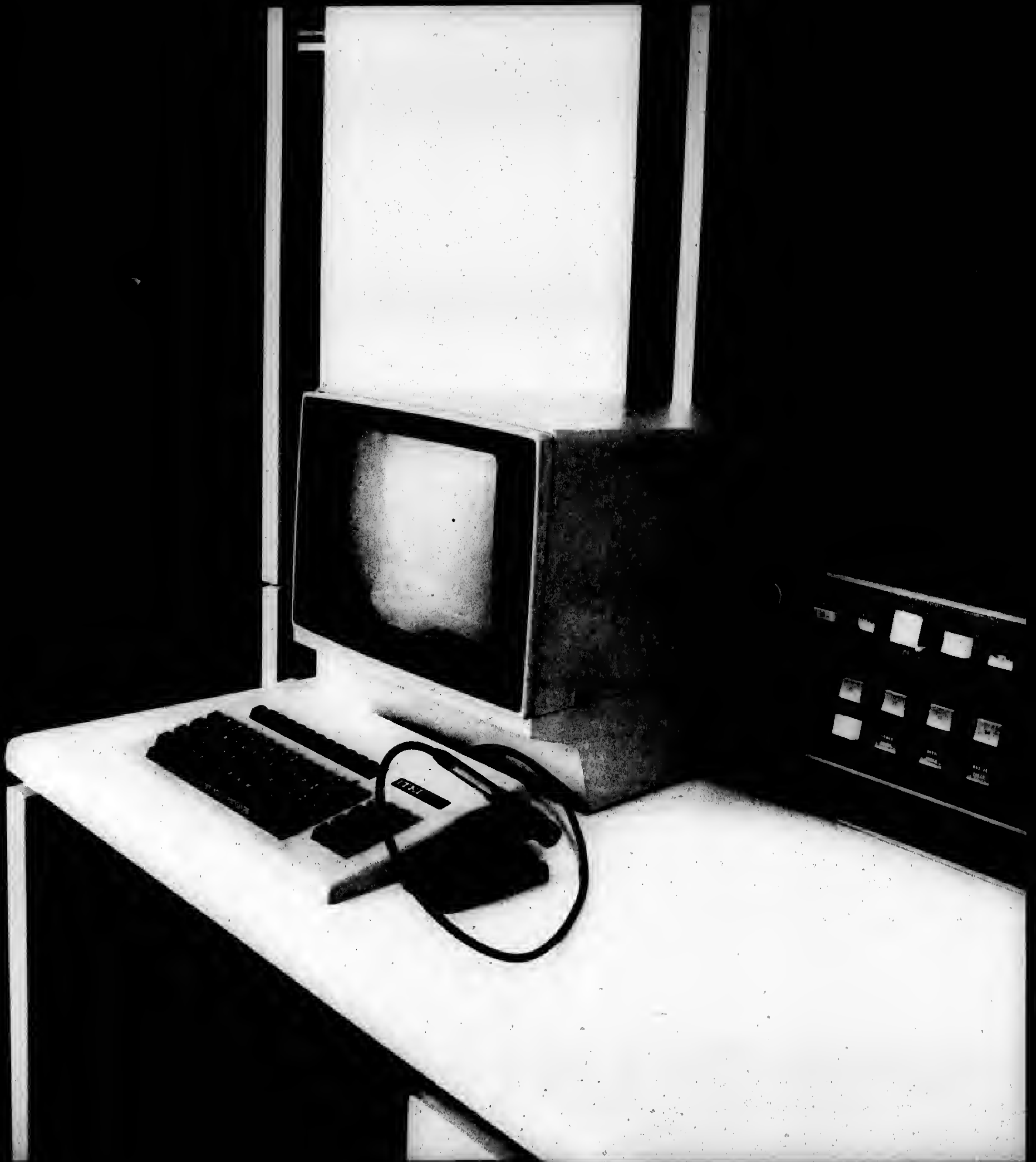
ITEL
CORPORATION

Data Products Group

One Embarcadero Center
San Francisco, California 94111
Telephone: (415) 955-0000

ITEL

ADVANCED SYSTEM 6



Key-to-Disk Units Found Most Reliable

By Frank Vaughan
CW Staff

CHERRY HILL, N.J. — "Overall service and manufacturer support continue to be weak areas. Users are advised to particularly consider manufacturer capability in these areas," according to the Fifth Annual Survey on Data Entry Equipment, part of Management Information Corp.'s *Data Entry Awareness Report*. The survey included more than 500 users with more than 760 pieces of equipment.

Equipment reliability is consistently above satisfactory level in the key-to-disk category, while the worst reliability problems are to be found with the keypunch equip-

ment, the report noted.

Four key-to-disk systems were given outstanding ratings in the survey: Pertec Computer Corp.'s CMC 18; Inforex Corp.'s 1301/1302; Univac's 1900; and

numeric display terminal grouping.

Recognition Equipment, Inc.'s Input 80 was rated as the top optical reader and there were no outstanding ratings in the keypunch and key-to-tape categories.

The survey also found that there is a growing trend toward the decentralization of data entry departments and that the data entry function is starting to contain more of the data preparation function.

Companies tend to be lax in making complete equipment evaluations, the report claimed.

The report is available for \$4.50 from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Data Entry Dimensions

General Computer Systems' 2100. IBM 3741 and 3742 key-to-storage units gained the top ratings in that category, and the firm's 3270 polled the best responses in the alpha-

All PDP-11 Cache Buffers are not created equal!



Model 920/981 uses bipolar MOS technology. Uses CPU power supply, comes with on-line/off-line switch.

Some plug in, some don't. Fabri-Tek's Model 920/981 Cache Buffer plugs directly into the Unibus of the PDP-11/34, 11/35, 11/40... and most other PDP-11 series computers. Measures just 8.75" x 5.2" x 1". Installs in minutes with no hardware or software modification. Compare that with oversize boards that can't interface directly with the CPU, take extra space and money to install.

What about performance? Some people talk a good game, with impressive "theoretical" performance figures. We have hard facts on throughput improvement from units already in the field — just ask for them. And we're ready to conduct a live demonstration at your site to prove the 920/981 is no paper tiger.

Is it ready when you are? Before you commit to a vendor, check his production and delivery capability. Fabri-Tek can provide whatever quantity you need, in 30 days or less. With the quality and service you've come to expect from the leading company in DEC memory enhancements.

When it comes to Cache, we showed DEC how.



FABRI-TEK INC.
COMPUTER SYSTEMS

5901 South County Rd. 18 • Minneapolis, MN 55436 • (612) 935-8811
U.K.: Maidenhead 37321-4

I need Cache!

☐ Send Model 920/981 literature
☐ Have salesman call ☐ I'd like a demonstration

Name _____
Company _____
Address _____
City/State/Zip _____
Phone _____

Meter Warns Of Temperature, Power Changes

WYNCOTE, Pa. — A temperature/power meter that issues a warning signal in the event of a power interruption or extreme temperature change is available from Mack Electric Devices, Inc.

The R-2-B monitor signals with an audio/visual alarm when a power failure occurs, a spokesman said. Built-in, rechargeable nickel-cadmium batteries power the unit when the normal source fails, he stated.

The unit also employs a mercury thermostat sensor allowing for direct continuous testing of liquid or air temperatures, he added. If a dangerous temperature is reached, a visual signal changes from green to blinking red and a high-pitched alarm sounds, the firm noted.

Optionally available remote monitors can be located up to half a mile away for dual-location temperature surveillance, the firm said.

The R-2-B is priced at \$233.30 from Mack Electric Devices, Inc. 211 Glenside Ave., Wyncote, Pa. 19095.

Companies Offer Free Literature

The following firms are offering free brochures:

A four-page brochure entitled "If You've Ever Misfiled a Tape," describing a prepackaged, prenumbered tape identification system, is available from Tab Products Co., 2690 Hanover St., Palo Alto, Calif. 94304.

An eight-page publication from the Pertec Computer Corp. details the firm's line of flexible disk drives. The booklet can be obtained from the company at 9600 Irondale Ave., Chatsworth, Calif. 91311.

A booklet entitled "Computer Power Protection: An Introductory Guide," explaining the various alternatives to power protection and listing different types of power problems, is available from Atlas Energy Systems, 9457 Rush St., South El Monte, Calif. 91733.

A pocket card that lists the speed and price range of Micro Networks Corp. analog-to-digital and digital-to-analog converters, amplifiers and data acquisition systems is available from the firm at 324 Clark St., Worcester Mass. 01606.

A six-page, illustrated digest detailing Cramer reset, elapsed, interval, cycle and solid-state timers as well as AC and DC instrument and timing motors is available from the Cramer Division, Conrac Corp., Old Saybrook, Conn. 06475.

Printronix Lowers Line Printer Price

IRVINE, Calif. — Printronix, Inc. has announced a price reduction for its Model 150 impact matrix line printer/plotter.

The single-quantity price for the 150 will be reduced 10% from \$4,000 to \$3,600, a spokesman said.

The reduction will apply to all units shipped or booked Feb. 1 and thereafter, the firm stated.

Involved With Exceptional Kids Mini Spreads Data for 'Dedicated' Group

By Esther Surden
CW Staff

RESTON, Va. — Getting accurate information about handicapped and gifted children to the teachers of those children has always been a difficult task. But with the help of a modular in-house minicomputer, the Council for Exceptional Children (CEC) here is doing just that.

CEC is an international organization dedicated to disseminating information about exceptional children. Until late 1969 it was a division of the Na-

tional Education Association (NEA), Demos Georganas, DP manager, recalled.

When it broke away from the NEA, CEC placed much of its DP work in the hands of service bureaus.

But the group's DP workload kept growing and CEC didn't have control over the way the service bureaus were developing software. Any special variations on the software CEC requested were performed at premium cost.

CEC was "caught in the old crunch," Don Foulk pointed out.

Foulk is a consultant with Xicron, Inc. who is working on the software development of CEC's current in-house system.

Modular Solution

The only way to bring costs under control and gain more responsiveness to its needs seemed to be an in-house system.

CEC looked at the hardware on the market and almost settled on a Data General Corp. Eclipse system until it found a system from Digital Systems Corp. (DSC) called the Galaxy/5. Impressed

by the system's modularity and its ability to accommodate growth, the organization ordered it for installation in January of last year.

The system's modularity combined with the vendor's responsiveness has kept CEC happy with its system. Foulk noted DSC has offered an upgrade to the CPU for \$1,500 that increases its speed by two and a half times.

The vendor is also offering users an upgrade to the direct memory access (DMA) feature that will increase the speed from 30- to 200 Kbyte/sec, he said.

The DP work done by the council falls into three categories: a membership application, publications application and general accounting.

Under the membership application, CEC maintains the names, addresses, renewal dates and types of membership of each of its members. It keeps files on about 65,000 active and 15,000 inactive members.

The application also keeps track of almost 15,000 interested nonmembers who subscribe to its services.

The application produces labels, renewal notices, membership cards and roster listings for the chapters throughout the country. It also takes care of rebating some of the membership money collected centrally to the chapters and federations.

(Continued on Page 88)

MIC Survey Finds Users Satisfied Despite Service, Support Gripes

CHERRY HILL, N.J. — Although service and support remain the "Achilles heel" of the small business system industry, most users of those systems are apparently satisfied with their systems, according to a survey conducted by Management Information Corp. (MIC) here.

Some 298 users of 454 small business systems and 912 peripheral devices rated the systems on a scale of 1 to 4 the highest, on performance reliability, ease of use, service and manufacturers support.

Of products receiving five or more responses, Basic/Four Corp.'s systems, Hewlett-Packard Co.'s 3000 series, IBM's System/3 and System/32, the Microdata Corp. Reality, Qantel Corp.'s systems and the Wang Laboratories, Inc. 2200 received an average rating of 3 or more in every category.

In the peripherals area, users gave grades of 3 or above to Burroughs Corp.'s disk and printer, Business Systems Technology's add-on memory, Centronics Data Computer Corp.'s printers, Decision Data Computer Corp.'s 9600 series, HP's magnetic tape drive, Memorex Corp.'s disk, Microdata's CRT, Qantel's CRT and Wang's 2216/17 CRT/tape peripheral.

Some users expressed concern over their vendor's support. Of systems receiving five or more

replies from users, the Datapoint 2200 with a rating of 2.4 and the Data General Corp. Nova with a 1.7 rating were graded lowest by their users.

No system with more than five users received less than 2.5 rating for service, indicating an improvement in this area.

Software Better

MIC also asked users to rate software and media and supplies. "Overall, the ratings for software companies improved over last year's survey, although the results were still disappointing. Even though less than five respondents used most packages, overall ratings were less than

satisfactory for most companies," the survey report said.

In the media and supplies arena, only one supplier with five or more replies — Control Data Corp. — received a 3 or better rating in all categories. Users rated the media and supplies on performance, company service and relative cost.

MIC would like more users to participate in its survey by completing a questionnaire. All users who return completed questionnaires will receive a free copy of the February 1978 issue of *Small Business Computer News* with this year's survey results. MIC said from 140 Barclay Center, Cherry Hill, N.J. 08034.

Replaces 'Unorganized System'

Door Maker Closes Orders by Mini

By Ann Dooley
CW Staff

TORONTO — The largest manufacturer of wooden doors in Canada is using a mini-computer system to open and close product orders faster and more efficiently.

In fact, Premium Forest Products, Ltd., was the first Canadian user of Computer Automation, Inc.'s Syfa minicomputer system, according to DP manager Paul Spears. "We were guinea pigs, but it's worked out well for

us," he said.

Two and a half years ago, Premium Forest decided to automate its "unorganized manual system" and looked at systems from all of the major companies. The decision was finally made to go with CA after one of the door manufacturer's largest customers recommended that vendor, Spears said.

For six months, the system ran parallel with CA's system in California. Now on its own, it handles inventory control, order

entry, accounts receivable, invoicing, credit entry and sales analysis for 4,500 standard products and a variety of special design products.

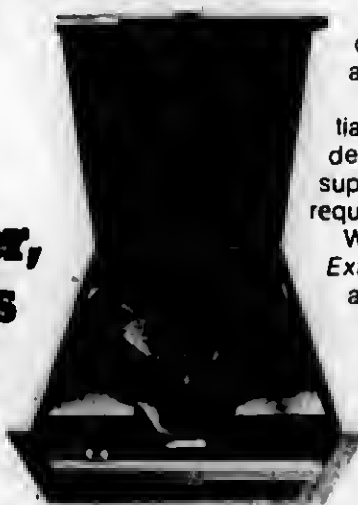
Merchandise pricing is also automated except for special items, which are handled manually. The company plans to add payables and raw materials applications to the system soon.

The large number of products made by Premium Forest complicates the manufacturing process

(Continued on Page 88)

When we installed our first minicomputer disk system, we talked a lot about RELIABILITY.

4000 systems later, our customers tell the story.



Reliability. We do more than just talk about it. We deliver it. That's one of the main reasons we're now the world's largest independent supplier of minicomputer disk storage systems.

We've delivered more than 4000 systems since we installed our first one in 1971. That's strong evidence of hardware reliability and broad product acceptance.

There's a lot more to the story. Behind our reliable hardware is a reliable company that keeps delivery commitments, provides total software support and responds quickly to customer service requirements. Ask our customers.

We make good disk drives work better through *Extended Emulation™*. This powerful approach adapts software to emulate the CPU manufacturer's operating systems—while still taking full advantage of the unmatched performance offered by our disk system. Whether you need disk storage for mini or micro, you need to know about the important benefits *Extended Emulation* can provide.

The diverse applications for our disk systems are regularly described in our quarterly newsletter, *The Bit*. If you'd like to be on our complimentary mailing list, use the coupon today. We'll send you the current issue. And if you need product data, or help with a specific application, contact the System Industries sales/service office nearest you.

System Industries
an equal opportunity employer

525 Oakmead Parkway, P.O. Box 9025, Sunnyvale, CA 94086
(408) 732-1650, Telex: 346-459

☐ Please add my name to your mailing list for *The Bit*.
Send product data on the follow disk systems:
☐ 2.5 MBytes ☐ 10 MBytes ☐ 300 MBytes

Name _____
Company _____ Position _____
Address _____
City _____ State _____ Zip _____
☐ My need is urgent. Have an applications specialist phone me today: (_____) _____ ext. _____

Schlage System Covers All Exits

SUNNYVALE, Calif. — Schlage Electronics has an access control system based on Digital Equipment Corp.'s PDP-8A minicomputer that provides access control for up to 256 doors.

The system uses a sensor to read a command card and transmits signals to the minicomputer, which regulates access. Access can be controlled by command key, access level or time, the firm said.

Management can monitor the status of any point through a CRT terminal that displays data transactions.

The price of the system starts at \$40,000. Schlage is at 1135 E. Arques Ave., Sunnyvale, Calif. 94086.

Door Maker's Mini Enters, Closes Orders

(Continued from Page 87)

and also creates a difficult price scheduling problem, Spears said.

"This is a very complex manufacturing environment and it was not easy to computerize," he added, but it's worked out very well.

There have been very few problems with the system, Spears said. The only real problem occurred when dirt and sawdust from the adjacent warehouse got into the computer center and clogged up the disks.

CA cleaned the disks and replaced the disk platter unit, and the system was back in business, Spears recalled.

The system has enabled the company to get invoicing done much faster and has cut down on overstocking of finished goods in the warehouse through inventory control, Spears

noted.

Very little training was required to operate the system, so some people were taken off other jobs and moved around, he said.

Although two additional people were hired to help with the work, the system has saved money because of the speed and efficiency with which the work is done, Spears said. The system handles approximately 200 orders daily amounting to a total of nearly 5,000 doors.

Order Entry System

The system includes an LSI2 stand-alone minicomputer with 64K memory, 20M bytes of disk storage, six CRTs and two printers. It is valued at approximately \$100,000.

When customer orders come in, they

are coded and a computer operator enters the orders via one of the CRTs. The information is then stored until printing time, which occurs twice daily.

After printing, the orders are taken to the warehouse and checked for errors or out-of-stock merchandise.

The orders are filed until shipping time, when they are filled and sent to the customer. One copy of the invoice goes to the customer and another is kept at the central headquarters for filing purposes or to keep track of any back orders.

The order invoice includes the customer code, product code, comment lines for any specifications, order date and expected delivery date.

The customers appreciate the system, Spears said, because they get their orders faster and can also see exactly what they owe with the open-item system of invoicing.

The system provides a report on the daily total of doors booked, sold and credited. The sales record breaks the products down into 60 product lines judged according to the thickness and type of door.

A monthly sales analysis is also run; this breaks down sales information by customer, product group, area, salesman or by what the major buying groups are ordering.

System Helps Dedicated Group

(Continued from Page 87)

The publications application is really an order processing system that handles orders received in cash or credit, credits them against a contract, adjusts inventory and produces packing lists or invoices. This system also takes care of back orders and aging of accounts.

When the system was installed, it included one CPU with 96K bytes of memory, two disk drives and a 600 line/min printer. It has since been upgraded in 32K-byte increments to 128K bytes of memory and another 16K bytes are on order.

Originally configured with five terminals, the system now has eight and "another half dozen" should be on-line by July, Foulk said.

With the DSC system, CEC will be able to add another CPU when it needs it. In fact, "we'll probably get a second CPU for a text processing application," Foulk noted. This will allow the organization to retrieve abstracts dealing with various subjects by various word searches, he explained.

"We can add up to four CPUs to the system," Foulk pointed out. If two jobs are trying to use CPU time and one of the CPUs is busy with the first job, the job attempting to get time will automatically go to the second CPU, he noted. "Programming is not dedicated to any particular CPU."

CEC did feel some concern about being only the third installation of a system by Digital, but those fears were allayed by several factors. All of the components used by the vendor are "off the shelf" so that the organization could get replacements if necessary, he said. "Our biggest concern was software support. They have been very responsive in some areas," he noted.

THE JAMES MARTIN SEMINAR

on the design, management and future of distributed processing, data base, and networks

New York March 27-31 1978
San Francisco April 17-21 1978
Atlanta April 24-28 1978

ACCLAIMED THROUGHOUT THE WORLD...

"This was excellent exactly what I needed" ... Chicago
"Totally excellent" ... Boston
"This is the best seminar I have ever attended (over 14 years in the field)" ... San Francisco
"I paid my own tuition and it was worth it" ... Houston
"Excellent seminar and superbly presented" ... London
"Outstanding" ... Chicago
"Inspiring" ... Los Angeles
"The best I have attended" ... San Francisco
"Very complete" ... London
"A tour de force by Mr. Martin" ... Chicago
"I do feel the money spent as very worthwhile" ... Toronto
"Martin was fantastic" ... Tokyo
"A fantastic week" ... Paris
"I felt that this seminar was splendid" ... Toronto
"A very worthwhile experience" ... San Francisco
"A course of excellence" ... Los Angeles
"Real" ... Boston
"I think the entire seminar was terrific" ... Boston

For full details phone (617) 887 2776 or complete the coupon and mail to:
Miss J. Tumber, Savant Institute, 8 Normandy Row, Topsfield, Mass. 01983.

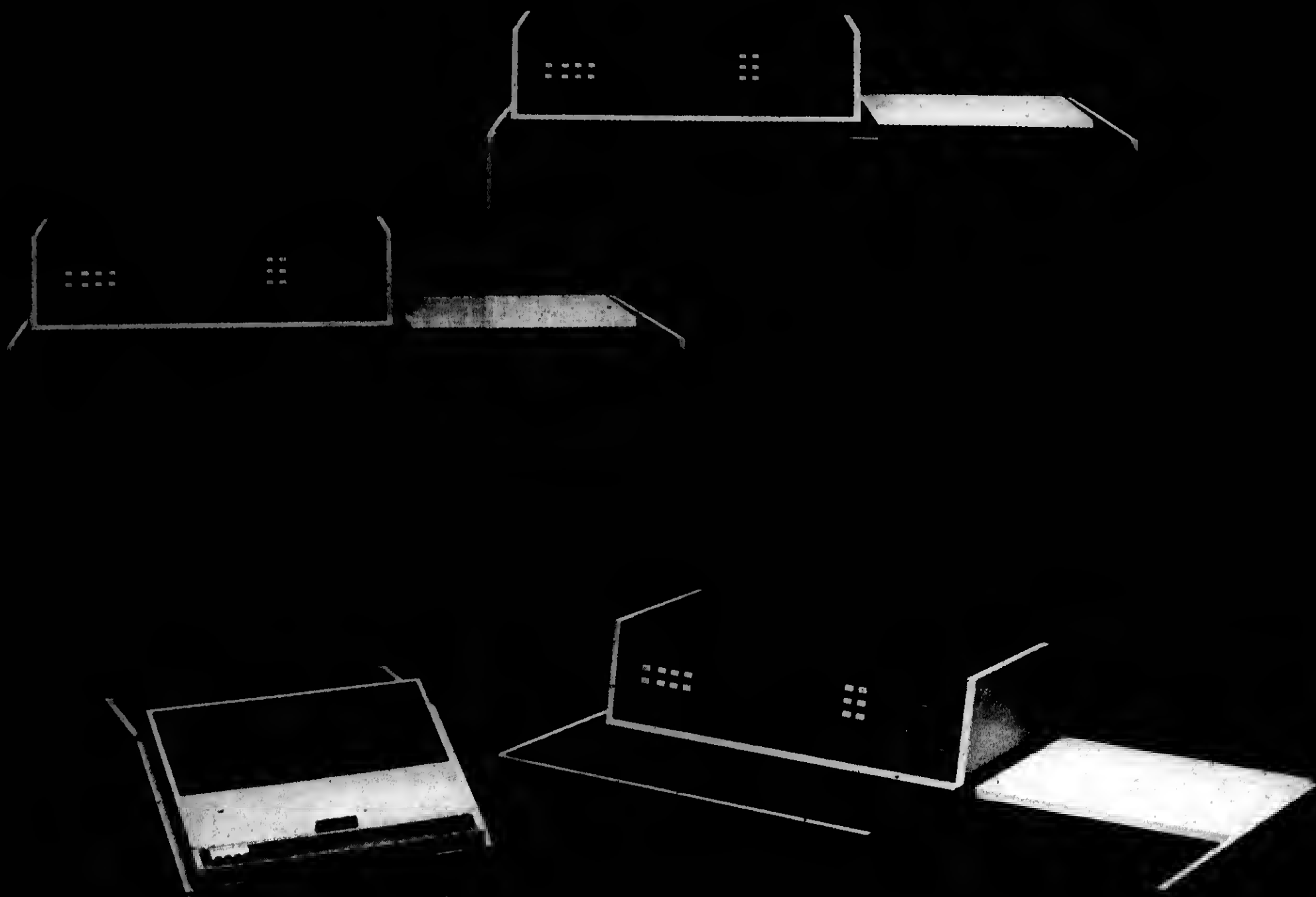
Please send me full details of the James Martin Seminar in

Name (BLOCK CAPITALS PLEASE)

Organisation

Address

Take your choice: on-line or off-line.



3 dry, convenient, laser printers, from Kodak.

For the detailed dry laser printer, ask for Kodak Company,
Microimaging Division, 1000 Main Street, Dept. 3000, Rochester, NY 14650.

KODAK KOMSTAR Microimage Processors



And Reduce Production Time System Helps Bottle Company Perfect Designs

MONTREAL — When Domglas, headquartered here, had designs on better ways to produce bottles, the firm looked to a minicomputer-based turnkey system to satisfy its needs.

In six plants from Quebec to British Columbia, the firm turns out bottles in myriad shapes and sizes for the food, beverage and chemical in-

dustries.

According to Hans J. Kleiner, assistant to the manager of mold design and manufacture, the firm, whose sales reached \$185 million in 1977, needed some way to better design both its glass products and the mold equipment used to produce the products.

"We were looking at some way of reducing costs by

either reducing manpower or increasing productivity, and we also wanted to improve the accuracy of our mathematical calculations," he noted.

The company had surveyed the various systems available before settling on a drafting and design system developed by Information Displays, Inc. (IDI) of Elmsford, N.Y.

Most of the graphics systems

available used storage tube technology, Kleiner noted, which is inadequate for the firm's usage needs. When the designers tried the storage tube systems, they found that the screens were cluttered and features such as selective erasure were not available. "Those systems were just too hard to work with," he pointed out.

With a refresh tube-based system, the designers could design, redesign, erase and make changes at will, he said.

The system represented a total initial investment of \$250,000 for the firm, but benefits should outweigh the costs. For example, to the company's knowledge, it has achieved 100% accuracy in volume calculation and mathematical formulation of bottle geometry and a substantial reduction in design-to-manufacture time, he said.

The system performs three basic applications which were all provided by IDI — volume calculations, design proportioning and molding design.

Using the volume calculation program, designers can find calculations for any shape bottle or any configuration. "It was the general belief in the glass industry that there was no way to automate the calculation of off-round shapes with acceptable accuracy and at reasonable cost," he said.

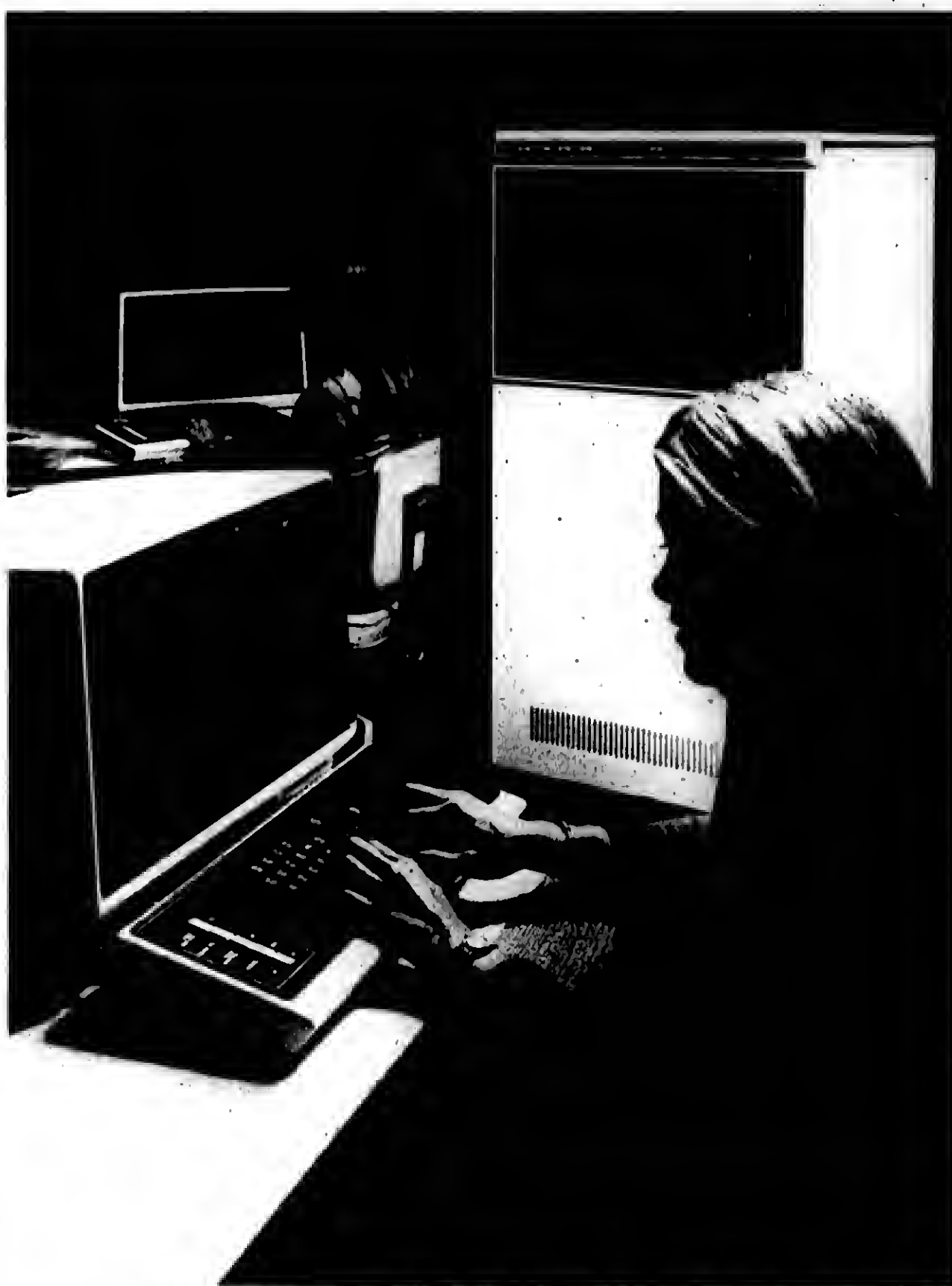
The design proportioning application allows the company to configure families of bottles both larger and smaller than the original container. The program takes care of the calculations needed to come up with the similar designs, Kleiner pointed out.

With the mold design system, Domglas can use the same machinery to produce all kinds of containers simply by changing certain variables.

Light Pen Used

With the IDI system, the operator works on the face of a CRT with a light pen, as he would with a pencil on a piece of paper. With the light pen, he can activate any of many drawing functions shown on the screen on both sides of the actual drawing area.

When a design is completed, a hard copy is made on a flat-bed plotter. For temporary storage, a mass memory with a capacity of over 3,000 drawings is used. Permanent storage is on magnetic tape.



With the 1300, you can consolidate remote job entry and batch data entry applications without compromising either function. The system features expandable disc storage (up to four — 10 Mb. drives) foreground and background editing and bisync communications.



Inforex 1300 and 1301 offer highly cost effective data entry capability for smaller installations (4 to 8 keystations) or remote locations where you can take advantage of our communications capabilities.



The 1303 provides medium range data entry capacity, with about triple the disc capacity of the 1301. It supports up to 16 keystations and the addition of edits, table look-ups, range checks and cross-footing. The 1303 also offers communications capabilities such as spooling, HASP and RJE.



The Inforex 3300 is a powerful pre-processing system that allows you to edit data at the point of entry, enabling you to offload your mainframe. Its sophisticated editing capabilities can also handle many of those applications which you haven't had time to put on your present mainframe.

INFOREX: THE SIMPLEST SOLUTION TO ALL YOUR DATA ENTRY PROBLEMS.

The simplest and best solution to all your data entry problems is right here: the Inforex data entry family.

Simplest because we design them for ease of use and speed of throughput.

Best because we've been a leader in the innovation and development of key-to-disc data entry products and capabilities right from the start.

Which is why our family's got it all. From the basic keypunch replacement 1300 IKE System to the tremendously powerful max-editing System 3300.

So whatever your needs—modest, middling, or immense—the growing Inforex data entry family will meet them.

You don't have to settle for a compromise system. You don't have to sweat out an unsatisfactory price/performance choice. All you have to do is choose the system that's best for you.

And that's where an Inforex Support Team comes in. They'll help you select just what you need. They'll provide expert installation. And they'll give you the benefit of their years of experience in other installations.

But even after all that, you won't be left high and dry. Whenever and wherever you need help, an Inforex Support Team will be available with the support you need.

The Inforex data entry family. You shouldn't settle for anything less.

I would like more information on the following:

- ☐ Key-to-disc data entry ☐ Distributed processing
☐ Computerized records management
☐ I would like to talk with an Inforex Sales Representative

Name _____

Title _____

Organization _____

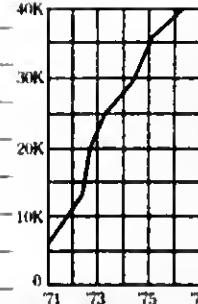
Address _____

City _____

State _____

Zip _____

Telephone _____



CW 2

Offices in major cities throughout the United States, Canada and Europe. Distributors worldwide.

INFOREX
Inforex, Inc., Dept. 321, 21 North Avenue, Burlington, Mass. 01803

ATTENTION!

If you buy, lease, or operate an IBM 3032, 3033, 370 series, CDC 7600 series or other liquid cooled processor contact us.

We have a cooling system for large processors that can save you up to 50% operating costs. It can outperform, and outlast anything on the market. Also it does not take up computer room space.

For further information, call or write:

CONTROLLED ENVIRONMENT CORP.

640 Reynolds Ave.
Kansas City, Kansas 66101
(913) 342-3599

Over ten years experience in computer room environments.

See the System 1330 at the Computer Caravan — Expo '78.

Saw Maker Sees Control in Mini-Based System

By Esther Surden
CW Staff

CHEHALIS, Wash. — When Stihl Northwest saw its bookkeeping machine was unable to control the inventory and sales aspects of its business, the firm switched to a minicomputer-based system to do the job.

The chain saw distributor considered the Singer System Ten and the IBM System 32 as well as the NCR Corp. 8200 system before finally selecting the NCR 8200. "We felt it had the most potential to help us keep in touch with our business minute by minute," Larry Robertson, the firm's DP manager, recalled.

The System/32 was too much of a batch machine and Singer Business Machines went out of business just before Stihl made its choice, he added.

NCR put the firm in touch with CMI Systems, Inc. of Renton, Wash., and Stihl looked at the software CMI had written on systems that were in operation. Those systems appeared to be running well, so the Stihl went with the software house.

Inventory On-Line

Stihl's system was installed a year ago; three months later, the firm was up and running. About 60 programs written in Cobol are used on the 80K 8200, including an on-line inventory system that allows the company to track accounts receivable, sales, inven-

tory and order entry.

"We are presently building our accounts payable and general ledger systems," Robertson noted.

All of the initial programming for the system was done by the CMI, but Robertson made some slight modifications to the programs. The system is run by an operator, but is easy enough to use that anyone with typewriter and keypad experience could run it, he said.

The 8200 has been very reliable, notwithstanding a slight problem Stihl had when it was first installed, according to the DP manager. NCR's service was termed "quite responsive," although Stihl does have to wait the full four hours for a service person because it is located in a remote area.

Herd of Minis to Track Cattle Disease in Australia

CANBERRA, Australia — The Australian Bureau of Animal Health has begun developing a national animal disease information system based on 20 minicomputers.

Upon implementation, the system should be a factor in the eradication of brucellosis in cattle, protecting Australia's international markets for beef and dairy products. Brucellosis is an undulant fever — a long-persisting bacterial disease characterized by fever, profuse perspiration, pain, swelling in the joints and an enlarged spleen.

Success in eradicating brucellosis at the planned rate should ensure Australia's continued access to international meat markets in the 1980s and 1990s, according to a bureau spokesman. However, if the program falls behind, Australia could be shut out of the U.S. market in the 1980s because the U.S. is nearing the end of its own brucellosis eradication program.

The benefit of the eradication program has been estimated by the Australian Industries Assistance Commission to be \$543 million.

The 20 Data General Corp. minicomputers, valued at about \$500,000, are presently being installed at veterinary diagnostic laboratories throughout Australia.

The main task in the eradication program is the analysis of between 10 million to 20 million blood samples per year, collected from farms and abattoirs. The resulting information will then be processed on the systems.

Reports produced by the minis will reportedly enable greater accuracy, speed and efficiency in decision making about individual herds by field veterinary staff.

The system also will collate all the data for an area — on a district, regional, state or national basis — informing administrators of progress with the eradication program.

One Nova 3 already installed in Canberra will keep records on all herds in Australia as backup storage to make sure no records are lost.

Dr. R. Morris, assistant director of the Bureau of Animal Health, said the decentralized approach adopted for the disease information system makes the system more useful to staff in the field than centralized systems. It encourages the involvement of staff, particularly because the system was designed for operation by people with no minicomputer experience.

The bureau, after careful evaluation of a range of equipment, decided on minicomputers and disk-based systems with diskette transfer of data between sites, Morris said. Each configuration includes 10M bytes of disk

storage and a floppy disk, with a 60 char./sec terminal printer and additional asynchronous communications line.

OCR SAVES MONEY

How Westinghouse
Saves Over \$10,000
A Month With OCR

Westinghouse Credit Corporation's business is financing at both retail and wholesale customer levels. Before OCR, credit applications for computer input were keyed from forms manually generated at a multitude of field offices.

Westinghouse's George Jordan was instrumental in replacing this costly and cumbersome keypunch operation with an Optical Business Machines Laser OCR-One optical character recognition system and seven newly designed forms. About 25,000-30,000 of these forms are scanned every month. The result... the keypunching staff has been reduced by over 50%. The savings from this alone amount to about \$10,000 a month! More than that, Westinghouse Credit has reduced their

reporting time by three days and has achieved much better control of their money.

For information on how you can cut data entry costs with the Laser OCR-One system, contact

Billy Graham
Vice President/
Marketing

**Optical Business
Machines, Inc.**

804 West New Haven
Avenue
Melbourne, FL 32901
(305) 727-1774



I'd like more information about
the Laser OCR-One

☐ send descriptive literature
☐ have a salesman call me

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

F _____

User Tries Again, Finds Success With Turnkey

By Esther Surden
CW Staff

N. HOLLYWOOD, Calif.—Although its first attempt at using a minicomputer was unsuccessful, Specialty Coatings & Chemicals, Inc. here tried again — and when it did, it found the right equipment could be cost-justified many times over.

According to Henry C. Jacoby, president of the company which manufactures industrial finishes and chemicals, Specialty faced a serious problem before turning to its first system.

"Our pricing structure is

quite complicated because we sell to jobbers, distributors and a network of 5,000 dealers. Before we decided to try a mini," Jacoby recalled, "our office staff of six full-time people had to contend with a maze of prices and discounts, resulting in many billing mistakes, and sometimes handwritten invoices."

Bills Paid Late

"What was worse," he added, "we had no standard formula for costing, and we later found that with the cost of raw materials rising so rapidly, we were selling some

items actually below what they were costing us to make them. Our bills were frequently being paid late."

The company also kept a 30,000-name mailing list of prospects of "Scriptomatic equipment," he said. All mailing was hand-sorted.

No Luck on First Try

The firm decided to lease an NCR 399 system to help cope with its problems. "After eight months, we still did not have half the programs operating on it," Jacoby said.

The system had no CRT screen and the users had to constantly refer to the manuals to see what they were doing wrong. "It was an obsolete system and difficult to train operators to use," he concluded.

After falling further behind on its correspondence, invoicing and other work, Specialty once again began a search for a solution. It contacted Mini-Computer Business Applications, Inc. in Los Angeles, a supplier of turnkey small business systems.

Vendor Recommendation

The vendor recommended a Digital Equipment Corp. Datasystem 310; Specialty took its advice and within six months was caught up on its work, Jacoby said.

The system is simple to operate because the users are

Printer Designed For Documents, Stiff Passbooks

MT. LAUREL, N.J. — Okidata Corp. has introduced the CP210 Model III, a document/passbook printer designed for use in small business and remote terminal applications.

The unit incorporates a microprocessor-controlled interface that allows a document to be positioned up or down in increments of less than one line, assuring accurate positioning of the printed line on documents without uniform line spacing, the company claimed.

Other Features

Other features are said to facilitate manual loading of documents, permit use of stiff passbooks and provide automatic positioning. Accepting forms, documents and passbooks from 2 1/2- to 8 in. wide and from 2-1/2- to 30 in. long, the printer will also accommodate single and multipart forms and both horizontal and vertical fold passbooks.

The Model III costs \$2,365 without a journal option or \$2,625 with the option, Okidata said from 111 Gaither Drive, Mt. Laurel, N.J. 08054.

prompted step by step, he noted. Jacoby has learned how to make programming modifications himself, he pointed out.

Office Staff Cut

With the system, "we've been able to reduce office staff to four full-time and one half-time people," Jacoby added. The statements are cleaner, information is available and the company's image has improved, he added.

The system is running billing, invoicing, order entry, accounts payable, accounts receivable, formula costing, payroll and some simple word processing applications.

The mailing list application has also been put on the system, allowing Specialty "to achieve greater contact with

prospects through more frequent and more specialized mailings," Jacoby said.

However, there is one drawback to Specialty's system, Jacoby reported. The number of terminals the firm can attach is limited, so Specialty is going "to a bigger system" with software being written by the same vendor.

"We wanted two stations" and greater disk capability, he explained, so the firm is switching to a Data General Corp. CS/40 system.

The turnkey vendor has been excellent throughout the decision to switch systems, Jacoby said. "It actually purchased it back from me," he noted.

The fact that the vendor stands behind the system it sold gives Specialty a great deal of confidence, he added.

the Computer Store™

Offers

A Unique

Profit Opportunity

For

Software Companies

Systems Houses

Computer Retailers

The Computer Store's Dealer Affiliate Program features the Data General microNOVA® product line and established professional business applications software for resale to the explosive small business computer market. Sales and technical training included. Call for details:

Paul Conover

the Computer Store, Inc.

120 Cambridge Street
Burlington, MA 01803

(617) 272-8770

NOVA is a registered trademark of the
Data General Corporation

Available Immediately For

SHORT TERM LEASE

370/138 370/148 370/145

3330's and OEM 3330's

360/30 360/40 360/50 360/65's

Greyhound Phoenix ICA's

CALL US COLLECT

United States

Austin	Ron Geil	(512) 451-0121
Boston	Tom Ryan	(617) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dave Hyland	(415) 283-8980

International

Canada	Don Maunder (Toronto)	(416) 366-1513
Mexico	Andres Contreras	(905) 543-6850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joe Gold (Geneva)	(022) 61-27-54
Austro-Asia	John Hallmark (Dallas)	(214) 233-1818

Non-IBM:

UNIVAC or)	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**
GREYHOUND TOWER, PHOENIX, ARIZONA 85077

DG Eclipse On-Line Cobol?

Better yet, CFOR, a business programming language preprocessor, is now available for your ECLIPSE. CFOR is easy to learn and implement and is translated to DG's fast-executing FORTRAN 5. Intelligent control flow and rational syntactic cosmetics lead to "GOTO-less" structured programs which are easy to write, read, debug and modify. A commercial field variable data type extends CFOR to data processing environments while retaining the computational, multi-tasking, interactive qualities of FORTRAN.

Contact David N. Langley

FINNING

FINNING COMPUTER SERVICES LTD.

SSS Great Northern Way, Vancouver, B.C., V5T 1E2, (604) 872-7474

DEC® Data System Owners Need new reports within minutes?

DEC® OEM's
Having trouble speaking English?

SYMBOLIC SYSTEMS® INC.

(DEC's first and foremost business OEM)

PRINT IV®

a user-oriented, query type report writer

To print a report, simply:

- select data desired
- select order desired
- enter selection criteria and required totals
- watch report appear on printer

No programming skills required!
License price includes 1-yr. warranty
For free demo and further information
call, write or telex

FRANK J. PONZIO, JR.

SYMBOLIC® SYSTEMS
25 Chatham Road Summit, NJ 07901
(201) 277-6100/Telex No. 13-6476

Authorization System 100% Reliable Dual Processor Keeps Card Checker Working

LAKE SUCCESS, N.Y. — When consumers want to use their credit cards, business establishments must check to make sure the card's use is authorized. The systems performing the checking have to be available and reliable.

Eastern States Bankcard Association (Esba) chose a dual-processor minicomputer to field the constant flow of inquiries that come into its headquarters here. "We have to maintain virtually a 24-hour uptime service in our teleprocessing network," Claude White, Esba's manager for software development said. "We cannot tolerate downtime."

The Tandem Computers, Inc. dual-processor system is being used as a front end to an IBM 370/158 mainframe, which in turn is backed up by an identical mainframe. The mini, which White calls his "traffic cop," routes incoming requests for credit on Master Charge and Visa cards to the right mainframe for processing.

100% Availability

Authorization requests are routed by the Tandem system to the host 370 if the card is one issued by one of the 310 Esba banks. Otherwise, the request may be routed to one of the other seven Master Charge associations in the Northeast or to the central Master Charge switch in St. Louis.

In addition Visa inquiries are sent over dedicated telephone lines to Visa USA, Inc. in San Mateo, Calif.

"Thus far the Tandem dual processor system, which has been in use here for about a year, has demonstrated an availability of virtually 100%," White said.

The mini system can handle all credit authorization inquiries by itself should the IBM system or host communications lines fail, he added. In that event, the Tandem system refers to its own disk files that contain a list of delinquent accounts and other "bad guys."

These so-called "negative files," updated each morning with magnetic tapes generated on the IBM system, permit the system to field the incoming calls independently until the problem with the rest of the system can be cleared up.

White said he had needed to use this backup capability and it "worked just fine."

Although the mainframe could perform its own switching with its own front end, according to White, it's easier to have the mini system do this job since it adds further assurance of system availability.

System in Action

The Tandem architecture is quite different from conventional computer systems, White noted. The central processors, of which there can be up to 16, are all interconnected through a dual communications path.

If a specific processor should malfunction, another assumes its duties, without operator intervention. Repair can be made while the system is operating. Dual communications paths between the processors and the peripherals help assure the availability of the peripherals.

The Esba system begins work when a member merchant telephones the association and tells the terminal opera-

tor the account number of the person desiring to charge something. This number is keyed into one of the 80 terminals connected to the minisystem.

The system then routes the communications to the appropriate mainframe by referring to a lookup table in memory based on account numbers. If the number corresponds to a member Esba bank, the inquiry for credit authorization is sent to the local 370/158.

If for some reason the line is not available, the Tandem refers to its negative file disk for a determination, reporting back to the terminal operator's CRT screen.

The dual-processor system includes two 50M-byte disks and internal memory of 256K bytes each. The two 370/158s are usually arranged with one on-line and the other off-line, although the two can be used to backup each other.

One single data file accessible by both systems containing some 2.3 million records are stored in disk rotating memory.

The 370/158s are primarily used to service the member banks with financial reports, on-line account data entry and inquiry, monthly statements for each account and other information pertaining to Master Charge and Visa.

A data base management package

which is used to access the negative files and to write the transaction files, was supplied by Tandem, along with a basic operating system and other interface software for connection with the 370.

Esba, assisted by Tandem, has developed application software that allows more comprehensive message switching.

A private association of banks in the Northeast, Esba includes banks in New York, New Jersey, Pennsylvania, Delaware and Connecticut.

With the number of transactions now running at about 20,000 per day, Esba plans to add a third processor to the miniconfiguration soon.

THERE'S A LITTLE BIT OF THE WIZARD IN EVERY SOUTHERN SYSTEMS PRINTER

And that's why more and more mini-computer users — and DECsystem-10 users, too — are putting Southern Systems printers to work for them. They know a little bit of the Wizard goes a long way . . . in trouble-free printer performance, in cost-saving (up to 50%), in efficiency of future system expansions.

The Wizard? He's actually just a symbol (but don't tell him that!) of Southern Systems expertise . . . in the precise configuration of printers . . . in the design and manufacture of new interfaces and controllers (like our S-10 for DECsystem-10) . . . in the delivery of printer systems for about half of what you'd pay elsewhere.

Southern Systems printers. For your DEC, Data General, Interdata or others. At speeds from 300 lpm up to 1500 lpm. SSI typically ships within 30 days and offers complete installation and nationwide service.

No wonder our customers keep coming back to us for a little bit more of the Wizard. You will, too.

For more information, call or write to:



**SOUTHERN
SYSTEMS, INC.**

Intracoastal Building
3000 Northeast 30th Place
Fort Lauderdale, Florida 33306
(305) 561-5226

Please send information on SSI's _____ lpm printers.

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____



Distributor Expands Line Beer Seller Gets Ahead With Mini

Special to CW

DOVER, N.J. — When a beer distributor here decided it was time to add a new line of brew, it turned to a minicomputer to deal with the expected volume of paperwork.

As a result of the installation of the small system, the firm reduced errors, cut the time it takes to route trucks and substantially improved its collections procedures.

About two years ago, American Corp. bought out half of another beer distributor to gain the Schlitz/Ballantine portion of the distributorship, according to Alan Chernotsky, owner of the firm.

"With the increased business we ex-

pected from the new line, we just didn't feel we could handle the increased paperwork," Chernotsky said. "We had 425 customers two years ago; now we service 750."

Increased Business

According to Chernotsky, the increase in business would have been too much for his 22 employees, who include drivers, warehousemen and clerical support. "I knew we needed some kind of automatic processing," he said. "We looked at striped ledger systems and mechanical bookkeeping machines, but they didn't do half the job we needed done."

"Then we looked at computers. I

guess we must have looked at 10 different kinds. Most of them didn't have much software, and the ones that did had canned software packages which the companies refused to modify."

Good Example

Chernotsky said he first heard about his present system, a Wang Laboratories, Inc. WCS-30, through an advertisement. When he investigated, he found that while no software existed for beer distributors, a system performing inventory, invoicing and cash receipts operations similar to what he needed was installed at a nearby fuel oil dealer.

"To me, this was a good example of



Chernotsky uses his system to manage order entry, invoicing, sales analysis and truck routing.

the kind of a system I had been looking for," he noted. "Everyone else I talked to said their systems did these operations perfectly, but nobody could show me any installations."

Confident that the system could handle the increased paperwork, Chernotsky decided to purchase it before he added Schlitz and Ballantine.

"I wanted to have our system up and running beforehand," he said. "I didn't want to be in the position of converting all our records over to the system at the same time we were trying to add a new line. That would have been absolute chaos."

Contracted With Programmer

Contracting with a programmer, Chernotsky was able to develop programs defined to his requirements and tailored to his needs.

His list of applications includes order entry for new sales; route assignment for his 11 trucks; a daily sales journal and summary; daily cash receipts; an inventory report, including a value report; an aged accounts receivable, payroll and accounts payable; and a sales analysis by salesman, customer or product.

The system also delivers complete accounting functions from cash disbursements to general ledger and all journals.

Duplicate Files

Chernotsky knew he would have to transfer all of his files from his manual system to the computer; during the process, he had to run duplicate files for two months. But he turned the situation to his advantage, he said, by updating all customer files as they were entered into the system.

"My salesmen made up slips for each customer to get records up to date. Now I won't let a file get out of date, and I have my operators make any changes on the spot," he added.

Because errors are reduced, the firm no longer wastes manpower and postage sending corrections to customers. Truck routing that used to take four people all day can now be accomplished by one operator in under two hours.

The largest advantage Chernotsky reported was improved collections. "Because my system provides accurate aged balances, I know immediately all receivables over 30 days and I have increased collections substantially."

"Also, the New Jersey Alcoholic Beverage Commission requires a statement of all customers with billings over 30 days, and now I can print it out daily without any hassles," he added.

Register now for DataComm 78!



Call 800-225-4242*

Don't miss the one Data Communications Industry Conference and Exposition held in the city where DataComm policy and regulation are established!

Profit from vital information, insight, ideas brought to you by nationally known data communications experts! Be there in person. Don't get DataComm secondhand!

Call 800-225-4242

Take part in panels and sessions that let you ask your questions, share experiences, express your needs.

Make DataComm your personal conference, choosing your options each day — ranging from tutorials for the beginner to advanced networking panels for the sophisticated user.

Call 800-225-4242

And register for one, two, or all three action-packed days, including:
Keynote Speaker-Richard Wiley, former chairman of the FCC • 19 Vendor/User Rap Sessions • 3 Special Management Sessions • 6 Network Tutorials and Panels • All Day Government Miniconference and MORE!

FREE! The Exposition at DataComm 78 will feature exhibits from manufacturers all over the country. Discuss your needs and plans with key representatives in a quiet-paced, informative atmosphere.

Call 800-225-4242

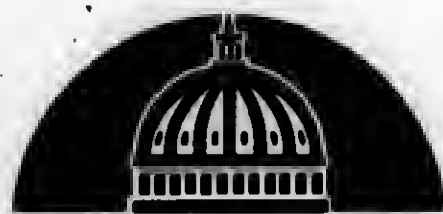
REGISTER NOW!

If this is the first news you've learned about DataComm 78, don't miss this chance to attend.

AFFORDABLE:

UNMISSABLE! Just \$115 for the whole DataComm Conference, or \$50 each for single days.

Don't delay! Master Charge, American Express, Visa/BankAmericard accepted. Call our toll-free number now to arrange your attendance at DataComm 78—the ONE conference you don't want to read about later and be sorry you missed.



DataComm

78

**CONFERENCE
AND EXPOSITION**

**February 21-23,
Washington, D.C.**

Sheraton Park Hotel

* Inside Massachusetts, call collect: (617) 964-4550.

Or write DataComm 78

Registration

**The Conference
Company**

60 Austin Street, Newton, MA 02160

Micro Bytes

I/O Board From Infinite Compatible With S-100

MELBOURNE, Fla. — An I/O board with 128 bytes of random-access memory, a serial port with switch-selectable data rates up to 19.2 kbit/sec and S-100 bus compatibility has been introduced by Infinite, Inc.

The MFIO-1 board features an 8-bit parallel input, a switch-selectable cassette interface with data rates from 300- to 2,400 bit/sec and two IBM 2708-type erasable programmable read-only memory sockets, a spokesman said. The structure of the unit allows up to 2K bytes of program storage for system bootstrap, monitor and utility routines, he added.

Total power requirements are less than 1A, and a 21-command, two-chip monitor program is available in programmable read-only memory as an option, the firm said.

The board costs \$282 assembled, \$234 as a kit and \$49 for a bare board from Infinite, 1924 Waverly Place, Melbourne, Fla. 32901.

Temperature Sensor Offered

NORWOOD, Mass. — Analog Devices, Inc. is offering a two-terminal temperature sensor that is reportedly capable of producing an output current proportional to absolute temperature when driven by a direct current supply voltage between 4V and 30V.

The AD590 is capable of achieving 1°C accuracy over a -55°C to 150°C range, a spokesman said. Power requirements for the device measure 1.5mW with a 5V supply at 25°C, keeping sensor self-heating effects to a minimum, he claimed.

The AD590 is available in three models. The "L" version is calibrated to 1°C at 25°C with a 1°C linearity over the range of -55° to 150°C; the "K" version offers a 2°C calibration and a 2°C linearity; and the "J" model features a 5°C accuracy with a 2°C linearity, the firm said.

The prices of the three versions are \$1.95 for the J model; \$3.95 for the K; and \$7.95 for the L from Analog Devices, Rte. 1 Industrial Park, P.O. Box 280, Norwood, Mass. 02062.

RAM Replaces SBC 8010

WALTHAM, Mass. — GSI Systems has introduced a 64K random-access memory (RAM) board that it said is capable of replacing four Intel Corp. or National Semiconductor Corp. SBC 8010 16K boards.

The Model 10046 has an access time of 475 nsec with a 650 nsec refresh rate, a spokesman said. Two serial I/O ports capable of providing RS-232C or current loop interface can be incorporated to permit the board to communicate with various peripherals, terminals and modems, the firm stated.

The board provides all the necessary logic and circuitry to perform accessing, reading, writing, transparent refresh and direct memory access, the spokesman added. It can be driven by any Intel or National Semiconductor 8010 board.

The 10046 is priced at \$179 with the 16K version selling for \$495 from the firm at 223 Crescent St., Waltham, Mass. 02154.

Rental Equipment Catalogued

BURBANK, Calif. — Electro Rent Co. has an eight-page catalog of nearly 200 pieces of microcomputer and minicomputer development/test equipment that the firm rents.

The catalog is available from the company at 4131 Vanowen Place, Burbank, Calif. 91505.

Retiree 'Programs' Hobby Into \$30,000/Year Career

SAN JOSE, Calif. — "My former company gave me a retirement program it never anticipated. By using one of its products, I'm making a lot more money now as a retiree than I ever did as a regular old working stiff."

Carrol S. Smith retired from Hewlett-Packard Co. in 1971 at age 65, after working in the corporate training department. The first thing he did with his spare time was fill it with work. He now uses a programmable pocket calculator and a desktop computer to play the stock market.

"I anticipated that retirement would be a shock long before it occurred, what with idle time and the reduction in income. So I made plans to have a new career waiting for me," Smith recalled.

"The stock market has been an avocation of mine for a number of years and, as a neophyte, I had even made some money. I had also done a considerable amount of reading about the market and even developed some theories of my own. Retirement gave me the opportunity to put these theories to the test."

Smith began his new career with the help of an early HP desktop calculator and an HP 35 pocket scientific calculator.

"Those early calculators were a real asset. The cost of renting a computer would have made such a small operation as mine unprofitable. Yet the equations that I used to pre-



Carrol Smith, 73, has turned his retirement into a second career as a stock market investor.

dict market activity required far more calculating power than I could do by hand. The calculators made it possible for me to reach my goal," he explained.

Grossing \$30,000 Annually

Smith's hobby has grown considerably in the past six years. He estimated that during that period he has moved more than \$5 million in and out of the market, yielding an average yearly income of \$30,000 — all from an initial investment of about \$35,000.

As the scope of his expertise has grown, so

(Continued on Page 97)

Surveyer Uses Micro to Draw Colorful Examples of Its Work

By Tim Scannell
CW Staff

LOS ANGELES — A firm that specializes in the compilation of demographic information in areas ranging from a few city blocks to thousands of miles picked an Intelligent Systems Corp. (ISC) Intecolor 8001 microcomputer to aid in its surveys of population and distribution.

One of the reasons Urban Decision Systems, Inc. chose that particular microcomputer was its ability to produce displays in eight different colors, according to Jerry Paris, a company official.

Since the installation of the 8001, Urban Decision has saved more than \$1,000 each month and is better able to graphically demonstrate its services to prospective customers, Paris said.

Urban Decision receives its demographic information, on a time-sharing basis, from the National CSS, Inc. network; a private data base that is accessible via terminal. The firm conducts surveys on households, income, expenditures and other areas in which census-type information is needed.

Although some of the studies are performed in concentrated sectors of four or five square miles, a number are focused on areas of irregular shapes and sizes.

"People would be giving us more and more 'polygon' [irregularly shaped area] orders," Paris said. "Since our system is driven by latitudinal and longitudinal coordinates, we would have to calculate a separate coordinate for every point at which the polygon would change direction."

"If somebody gave us something like an 800-sided polygon, several man-days would have to be allocated" to perform this task, he

stated.

Because of the great amount of time it took to survey large areas and the number of errors experienced with a manual system, Urban Decision decided to use a microcomputer in conjunction with a digitizer to simplify the operation.

"We would just define a single reference point on a map and get the displacement, in inches, using a digitizer," Paris said. "The microcomputer would then translate the coordinates into miles" relative to the area under inspection.

The 64K Intecolor 8001 at Urban Decision Systems, which runs about five hours daily, incorporates an Intel Corp. 8080 microprocessor and a Shugart dual floppy disk drive. It is interfaced to a Science Accessories Corp. Graf/Pen digitizer.

The user is currently under contract with

(Continued on Page 97)



Urban Decision employee keys demographic data into a micro-based system.

MICROCOMPUTING

I
J

INQUIRY — Refers to a technique whereby the interrogation of the contents of a computer's storage may be initiated at a local or remote point by use of a keyboard, Touch-Tone pad or other device.

JACK — 1. A socket to which the wires of a circuit are connected at one end and into which a plug is inserted at the other end. 2. A connecting device to which a wire or wires of a circuit may be attached and which is arranged for the insertion of a plug.

JOB CONTROL LANGUAGE (JCL) — 1. The JCL for modern operating systems may be quite complex and there are probably nearly as many user-prepared jobs which fail to execute due to JCL errors as failures due to compiler language errors. 2. A programming language specifically used to code job control statements.

JOVIAL (JULES OWN VERSION OF IAL) — A language containing facilities for numerical computations and some data processing. Most widely used for command and control applications. A new version of Jovial called Jovial/J73 has been developed; it is expected to become the new standard language for command and control applications.

effectiveness especially as measured from a computer's point of view, i.e., hash or garbage.

K

KEYWORD — Refers to various significant or informative words in a title, abstract, body or part of the text that generally are utilized to describe a document. A keyword or set of keywords may describe the contents of a document, label the document and/or assist in identifying and retrieving the document.

KILOBAUDS — Refers to high capacity data channels. For special applications, some data channels capable of 20 kilobauds have been placed in service.

KILOCYCLE — Abbreviated kc. One thousand cycles per second.

KIT ASSEMBLERS — A typical kit reads a source program from an external device and converts it into binary form in the MPS memory. Input can be read from any device, including the teletypewriter keyboard. A second pass of the source can be made to generate an assembly listing. The assembler itself occupies approximately 3K of memory in some systems.

LEARN

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc., 207 Kenyon Road, Champagne, Ill. 61820.



COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

Microdata 1800 Cpu (Reality) Wanted for above: mag tape controller and disc controller. (201) 751-3000.

FOR SALE: ALTAIR 8080B Computer 36K, serial I/O, cassette interface \$1900 firm. Rick Ellis, Box 287, Stow, Mass. 01775 (617) 897-9841.

8080/8085 ASSEMBLER, North Star Micro Disk-to-RAM, \$50. Literature \$1. J. Howson, 35 Briarwood Ln., Marlboro, MA 01752.

GAMES DEMOS APPLICATIONS. Programs in BASIC for home and office use. Many games available. Self-teaching BASIC. Checkbook balancing, mortgage/interest calculation and other applications. Detailed information \$1.00. Mike Computing, P.O. Box 17105, Irvine, Ca. 92713.

Processor Technology Sol-20 Computers 20% off. Byte (215) 525-7712.

MICRODATA MEMORYs, 1800 CPUs, SELECTRIC #735 I/Os, (new), PC Bd REPAIR; Shebesta (513) 474-1880.

Microsoft ("Altair") BASIC for 8080/280/8502 and FORTRAN IV for 8080/280 now available to OEMs, end users. 808/280 BASIC has random, sequential files; double precision; IF... THEN... ELSEs and more. FORTRAN produces optimized relocatable code, meets ANSI88 except complex. CP/M and ISIS-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 San Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 282-1488.

LEARN MICROCOMPUTER PROGRAMMING. At home. At your own pace. Complete course consisting of 10 lessons, problems, solutions, practical examples in 8080, 8085 assembly language. \$49.95. Write or call Pat for FREE BROCHURE. Logical Services, Inc., 711M Stierlin Road, Mountain View, Calif. 94043. (415) 965-8385.

WANTED: Applications software in Basic for the Data General microNOVA with 28K and dual floppies. Outright purchase or royalty negotiable. Box 1415, 797 Washington St., Newton, Mass. 02160.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02180.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02180. I have read the rules, and would like to place my ad as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (_____) _____

Retiree Turns Hobby Into \$30,000/Year Career

(Continued from Page 95)

has Smith's equipment. He has upgraded his desktop calculator to a Wang Co. 720B desktop computer and twice upgraded from his HP 35, first to an HP 65 programmable pocket calculator and recently to an HP 97 programming printing calculator.

"Keeping track of the market requires a considerable amount of chart-

ing. Primarily, I'm searching for a number known as the 'relative strength' of a stock. This involves taking the stock price and dividing it by one of the basic market indicators, like Standard and Poor's and Dow Jones, and then using some constant multiplier to give a chartable result.

"The chart describes the activity of the stock in relation to the chosen in-

dicator. From this graphic representation, a knowledgeable investor can locate 'buy' and 'sell' signals. Occasionally, the graph will give you a false signal, but 75% of the time it will be quite accurate," Smith said.

"I use two running stock price averages, one short-term and the other long," he continued. "Where the average graphs cross, they confirm the relative strength signal. Other checks on relative strength are an ongoing record that I keep of changes in the volume of stock sales and a 50-day true running average of each chosen stock.

"Combining all five indicators for just one stock would be a difficult job. Attempting the same operation on the more than 100 stocks I regularly survey would be clearly impossible

without some kind of DP," he said.

Smith divides his computational load between the Wang 720B and the HP 97. The 720B handles the large number reduction and processing operations and the HP 97 is assigned the shorter, more flexible programs.

Smith's results apparently have been successful; he and his wife have taken on five cruises in nearly as many years and he has purchased both a mobile home and a truck to tow it.

On each of the cruises, Smith used his calculator as a ticket of admission to the bridge. There he has challenged the ship's computers and books of navigation tables to tests of accuracy. One captain was so impressed, Smith said, that he asked to use the calculator on the bridge for the rest of the trip.

User Gets Graphic Examples

(Continued from Page 95)

the Public Broadcasting System (PBS) to survey specific television viewing areas. "We're highlighting the 'A' and 'B' viewing areas for all the PBS stations in the U.S.," Paris said. "We show the 'A' sectors in one color and the 'B' in another color, and we have a little blinking broadcast beacon representing the location from which the television signal is originating."

The system "is very impressive and, at the same time, it's a real workhorse," he added.

Manuals Inadequate

The system was purchased from a hobbyist computer store at a price "in the vicinity of \$5,000." Although it has been relatively trouble-free, there have been a few difficulties, Paris said.

"We had the usual shakedown problems," he recalled. "We had to take it back once because of a problem with the power supply, but the biggest problem we've had was getting information from the manufacturer" concerning the microcomputer's operational capabilities.

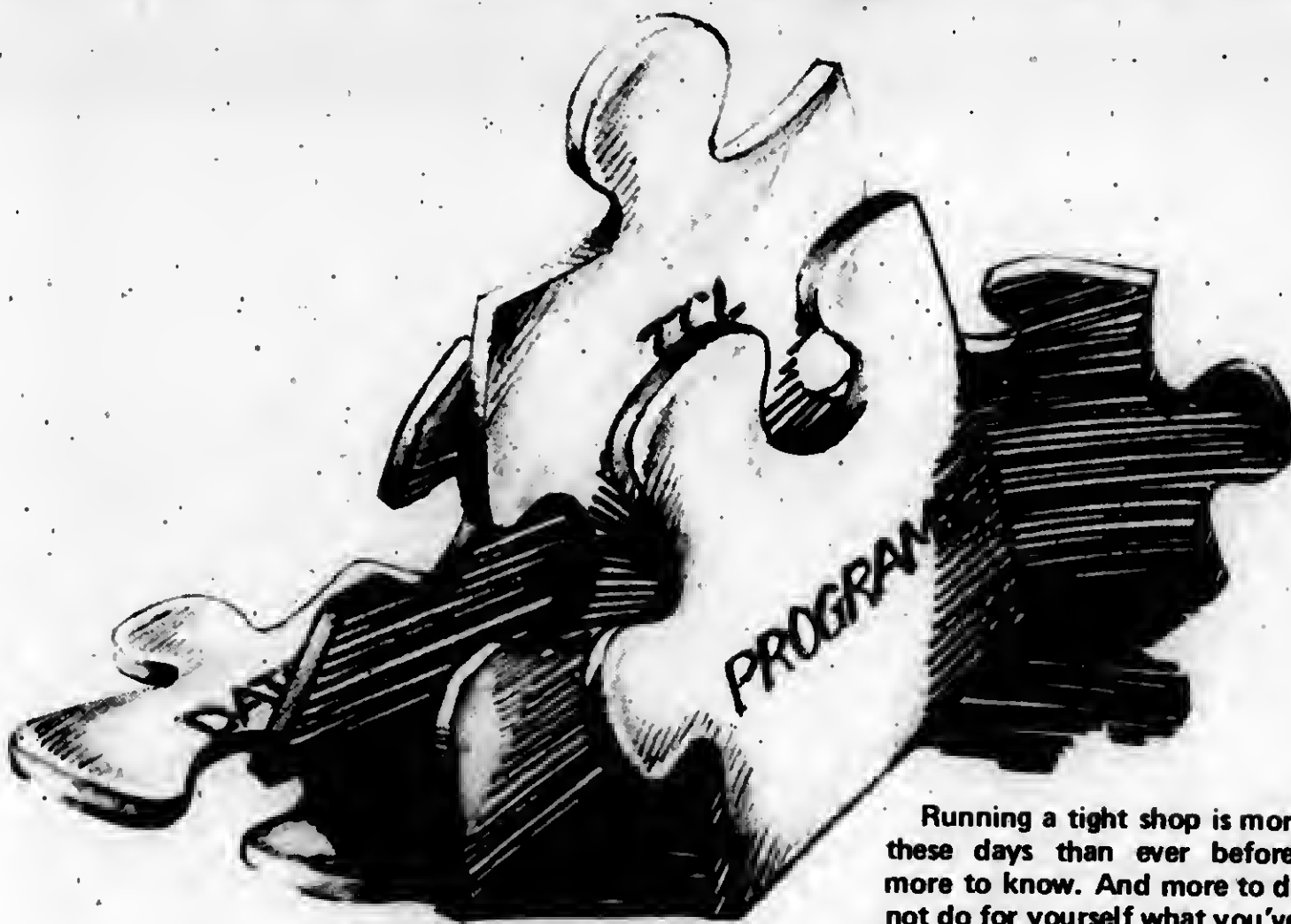
"We don't think the manuals are terribly good and I'm sure the manufacturer knows that also," he stated.

"Although our experience has been with a national time-sharing service and we never had a microcomputer before, I feel there's a lot of potential yet that we're just learning," Paris said. "We eventually would like to market some type of system where people would buy a terminal and we would send out signals on the National CSS network providing some type of

graphic capability."

Most of the people seeking demographic surveys are responsible for providing support information to management that is used as a basis for decisions, Paris said.

Get It All Together...



Running a tight shop is more difficult these days than ever before. There's more to know. And more to do. So why not do for yourself what you've done for your users?

With JOBDOC, you build a data base of everything you need to know about running your jobs. And then let JOBDOC go to work:

- Controlling Costs
- Monitoring File Relationships
- Generating Complete Job Requirements
- Cross Referencing All Job Related Information
- Providing Operating Statistics
- Giving You A Better Audit Trail Than You Ever Thought Was Possible.

JOBDOC: When you want an easier way to do a tougher job.



Gulf Computer Sciences Inc.
1775 St. James Place
Houston, TX 77027
Tele. 713-627-9320



'Speak To Me ...'

155-II

Up to two megabytes with DAT.
Sale or Lease

MDISCO
312-698-3000

I/O Board Links S-100

WESTLAKE VILLAGE, Calif. — An I/O board that combines two parallel input and output ports and a serial I/O port using an 8251 programmable universal synchronous/asynchronous receiver-transmitter has been introduced by Vector Graphics, Inc.

The Bit Streamer communicates with board circuitry via a microprocessing unit; it was designed to interface to an S-100 bus structure, a spokesman said.

The I/O board costs \$155 in kit form and \$195 assembled from the firm at 790 Hampshire Road, Westlake Village, Calif. 91361.

HP Adds Books On Calculators

PALO ALTO, Calif. — The Hewlett-Packard Co. has released 10 books for owners of its HP-29C programmable calculators. The books provide solutions to problems commonly found in 10 different areas, the firm noted.

Each of the solution books provides the user with 12 programs that HP selected for their everyday usefulness. A summary of each program, a listing of program steps and an explanation of how the results are displayed on the calculator are meant to allow users with little or no experience to program and operate one of the calculators, the firm said.

The books sell for \$7.50 each from HP at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Boards Extend PCM-12 Use

SAN RAMON, Calif. — Pacific Cyber/Metrix, Inc. (PCM) is offering a prototyping board and an extender board for use with its PCM-12 microcomputer system.

The 12090 prototyping board plugs directly into the PCM-12's backplane bus using a standard H322140 edge connector, according to a spokesman. The board will accommodate as many as 40 14-pin or 16-pin dual in-line packages (DIP) and up to four 40-pin DIPs, he stated.

The board can handle either wire-wrap or solder-tail integrated circuit sockets, PCM noted.

The 12190 extender board allows the user to physically extend the bus connections for a given module beyond the card cage area, the firm said. When

this is done, the module becomes more accessible with no degradation in system performance, it claimed.

The prototyping board is available for \$42; the extender board with connector sells for \$43 from the firm at 3120 Crow Canyon Road, San Ramon, Calif. 94583.

System Based On Z80 Micro

HORSHAM, Pa. — A microprocessing system that incorporates the Zilog Z80 microcomputer and features 80K of random-access memory (ROM) was introduced by Digilog Systems, Inc.

The Microterm II package allows the inclusion of a 24- by 80-character CRT, a 2,200 char./sec non-impact printer, single or dual mini-diskettes and two Z80A microprocessors with 80K bytes of RAM capacity, all in one unit, the firm said. The internal printer, dual diskettes and memory expansion beyond 32K are optional features, it added.

The basic configuration with 32K RAM, CRT, dual processor, dual diskettes with 32K RAM and communications interface is priced at \$5,920. The internal printer is priced at \$1,675 and the 16K memory expansion costs \$515 for a single unit from Digilog Systems, Inc., Babylon Road, Horsham, Pa. 19044.

Static RAM Board Fits M6800 Buses

ROCHESTER, N.Y. — American Technologies has introduced an 8K by 8-bit low-power static random-access memory (RAM) board for microcomputer systems utilizing the Motorola, Inc. M6800 bus structure.

The SME6808 is organized as two 4K arrays that can be independently located at any 4K boundary on the 64K addressing range of the system, a spokesman said. Base address selection for each array is made via on-board jumpers, he stated. Switches on the board allow selection of a read-only mode of operation for each of the 4K arrays, permitting the user to simulate read-only memory for software development applications, the firm said.

The memory board operates from a single 5V power supply over a 0°C to 70°C temperature range, the firm claimed. Prices for the board, which come in 500 nsec and 250 nsec versions, are \$324.95 and \$399.95 respectively, from the firm at P.O. Box 23001, Rochester, N.Y. 14692.

Data Cassette Has Pilon-Coated Pad

GARLAND, Texas — A data cassette with a storage capacity of 50,000 bytes of 30 byte/sec data, developed for the home computing user, has been announced by Percom Data Co., Inc.

The Pilon-30 features a pilon-coated pressure pad that reportedly provides a more uniform tape-to-head contact and eliminates "fiber-lint," a source of drop-out error in audio cassettes, a spokesman said.

Price of the polyester-based tape, sealed in a five-screw housing, is \$2.49 in quantities of five from the firm at 318 Barnes, Garland, Texas 75042.

Mom would be proud of you for picking a data communications terminal system from Trendata.

There's such a selection. Not only in terminals and peripherals, but also in financing arrangements. We offer a variety of lease programs, straight purchase plans, even rental packages. Easy. Convenient.

You deal with one company that guarantees the product and backs it with nationwide service.

You can start with a small investment in equipment and later expand to more capacity without going through a financial hassle.

Our lease and buy programs are just as flexible as our terminal systems. Our equipment is designed to fit your people, our financing programs to fit your pocketbook.

They're both time savers you can really bank on.



**Applied Magnetics
Trendata**

610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086
(408) 732-1790

Our terminal lease or buy programs fit everyone's pocketbook



Motorola Adds 4K-Bit RAM

AUSTIN, Texas — Motorola Semiconductor Products, Inc. has announced the availability of a 4K-bit static random-access memory (RAM) that operates from a single power supply and is compatible with transistor-transistor and diode-transistor logic.

The MCM2114 is offered in speed ranges of 200nsec, 250nsec, 300nsec and 450nsec and in two power versions, 550mW and 385mW, a spokesman said. Both

use a single 5-volt power supply with a tolerance of approximately 10%, he stated.

The memory features data I/O of the same polarity and operates without clocks or timing strobes, the firm noted.

Price of the unit, in an 18-pin plastic or lid-seal ceramic package, is \$12.25 in quantities of 100 from the firm at 3501 Ed Bluestein Blvd., Austin, Texas 78721.

Vista Minifloppy System Designed for Z-80, 8080

TORRANCE, Calif. — Vista Computer Co. has designed a minifloppy disk system for both Z-80 and 8080 microcomputer applications that includes an S-100 bus controller card.

The V80 system includes a minifloppy disk drive with a capacity of 80K bytes, a direct current regulator board for powering the unit from the user's microcomputer, an S-100 bus card that can control up to three

drives, a disk operating system and Basic-E compiler recorded on a diskette, I/O cables and hardware and software documentation.

Features of the system include context editing of programs and text, a debugging function, program assembly, batch processing and a file management and storage program, according to a spokesman.

The single-sided disks contain 35 track/side with 2,304 bytes/track, he said; adding the drive has a track-to-track average seek time of 40 msec.

The system is priced at \$649 as a kit and \$749 assembled from Vista Computer, 2807-FS Oregon Court, Torrance, Calif. 90503.

KIM-1 Offered for Prom Programmer

EARLYSVILLE, Va. — A programmable read-only memory (Prom) programmer for use with MOS Technology's KIM-1 microcomputer has been introduced by Optimal Technology, Inc.

The programmer also contains a verify mode that reportedly confirms that all bits have been programmed correctly, the firm stated.

The programmer, which comes on a printed circuit board, is priced at \$59.95 from the firm at Blue Wood 127, Earlysville, Va. 22936.

I/O Controller Goes With Z-80

CUPERTINO, Calif. — A dual-channel, multiprotocol, serial data communications controller circuit designed to work with Z-80 microcomputer systems was released by Zilog, Inc.

The Z80-SIO supports the "daisy-chain" interrupt structure of the Z-80 MPU, a spokesman said. The unit incorporates silicon-gate depletion load technology and each of its full-duplex channels has four control lines for most commonly used modems, he said.

Price of the controller circuit is \$54 for a 40-pin ceramic package and \$49 for a 40-pin dual in-line package. Zilog is located at 10460 Bubb Road, Cupertino, Calif. 95014.

System Permits Remote ac Control

BEN LOMOND, Calif. — Mountain Hardware, Inc. has unveiled a system that permits control of ac devices remotely from any S-100 bus or Apple II microcomputer over existing 110 Vac wiring.

Introl provides on/off control and status checks at any ac outlet, the firm said. The system impresses a code modulated 50 MHz control on the ordinary ac wiring and decodes the signal at any outlet to switch ac devices on and off, a spokesman stated.

The system includes a controller that can address up to 64 channels and a dual, 500-watt remote unit that attaches to an ac device, the firm noted.

The ac controller costs \$149 in kit form and \$189 assembled. Remotes cost \$99 in kit form and \$149 complete from the firm at P.O. Box 1133, Ben Lomond, Calif. 95005.

The
Computerworld
Index
Tells You
What You
Need to Know.

Swapping a 360/370 for a DEC can be a good deal. Hanging on to the IBM 1403's will make it a better deal.

Moving to a DEC System can make good economic sense. But if you're about to do it, just one word of caution. When you're evaluating your peripherals, be sure to hang on to your IBM 1403 printer. You know from your own experience that the 1403 gives you remarkable print quality. It's a proven performer that others have used to improve DEC System printing.

With the Grumman printer controller it's a simple matter to interface the IBM 1403 to your DEC system. Or, for that matter, to any other computer you might be considering. You'll not only retain the superior printing you're accustomed to, but continue to enjoy the extremely high reliability of the 1403. Best of all, the economics are right.

Remember, whether you buy, rent or lease our printer controller, we can provide efficient maintenance.

For complete information, contact your Grumman Data Systems representative. Or write or call Joe McDonough, Grumman Data Systems Corporation, 45 Crossways Park Drive, Woodbury, NY 11797, (516) 575-3034.



Grumman Printer Controller. The image maker.

Canada: Digital Interface Ltd. Tel: (416) 231-3321
Nordic Countries: OY D. H. Wirkkala AB. Tel: 88 21 33
Great Britain & Ireland: Data Design Techniques Ltd. Tel: 01-903 6977
Spain: CERO. Tel: 416 87 60/ 416 61 88
Switzerland & Austria: Intersystems AG. Tel: 061/35 09 25
West Germany: PeriData GMBH. Tel: 06196/81952

Analog Devices Introduces 8-Bit CMOS Converter

NORWOOD, Mass. — An 8-bit multiplying CMOS digital-to-analog (D/A) converter with a power consumption of less than 20mW has been introduced by Analog Devices, Inc.

The AD7523 features four-quadrant multiplying and a settling time within 100 nsec, according to a spokesman.

The converter is being offered in three versions: the AD7523JN, which provides a linearity of being .5 least significant bit (LSB); the KN, providing .25 LSB; and the LN, which features a .125 LSB.

All of the units provide a feed-through of .5 LSB at 200 kHz with a uniformity that is constant over a temperature range of 0°C to 70°C.

The converters are housed in 16-pin plastic dual in-line packages and are priced at \$2, \$5 and \$7.50 for the JN, KN and LN, respectively.

Analog Devices is at Rt. 1 Industrial Park, P.O. Box 280, Norwood, Mass. 02062.

Wintek Cuts Module Price

LAFAYETTE, Ind. — The Wintek Corp. has announced a 62% price reduction on its 2K CMOS random access memory (RAM)/Battery Module.

The price has been lowered from \$889 to \$349 with 256 bytes costing \$129.

Wintek is at 902 N. 9th St., Lafayette, Ind. 47904.

BASF Has Flexy

BEDFORD, Mass. — BASF Systems is offering a series of mini-floppy disks whose design is said to give the writing head of the computer access to 40 tracks instead of 35 and allow the user 1M bits of single-density storage per side.

The Mini Flexydisks come in 10 and 16 hard-sector formats and one soft-sector format; the firm said.

The series was developed for systems using 5.25-in. disk drives and has applications in personal computing and small business environments, a spokesman stated.

The diskettes are priced from \$4 to \$6 each from BASF Systems, Crosby Drive, Bedford, Mass. 01730.

Avdex Adds Cassette Line

BALDWIN, N.Y. — Avdex Corp. has a line of data cassettes, loaded in one-, three- and five-minute lengths, designed for use on hobby and small business computers.

The cassettes are manufactured with

short leaders to prevent leader contact with the recording head and make possible an instant start operation, according to a spokesman.

They utilize machine-guided rollers, stainless steel pins and oversized pressure pads and hubs for a uniform tape transport, he added.

The CDC-1, CDC-3 and CDC-5 cassettes are priced at \$4.95, \$5.65 and \$6.35, respectively, from the firm at 2280 Grand Ave., Baldwin, N.Y. 11510.

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.

NCR
Varian Graphics
Informatics
National Semiconductor
Datamation
Communication News
McCormack & Dodge
Data Rentals
Computer Sales International
Intel
Electronic Ventures
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing
S. E. A.
Tri-Data
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems
Shasta
Moslek
DIVA
SBC Magazine
Tele-dynamics

Control Data
Honeywell
Printtronix
Codex
Lear Siegler
E. M. & M.
The Morley Company
Varian Graphics
Total Typograpy
Wang Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Intorex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Informer
Computer Decisions
Intosystems
T-Bar
Corporate Systems
DynaTech

IBM
General Computer
Atlantic Research
Teletype Computer Products
General Electric
Gume
Moore Business Forms
DataMedia
Texas Instruments
Computerworld
NCI
Deltak
Kodak
BASF
Western Union
Anderson Jacobson
Computer Input Services
Paradyne
ComData
Genesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service

Itel Corporation
Peripheral Products
Applied Digital Data
Epic Data
Sykes Datatronics
Cummins Allison
American Microprocessor
International Data Corp.
Programs, Inc.
Beehive International
Interlec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini-Computer Systems
Tandem Computers
PCC/Perlec
Computrend
Extel
Mentel
Sycor
Digitronics
Computer Services
Datamart
Courier Terminals
Trac/Hughes & Bomac
Modems Plus
Software Design
Curtis 1000
Spectron
K&K Associates

Sperry Univac
Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathematica
Rianda Electronics
Computer Corp of America
AT&T
Cullinane
Hewlett Packard
Pansophic Systems
General DataComm Industries
Continental Peripherals
Computer Associates
Qanter
Diablo Systems
Marketechs
Racal-Milgo
Data Systems Specialists
Key Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
McGunn Safe
Allstate Computer
H/G Professional Forms
Nichols & Company
Datapro

Hobby Havens

As a service to hobbyist readers, Computerworld periodically will list the micro clubs in different parts of the country.

Clubs wishing to be included in this listing should send their name and address as well as the name and address or telephone number of a contact person to Frank Vaughan at Computerworld, 797 Washington St., Newton, Mass. 02160.

CALIFORNIA

North Orange County Computer Club. Contact: Lorin Mohler, P.O. Box 3603, Orange, Calif. 92665. Telephone (714) 998-8080.

IDAHO UPDATE

Pocatello Microcomputer Club. New Contact: Joseph E. Price, Box 8107 (Physics Department), Idaho State University, Pocatello, Idaho. Telephone (208) 236-2350, 232-4462.

ILLINOIS

Cyborg. Contact: Ralph Bargaen, 1362 E. 59th St., Chicago, Ill. 60637.

INDIANA

Evansville Computer Club. Contact: Robert W. Herdink, c/o National Sharedata Corp., P.O. Box 3895, Evansville, Ind. 47737. Telephone (812) 426-2728.

MONTANA

Flathead Computer Society. Contact: E.G. Brooner, P.O. Box 236, Lakeside, Mont. 59922. Telephone (406) 844-3410.

OREGON

Oregon Council for Computer Education. Contact: Dick Ricketts, 1200 Highway 99N, Eugene, Ore. 97402. Telephone (503) 689-6500.

PENNSYLVANIA

Centre Country Computer Club. Contact: Carl Vesper, 1357 E. College Ave., State College, Pa. 16801. Telephone (814) 238-0048.

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

For complete information on how the 1978 Computer Expo can work for you, use the coupon below or call Kim Wichert, toll free 800-225-4242. In Massachusetts, (617) 964-4550 (collect).



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
☐ Have Sales Representative call me
☐ Send Reservation Agreement
☐ Send Copy of 1977 Attendee Analysis

- | | | |
|--|---------------|---------------|
| ☐ Southern California Computer Expo | Anaheim/LA | March 21-23 |
| ☐ Northwest Computer Expo | San Francisco | March 28-30 |
| ☐ Southwestern Computer Expo | Houston | April 11-13 |
| ☐ Southeastern Computer Expo | Atlanta | April 18-20 |
| ☐ Gateway Computer Expo | St. Louis | April 25-27 |
| ☐ Midwestern Computer Expo | Chicago | May 2-4 |
| ☐ Mid-Atlantic Computer Expo | New York | May 9-11 |
| ☐ Great Lakes Computer Expo | Detroit | May 23-25 |
| ☐ New England Computer Expo | Boston | May 30-June 1 |

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (____) _____

'Privilege Used as Weapon'

IBM Claims Obstructed Prosecution: U.S.

By Catherine Arnst
CW Staff

NEW YORK — IBM has used attorney-client and work product privilege claims as a "weapon to obstruct the prosecution of this case," the government charged recently in the U.S. vs. IBM antitrust trial.

As a consequence, IBM should pay all costs pertaining to the special Masters' Review of some 26,000 documents [CW, March 7], the government requested in a motion before Judge David N. Edelstein, who is hearing the case.

IBM privilege claims, asserted originally for some 100,000 internal corporate documents, have been haggled over by the parties since 1973, when the government first asked that they be produced.

In April 1973, Edelstein appointed three Special Masters to review the documents one by one. The government designated approximately 37,000 documents for the masters' review, and IBM withdrew privilege claims on 10,000 of those without review because they fell into categories Edelstein had ruled did not qualify for privilege claims. After two years, the masters denied privilege claims on all but 2,173 documents.

IBM Claims Denied

IBM appealed their rulings on approximately 14,000 documents but later determined that 50% to 60% of those no longer deserved claims of privilege because of age or the unimportance of the subject matter to the case. Ultimately, 1,100 documents were handed to Edelstein for review last summer, and he denied virtually all privilege claims.

At the time of this review, Edelstein said, "I have looked at the documents and the objections and claims that have been made, and unless I have become completely witless, for the life of me, no matter how I would try or no matter how much I would want to identify with [IBM's] perception of the law...I have not been able to see the merit of some of the objections [to the Special Masters' rulings]..."

"I must also say there are documents so clearly outside the possible reach of any [privilege] claim that I am amazed they are in there..."

The government's motion charged that "from beginning to end, IBM counsel have continuously asserted frivolous privilege claims as a means of wasting the time and money of this court and government counsel

and for denying to government counsel the best evidence."

Strong Exhibits

The documents at issue which the government offered into evidence this fall [CW, Nov. 7], are considered to be some of the strongest exhibits in its part of the case. Justice Department attorneys complain that if they had had these documents sooner, they could have shortened their court case considerably.

"It should be noted that of all the recent monopolization cases filed against IBM, only in this case did the plaintiff have sufficient resources to pursue the documents in question long enough and in sufficient detail to the point where the frivolous nature and the vast majority of the claims were clearly exposed," the government stated in its motion. Consequently, "less endowed plaintiffs...did not get the documents to which they were entitled," it charged.

PCMs' Success Convinced IBM To Alter Plans, Memos Reveal

By Molly Upton
CW Staff

SAN FRANCISCO — By November 1970, members of IBM management were aware the firm needed to make some adjustments in its pace of product introduction and profit margins, in response to the activities of plug-compatible manufacturers (PCMs), according to internal IBM documents.

In a memo to W.C. Hume, D.R. McKay and John Opel, author J.E. Bertram said the direct storage access systems area "has come to be an item of major concern for IBM over the last six months, because of rapid growth and technical competence of our competition."

The memo which addressed the Data Processing Group (DPG) plan, was introduced into evidence at the Memorex Corp. vs. IBM trial here.

"In previous years when we had little effective plug-compatible competition, it was possible for us to achieve quite long product lives and attractive profitabilities from our direct access storage device products by stretching out the rate of our new product introduction," Bertram wrote.

IBM's response said the government charges are "palpable nonsense" and its motion a "sham — a reckless attempt to cover up for the antitrust division's mishandling of the litigation."

The firm's defense against the motion is that it availed itself of all avenues of appeal, as is its right, IBM said. "All [the government] really asserts is that IBM should have waived its right because plaintiff would have that be so. If complaints of this nature appear to be imbued with a certain puerility, nothing in the [government's] presentation of the point diminishes the reality of that appearance..."

"It is understandable why plaintiff would have preferred that IBM immediately capitulate instead of pursuing its right to have the privileged status of specific documents considered by the masters. But plaintiff's preference in this regard hardly means that IBM's preference not to capitulate is the equivalent of bad faith."

"Owing to the change, this is no longer possible as our competitors are hungry, aggressive and possess in combination a total technical competence at least equal to our own," the memo said.

"This means we must reduce the intervals between successive product introductions and reduce our profit margins if we are to remain in this area," Bertram continued.

"We have some problems in reorienting to a competitive situation. Our development capabilities are still geared to a slower pace of technical progress than is now needed." The firm had some difficulties because the disk, tape, architecture and systems areas were geographically and organizationally separate, he indicated.

"The situation is being addressed vigorously by San Jose management and technical people, we are developing new capabilities in disks, heads and servos, and the recent 3330 and 2319 announcements have helped restore our position."

"While our installed inventory represents an exposure to competitive displacement, intelligent reuse plans may be able to assist in containing the situation."

InSci
Information Science Incorporated

Personnel

Payroll

ERISA

EEO

OSHA

InSci Headquarters 95 Chestnut Ridge Road Montvale, New Jersey 07645 201-391-1600

Memphis TN 901 761-1845 Menlo Park CA 415 854-1903 Newport Beach CA 714 752-7672 Oak Brook IL 312 986-6460 Raleigh NC 919 781-6095 San Antonio TX 512 690-0110 Waltham MA 617 890-1518 West Palm Beach FL 305 689-8777

Member SIA Software Industry Association

But Predicts Shorter Life Cycle

Investor Sees Smooth Earnings for IBM 30

By Molly Upton
CW Staff

NEW YORK — IBM's 30 series will not experience the sharp peaks and valleys in revenue and earnings traditionally experienced by new product lines, according to a report by Harry Edelson, vice-president of Drexel Burnham Lambert, Inc., an investment firm here.

Previously IBM's revenue and earnings growth has followed the shape of a lambda over the period of the product cycle, which has generally been six years, he observed, but Edelson feels the 30 series' marked trend toward outright sales gives IBM "greater flexibility to stabilize growth."

The lambda formation was built on the rental base. The thesis of the lambda formation is that "the price of IBM's stock is more susceptible to the IBM product cycle than economic conditions, wars or crises."

In the past, the outright sale of DP equipment has accounted for "10% to 30% of IBM's total revenues, and until the last few years the percentage has varied in the shape of a lambda over the course of the product cycle," he said in the report on IBM's product cycle.

Looking at the different circumstances surrounding the debuts of the 30 and the 370 lines, Edelson concluded 1978 will not be a bad year for the 20 series, as the first year in other product cycles has been.

Purchase orders are extraordinarily high for the 30; Edelson estimated "IBM has more orders for the 3031, 3032 and 3033 computers than the total installed base of superseded computers, namely the 370/148, 158 and 168."

And, he noted, there is less fat in the use of computers as users are utilizing their machines for almost two shifts a day, compared with 1.5 shifts in 1971.

"Orders are now strong enough to allow IBM to control operating results by controlling production levels," he remarked. IBM should have a "good year in 1978 and an even better one in 1979, when it is in full production on its new computers."

Growth rates, he said, will stay in the 10% to 20% range, recessions notwithstanding.

Shorter Lifetime

Whereas IBM's product cycle has previously been six years, the 30 series without mid-life kickers may last only three or four years, Edelson observed.

The relatively short life of the series is indicated by the facts that its low purchase price/lease price does not encourage leasing and that there is no model "U" (unit) designation, which implies there may not be any attached processors or multiprocessor versions, he explained.

Also, the series does not incorporate anything radically new in either hardware or software, according to Edelson.

In contrast, "the next major IBM product cycle early in the 1980s is likely to be rental-oriented and include at least some fourth-generation computer hardware and new simplified software that would encourage computer access from remote terminals,"

Edelson said.

The early '80s will be ripe for such a new line, he indicated, because third-generation computers have been around for 13 years, a long time, and, because the plug-compatible manufacturers are making headway, with Amdahl Corp.'s revenues reaching about \$200 million in 1977.

Other reasons include the fact that introduction of new series would not result in "massive discontinuances (returns) of leased IBM equipment" because it has been selling much of its gear in previous years.

Also, the best use of IBM's \$5 billion cash reserve would be to "rebuild the lease base by introducing a highly ad-

vanced computer series," Edelson observed.

Replacements for the 370/115-2 and 125-2s will likely signal the first mid-life kicker for the 30 series, he indicated.

Edelson listed industry speculations about forthcoming IBM product introductions. These include the possibility of "greatly increased competition" between IBM's Data Processing and General Systems divisions in the form of a machine in the range of the 115-2 125-2 and possibly for the System/3; a terminal-oriented mini-computer system with extensive software from the Data Processing Division in the first quarter of 1978;

and a System/36 and 38, which may be the "first IBM commercial product with bubble memory. These might be announced in the summer, he said.

Another possibility is an H series, probably in the last quarter of 1979, which could be fourth-generation but probably will be a mid-life kicker for the 3033 using improved ECL logic and 32K- or 64K-bit memory chips.

The final possibility is the Sierra, which could be announced in late 1981 or 1982, Edelson said. This would be a fourth-generation series using such new technologies as the Josephson Junction and bubble memory for logic, memory and peripherals, he speculated.



Price/performance. Flexibility. Relia

Series/1 is a family of small, powerful, general-purpose computers that puts the emphasis on productivity.

Series/1 offers a choice of two processors in a variety of storage sizes, plus a full range of I/O units, high-speed disk storage, dual-sided diskette capability, both digital and analog sensor I/O, line and matrix printers and a choice of standard or customized display stations. And well-documented user attachment features make it possible to directly attach non-IBM equipment you may already have.

In addition, communications capabilities include asynch, bisynch and SDLC. IBM's new Programmable Communications Subsystem gives Series/1 the flexibility to simultaneously handle multiple line disciplines or protocols and an extremely broad range of communications I/O, from a variety of manufacturers. And because it is programmable, the user can meet changing communications requirements without having to add new hardware.

But that's not all. The real news of Series/1 is the extensive nature of the architecture.

Both processors—the 4953 and the more powerful 4955—feature realtime 16-bit design, proven bipolar LSI logic, MOS-FET N-channel storage, micro-processor device control and a comprehensive priority interrupt structure. In addition, you get hardware multiply and divide, power fail/auto restart, full double-word arithmetic, parity checking on all I/O data transfers and storage busses and a full-function instruction set including up to 207 microcoded instructions on the 4955 (with the Floating Point Processor feature) and

Commerce Predicts 23% French Market Growth

By Jeffrey Beeler
CW Staff

PARIS — The market for computer products in France will total \$6 billion by 1980 for an average annual growth of 23.6%, according to a study released recently by the U.S. Department of Commerce.

In 1975, mainframes accounted for \$793 million of France's total \$2 billion computer market, and peripherals contributed another \$633 million. By 1980, purchases of mainframes and peripherals will increase to an estimated \$1.53 billion and \$1.06 billion, respectively, the report predicted.

This year, the French mainframe market will exceed a projected \$1.05 billion, and peripherals sales will total an estimated \$757 million, the study

added.

Spurred by this expected growth in hardware demand, French imports of computer products will expand an average of 16.8% annually during the next three years, according to the survey. American vendors will continue to provide 40% of these shipments, about twice the share of West German firms, their chief foreign competitors.

In 1976, the French imported \$795 million worth of computers and peripherals, of which U.S. manufacturers contributed \$312 million and West German companies \$160 million. Other major importers of computer equipment include the UK and Italy, which in 1976 shipped respectively, \$154 million and \$71 million in hardware.

To counter its heavy reliance on foreign shipments — France contributes less to its own market than any other major computer-producing nation — the French government has

International News

committed itself to strengthening its domestic computer industry.

The merger in 1975 of the French company CII with Honeywell Bull to form CII Honeywell Bull represented a step toward greater market control, as does the government's guarantee to provide the new firm \$250 million in

sales between 1976 and 1980, the study explained.

Production figures for the last four years suggest the French computer industry could use some bolstering. In 1974, French production of computers and peripherals totaled \$1.02 billion and \$180 million, respectively. By 1977, those totals had risen only to \$1.8 billion and \$392 million, the report noted.

Growing Value

Despite sluggish growth in domestic output, the value of this country's installed computer base, which totaled \$5.4 billion in 1977, will grow to about \$5.65 billion this year, to \$7.9 billion in 1980 and to \$9.6 billion in 1982. In numbers of units, the French installed base will increase from 19,147 last year to 64,937 in 1982, the study forecast.

Of the 24,514 computers that will be installed in France by year end, small computers will account for 21,113; medium-scale units for 2,493; and large-scale mainframes for 908. By 1982, the country's installed base will grow to 59,021 minis, 3,484 midis and 1,534 maxis, the market analysis said.

At the same time, the dollar value of the three equipment categories will also rise steadily. This year, the installed base of minicomputers will be worth \$1.51 billion; the installed base of medium-scale computers, \$1.59 billion; and \$4.29 billion, respectively, the report predicted.

By 1982, the total value of minis, midis and maxis installed in France will have grown to \$3.1 billion, \$2.23 billion and \$4.29 billion, respectively, the report predicted.

U.S. vendors account for about 65% of France's total installed base of general-purpose computers and slightly less than 50% of the country's installed base of small computers, the analysis added.

In other findings, the study noted that, because France is user computerized relative to other Western European countries, the government encourages the development of computer-based techniques. The largest growth in computer use will occur in the manufacturing sector, where hardware expenditures will nearly double between 1975 and 1980, Commerce said.

"Dramatic" increases in equipment sales will also take place in the retailing, communications and medical sectors, the study said.

During the next five years, France's commitment to central processing will weaken, especially among large organizations, and teleprocessing applications will spread as users link their processors to small business computers and minis.

Sales Prospects

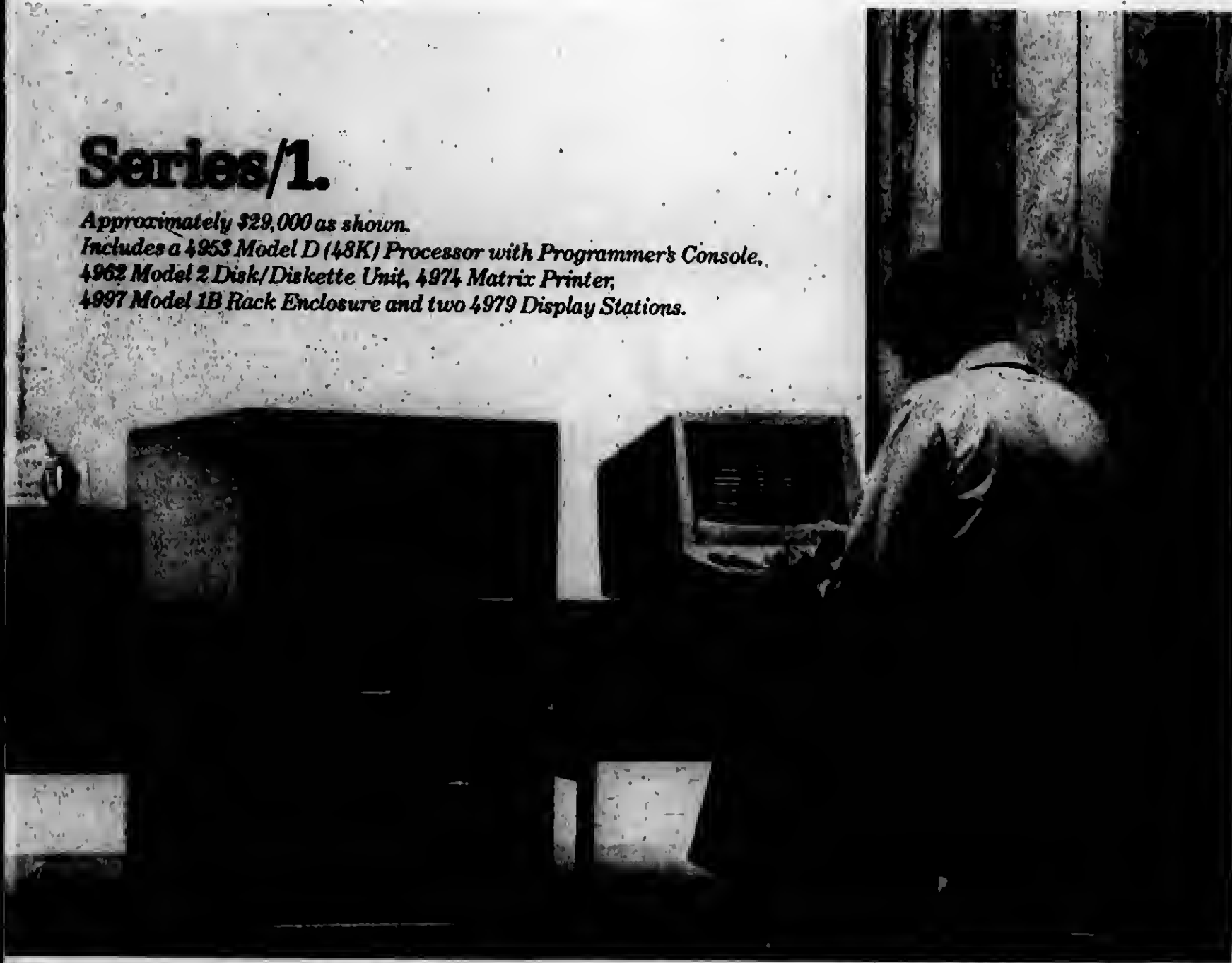
The marketing report also foresees rapid expansion in the minicomputer and large systems markets, but declining hardware sales in the medium systems sector.

Sales of peripherals will also make "substantial" strides during the next few years. In fact, purchases in that sector of the market are "likely to outstrip the sales of computer systems themselves in terms of percentage growth," the report concluded.

Series/1.

Approximately \$29,000 as shown.

Includes a 4953 Model D (48K) Processor with Programmer's Console, 4963 Model 2 Disk/Diskette Unit, 4974 Matrix Printer, 4987 Model 1B Rack Enclosure and two 4979 Display Stations.



bility. Service. You can't beat Series/1.

168 on the 4953.

The Series/1 Realtime Programming System manages system resources for batch, real-time, communications and sensor-based applications in a multiprogramming environment. The Realtime Programming System also provides IBM Systems Network Architecture (SNA) support for Series/1, enabling it to function as a cluster controller communicating to host System/370 processors over SDLC lines.

In addition, Control Program Support provides task and data

management, I/O device support and operator interface services for users developing a tailored operating system.

For application development, PL/I provides the ability to write both commercial and scientific applications in one high-level language. Two other languages, FORTRAN IV and Assembler, are also offered.

Series/1 is supported by IBM's extensive service organization, backed by a sophisticated parts inventory system and a variety of portable diagnostic tools to supplement special diag-

nostic features built into the system.

On site installation by IBM Customer Engineers plus a three month parts and labor warranty are included in the Series/1 purchase price. Ongoing IBM maintenance is available under the IBM Maintenance Agreement at a fixed monthly charge.

To find out more about Series/1, contact your IBM Series/1 marketing representative or write the IBM General Systems Division, P.O. Box 2068, Atlanta, Georgia 30301.

IBM

February 13, 1978

Com

By Jeff
CW

PARIS — The n
products in France
by 1980 for an av
of 23.6%, accordi
recently by the U
Commerce.

In 1975, mainfr
\$793 million of Fra
computer market,
tributed another
1980, purchases
peripherals will
timated \$1.53 billi
respectively, the r

This year, the
market will excee
billion, and peripl
an estimated \$752

Series

*Approximately \$28
Includes a 4953 Mo
4962 Model 2 Disk/
4997 Model 1B Rack*

Study Eyes \$6 Billion POS Mart in West Europe

By Jeffry Beeler
CW Staff

NEW YORK — The Western European market for point-of-sale (POS) equipment will approach \$6 billion during the next 10 years, and POS terminal systems will account for about a fourth of that total, according to a market study released here recently by Frost & Sullivan, Inc. (F&S).

Of the nearly \$1.5 billion that Western European countries will spend for on-line checkout systems through 1987, about \$820 million or 56% will be spent by department and variety stores, while another \$550 million will be claimed by large self-service stores (super stores), F&S said in its 10-year forecast of trends in the Western European POS market.

Department and variety stores will also dominate continental POS sales from the standpoint of unit volume. During the next 10 years, Western European countries will install 205,250 computerized checkout systems, of which 126,600 will go into department and variety stores, the report estimated.

International News

The second largest customer for POS systems will be super stores, which will install 66,700 units between now and 1987, F&S added.

Scanning systems will also experience healthy sales growth especially among large self-service food stores, the study predicted. During the second half of the forecasting period, Western Europe will install 36,900 scanning systems worth an estimated \$330 million.

Of that total installed base, super stores and supermarkets will account for 18,720 and 16,020 units, respectively, for a sales value of about \$150 million for each of the two market sectors.

As minicomputer-based POS systems and distributed data collection networks grow in popularity in coming years, they will create a rising demand for communications and communications equipment, the report

concluded. F&S estimated that 1978-1987 sales of interface and modems to the Western European POS market will total \$190 million, of which chain stores and department/variety stores will receive \$150 million and \$30 million, respectively.

Analyzing projected sales by country, the study predicted France, West Germany and the UK will account for about 63% of Western Europe's total POS market during the next few years. France will have a slight market edge with cumulative sales of more than \$1.23 billion, followed by West Germany with \$1.20 billion and the UK with \$1.18 billion.

Italy will claim the fourth largest market share with total POS equipment purchases of slightly more than \$500 million, F&S added.

Examining each country's buying patterns in closer detail, the market research firm noticed considerable differences in distributions of equipment shipments. The UK, for example, will prove the largest purchaser of POS systems for department and variety stores with 29,700 units or 23.5% of Western Europe's installed base.

West Germany will place a close second in that sector with 27,700 POS units or 21.9% of the installed base, and France will account for the third largest share of the department/variety store market with 18,000 shipments.

In the super store sector, West Germany will provide the largest market for POS systems with 28,400 units or 43% of the installed base, compared with France's 21,500 units or 33% of the total.

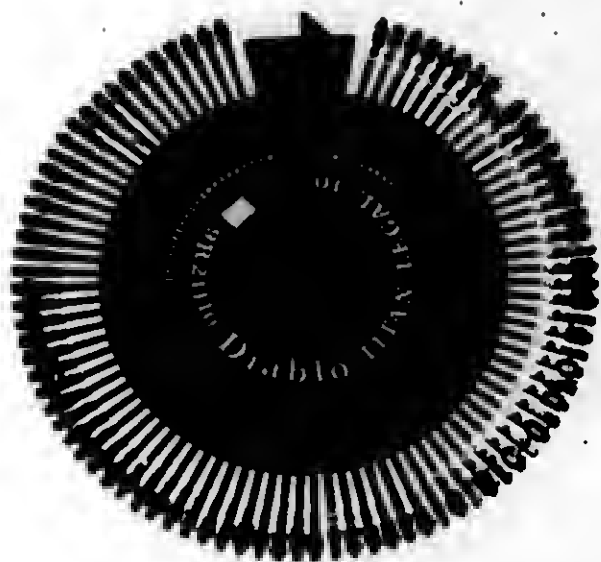
British super stores will buy the third largest number of computerized checkout systems—3,600.

Among chain stores, the UK will form the largest market for POS equipment with 2,200 shipments of 25.2% of that sector's installed base of 8,650 units, the study estimated. France will rank second with 1,900 units or 21.7% of the installed base, and West Germany will place third with 1,700 shipments or 20.1% of the total.

In other findings, the report predicted that total cash register and POS terminal sales to Western Europe will top \$413 million this year and \$454.7 million in 1980. By 1987, annual POS equipment purchases throughout Western Europe will exceed \$738 million, F&S said.

Of the countries covered in the study, France will provide the fastest growing market for all kinds of POS equipment, with an average annual sales growth of 21.5%. West Germany will rank second in yearly sales increases of 21%, and the UK will follow with an annual market expansion of 20.6%, the report said.

Xerox re-invented the wheel.



It was the invention of the wheel that got everything rolling in the first place. But it was the re-invention of the wheel by Xerox that got the word processing industry to where it is today.

It all began with the introduction of Diablo's HyType I printer in 1972.

Later, the introduction of the HyType II put print wheel technology into high gear. Features, such as 55 cps and true proportional spacing established industry standards.

In fact, no one has ever managed to duplicate the

combination of HyType's reliability, print quality and speed. And today there isn't a wheel around that isn't based on Xerox technology.

Of course, all our successes with wheels didn't mean that Xerox started coasting on them. The word processing industry required one with more durability so Xerox re-invented the wheel, again. The first metal wheel.

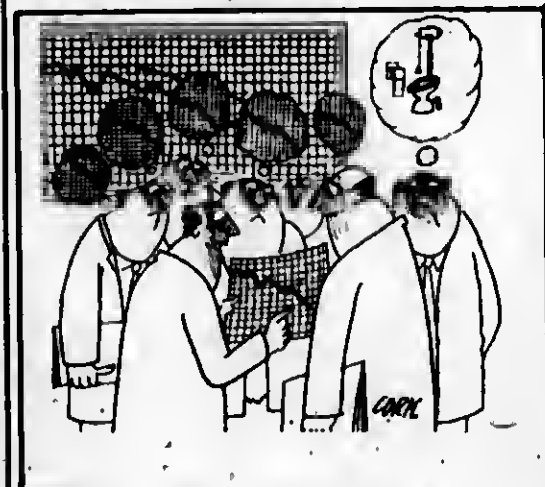
Now you can get up to 60 fonts, exact proportional spacing, and crisp fully formed characters in a wheel that will last up to ten times longer than plastic. In fact, if the 1355WP metal wheel ever does need replacement, it most likely won't come until after 50 million impressions.

Or just about the time Xerox will have re-invented another wheel.

Diablo Systems

XEROX

Diablo and XEROX® are trademarks of XEROX CORPORATION.



Personnel Needs Triple

Amdahl Staffing Up by 'Turning On' Workers

By Molly Upton
CW Staff

SUNNYVALE, Calif. — How does a firm meet its personnel requirements when the number of its employees triples in a year and a half?

Rather than spending all of its energies looking for people, Amdahl Corp.'s Anthony M. Pozos, vice-president of industrial relations, devotes much attention to making the company a good place to work.

In addition to various compensation plans, the firm attempts to provide an environment that keeps people "turned on" about their job and their prospects, Pozos indicated.

Amdahl has in-house training programs, employee orientation, technical training and in-house continuing education with degree programs from Stanford. It also relies on outside seminars and other exposures for skills training, he said.

In order to keep good people, "you have to help them become better," Pozos believes.

Amdahl wants to be an exceptional company in terms of success and to achieve that goal one has to have exceptional employees who can provide exceptional products and services, he said.

Not Enough Insiders

Currently the firm is staffing 40% of its managerial positions from outside simply because it doesn't have enough people within the organization. However, it would like to produce its own managers and is making a determined effort to increase the number of managers from within the firm.

Although it may be difficult to take a manager or prospective manager away from his job to provide him with additional training, Pozos said that to do otherwise would be unfair to both the company and the individual.

In 1978 the emphasis will be on helping more people inside Amdahl grow. But, he commented, if the firm's rate of growth continues, that will be inadequate.

Pozos' principal problem is finding ways to preserve the feeling of a small company. Amdahl in that regard is at somewhat of a disadvantage because it has a monolithic structure and a single product line; product divisions along product lines as at Hewlett-Packard Co. are therefore not a possibility.

But Amdahl has a series of small buildings, which helps give people an identity with a specific group, and there are gatherings of people within departments, sections and within the entire company. Recently all employees here gathered to celebrate the shipment of the 100th CPU.

Pozos said he intends to continue exercising creativity in finding ways to encourage the achievement of employees both as individuals and as part of a productive team.

Communications within a company are important. Amdahl holds staff meetings down to the vice-presidential level once a week and an off-site meeting quarterly.

In addition, each officer meets six times a year with groups of 10 to 15 employees, who can ask questions anonymously in advance if they wish or in person.

When any officer is on the road, he is scheduled to meet sales and support personnel in the field to hear their

views and keep them posted on what's happening with the company.

Once each quarter all managers get together to report on progress, he said.

Pozos wants Amdahl to be known as a successful company that is a success with its people. His personal goal is to have Amdahl regarded as a company setting the standard for employment. HP currently has that image, he said.

Amdahl has been lucky with its employees, he said, citing a surge of enthusiasm which is pervasive and influential in terms of results. This is evident in the cooperation offered by employees, he said.

The average age of Amdahl employees is probably under 30 now; it

was 31 last August, he said.

Amdahl will often leave a position open several months in order to find the right person. The company is selective in terms of both the individual's qualifications and attitude, he said.

The firm has not had a problem obtaining sales people, he added.

Amdahl uses all the standard means of finding prospective employees, but one of the most fruitful is employee referrals, Pozos said. Although the firm offers employees bonuses for people who join the firm, employees recommend people without the bonus, he said.

SARA...for fast, effective relief.



DECwriter II & III

FOR SALE

• LA36 • LS120

BE FIRST TO DELIVER

CALL 800-323-2288

IN ILL. CALL 312-279-1960

ICE INC.

12400 N. 10TH AVE.

CHICAGO, ILL. 60641

DDC Claims Method Cuts Disk Head Crashes

By Jeffry Beeler
CW Staff

SAN DIEGO — Digital Development Corp. (DDC) has devised a technique it claims reduces by 1,000-fold the concentrations of contaminants that cause expensive and inconvenient crashes of fixed-head disk systems.

The technique consists of creating a slightly pressurized helium atmosphere inside disk/head chambers and in-

stalling a particle-catching Ferrometric seal manufactured by Ferrofluidics Corp. in Burlington, Mass.

DDC credited the modified design with preventing read/write head damage and data loss by filtering out particles that migrate to disk surfaces from drive-ball bearings or worn elastometric seals.

In recent tests, the company found the combination of pressurized disk chambers

and Ferromatic seals cut concentrations of drive contaminants larger than 0.5 micron to less than 100 parts/million. Before DDC added the seals, particle counts inside the drives averaged 100,000 part/million, the company reported.

Gas Cushion

In the modified drive design, the helium atmosphere protects the disk from crashes by

forming a gas cushion or bearing on which the read/write head rides 60 microns from the recording surface. The helium's low molecular weight and the seal's low drag minimize a drive's energy consumption, DDC said.

After purging and sealing the disk chamber, the firm maintains internal atmospheric pressure either by providing a self-sustaining helium supply that automat-

ically replaces any lost gas or by recharging the drives once every six months.

In a typical vertical spindle disk drive, a diametrical gap of only .006 to .007 in. separates the shaft from the Ferrometric seal, which consists of four parts: a ring magnet polarized axially, two magnetically permeable pole pieces that sandwich the magnet and the ferrofluid that forms the "liquid O-ring" dynamic seal.

When the seal is assembled, the magnet and pole pieces remain stationary with a mechanical clearance between the pole and rotating shaft. The ferrofluid sealant fills the ring between the shaft and the stationary pole pieces.

Before it developed the modified drive design, DDC had little success in using conventional seals to protect disk surfaces from contamination by lubricant-bearing particles, according to Carl Costantino, the firm's engineering supervisor.

"With both sealed or shielded bearings, outgassing of the lubricant deposited tenacious particulate on the disk," he said.

"Lip seals were tried, but seal wear created dust that eventually migrated to the disk. Lip seal wear also shortened life expectancy of the unit," he noted.

Philips Controls Has OEM Motor

CHESHIRE, Conn. — North American Philips Controls Corp. has announced a 12 Vdc 3-watt motor with an ironless rotor and oblique winding design.

The motor, Model 4322 010 76050; can be used in card readers; ribbon, paper, head and carriage drives in printers; chart and pen drives in XY plotters; and reel and capstan drives in audio or digital cassette tape recorders, according to the vendor.

The motor achieves efficiency in excess of 70%, the firm said. The standard unit, without an optional tachometer, costs \$15.20 in lots of 100.

North American Philips Controls is in Cheshire Industrial Park, Cheshire, Conn. 06410.

ASM2.

ANNOUNCING RELEASE 2.3

RELEASE INDEPENDENT FROM MVT 21.6 THROUGH
MVS 3.7 AND VS 1. SUPPORTS ALL TYPES OF DASD/SUPERDISK/MSS.
SUPPORTS BDAM, PDS, SEQUENTIAL, ISAM, AND VSAM DATA SPACES.

ARCHIVAL/RETRIEVAL.

Online space reduction through the offloading of infrequently-used data sets to less-expensive storage media. Easy, high performance retrieval under user or Data Center control.

Commands and functions operative in batch and from online facilities such as TSO, provide users with powerful, yet simple to use, space management control without JCL.

BACKUP.

The incremental dump. Non-redundant offloading of only the most recently modified data sets, substantially reduces the duration and size of the normal daily backup operation.

COMPRESS/DASD CONVERSION.

Highly efficient compression features assure complete reclamation of unused space and offer a powerful assist in DASD conversions. ASM2 will automatically adjust allocations for differing source and receiving DASD types and data set organizations.

ACTIVITY REPORTING.

Complete management and user reporting. Concise, yet comprehensible at any level.

DYNAMIC ALLOCATION.

Even on pre-MVS and ASP systems, ASM2 will, under user-specified conditions, dynamically allocate both tape and disk.

USER EXITS.

Powerful (SMF-like) exits provide the capability for users to tailor system results to specific, installation-determined purposes. Space management flexibility found only in ASM2.

SUPERSCRATCH.

Based upon predetermined global criteria, ASM2's superscratch facility provides yet another dimension in space conservation.

**DATAPRO 70 HAS SELECTED ASM2 AS THE ONLY
AUTOMATED DASD SPACE MANAGEMENT SYSTEM
WORTHY OF INCLUSION!**

EXTENDED SPACE REPORTING AND BILLING.

Billing and utilization reporting at the track/day level. User exits permit the transfer of custom formatted billing data to the installation's job accounting or chargeback system.

EXTENDED PDS.

High performance. PDS data set and member-specific dump/restore Data Movers feature dynamic reblocking of load-modules moved to a disk device with insufficient track capacity.

DISK TO DISK.

Added flexibility through the provision or intermediate storage of archived files on disk. A multi-tiered archival structure results which manages data on-line, archived to disk/MSS, or archived to tape while permitting complete archive, scratch, and restore capability throughout.

GDG CONTROL.

Guarantees a specified ratio of online vs. offline members of generation data groups enabling users to standardize GDG usage.

VOLUME RECONFIGURATION/DEFRAGMENTATION.

Device independent reconstruction of entire volumes. High-speed dump/restore facilities intelligently restructure volumes and dynamically re-block data to like or different target volumes based on user criteria.

TAPE CONSERVATION.

ASM2 archive tapes containing partially useful data are consolidated via a forward-merge process incorporating multi-volume data set capabilities allowing large data sets to optionally span archive/backup tapes.

INTEGRITY.

Complete system integrity is assured. All files and catalogs are easily reconstructible from transaction journals even under the most drastic circumstances.

**IN OVER 150 LARGE-SCALE INSTALLATIONS,
OFFERING SUPPORT IN CANADA AND EUROPE AS WELL AS
IN THE DOMESTIC U.S., AN IMPECCABLE REPUTATION
FOR QUALITY, INTEGRITY, AND RELIABILITY.**

**DELIVERING THE UNDISPUTED LEADER IN SPACE
MANAGEMENT SOFTWARE SINCE FEBRUARY OF 1974!**

The Cambridge Systems Group

19857 Beekman Place, Cupertino, California 95014 (408) 255/5727

DECprinter I's

For Sale

• LA180

BEST PRICE • FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN IL CALL 312-279-1960

Digital Equipment Group

ICE INC

112 N. CHERRY ST.

Elmhurst, IL 60126

And Cut Series I, II Prices

HP Planning to Broaden Offerings in 3000 Line

By Molly Upton
CW Staff

SANTA CLARA, Calif. — Hewlett-Packard Co. intends to broaden its line of 3000 offerings, probably at both the high and low ends, and reduce prices on its current Series I and Series II, according to Jerry Peterson, product marketing manager for the firm's General Systems Division.

Despite the new models, Peterson expects the 3000 line will not address new markets but will continue to focus on the horizontal market of IBM System/3 upgrades and on large manufacturing firms implementing distributed data processing (DDP), he said.

HP will be making software enhancements to the 3000s, starting with a multileaved remote job entry (MRJE)

Digital Equipment Corp. PDP-11/70s and PDP-11/34s as well as with data entry firms such as Four-Phase Systems, Inc. and Datapoint Corp. Many remote sites are evolving from data entry applications and some of these vendors are entrenched, he said. Data 100 Corp. is also a competitor, and IBM is nearly always on the scene bidding its Series/1 or the 34 or both, he said. Honeywell Information Systems, Inc. is appearing with its Level 6, he added.

Need for Data Entry Capabilities

Vendors in the DDP arena must offer good data entry capabilities, he said, adding that HP hopes to compete

head-on in this area with the data entry firms. HP's approach will be to put some intelligence in its terminals and download the software, written in a high-level language, from the 3000, Peterson said.

The 2000 series, a smaller time-sharing machine, is "almost at the end of its product life," Peterson said. HP will support it but there will be no new models, he indicated. However, the firm will build the machine to fill customer orders.

Meanwhile, the Model 2026, dedicated to data entry and data communications, is in full production.

The Series I 3000, which is basically a repackaged version of the original

3000CX with core memory, is doing very well. "We're selling just about all the upgrades we get back," he said, adding the machine's success has surprised some HP people.

The Series I is the first repackaged version of a CPU that HP has ever marketed, he said.

The reliability on the Series I is pushing that of the Series II, which is remarkable considering the former is core as opposed to error-correcting semiconductor memory, he said.

The operating system on the Series I, which has a maximum of 128K, is different from but transparent to that on the Series II, with 512K, he said.



CW Photo by M. Upton

Gerry Peterson

system, which allows a user on a terminal linked to a 3000 to schedule jobs to be passed to an IBM 370 in the network, he explained.

There will also be enhancements to HP's multiprogramming executive operating system (MPE) and data base management and data entry capabilities, he said.

Need for Expandable Machine

In commenting on possible new 3000 models, Peterson said there is a real need in DDP for a more expandable machine in the Series I price range. In addition, there are applications requiring a more powerful 3000, one that can handle 40 to 50 terminals while performing different jobs, he said.

Although the 3000-II can handle up to 63 terminals in a dedicated environment, the average installation with a mixture of jobs has about 25 terminals, he said.

The machine's architecture will permit expansion, whereas current models use only one selector channel and one disk controller, he explained.

During 1978, HP's General Systems Division expects to devote a significant amount of its resources to pursuing the DDP market, Peterson said.

Currently the majority of the 3000's installed base and marketing efforts are in System/3 replacements, he said.

That replacement effort is going well, he added. Generally, the 3000 replaces 3/12s, 3/15s and a few 3/10s. With IBM selling the 34, customers are getting the idea they are going to have to switch anyway. Thus, they look at other vendors as well as IBM because IBM provides no easy upgrade path for users, he said.

In the DDP area, HP competes with

Are you a user?

Sophisticated?
Becoming experienced?
First time? Or still thinking it over?

Whatever your level, one thing is certain. You'll be more of a computer user in the near future. And Computer Expo 78's Conference has vital information you can't afford to miss. At least one of these days should be a must on your calendar:

TUESDAY

You're on the executive level. You deal with data processing personnel, problems, payments and plans. Today is yours.

The Executive Briefing

- Keynote speech: "Strategic Systems Planning: a View from the Top," by an official of the consulting firm, Booz, Allen & Hamilton
- Case Studies: Data Base and the Executive; Potentials of Distributed Data Processing.
- Presentations: Trends and Opportunities in System Financing; The Computer Resource of the Future.

WEDNESDAY

Double Conference Day

(Two simultaneous conferences)

You're bringing in a first computer system for a small company, you're involved in light, inhouse use of computers (maybe about to trade up), or just thinking of your own system. You'll want to attend the Program on Small Business Systems.

You're interfacing with computer personnel on a day to day basis. The Program on Managing People Problems is designed just for you.

Here's your schedule:

Small Business Systems

- Keynote Speech: "Data Processing in Small Business Today," by an official of Arthur Andersen and Company
- Case Studies: Computer Uses in Financial Reports; Computer Uses in Operations Planning & Reporting
- Presentation: How to Negotiate with Vendors • Days-end panel that includes you, your questions, views and comments.

Managing People Problems

- Keynote Speech: Given by a recognized expert in data processing personnel management • Case Studies: Career Pathing for Operators and Programmers; Improving the User/DP Relationship • Presentations: Testing for DP Competence; Coping with Security/Privacy Regulations.

THURSDAY

You're a manager or technician, and your organization is thinking of distributing its computer resources to regional offices and plants. This is your can't-miss day:

Distributed Data Processing

- Keynote Speech: "Critical Issues in DDP" • Case Studies: Applications for DDP; Equipment Selection
- Presentations: Networking Aspects of DDP; The Data Base Question.

Anaheim

Southern California Computer Expo

March 21, 22, 23
Disneyland Hotel

San Francisco

Northwestern Computer Expo

March 28, 29, 30
San Francisco Civic Aud.

Houston

Southwestern Computer Expo

April 11, 12, 13
Astrohall

Atlanta

Southeastern Computer Expo

April 18, 19, 20
World Congress Center

St. Louis

Gateway Computer Expo

April 25, 26, 27
Gateway Convention Ctr.

Chicago

Midwestern Computer Expo

May 2, 3, 4
McCormick Place

New York

Mid-Atlantic Computer Expo

May 9, 10, 11
New York Coliseum

Detroit

Great Lakes Computer Expo

May 23, 24, 25
Cobo Hall

Boston

New England Computer Expo

May 30, 31, June 1
Northeast Trade Center

Each Conference day is just \$55. All three days only \$135. The Exposition is FREE.

Take one, two, or all three days. And send your key personnel to the days that will benefit them most. You'll profit! Now in its 7th successful year, Computer Expo 78 brings you a nationally-respected Conference. No frills, all usable facts. Answers to critical questions you face now, designed for you to put to practical use now. You'll have the chance to talk with leading consultants and users from all over the U.S. Gain insight, trade ideas, learn the latest. At the free exhibitors' seminars every afternoon you'll talk with knowledgeable representatives from the nation's top manufacturers.

Come to Computer Expo 78's Conference and Exposition, and come away a smarter user.

*All conferences will be held from 9AM to 1PM
Register now! Space is truly limited.

COMPUTER
CARAVAN'S

COMPUTER

SAVE TIME!

To register, for more information, or for your Free Ticket to the Exposition,

Call TOLL FREE
800-225-4242

In Massachusetts, call collect:
617-964-4590.



Executive Corner

• Lloyd D. Turner has been elected vice-president and group executive for the Terminal Systems Group by the board of directors of Burroughs Corp.

• Richard Burcham has been named president of Hawkeye Information Systems.

• William McCalmont has been appointed vice-president and general manager of Intel Corp.'s Memory Systems Division.

• Robert J. Pieper has been promoted to vice-president, marketing, at Dataproducts Corp. Robert G. Wallstrom has been promoted to vice-president of the newly created Business and Planning Office.

• Lovell C. Chase Jr. has been appointed vice-president of Comtal Corp.

• Ronald R. Bresnahan has joined Cambridge Memories, Inc. as vice-president of finance. He will also serve as a member of the executive staff at Cambridge.

• Bernard Goldstein has been appointed senior vice-president of Tymshare, Inc.

• C. Thomas Deere has been promoted to executive vice-president for marketing and corporate development at Data Card Corp.

• Richard L. Hencley has been appointed to senior vice-president for corporate programs at Data Card Corp. and William T. Price has been appointed senior vice-president, corporate finance and administration.

• Richard L. Walker has joined Memodyne Corp. of Newton, Mass., as vice-president of engineering.

• Gary E. Liebl has joined Microdata Corp. as president of Microdata International and senior vice-president, Microdata Corp.

• James B. Lambert was elected president and chief operating officer of T-Bar, Inc. A. Henry Morgan was elected chairman of the board.

• Dr. Robert W. DeGrasse has been promoted to senior vice-president and general manager of the Computer Output Microfilm (COM) Systems Division at Quantor Corp. J. Mark Woods has been promoted to vice-president of domestic sales of the COM Systems Division. Vernon R. Pieters II has been promoted to senior vice-president and general manager of the Peripheral Products Division. Thomas C. Rock has been promoted to vice-president of marketing for the Peripherals Division. Torrey Everett III has also been promoted to senior vice-president.

• Donald L. Puket has been appointed to the position of vice-president of manufacturing at Documation, Inc.

• Samuel Soberanes has been promoted to division vice-president of sales for the CMC division of Pertec Computer Corp.

• Dayton E. Krogstad has been named vice-president and general manager of Randal Leasing, Inc.

• William T. Chambers has been promoted to division vice-president, marketing for the Pertec Division of Pertec Computing Corp.

• Robert E. Kunkle has been appointed vice-president of marketing at Diva, Inc. Also at Diva, David H. Smith has been appointed manager, customer services, Western Region. Stanley Hydeke has been appointed to the position of manager of hardware engineering at Diva.

• Marvin S. Rosoff has been promoted to vice-president, industrial relations, and Alexander W. Giles Jr. to senior vice-president, finance at Modular Computer Systems, Inc. (Modcomp). Richard Adams has been named Modcomp's Head of Operations.

• Vincent R. Ceriello has been elected vice-president and director of Human Resources Management Systems at Hay-Huggins Data Services, Inc.

• Reto Braun has been appointed vice-president and general manager of Memorex Corp.'s Europe, Middle East and Africa Group.

• Samuel Soberanes has been promoted to vice-president of sales for the CMC Division of Pertec Computer Corp.

• C. Trent Riley has been appointed vice-president of human resources for Sycor, Inc.

• Dr. J. Leland Seely has been named a vice-president and manager of corporate R&D at American Microsystems, Inc.

• Andrew P. Psihas has been appointed vice-president and center manager for National Sharedata Corp.

• Ronald J. Hilbink has been named vice-president of personnel and facilities administration at Dataproducts Corp.

• Dr. Yoshiyasu Narahara has been appointed director of technology development at Shugart Associates.

• Steven H. Puthuff has been named vice-president of engineering for Memorex Corp.

• Frank Biamonte has been appointed general manager of STC Systems, Inc.

• NCR Corp has named Herbert M. Schene vice-president of Far East/Australasia and Paul W. Lappetito vice-president of Canada/Latin America. A.J.R. Oosthuizen will replace Lappetito as president of NCR Canada.

• Gary F. Hall Sr. has been elected vice-president of Recognition Equipment, Inc.

• Carl L. Holder has joined Wabash Tape Corp. as vice-president of product management.

• David A. Kidd has been appointed marketing manager at National Computing Industries.

• John F. Williams has been named president of IBM's real estate and construction division.

• John M. Thornton has been named chief executive officer of Wavetek. Joel A. Naive will resign as chairman of the board and become chairman emeritus while continuing to aid management as a consultant.

• Warren Bess has joined Improved Insurance Systems, Inc. as vice-president of marketing.

The pioneer of small business computers now makes small business computers.

Actually, Basic/Four Corporation has been making its own central processing units since August, 1976. We now make our own terminals, too.

We wanted tighter rein on manufacturing and testing, choice of the latest components, total control of quality, production and delivery. So we could offer even more reliable, better products.

Now we do.

The Basic/Four® CPU's new semiconductor memory means 40% faster cycle time, down from 1 microsecond to 600 nanoseconds. New models make expansion even easier, accommodating one to 16 terminals. There are other improvements, too, with more to come.

And the Basic/Four systems we make have been running, bug-free, like before - only better. The best business computers available.

All-around simplicity

We also made sure our system would be the easiest to install. And operate.

The software uses BUSINESS BASIC. And we have applications modules that are pre-planned and packaged, including such eminently usable programs as CBS (Comprehensive Business System) and EASY, an exception analysis system. Plus a multitude of specialty packages. For

hospitals, insurance, travel agencies, bond brokers, banking, the apparel industry, trucking, publishing - literally dozens, and more on the way.

Full time commitment

Our specialty is small business computers; it engages our full attention, dedication and effort. And, of course, as the pioneer, we've been at it longer.

Long enough to have established through SORBUS INC., our sister MAI company, a national network of support and service, 24-hours a day, if needed.

All this leadtime and concentration keeps us ahead.

And now we make our own. So we know we're offering the best.

If you'd like to know more, call or write: Basic/Four Corporation, 18552 MacArthur Blvd., Irvine, CA 92714

Look to the pioneer

Ever since we pioneered the field, our operating system has been acknowledged as the best of any small business computer. It had to be - because our systems were always interactive, even when others were batch.

Nowadays, everyone in the field

is talking "transaction processing" - following our lead, some six years later!

basic / four corporation
an MAI company

Albuquerque • Anchorage • Atlanta • Baltimore/Washington • Birmingham • Boise • Boston • Buffalo • Charlotte • Chattanooga • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fresno • Grand Rapids • Hartford • Honolulu • Houston • Kansas City • Indianapolis • Las Vegas • Los Angeles • Lubbock • Madison • Memphis • Miami • Milwaukee • Minneapolis/St. Paul • Nashville • New Jersey • New Orleans • New York • Orange County • Philadelphia • Phoenix/Tucson • Pittsburgh • Portland • Richmond • Sacramento • Salt Lake City • San Antonio • San Diego • San Francisco • San Juan • Seattle/Tacoma • St. Louis • Syracuse

Basic/Four Systems are also marketed in more than 30 foreign countries.

TSUNAMI

By Charles P. Lecht

IN DEPTH
IN DEPTH
IN DEPTH
IN DEPTH

CHAPTER II

To any observer even remotely familiar with the computer industry — or the Japanese — the rapid growth and technological advances achieved in the Japanese marketplace, particularly within the last few years, have not come as a surprise. The Opec embargo and the energy crisis of the '70s demonstrated to virtually all the world's industrialized nations how vulnerable they were to politically motivated or other artificial disruptions of supply. They shook Japan to a degree perhaps not fully appreciated by governments having more or less

adequate, compensatory access to internal or alternate outside sources.

Japan has always been compelled by a dearth of natural resources to structure its economy (and, by extension, to behave in the world market) in such a way as to minimize its dependency on others, thus attaining the highest possible degree of self-sufficiency consistent with its inevitable political obligations, national survival and self-esteem. In this, history has served Japan well, for it has dramatically instructed this proud people in what the world regards as acceptable (or, rather, unacceptable) means of reducing exposure to raw material and energy

shortages.

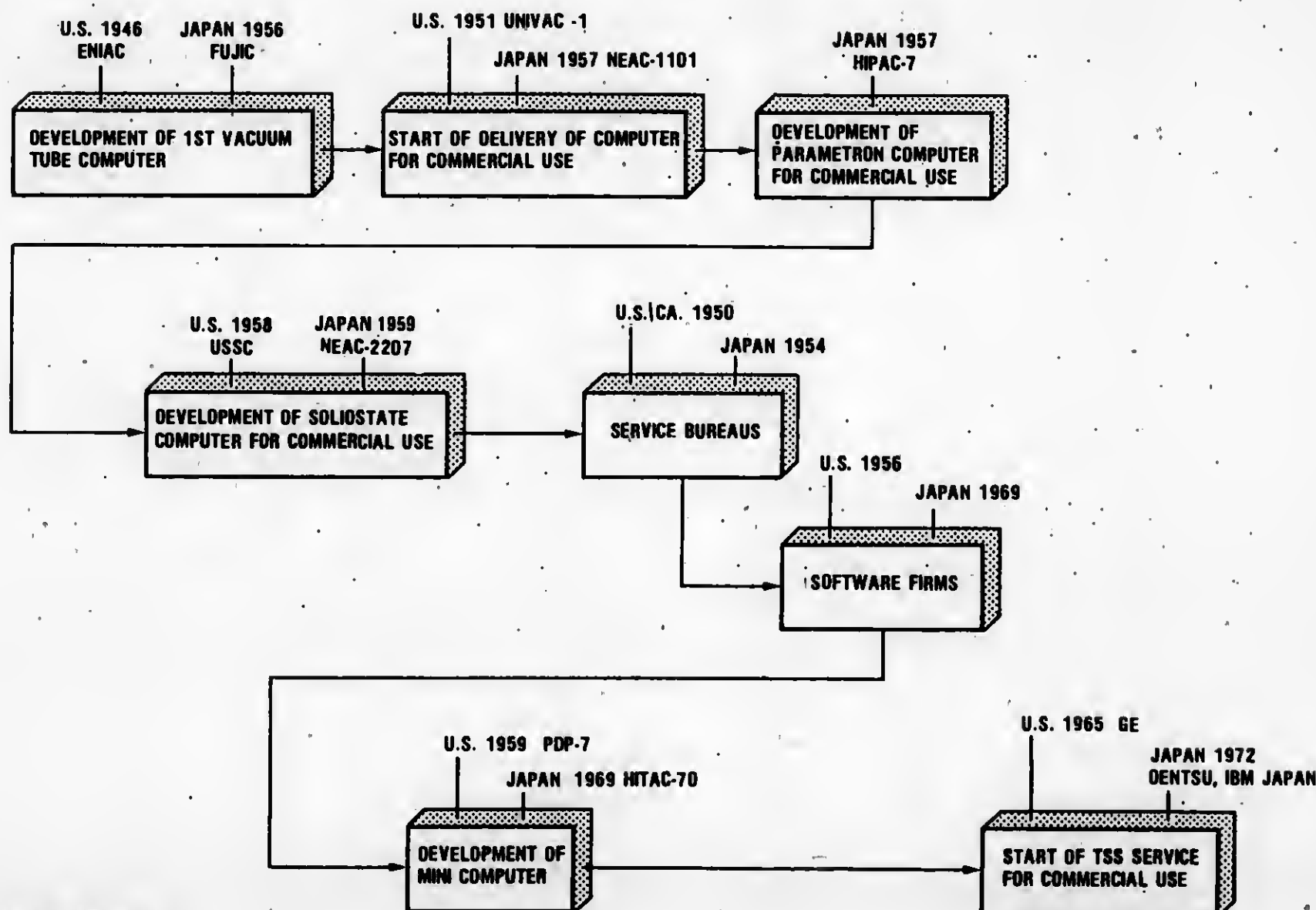
The tragic lessons of 20th Century political and military warfare, which the Japanese learned at exceptionally great expense, have made Japan's successor governments acutely sensitive to the threat technological weakness poses to their national integrity. It is perhaps natural, therefore, that they should seek to buffer their economic position against the adverse effects of land-related poverty by exploiting those qualities which they possess in abundance: aggressiveness and competitiveness toward "outsiders"; the ability to dedicate themselves to some focal, communal activity (especially

when this is defined for them by figures of authority within the national community); and a singular aptitude for recognizing technology-based processes and products with high economic potential, importing the seminal technology cheaply ("discount mimesis"), improving its price/performance characteristics (value-added inventiveness applied to an outside model) and, finally, reexporting it (shrewd intelligence).

In short, the Japanese have what living on a rock cannot take away from them: brains and will power.

While fervently maintaining their age-old traditions and spiritual values

Industry Progress



SOURCE: ACT/TAG, ADAPTED FROM
A JECC WHITE PAPER

Figure II-1

TU-BE OR NOT TU-BE

Alas, poor Yorick, his program won't run.
It went down the tubes at a quarter to one.
When called to explain why his run had exploded,
He couldn't be sure they had run what he coded.
Did they mount the wrong file, or have bad JCL?
He needed hard copy in order to tell.

For although console messages flashed on the screen,
The one guy who needs them was far from the scene.
Alas, poor Yorick, faced another long wait.
They couldn't dump DOCS till a quarter past eight.

So if you, like poor Yorick, have known the futility
Of waiting around for that printlog utility,
Let Datachron's CONSOLOG be your salvation—
Make the printer your console at job termination.

CONSOLOG

- CONSOLOG:** Automatically logs partition console messages to the printer at end-of-job.
- CONSOLOG:** Eliminates printlog utility runs that interrupt normal processing.
- CONSOLOG:** Uses no core, installs in minutes on any IBM 370 DOS/VS with 125D/3277 support.
- CONSOLOG:** Only \$985 or \$75/mo. Free 30 Day Trial

☐ Send More Info ☐ Send CONSOLOG For 30 Days

Name _____ Co. _____

Title _____ Tel. _____

Address _____

City _____ State _____ Zip _____

Computer model _____ ☐ 125D or ☐ 3277

DATACHRON CORPORATION 174 FIFTH AVE. NEW YORK, N.Y. 10010 (212) 675-5333

ADD RACING STRIPES TO YOUR CENTURY



Now Available For Your

NCR 101 & 151

Computer Enhancement Corporation

Memory For: 101 151 200 201 251 300 Criterion

☐ Urgent! Please Phone Me Ext. _____

☐ Have Your Rep Contact Me

☐ I Want A Demonstration

☐ Send Me All Literature

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone () _____ Ext. _____

For further information call or write:
COMPUTER ENHANCEMENT CORPORATION • 3188 E. Alway Ave., Costa Mesa, California 92626 • 714/764-0621

TSUNAMI IN DEPTH

Page 92

(at least insofar as these apply to their private domestic life), the Japanese have been just as ardent in their commitment to national independence through adoption and adaptation of modern methodologies first developed elsewhere. Following the international calamity of the 1940s, the Japanese people taught the world a lesson in material management in their approach to rehabilitation of leveled industries.

I believe the Japanese will teach the world yet another lesson in the 1980s in (although hopefully in a less drastic context) — this time as much motivated by desire as need. They are proud of their ability to economize. Also, by any measure, they have shown themselves to have little patience with antiquated methods, technological or otherwise, where reconfirmation of their status as a world economic power is directly involved.

In view of Japan's startling rise to second (only to the U.S.) in the world in the manufacture and usage of computer systems, not to speak of electronics in general, I believe the U.S. government may well want to reevaluate its support of like industries here at home to see what can be done to ensure it is not inadvertently contributing to the erosion of its own leadership position. Recent events suggest that it is in fact making just such an inadvertent contribution, but that is the subject of a later *Tsunami* chapter.

Since (in my view) the potential of computer and communications systems technology is as great as that of nuclear technology in matters pertaining to the conduct of both peace and war, I further believe the Japanese government (like the governments of almost every other highly developed nation) is fully aware of the significance of technological leadership as it prepares for its future. Like other countries prevented either by agreement or lack of resources from applying nuclear technology to the creation of weapons systems, Japan in some ways now finds itself in an enviable position arising from its having dedicated its nuclear technology-related investments to peaceful uses. This should dramatically help its economy to overcome present shortages by the turn of the century.

The Invisible Arsenal

But this fact does not necessarily imply that so highly intelligent a people will be totally without recourse in the event of global conflict, regardless of the form such conflict might assume, if its technology base can remain strong in other (nonnuclear) areas. To conceive that, in the event of war, countries without nuclear attack or retaliation capabilities will adhere to agreements purporting to limit other means of either attack or retaliation (e.g., biochemical warfare) is a grim and dangerous absurdity.

Even our government, having apparently recognized the power of non-explosive alternatives, has concluded lately that it may be in our best interests to reevaluate our own attack and deterrent options.

The U.S. position on various alternatives to nuclear weaponry has seemed sadly ostrich-like. Ostensibly convinced that the boom, flash, crash and radiation of the bomb are enough to make our real and potential enemies keep their distance, we and they both know that more effective means to neutralize entire countries exist.

For, even after having disavowed the destructive potential of chemical, bacteriological and radiological phenomena, we are not unaware that a highly developed computer and communications system can yet be used to penetrate a foreign government's financial machinery, its military security, etc. and then aid in creating the conditions for neutralization before it can act.

In the realm of the invisible, computer systems-related activities can be assured a prominent role in our growing arsenal.

The incredible breakthroughs in computer technology which we are now witnessing will take us toward a world where, if conflict arises, war may be conducted without visible damage either to people or to their environments — especially in the case of noncombatants. Through our advancement of computer and communications technology, we can create the means to augment our physical and intellectual powers artificially so as to be able to accomplish objectives — including the avoidance of conflict — that might otherwise involve the use of force.

The U.S. now leads the world in computer technological know-how, as it has from the beginning of the computer era. It also leads in communications know-how, although in this case its supremacy is of a lesser degree. Both leadership positions are, in my opinion, being eroded as other nations improve their own industries.

The Japanese, in particular, having leapfrogged over Germany, France and England in the past five years, are challenging the preeminence of the U.S. computer industry in the world marketplace in ever more powerful and effective ways. While Japan has become the world's second largest user and supplier of computer systems, it is the only developed country now meeting more than 50% of its own DP needs through home-based industries.

While this chapter describes the startling performance of Japanese industry in creating and nurturing a domestic technological fountainhead, it is in no way intended to suggest that this necessarily poses a threat to anyone, or indeed that it will not ultimately be of benefit to us and to all mankind.

Rather, it is intended to provide con-

Computer Installations in Japan (As of March 1976)

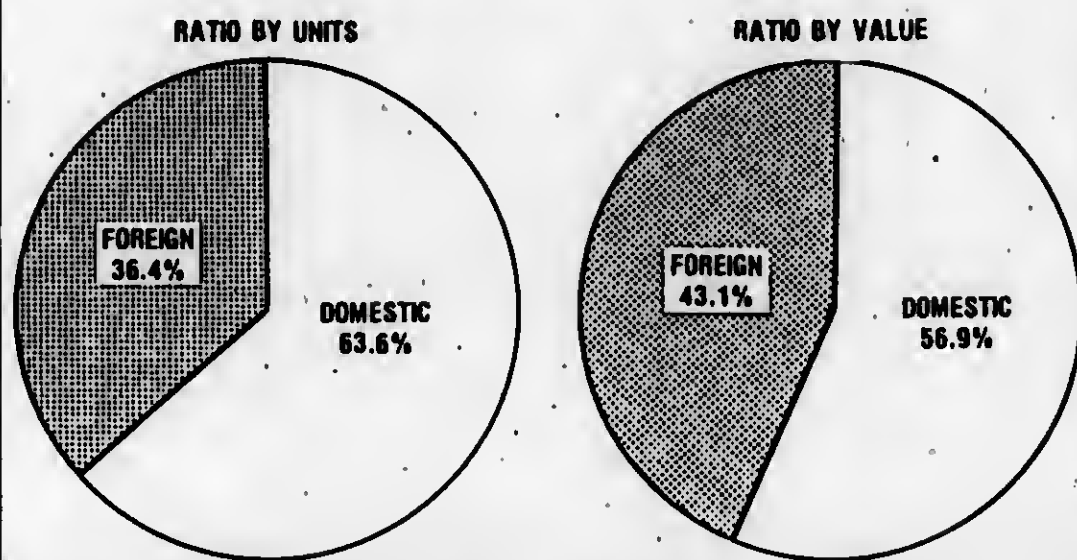


Figure II-2

TOTAL: US \$6,488 MILLION

SOURCE: MITI

General Purpose Computer Base Growth in Japan

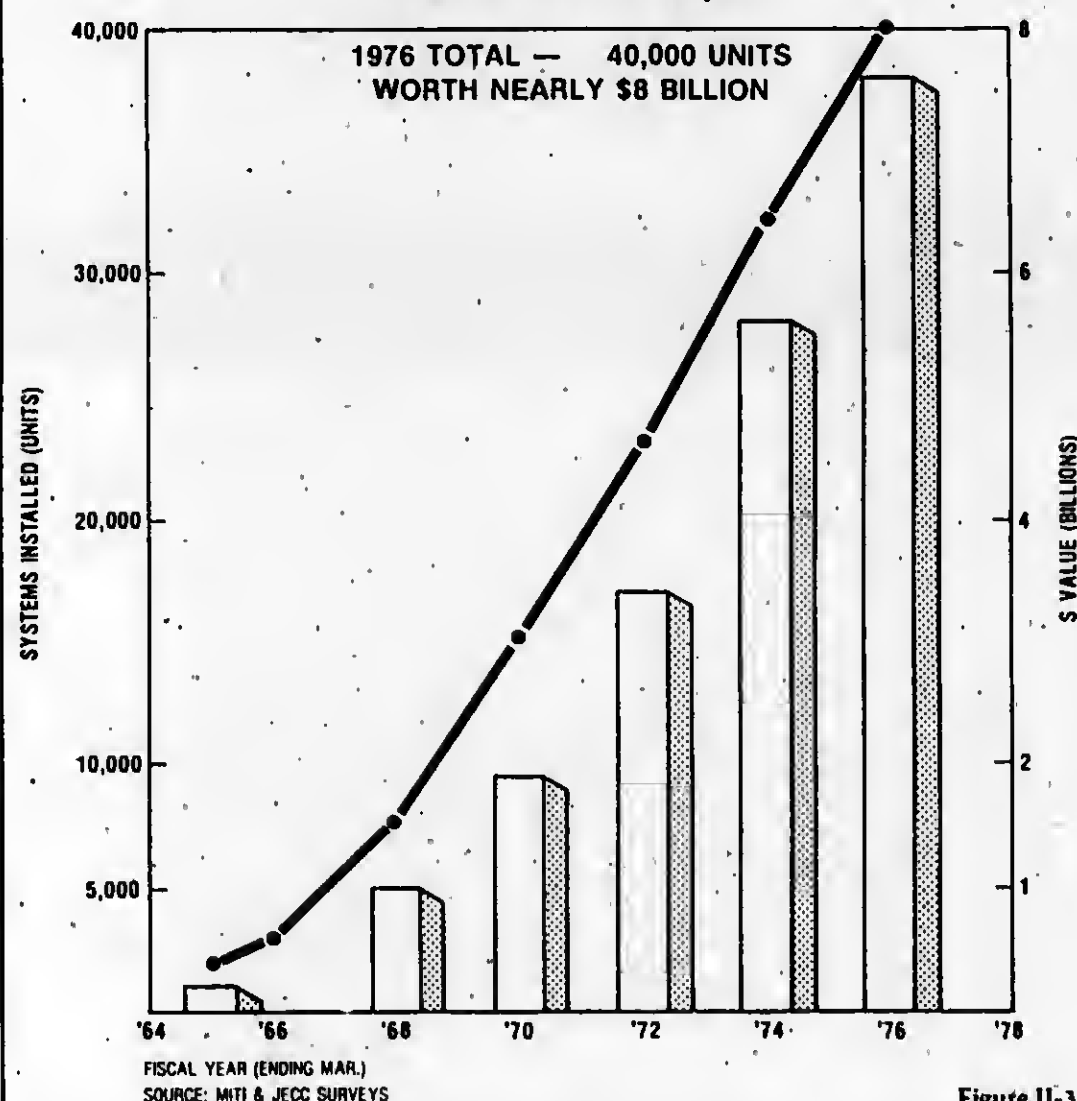


Figure II-3

MITI Supported Industry Consolidation

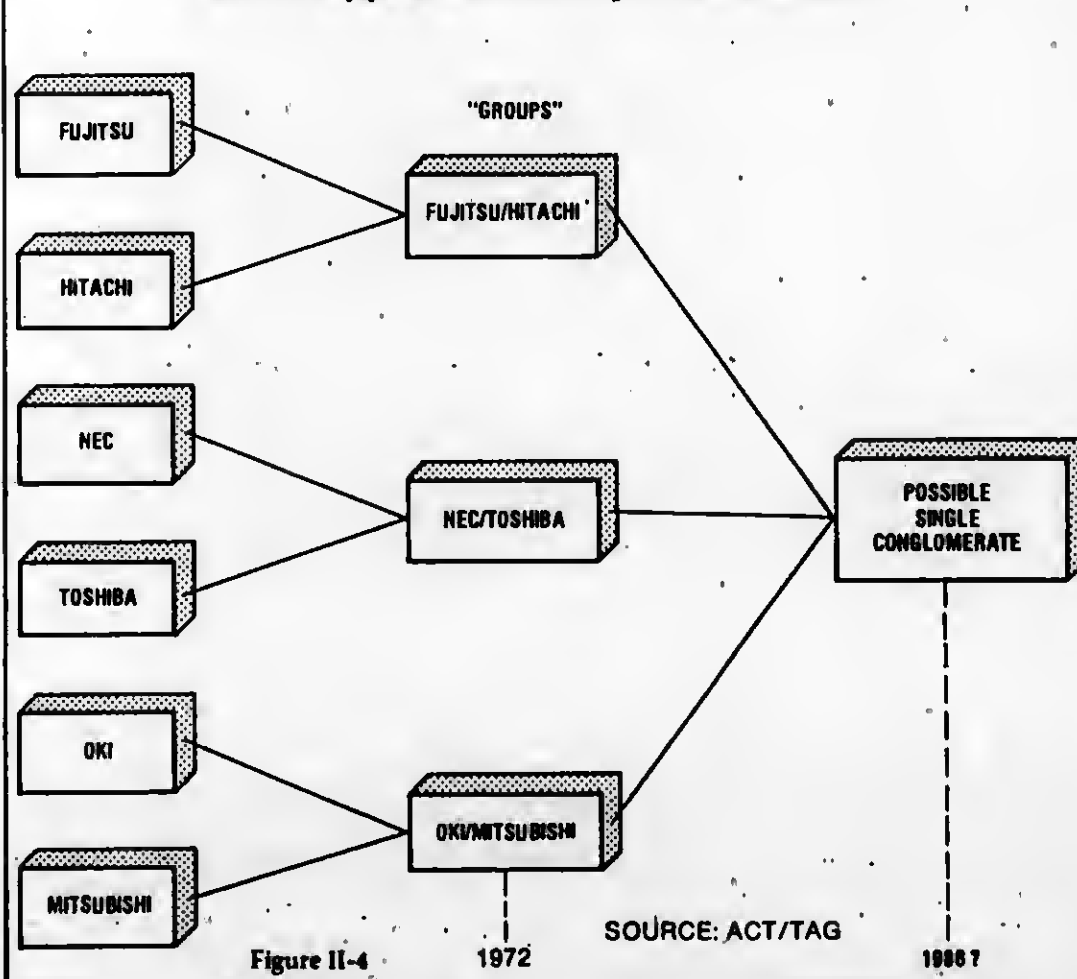


Figure II-4

SOURCE: ACT/TAG

1988 ?

TSUNAMI IN DEPTH

cerned Americans who see some virtue in the fact of our current technological leadership with a description of the Japanese computer industry challenging it.

Positioned to Strike

In an article in the January 1978 issue of *Datamation* entitled "Is There a Japan, Inc.?" E.K. Yasaki suggests the low-volume export market currently controlled by Japanese computer manufacturers signifies an overreaction in our country to the possibility of too much competition from Japan.

Noting that "no more than 5% of [Japan's] computer production" is exported and that "most of that is from IBM-Japan," Yasaki concludes that, even while Japan's desire and intention to increase exports in this area are not in doubt, "American users will be exposed to Japanese small systems before many are exposed to the likes of a Japanese medium- or large-scale machine."

However, as *Datamation's* top Far East editor must know, this phenomenon can at best be a source of uncertain comfort to us with respect to Japan's posture as a contender for world leadership in the manufacture and/or usage of computer systems. With more components, so-called sub-

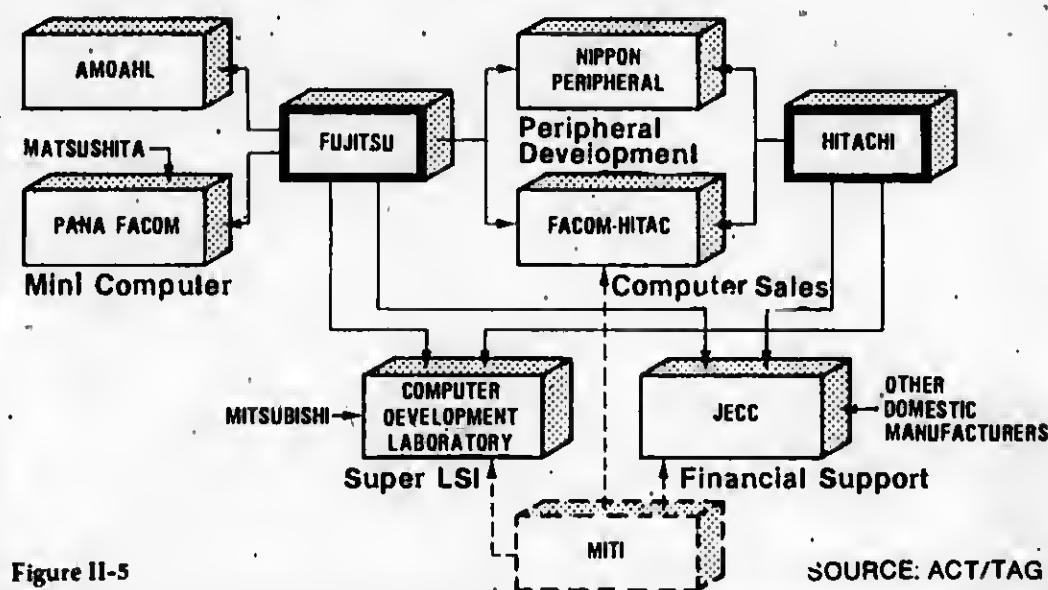
assemblies, LSI chips and peripherals being made in Japan today than in any other country but the U.S., and with processor technology changing to reflect the benefits of networked clusters of minicomputers and microcomputers, the Japanese are perfectly positioned to strike for world leadership.

It is clear Japan has need to create the most efficient management and manufacturing machine possible in view of its critical resource shortages. Ninety-eight percent of its own iron ore supply, 99% of its petroleum, 100% of its tin, nickel and bauxite, 82% of its coal, 86% of its copper and 100% of its nuclear fuel (uranium) are imported, and it is now facing a growing food import requirement.

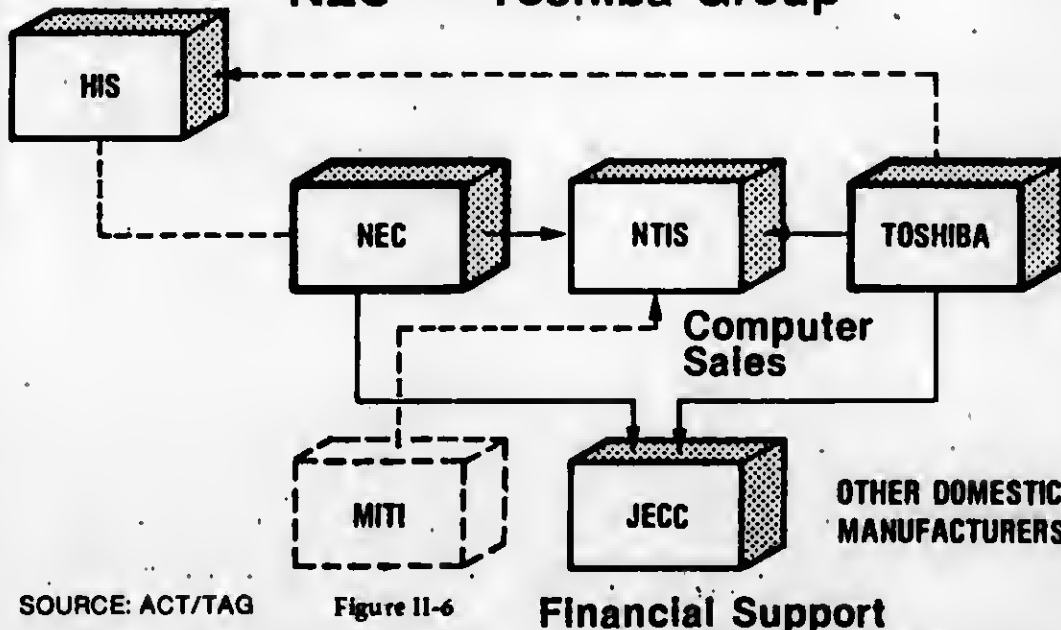
It is indeed one of life's ironies that the Japanese, who constitute one of the most productive peoples in the world and who strongly desire to remain so, must depend so heavily upon imports. As we have said, they certainly have no shortage of brain power, people power or of will. And in our changing modern world, where need fulfillment is more likely to give rise to anarchy than to diligence, the Japanese are a striking example of the vitality and persistence of "our" Protestant work ethic.

With a land area roughly comparable

Fujitsu — Hitachi Group



NEC — Toshiba Group



Look Into Johnson Systems'

CICS/VS UTILIZATION MONITOR AND CHARGEBACK SYSTEM



"Now, a powerful data collection system that lets you accurately account for . . . and equitably bill for . . . all resources used by each user."

"The first feasible alternative to Performance Analyzer."

Send me your brochure about the new CICS/VS UTILIZATION MONITOR and CHARGEBACK SYSTEM.

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip _____ Phone (____) _____

Computer _____ Operating System _____

C213



**Johnson
Systems, Inc.**

8400 Westpark Drive
McLean, Virginia 22101

(703) 893-8700

CBC COMPANIES

A new name in front of an old reputation for reliability. We have a CONTINUOUS INVENTORY OF TERMINALS and we STOCK AND INSTALL OPTIONS. Immediate delivery on most items.

The popular ones

DEC

- Writer II (LA-36 Printer Terminal) \$1,600 ea.
- Writer III (LS-120 Teleprinter) \$2,600 ea.
- Scope (Video Display Terminal) \$1,500 ea.
(Model VT-52)
- Printer I (LA-180 High Speed Printer) . . \$2,690 ea.

1. IAL (614) 461-5496.
2. ESCRIBE YOUR NEEDS.
3. EPEND ON THOSE WHO USE
DIGITAL EQUIPMENT FOR YOUR BEST
ANSWERS, PRICE AND DELIVERY.

CBC COMPANIES
170 E. Town Street
Columbus, Ohio 43215
Call-614-461-5496

TSUNAMI IN DEPTH

Page 94

to that of California, Japan is about half as populous as the U.S. and has a current gross national product (GNP) about half as large as ours. Its GNP growth rate (prior to the oil embargo/crisis of 1973) was nearly 10% per year. (Both the U.S. and Japan now have GNP annual growth rates in the neighborhood of 5%, demonstrating the impact of developments in our oil trade upon Japan's overall economic position more forcefully, perhaps, than any other statistic.)

Moreover, in fiscal 1977, Japan had an estimated trade surplus of approximately \$16.5 billion, (according to the Jan. 23, 1978 issue of *Electronic News*), while the U.S. incurred a trade deficit of about \$28 billion. Japan's recent recession caused its unemployment to climb to an all-time "high" of about 2% of the labor force, in comparison with a rate of nearly 7% in the U.S. in 1977.

Cultural Impetus

The unique cultural envelope of Japanese life, while not altogether precluding internal strife — indeed, the levels of disorder seem to be intensifying overall — nevertheless ensures that Japanese industry can count upon a degree of individual diligence and loyalty, the equal of which exists in no other developed country.

The second largest users of computers in the world, the Japanese had nearly 23,000 domestically produced general-purpose systems worth \$4.6 billion installed as of December 1976. The total installed base comprised nearly 40,000 systems, worth over \$8 billion when foreign manufacturers' products are included.

Japan is also well on its way to becoming the world's leading electronics producer by the mid-'80s. Total electronic output was valued at approximately \$21 billion in 1977; or about five times the 1967 rate. Also, by the mid-1980s, the total usage of computers in Japan will rise to represent more than 4% of the GNP, the Ministry of International Trade and Industry (MITI) has projected.

Japan's growing success in electronics, DP and other high-technology products has concerned the Western

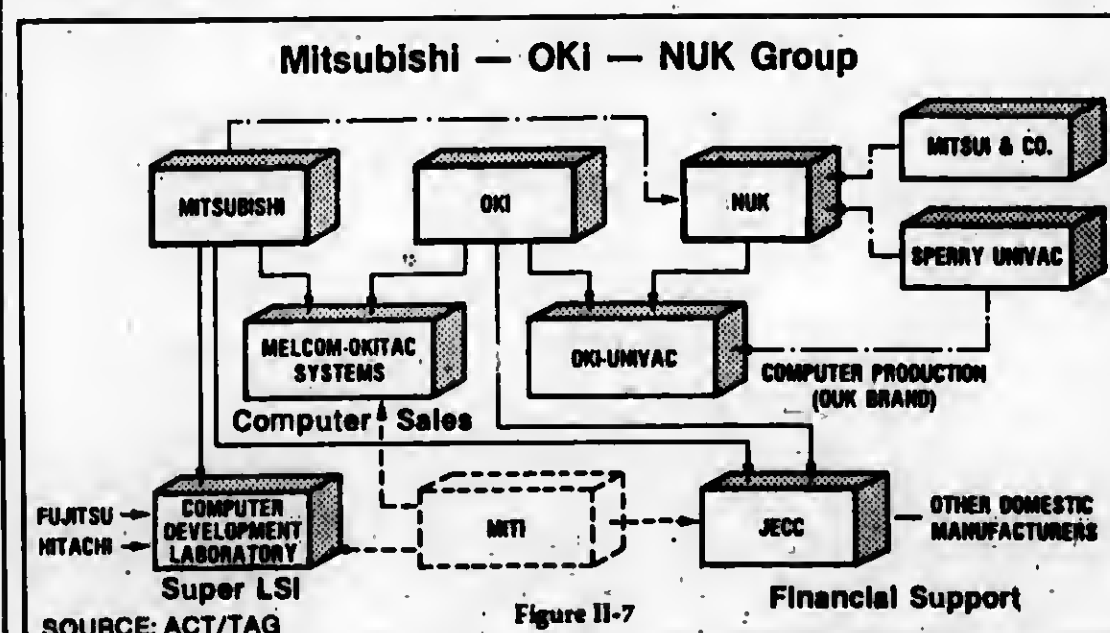
(primarily U.S.) manufacturers to the extent that IBM, it is reported, considers Japan "its most competitive marketplace" and "Number One future challenger in world DP markets." Indeed, with a share of approximately 30% of the Japanese marketplace as of March 1977 (see Figure II-8), but increasingly beset by problems in certain of its international operations, IBM cannot help but see itself being elbowed aside in other nations by Japanese companies producing systems of high quality at costs lower than its own.

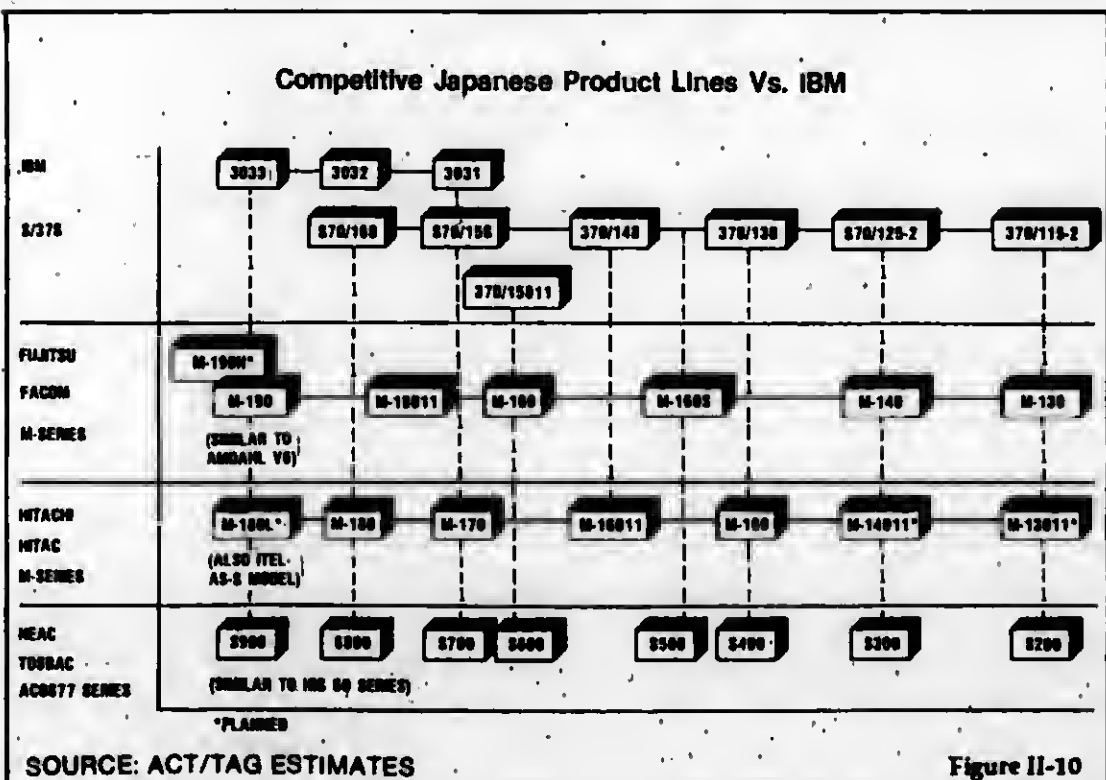
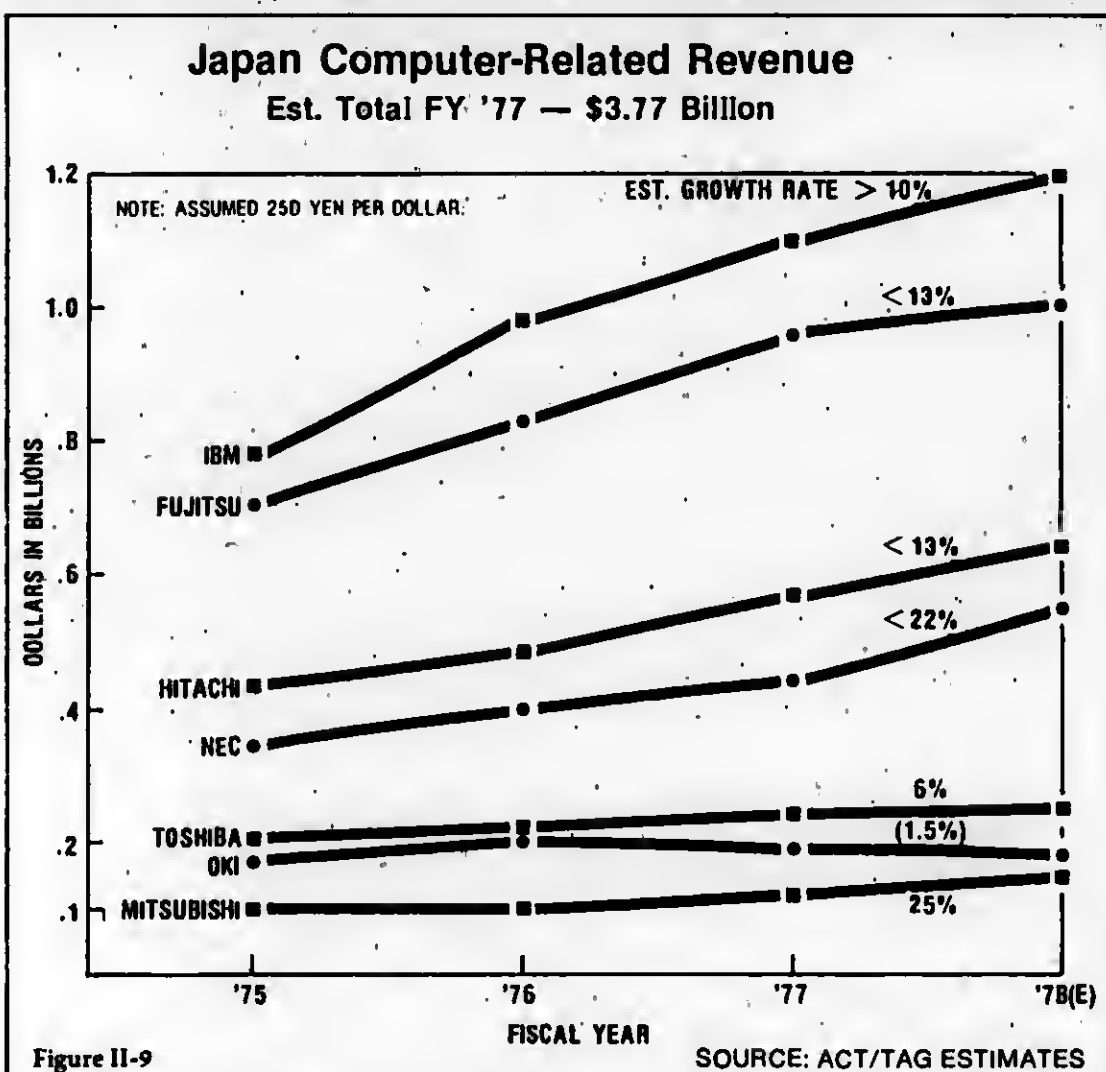
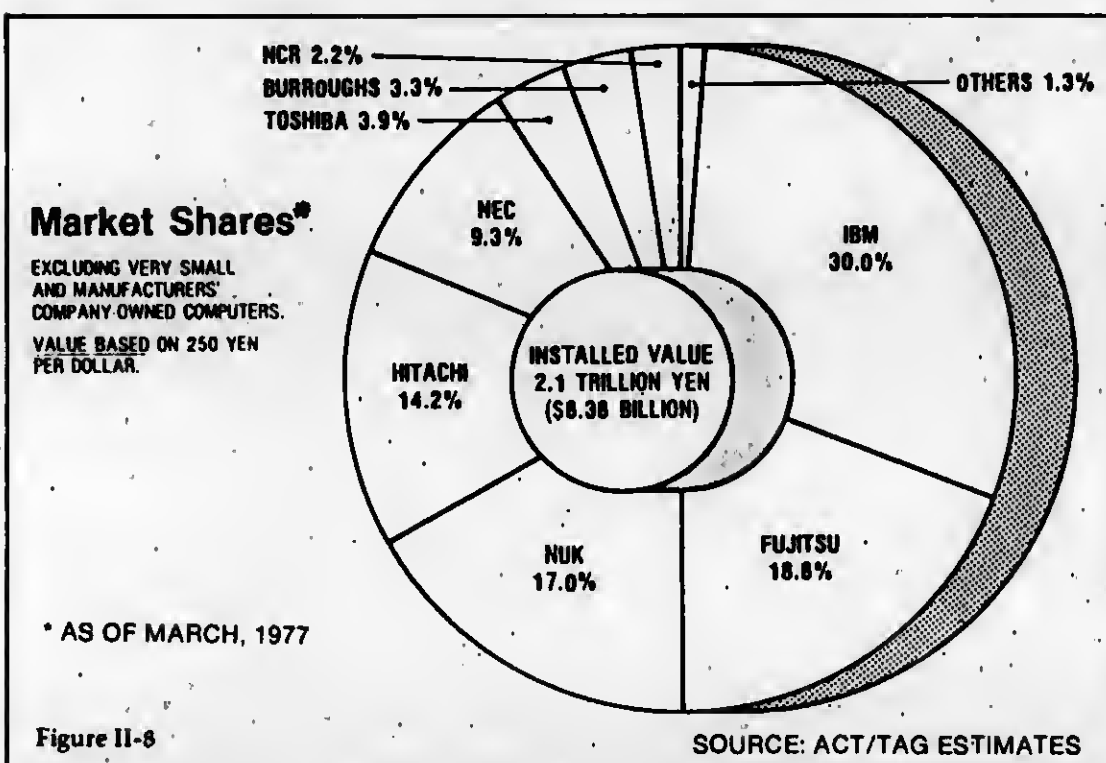
While real competition these days may come from other than the Japanese, none, perhaps, but the Germans and Italians (future Tsunami chapters will cover these worthy competitors) seem capable of matching Japanese quality, prices and/or delivery schedules.

That a substantial share of Japanese DP and electronic component technology originated in the U.S. is understandable in view of the heavy U.S. investment in Japan in the past 25 years or so. The technology was purchased or obtained through licensing agreements; it was also "brought home" by the scores of Japanese students and visitors the U.S. has trained and entertained over the past years.

In many cases, innovative Japanese engineers acquired U.S. parts, equipment, even designs, and improved on these to produce systems competitive with our own.

A recent example is Fujitsu's acquisition of Amdahl Corp.'s 470V designs and technology. The Fujitsu M-190 and its now announced M-200 are actually enhanced Amdahl designs, e.g., I/O channel dynamic address translation (DAT) capability and higher density memory chips were added. Following development of multiprocessor capability, among other value-added functions, Fujitsu with its M-200 seems to have provided us with an excellent demonstration of the capability of the Japanese computer industry to leapfrog our own; the M-200 is reputed to be considered more powerful than IBM's 3033 and Amdahl's 470V/7.





I do not believe any foreign computer systems manufacturer anywhere is as capable as the Japanese in making use of *our* technological achievements; Japanese chauvinism is an anachronistic concept when it comes to technological methods.

Fujitsu says its willingness to back the amazing Mr. Amdahl when Wall Street financial institutions would not (in the early 1970s) has actually benefited the U.S. Without its financial support, it feels that Amdahl's technology would not be available today within the U.S. (and other marketplaces) and that this development in turn forced IBM to react by lowering its prices (e.g., 370/158 and 168) through the 30XX announcements — thus creating more competition for the benefit of all users.

Although it thought the Amdahl venture risky, Fujitsu also had the foresight to conclude its own exposure to financial loss would be offset by a potential quantum jump in its own technological know-how.

Thus, we now have ample cause to wonder whether the U.S. financial community, by its rejection of Amdahl, wasn't in the final analysis speaking more to the U.S. government

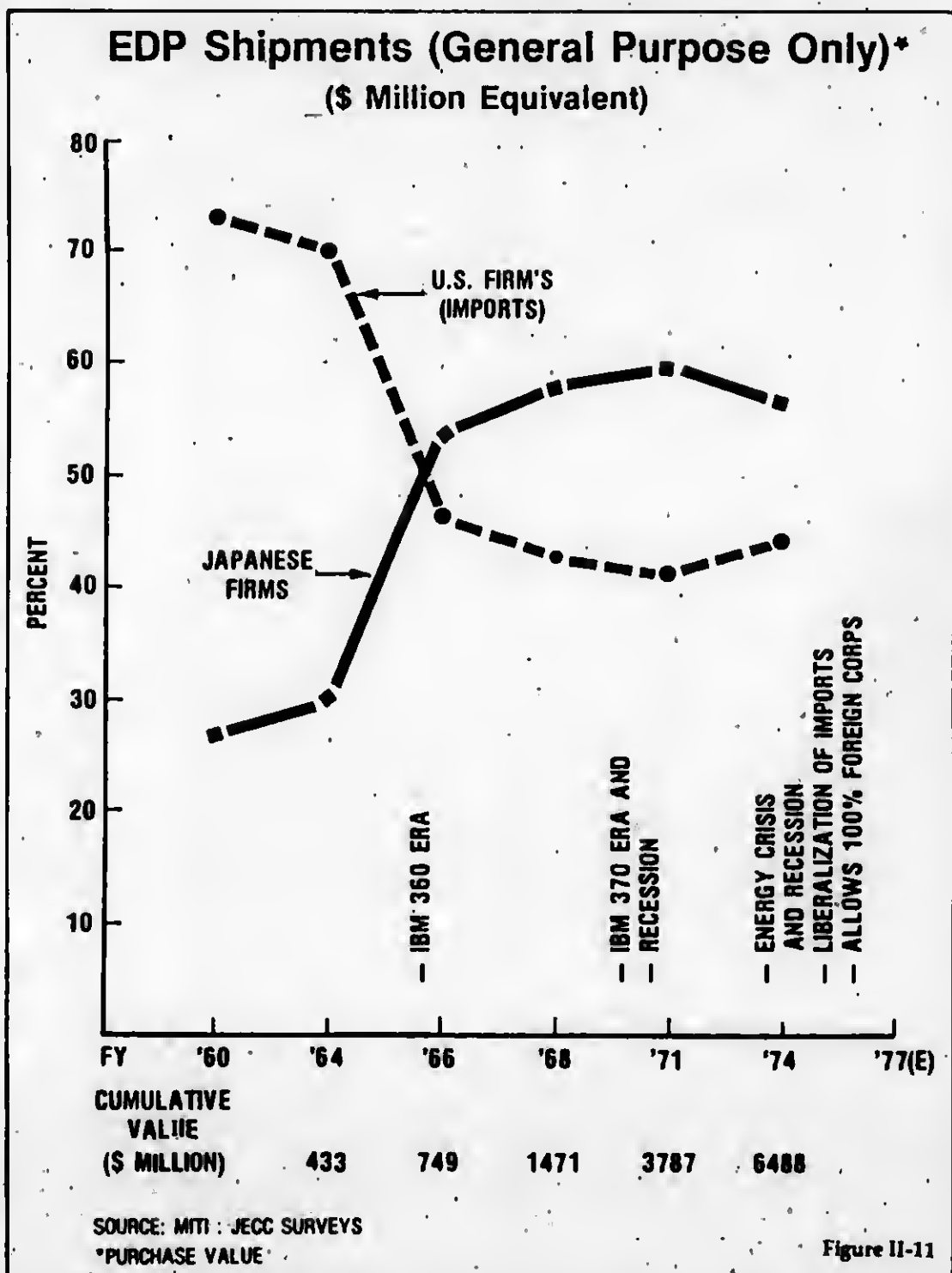
than to Amdahl. For factored into that community's decision must have been a healthy fear that our own government's policies would make it difficult for a new, large computer manufacturer to survive. (In view of our government's apparent campaign of debilitating legal actions against our DP industry, it would be difficult not to notice that we lack a national information systems industry policy; this is a lack from which the Japanese do not suffer.)

U.S. Firms in Trouble

Nippon Electric Co. (NEC) and Toshiba also obtained much of their technology and computer designs through cross-license agreements with Honeywell Information Systems, Inc. Some of the more competitive models of the Acs series are actually HIS Series 60 designs.

In fact, the NEC-Toshiba group has produced a less costly, more powerful version of some HIS Series 60 systems and is negotiating their export to HIS and HIS affiliates.

Other such examples include the Univac 90 series processors (e.g., 90/30 through 90/80), which are produced by the Mitsubishi-OKI-NUK



IN DEPTH

group.

Burroughs Corp. and NCR Corp., like Univac, have recently been in difficulty as viable competitors in the Japanese marketplace because of increasing domestic competition (including price cutting). In a sense, these U.S. companies and others are facing three IBMs in Japan, given that the two powerful combines — Fujitsu-Hitachi and NEC-Toshiba — and IBM-Japan are each as potent in Japan as IBM by itself is here.

One would guess that Univac's position in particular, once so strong in Japan, has been dealt a blow by Univac's own recent decision to cancel its "Roanoke" project (also known as UPL, or Unified Product Line). NCR and Burroughs, never strong in the general-purpose systems marketplace in Japan, now face increasingly uncertain futures.

The U.S. minicomputer manufacturers do not seem to face a bright future either; domestic Japanese mini and small systems manufacturers are too strong for them to compete.

Remarkable Growth

The use of computers in Japan started roughly in 1955. As we noted earlier, over the past two decades the number of computer systems in operation has increased to nearly 40,000 units with a total value of about \$8 billion as of December 1976. This represents nearly a 15% increase over 1975, the lowest growth rate year ever, attributable to the impact of the recession upon Japan in the early 1970s.

Computers are now affecting virtually every facet of human life in Japan, such as transportation, distribution, education, medicine, energy and environmental protection. Thus, computers have already become an indispensable element in Japan's social and economic fabric.

Figure II-1 shows the evolution of the Japanese computer industry superimposed on our own from the 1950s through the early 1970s. Figure II-2 provides a representation of the Japanese installed base from the early '60s to the present day; Figure II-3 shows the growth of this base from the mid-1960s to the present.

With extensive support from its government, the Japanese domestic computer industry has registered startling growth. Indeed, domestically produced computers are now in very wide use in Japan, accounting for about 60% of the total value of computer systems installed.

The Japanese government has designated the computer industry as one of the nation's "core" export industries for the future. Among the major reasons given for this designation is the Japanese view that the information needs of today's increasingly complex society extend to almost every area of human activity and that this points to an almost limitless expansion of the DP market worldwide.

Japanese industry leaders who defend their government's concern for its computer industry cite a report prepared by the Commission of the European Communities entitled "Community Policy on Data Processing." The report maintains that DP increasingly penetrates virtually every walk of life, transforming management and administration, education

and science.

The very structure of society may be determined in the future by the way it uses information systems. As labor-intensive industries move toward developing countries, Europe needs to develop, rapidly, industries requiring concentrated skills of a high level; of these, data processing presents a classic example.

Sensitive as they are to public opinion, the Japanese must be admired for their patience with other nations in having to justify their achievements. Their computer industry did not yet even exist when Europe's was already well developed. But as we observed at the start of this chapter, the reasons behind their need to promote growth in this particular resource aggressively

Announcing

Another of our distributed processing systems that let you grow without growing pains.

The hard-working Sycor Model 405 is a great system for distributing data processing tasks to small offices.

You can tailor it to handle the specific tasks of a specific location, putting just the right amount of power at every point in your network.

It comes with up to 64 thousand bytes of memory and two data stations, and it supports one printer. It also accommodates two or four diskettes for up to two million bytes of storage.

Best of all, the Sycor 405 can help you grow without having to replace hardware or reprogram software.

Grow step by step with no missteps.

The upward compatibility of the Sycor 405 lets you move up in the 400 series without having to redesign your system.

And Sycorlink™ a 400 series networking feature, permits disk file and peripheral access of one system by another. Any operator can automatically access any file in your growing Sycorlink network.

With Sycorlink, you increase your computer power every time you add another system. And set up a distributed data base with no file duplication.

Three languages accent flexibility in proven software.

Start working right away with Sycor's proven 400 series software. The new 405 is ready with both data entry and concurrent processing. A full range of file management capabilities and utility programs makes your 405 productive immediately.



IN DEPTH

were all too clear.

Also behind the Japanese government's attention to its computer industry, is the fact that computer technology has a very high degree of transferability to other electronics products. A survey recently conducted by the Japan Electronic Industry Development Association (Jeida) indicated 84% of all the technologies in-

volved in developing and manufacturing 49 selected electronics products were derived from computer technology.

Government-Industry Venture

Recognizing the cash requirements for effective competition in the computer industry would exceed what any single Japanese company could afford,

the Japanese government and major domestic manufacturers joined together in the latter 1950s to help create the Japan Electronic Computer Co., or Jecc. In August 1961, Jecc was designated the sole rental agency for domestically built computer systems. Working under a scenario which involved its front-end financing of systems sales and rentals, it grew as it

helped Japanese manufacturers realize quick returns on their marketing efforts.

As of 1976, Jecc's capitalization was Yen 59,700 million (\$239 million). Since it requires enormous funds to purchase "sold" computer systems, Jecc has benefited from the generous cooperation of many financial institutions, including the Japan Development Bank, commercial banks, trust banks, life insurance firms, property insurance companies and local, mutual and foreign banks.

With extensive assistance from the Japanese government, Jecc has played a key role in enabling its shareholder manufacturers to concentrate upon research, development and production. This in turn has contributed significantly to the development of the Japanese computer industry.

Today, Jecc's main business is still leasing computer systems purchased from its shareholder manufacturers to users. With its business expanding, Jecc also intends to provide a variety of user-oriented services. It is, in fact, already doing so by offering survey, research and consultant services, among others. (see Figure 11-12 for a summary of Jecc financial data.)

'The Jecc Yoke'

But Jecc's existence is not untouched by controversy, even in Japan. When speaking privately to Japanese computer industry experts, one cannot help but feel they would like to be free of what one executive termed "the Jecc yoke."

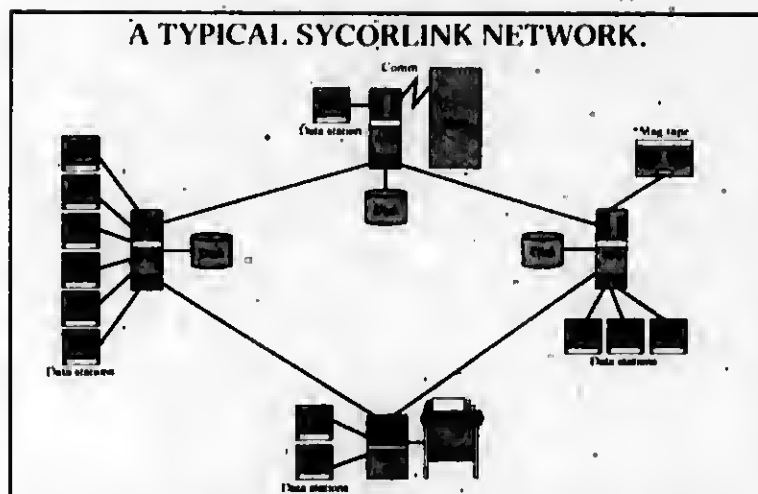
For while its member companies are indeed benefited by Jecc yen on the front end of a "sale," in return for this they give up to Jecc the benefits of long-term leasing, perhaps the foremost reason for IBM's past successes. (It should be understood that the "sale" process, in this context, involves negotiating a fixed-term lease with a client, turning it over to Jecc and obtaining in return a fixed amount from Jecc. Jecc thus becomes the leaseholder.)

Further to the executive's point, if the "sold" system is returned to the manufacturer in less than its term, it must be repurchased from Jecc at a rate highly advantageous to Jecc. This essentially fixes the potential profit of Jecc membership, while leaving open that of Jecc (which thus, presumably, cannot lose).

Even though Jecc is owned by its members, they cannot survive unless systems that are "sold" stay on lease for the contracted terms or longer. No doubt this properly motivates the home-grown Japanese computer industry as a whole to be highly competitive with foreign industries, even as individual companies remain internally (and fiercely) competitive with one another.

Thus, while in a stable economy Jecc can be very helpful to the Japanese computer industry, it is unfortunately

the Sycor 405.



Your programmers can format the screen for key entry without learning another language, with Sycor's screen-interactive COBOL. And handle financial analysis applications with BASIC. Sycor's Terminal Applications Language, TAL 2000, makes data entry quick and easy.

You can also choose from numerous communications packages — including SDLC — and a wide range of utilities. So whatever mainframe you operate with, Sycor can operate with it, too.

Get entry level processing at a level-headed price.

The flexible Sycor 405 lets you match the system to the site with one of the most competitive prices around. So you never have to overequip any location. Or pay for power you don't need.

And as your needs grow, the Sycor 400 family of distributed processing systems helps you meet them. With upwardly compatible hardware. And software you can run on any of our large-screen 400 series systems. So your investment in software is protected with Sycor.

Find out more. Call 800-521-2838 toll-free.

We have ten years' experience in distributed data processing, over 100 service centers across the nation, 40,000 systems installed — and more. Find out how much more by calling Tony Fazio, VP Sales. Or write Sycor, Inc., 100 Phoenix Drive, Ann Arbor, Michigan 48104.

Better yet, contact a nearby sales office. We're in the Yellow Pages under "Data Processing Equipment."

Sycor puts computer power where the work is.

SYCOR

Japan Electronic Computer Company Finances

(In ¥ 100 million)

Year	1961	'62	'63	'64	'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'75	'76
Computer Purchases	11	32	59	117	208	269	368	666	825	922	874	892	1,080	1,244	1,264	
Loans from Japan Development Bank	2	8	15	25	55	70	70	90	155	215	390	150	215	325	530	470
Capital	11	21	32	47	71	106	142	189	284	425	534	597	597	597	597	597

SOURCE: JECC

Figure II-12

Are Your DASD's Drowning ... in a Sea of Data?

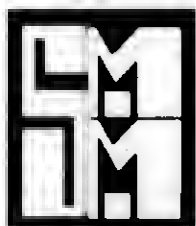


DMS/OS is the Wave of the Future in Data Management

In its first year, over 50 major banks, industries and government agencies have purchased DMS/OS. They are enjoying the benefits of having the most complete data management system available. Let us show you how they are controlling their DASD resources with DMS/OS.

Find out why DMS/OS is the wave of the future in data management. Just call or write for our free brochure or functional overview.

SOFTWARE MODULE MARKETING



Crocker Bank Building/Penthouse • 1007 7th Street •
Sacramento, CA 95814 • Telex SMMSAC 377-314 • IN
EUROPE: California Module Marketing, Ltd. • C/O
Country Formations Ltd., • 27 Kelsa Place, London W.8

a drain on its vitality in times of rapid change.

Incentives for Cooperation

In 1971, dissatisfied with the state of Japan's computer industry, the powerful Miti organization provided the six major Japanese mainframe manufacturers with an offer they couldn't refuse: Miti "suggested" that while continuing to compete they also cooperate to ensure their survivability, and the ministry provided financial incentives for them to do so. The home-cultivated computer industry was bedraggled by continued change and acceleration through the period of rapid economic growth that characterized the latter '60s in Japan.

According to R.T. Fertig, vice-president of Advanced Computer Techniques Corp.'s Technology-Analysis Group, "the Japanese marketplace was literally churning with product announcements." No Japanese computer manufacturer could claim profitability and the Japanese government felt compelled to authorize Miti to find ways to help its national computer industry. It suggested that, in a land empty of critical, natural resources and inhabited by people intensely desirous of staying there, a failure to acknowledge the importance of other, "indigenous" commodities such as technology would be shortsighted, indeed.

Late in 1972, the six domestic Japanese mainframe manufacturers were thus realigned into three groups, each consisting of two firms. Figures II-5, II-6 and II-7 show the three groups and their complex interrelationships. Figure II-4 provides yet another perspective on the possible results of Miti's activity: a national conglomerate.

Reviewing Figure II-9, we can conclude (if we leave out IBM) that such an entity would have constituted the second largest computer company in the world (in terms of combined revenues from DP).

Recent U.S. government concern for its negative balance of trade with Japan might legitimately be extended to the potential threat U.S. companies engaged in the world computer technology trade face from Japanese competition. While noticing the 148% increase of Japanese DP products exported to the U.S. in fiscal 1976, it has done little to help our manufacturers to compete. Figure II-11 dramatically portrays how effective the Japanese government has been in helping its own industry to handle the same problem.

Figure II-10 says it all. We can only admire the meticulous manner in which Japan's home-based computer industry has matched each and every IBM competitive product challenge.

Anyone reviewing this data cannot help but conclude that recent Japanese industry protects over U.S. overreaction to Japan's competitive viability in

DP are indeed unjustified.

It seems clear to me that the Japanese, like any business interest group enjoying great success in its chosen market, currently aspire to maintain the lowest possible profile in the DP market. Under the circumstances, they are as likely to achieve this objective as might a dragon seeking to conceal itself under a tatami mat.



Lecht is the author of five previous books on computer-related matters: The Programmer's Fortran II and IV, The Programmer's Algol, The Programmer's PL/I and The Management of Computer Programming Projects and most recently, The Waves of Change.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and Data Processing Management Association.

The full-year 1977
Computerworld Index
will be available soon.

For subscription details,
call Maureen Burke at
(617) 965-5800.



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

a new subscription

new address

new title

new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



**797 Washington Street
Newton MA 02160**



When it's time for COM, it's time for Quantor.

When you make the move from paper to computer output microfilm, or when you replace your current COM equipment, you want the transition to be as smooth as possible. And you want to make sure you're getting the best equipment for your needs and budget. So you come to Quantor.

Quantor is with you every step of the way, because COM equipment, installation and service are Quantor's only business. We're a single source, from systems to software to supplies. We were the first to offer a total, self-contained microfilm processing system — eliminating the need for darkrooms, special plumbing and trained technicians. And we back up our equipment with total support. Our regional offices are staffed with a systems/software analyst, service

specialist and supplies manager. They're ready, wherever and whenever you need them.

Quantor's six new COM recorder/processors and duplicators are proof of our commitment to provide you with the best equipment, at the most economical cost, for your own specific application. For example, our new in-house COM system includes the Q101 off-line recorder/processor combined with the Q203 duplicator — an excellent option for smaller companies. The Q118 minicomputer-controlled recorder/processor, with up to 40 megabytes of random disk storage, completely frees your host computer from formatting tasks. The Q16 option adds 16mm capability. And the new Q207 high-speed duplicator with optional collating capability is

available in both vesicular and diazo models.

Our software library makes it easy to interface with any computer. You can choose from a series of formatting options for titling and indexing — using either our host computer or minicomputer software. And we offer four excellent Quantor displays, ranging from 3/4 to full size, to complete our product line.

Before you make your move, call our President, Charles Askanas: (415) 965-3700. He'll set the wheels in motion. A Quantor representative will contact you and make recommendations that will relieve your COM qualms. You just relax and let us do the worrying. Because when it's time for COM equipment, microfiche displays, software, supplies and service — it's time for Quantor.

Quantor 520 Logue Avenue, Mountain View, CA 94043

Atlanta, Boston, Chicago, Cleveland, Dallas, Denver, Detroit, Houston, Los Angeles, New York, San Francisco, Seattle, Tampa, Washington, D.C.

When the Name of the Game is Subsystem Cost Per Byte, We Have the Only Game in Town.

Ampex and MSC.

Masterminds of more for less.

Over there is where you are going to put your snazzy, new, super-sophisticated minicomputer. Your PDP-11, HP3000 or 21MX. That Nova, Eclipse or the latest miracle from Interdata or Microdata. And over here, the space you've reserved for the disk subsystem to best meet your mass storage needs. The space where much of your computer's promise is going to spring to life. And the space where many of its potential problems might also be born.

It's to talk to you about that space that we've purchased this space. We are Microcomputer Systems, a company that among other things makes disk controllers. Together with Ampex, a company that among other things makes disk drives, we are offering disk subsystem packages that meet your top line performance requirements while you meet your bottom line cost objectives. Disk drives from Ampex's justifiably respected family of storage modules combined with our Series 1000 disk controller, a product of advanced microprocessor-based technology that has been field-proven to be the most reliable and maintainable in the business.

In short, not only do we think we can fill that subsystem space for you, we think we can fill it with the best subsystem at the lowest cost per byte.

Ampex. A familiar name in disk drive quality...and innovation.

What's in a name? Obviously more than Romeo thought when he uttered that now famous line. In the mass storage market, what is in a name—or behind it—can help open a door or close a sale. The name Ampex, for instance, implies credentials that are generously delivered by its product line. Performance. Reliability. Maintainability. Quality control. Innovative engineering

technology. And distinguished manufacturing techniques.

More specifically, that part of the Ampex product line that helps make up the MSC disk subsystem packages—the DM940, DM980, DM9100, DM9200 and DM9300—offers a full range of capacities from 40 to 300 megabytes and the kind of feature list you would expect from a company like Ampex. Total family plug compatibility. Standard and custom interfaces. Variable sector formatting. Variable length record format. Double density upgrade on the 940 and 9100. Dual port upgrade. Simplified maintenance design. Changeable logical unit address. And, of course, any number of options to meet any number of needs.

Speaking up for the silent partner. The MSC Series 1000 Disk Controller.

The controller half of our subsystem packages is not as well known as our disk drive partner. But as a happily growing number of customers and a painfully groaning number of competitors are learning, Microcomputer Systems is a name to be reckoned with.

And little wonder. The Series 1000 is the consummate controller. With software support for all popular minicomputer operating systems. Micro-programmed controller architecture. Full ECC error correction. And operator-oriented, self-testing capability. To be direct, the MSC Series 1000 is the most flexible, efficient, functional, maintainable, reliable, feature-filled and affordable intelligent controller on the market today.

Be the bottom line hero in your company. Buy the top line subsystem from ours.

This is the part of the ad where most companies trying to sell you a disk subsystem would take a lot of features and a lot of dollars, wrap them into one seemingly irresistible package, tie it all vaguely together with several smart sounding terms like "maximum cost efficiency" and "price/performance ratios," then run it up the flagpole.

We'd prefer to put it more bluntly. Yes, we think the MSC/Ampex subsystems are, feature for feature, the best that you can buy anywhere today. But, with some estimable competition out there, the most important fact is that the MSC/Ampex subsystems deliver the lowest subsystem cost per byte. Period. Lower than Systems Industries. Lower than CalComp.

Doubt it? Pick up the phone, call (408) 733-4200, extension 44 and check it. After all, this is a game we're both playing for keeps.



**microcomputer
systems
corporation**

440 Oakmead Parkway
Sunnyvale, California 94086
(408) 733-4200, extension 44
TWX: 910-339-9359



Growth Attributed to Minis West German Market at \$5 Billion

WASHINGTON, D.C. — The West German hardware market totaled about \$5 billion last year and will grow 10-15% annually during the rest of the decade, according to a recent U.S. Commerce Department forecast of computer sales trends in that country.

Most of the anticipated growth will result from rising minicomputer sales, which since 1975 have grown considerably faster than large systems purchases. As minicomputer sales continue to grow during the next three years, they will steadily eclipse mainframe sales as the dominant factor in the total West German hardware

market, the Commerce Department predicted.

At the same time, the microcomputer and microprocessor market will expand an average of 100% annually from its current level of about \$25 million/yr, the study added.

Through 1976, the Federal Republic of Germany constituted Europe's largest hardware market with almost 30,000 large-scale installations and 84,184 minicomputer and terminal systems, the market report noted. Those totals compared with the previous year's installed base of 24,821 mainframes and 79,333 smaller sys-

tems.

Thus, during 1976 West Germany's installed base of large- and small-scale systems jumped 20% and 6.1%, respectively.

At the same time, the cumulative value of the country's large-scale installations rose 11% from about \$11.2 billion to almost \$12.4 billion, the market forecast reported. In the minicomputer and terminal sector, cumulative hardware values increased 27.4% from about \$1.85 billion in 1975 to about \$2.35 billion in 1976.

Part of the growth in the West German hardware market stems from increasing domestic production. In 1975, the country's output of DP equipment totaled about \$17.2 billion. One year later, production had exceeded \$19.8 billion, the study noted.

Nevertheless, West German users remain heavily dependent on imports to keep pace with their rising demand for DP equipment. During 1976, total hardware shipments from foreign countries grew 23.7% to about \$12.7 billion, the Commerce Department said.

Of that total, U.S. companies, traditionally West Germany's chief hardware supplier, contributed about \$455.1 millions or 35.7%.

Analyzing U.S. imports by product type, the report noted that in 1976 CPU shipments accounted for about \$67 million of the U.S.'s total hardware imports to West Germany. Peripheral memories and input/output devices, meanwhile, contributed an additional \$71.3 million and \$92.7 million, respectively.

By contrast, West Germany's imports of U.S. CPUs, peripheral memories and input/output devices in 1975 totaled \$43.9 million, \$68.6 million and \$61 million, respectively the study said.

West German demand also remains high for other U.S. products, including intelligent terminals, optical character recognition equipment, point-of-sale terminals, databank systems and automated warehouse systems, the Commerce Department advised.

Evaluating West Germany's domestic computer industry, the report noted that Nixdorf, Europe's leading minicomputer manufacturer, boosted its sales in 1976 to \$343 million, an 11.4% jump over the previous year's sales of \$308 million. At the same time, the company increased its open orders to \$250 million, 18.6% higher than its 1975 total, the study added.

In 1976, exports accounted for 40% of Nixdorf's total hardware sales, and a large fraction of those shipments went to American customers through the company's U.S. subsidiary, Entrex. By 1980, the West German vendor expects its hardware shipments to the U.S. to surpass \$100 million for the first time, the study reported.

Siemens, West Germany's second largest computer manufacturer, increased its domestic installed base from 2,560 to 3,431 units in 1976, while IBM, Europe's leading hardware supplier, boosted its number of continental installations from 7,600 to 9,680, the Commerce Department added.

The German company also reported its sales rose 10% to \$575 million in the fiscal year ended September 30,

NEW WATER DETECTION ALARM

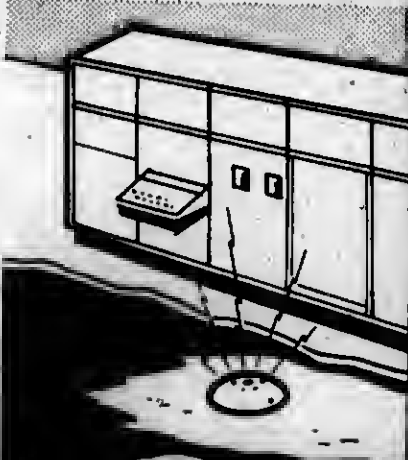
FOR COMPUTER AREAS

Warns you of water leakage in sub-floor wiring areas.

- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained...no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

From \$40 - \$70.

Ask about **WATER ALERT** today.



Dorlen Products

ROCKWOOD NATIONAL CORPORATION

ANNOUNCES

THE FORMATION OF

ROCKWOOD FINANCIAL SERVICES, INC.

PROVIDING THE COMPUTER USER WITH
ECONOMICAL AND IMAGINATIVE LEASING
OPPORTUNITIES FOR IBM SYSTEM/370,
CPU's AND PERIPHERALS WITH 5 OFFICES
TO SERVE YOU, HERE AND OVERSEAS.

33 WEST TARRYTOWN ROAD
ELMSFORD, N.Y. 10523
(914) 592-3105

SYNCHRO-SOUND

ENTERPRISES, INC.

Everything you need in
small computer systems!

LEAR SIEGLER ADM 3A TERMINAL



Assembled
\$854.95

Kit
759.95

Lower Case Option **69.00**

ADM 1 TERMINAL **\$1529.00**

ADM 2A TERMINAL **\$1995.00**

HAZELTINE MODULAR 1 INTELLIGENT TERMINAL



\$1659.00

1500 VIDEO TERMINAL

Kit also available

\$1149.00

CENTRONICS 703 SERIAL PRINTER

\$2395.00



761 PRINTER

KSR with Keyboard

\$1695.00

700 PRINTER **\$1266.00**

OKIDATA MODEL 22 LINE PRINTER



Tractor Feed
\$2249.00

RS 232C
Serial
Interface
379.00

MODEL 110 LINE PRINTER

Friction Feed

\$1149.00

NEW ADDS REGENCY 100 VIDEO TERMINAL **\$1325.00**



IMSAI 8080 MICROCOMPUTER



With 22 Slot **\$649.00**

Microcomputer based Business
Systems available



SYNCHRO-SOUND ENTERPRISES
The Computer People
193 25 Jamaica Avenue
Jamaica, New York 11423
212/468-7067 TWX 710 582 5886
Hours 9-4 daily and Saturday
Visit our new showroom
Working units on display
Dear Sir

What's Your Title?

Dictionary Updates DP Job Classifications

By Ann Dooley
CW Staff

WASHINGTON, D.C. — The Department of Labor has issued a Dictionary of Occupational Titles which updates several data processing job classifications used by commerce, industry and the government.

The new dictionary has described DP job functions more precisely than was possible in the earlier editions, which were based on perceptions gained in the early days of DP, a spokesman said.

In addition, the new volume has reduced overlapping job functions.

The fourth edition, which contains 20,000 definitions and is the first update in 12 years, has eliminated age and sex references and provides a more comprehensive and standardized base for classifying job applications and orders, making referrals, assessing worker transferability or relocating workers displaced by technological change, according to Secretary of Labor Ray Marshall.

The Dictionary is used as an aid in

job placement at the 2,500 federal-state public employment service offices, as well as by local employers and testing programs; professional societies and trade associations, vocational counselors and a variety of other employment personnel.

The 1977 edition is based on more than 75,000 on-site job analyses, coordination with professional and trade associations and research on the changing occupational structure of the American economy. The Dictionary was compiled by the U.S. Employment Service of the Labor Department's Employment and Training Administration.

According to the Dictionary, the DP manager: "directs and coordinates planning and production activities of electronic data processing, consults with management to define boundaries and priorities of tentative projects, discusses equipment acquisitions, determines specific information requirements of management, scientists or engineers and allocates operating time of computer systems. The DP manager also confers with department heads involved with proposed projects to insure cooperation and further defines the nature of the project. He also consults with systems engineer, electronic data processing to define equipment needs, reviews project feasibility studies, establishes work standards, assigns, schedules and reviews work."

"The DP manager interprets policies, purposes and goals of organization to subordinates, prepares progress reports to inform management of project development and deviation from predicted goals, and contracts with management specialists or technical personnel to solve problems. The DP manager also revises computer operating schedule to introduce new program testing and operating runs, reviews reports of computer and peripheral equipment productions, malfunction and maintenance to ascertain costs and plan operating changes within his department, and analyzes data requirements and flow to recommend reorganization or departmental realignment within the company."

"The DP manager also participates in decisions concerning personnel staffing and promotions within the electronic data processing department, directs training of subordinates, prepares proposals and solicits sales of systems analysis, programming and computer services to outside firms."

Systems Analyst

The Dictionary indicates that a systems analyst, electronic data processing who can also be designated "programmer-analyst," "analyzes business procedures and problems to refine data and convert it to programable form for electronic data processing; confers with personnel to organizational units involved to ascertain specific output requirements, such as types of breakouts, degree of data summarization and format for management reports, studies existing data handling systems to evaluate effectiveness and develops new systems to improve production or workflow as required and specifies in detail logical and/or mathematical operations to be performed by various equipment units

and/or comprehensive computer programs and operations to be performed by personnel in system. A systems analyst also conducts special studies and investigations pertaining to development of new information systems to meet current and projected needs, plans and prepares technical reports, memoranda and instructional manuals relative to the establishment and functioning of complete operational systems, and may prepare programs for computer use."

Programmer's Duties

The Dictionary indicates that a business programmer "converts symbolic statements of administrative data or business problems to detailed logical flow charts for coding into computer language and analyzes all or part of workflow chart or diagram representing business problem by applying knowledge of computer capabilities, subject matter, algebra and symbolic logic to develop sequence of program steps. The programmer also confers with supervisor and representatives of departments concerned with the program to resolve questions of program intent, output requirements, input data acquisition, extent of automatic programming and coding use and modification and inclusion of internal checks and controls. The business programmer also writes detailed logical flow chart in symbolic form to represent work order of data to be processed by a computer system and to describe input, output and arithmetic and logical operations involved. The programmers also convert logical flow chart to language processable to computer, devises sample input data to provide test of program adequacy and prepares block diagrams to specify equipment configuration. In addition, the programmer observes or operates a computer to test a coded program, using actual or sample input data, corrects program errors by such methods as altering program steps and sequence, and prepares written instructions (run book) to guide operating personnel during production runs. The business programmer also analyzes, reviews and rewrites programs to increase operating efficiency or adapt new requirements, compiles documentation of program development and subsequent revisions and may specialize in writing programs for one make and type of computer."

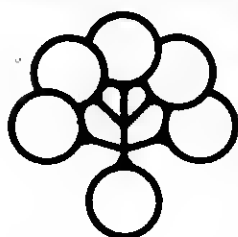
The Dictionary indicates that a chief programmer in business "plans, schedules and directs preparation of programs to process business data and solve business-oriented problems by the use of electronic data processing equipment, consults with managerial and systems analysis personnel to clarify program intent, indicate problems, suggest changes and determine extent of automatic programming and coding techniques to use and assigns, coordinates and reviews work of programming personnel. The chief programmer develops original programs and routines from work flow charts or diagrams, consolidates segments of a program into a complete sequence of terms and symbols, and breaks down program and input data for successive computer passes, depending on such

(Continued on Page 104)

Run ISAM Files on 3330-II and 3350's with DOS/VS Rel. 34

With The Value Computing Advanced Function
ISAM 3330-II/3350 Native Mode Support

- ☒ No reassembly of Your Programs
- ☒ No Changes to Your JCL
- ☒ Completely Transparent to Operations



Value Computing Inc.
The Computer Operations Company

Please send me more information about ISAM Native Mode Support

NAME _____ COMPANY _____
TITLE _____ PHONE _____
ADDRESS _____ CITY _____ STATE _____
ZIP _____ CPU _____ OPERATING SYSTEM _____

Mail to: VALUE COMPUTING INC.
300 VCI Building, W. Marston Pike
Cherry Hill, New Jersey 08002

Or call toll-free 800-257-8242

1078

#1 IN DEC

Our new catalog lists more Digital Equipment items than any catalog, flyer or advertisement ever published in the secondary market.

WRITE FOR YOUR FREE COPY TO:

NEWMAN COMPUTER EXCHANGE
1250 North Main Street, Dept. CW9
P.O. Box 8610 Ann Arbor, MI 48107
(313) 994-3200



COMPUTER DEALERS ASSOCIATION

CHARGE!

Put yourself on top of the list! Take out your Amex, Visa or Master Charge card and **CHARGE** your own subscription. It costs only 35¢ a week to win the war.



COMPUTERWORLD

11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mktg. Sales Representative
52 Other Sales/Marketing
66 Consultant
76 Lawyer/Accountant
86 Librarian/Educator/Student
99 Other:

First Steps Taken

Bank Consortium to Ensure Emergency DP

By Jeffry Beeler
CW Staff

NEW YORK — A consortium of local banks, insurance companies, manufacturers and other businesses has taken the first step toward creating a jointly financed and operated computer center that would ensure participating firms uninterrupted DP services during extended system shutdowns.

In a meeting held here earlier this month, consortium members announced they have begun requesting bids for a study to help them evaluate the feasibility of establishing the first such shared contingency computer center (SCCC) in the U.S. Representatives of the co-operating firms will decide whether to begin development of the proposed center after they have reviewed the feasibility study's findings, which are slated for release in about six months.

As currently envisioned by its planners, the center would provide computer backup to any consortium member whose system is rendered inoperable for long periods by major fires, floods or other disasters. When not providing long-term backup services, the center would be used full-time by participating companies for testing new hardware and software acquisitions, explained Don Phelps, vice president of Irving Trust Co., one of the consortium's members.

15 Participants

To date, the SCCC proposal has attracted 15 participating firms in the greater New York area, and an undisclosed number of other organizations have expressed a strong interest in the concept. Besides Irving Trust, current consortium members include Exxon Corp., Chemical Bank and 12 other companies that thus far have chosen to

keep their identities secret.

If the pending feasibility study recommends implementation of the proposed plan, each of the participating firms will contribute equally to the center's financing, operation and management, Phelps explained. At the same time, consortium members would retain independent control over the smaller, in-house backup systems each maintains as a hedge against short-term DP emergencies like power outages.

Need Recognized

Long before they formed their current alliance, most member firms had recognized the importance of creating a facility that could provide DP backup during long-term computer shutdowns, Phelps noted. But until recently, the cost of such an ambitious project had proven far too high for any single investor to seriously consider.

Now, however, if the consortium's collective financing plan is judged sound in the forthcoming feasibility study, it could make the multi-million dollar SCCC project economically viable by minimizing the amount each member would have to contribute toward total development costs, Phelps added.

Local Investigation

Largely because of its potential economic advantages, the concept of sharing computer backup facilities and expenses has grown steadily in popularity, both in this country and abroad. The idea has already attracted the interest of business groups in several U.S. cities, notably Chicago, and SCCC projects are also being discussed

by prospective users in France, Phelps said.

In the local area, one of the first serious attempts to investigate the subject was initiated by the New York Clearinghouse Association, a group of 11 banks that co-operate to study and solve financial problems common to member institutions. About a year ago, the NYCA appointed a task force to assess the potential dangers of extended computer failures and to consider possible remedies for such catastrophes.

The task force in turn invited a number of other local firms including brokerage houses, public utilities and service organizations to join the discussion and contribute their views and suggestions. Among the companies that accepted the task force's invitation were the members of the current SCCC consortium.

Steering Committee

Since then, representatives of the consortium have appointed a steering committee to oversee evaluation and planning of the suggested computer center. Besides Jacobson, the committee consists of Lee W. Spitzer, group chairman and an executive vice president of Irving Trust; and Charles B. Greene, an Exxon computer sciences manager who heads the project's executive committee.

Members of the steering committee have yet to announce prospective locations for the backup facility, select the hardware configuration it will house or issue detailed guidelines governing the center's use and operation. These and other important questions will be among the topics covered in the feasibility study, Phelps said.



Presenting the most dynamic business Opportunity since the Big Mac.™

A National ComputerLand Retail Franchise

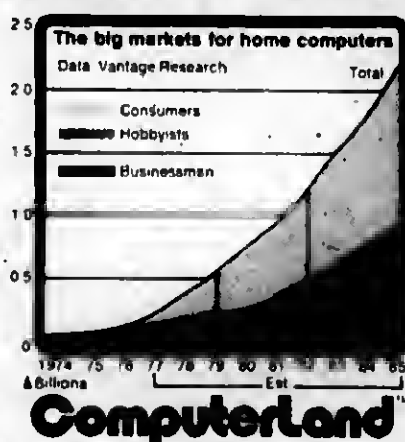
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 895-9383 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Big Mac is a trademark of McDonald's Corp.

Mail to E. E. Feber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW
San Leandro, CA 94577 (415) 895-9383

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

Federal Guide Updates DP Job Classifications

(Continued from Page 102)

factors as computer storage capacity and speed, extent of peripheral equipment and intended use of output data. The chief programmer also test runs on the computer to correct or direct correction of coded programs and input data, revises or directs a revision or existing programs to increase operating efficiency or adapt to new requirements, compiles documentation of program development and subsequent revisions and trains subordinates in programming and program coding. This individual also prescribes standards of terminology and symbology to simplify interpretations of programs, collaborates with computer manufacturers and other users to develop new programming methods, and prepares records and reports."

Engineering Programmer

The Dictionary indicates that a programmer in the engineering and scientific area "converts scientific, engineering and other technical problem formulations to a format processable by computer, resolves symbolic formulations, prepares flow charts and block diagrams and encodes resultant equations for processing by applying knowledge of advanced

mathematics, such as differential equations and numerical analysis and understanding of computer capabilities and limitations and confers with engineering and technical personnel to resolve problems of intent, inaccuracy, or feasibility of computer processing. This programmer also reviews results of computer runs with interested personnel to determine the necessity for modifications or reruns."

Programmer's Job

The Dictionary indicates that a programmer in the information system category "develops and writes natural and artificial language computer programs to store, locate and retrieve specific documents, data and information, develops computer programs for input and retrieval of physical science, engineering or medical information, text analysis and language, law, military or library science data, and writes programs for classification, indexing, input, storage and retrieval of data and facts, display devices and interfacing with other systems equipment.

The Dictionary costs \$12 from the Government Printing Office, Washington, D.C. 20210.

Supermarkets View EFT as Customer Service

By Ann Dooley
CW Staff

SOMERVILLE, Mass. — The objectives of electronic funds transfer (EFT) from a supermarket viewpoint are to provide customer service at no additional cost, as well as spark cost savings and paper reduction, according to M. Dean Potts, senior vice-president for First National Stores.

Although there is no one supermarket viewpoint on EFT, the industry does not intend for EFT to become the only means for a settlement transaction, he added.

EFT should be a supplement to and not a replacement for other forms of settlement, he said. For myself, "I am in favor of EFT — under the proper conditions and in the proper form," Potts said in a recent interview.

Spectrum of Services

EFT can provide a full spectrum of services offered through a remote terminal including deposits, withdrawals, transfers, debit cards, automated teller machines and check verification.

But the use of these functions should remain voluntary, Potts noted.

To understand the issue of EFT, it is necessary to understand the economics of supermarkets, he continued.

There are more than 30,000 supermarkets in the U.S. with sales of \$1 million or more annually and average weekly sales of \$72,425, he said.

The average supermarket performs 7,712 checkout transactions weekly on an average sale of \$9.39 — some being small one-item transactions and some being weekly shopping transactions, Potts said.

"Last year, the average net profit rate was .86% on sales — less than one percent," Potts claimed.

Store labor on the other hand, is slightly more than 50% of the total expense structure and store employees are generally well paid, contrary to popular belief, he continued.

So, what this means is that there is a high sales volume with many customers, low per customer sales and a low rate of profit, Potts noted.

Check-Cashing Agencies

Supermarkets have become the principal check-cashing agencies in the country — the value of the checks cashed in some supermarkets exceeds the total sales of that store, Potts said. Generally, however, it averages 80% or more of weekly sales, he explained.

The average value of each check is about \$52 and the typical supermarket cashes approximately 1,114 checks per week, he estimated. Large-volume stores cash up to 2,369 checks, Potts said.

Automating Acquisitions?

CHICAGO — "Automated Acquisitions: What's Good? What's Bad? What's Missing?" will be covered here at the annual conference of the American Library Assoc. to be held here on June 27, 1978.

Speakers will discuss the automation needs of libraries and the problems, advantages and justification of automated acquisition systems, a spokesman explained. A state-of-the-art review of current systems and their impact on publishers, wholesalers and library activities will also be presented,

"This heavy volume of check transactions is why supermarket operators consider EFT," he said. "Price competition is well known in our industry — service competition is almost as important," he added.

Fewer Problems

If EFT can reduce a portion of the check transactions, it may help reduce problem areas, he said.

But for EFT to be successful, it must prove acceptable to a sufficient number of customers and that is a primary concern, he said. Most EFT systems start as check verification systems and have not gone beyond that point, Potts said. A common reason for adopting the system is to eliminate bad check losses but the losses from bad checks are only two to four cents on the dollar and are not a major item in the cost structure, Potts claimed.

Bad check loss is only a fraction of the 29.5 cents it costs to cash a check in a supermarket, he added.

The cost of coin and currency and the cost of depositing checks will not be affected under an electronic verification system, he said. However, if the system is customer activated, there can be some benefits in reduced clerical costs, Potts explained.

Customer's View

Another concern about the system is the costs perceived by the customers, according to Potts. "We do not want them to believe that we are adding expensive systems that will add to the cost of their groceries, whether or not they are one of those using the system," he said.

The customer spends two to three times longer shopping for the items than waiting to be "checked out," however most customers perceive the time spent to be the opposite; that is more time spent waiting in line than shopping, Potts said.

The industry cannot afford to add anything to checkout process time that will slow that operation. "So, before we begin to attach point-of-sale EFT devices to our registers, we must be convinced that we will not lengthen lines at our checkstands," he said.

Another important factor is that check verification or full EFT must have little or no involvement of store personnel which would increase the already high labor costs, he added.

Customer Activated

Also, if the customer activates the system himself, he cannot blame errors or malfunctions on store employees, he noted.

Systems that scan a customer's ac-

he said.

Participants in the program will include Richard M. Dougherty, Director of Libraries at the University of Calif.; Linda Crismond, University of Southern Calif.; and John Secour, Yankee Book Peddler, the spokesman stated.

Additional information can be obtained from the Assistant University Librarian for Technical Services, Duke University Library, Durham, N.C. 27706.

count before giving a "clear" indication are other potential sources of aggravation for the supermarket operators. A customer will often mail his paycheck to his bank on Friday and draw checks against that deposit on the weekend.

However, an on-line system would not allow customers to "float" their accounts and would create a situation where the store manager must face losing a customer or violate the system, Potts pointed out.

Economic Failures?

The industry is also concerned that some financial institutions, in their anxiety to compete, may establish systems which are technological successes and economic failures, Potts said.

After getting customers used to the service, the store might find it necessary to discontinue or charge for the service. And the customers would blame the supermarket, he added.

Supermarket operators are also con-

cerned that EFT networks may be regulated as public utilities or as part of the banking system.

If EFT were to be regulated as a public utility, it would not develop as quickly from a technical or cost standpoint, the industry members fear.

Applicable Regulations

Further, they also express concern about which banking regulations would be applicable to the supermarkets housing terminals if EFT were to become part of the banking system, Potts said.

For an EFT network to achieve the supermarket's objective of customer service, it must be broad based and although sponsored by a financial institution, must not be limited to customers of the institution, he said. The system should not have any perceived or actual increase in operating costs, should not lengthen checkout time, should be customer activated and should have a strong chance of survival, Potts said.

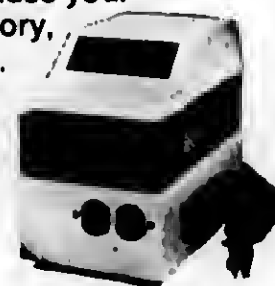


IS YOUR COMPUTER ON A PARTY LINE?

Other equipment in your facility can cause your computer to make errors, lose its memory, wipe out a program, or stop operating.

The Topaz line 2 power line conditioner:

- Regulates incoming voltage
- Removes lightning spikes
- Removes equipment transients caused by air conditioners, elevators, X-ray equipment, office machines or factory equipment.



TOPAZ
line2

Now you can have clean, noise-free, regulated power without the expense and delay of installing an independent power source. The Topaz line 2 is a completely self-contained, portable line voltage regulator and Ultra-Isolation Transformer. Simply plug it into any 120 volt outlet, then plug your equipment into the line 2. It costs less than a "dedicated" power line and does so much more.

If you've been having random problems with your computer or electronic cash register, or are about to install one, find out how the Topaz line 2 can protect your equipment and provide the clean power you need.

Send for our brochure or call today.

TOPAZ SOLUTIONS TO POWER PROBLEMS
ELECTRONICS

3855 Ruffin Road, San Diego, California 92123—(714) 279-0831—TWX (910) 335-1526

We're really proud of our add-on memory for your PDP*-11/70. Here's why.

First, we'll ship it when you need it. No waiting. We invented semiconductor memory, manufacture our own components and deliver more bits of memory every year than any other company.

No one has more experience in MOS memory technology than our design team. They've designed our in-1670 for PDP-11/70 to deliver optimum reliability, with the features you need. Error Correction Coding and Error Logging, for example, mean that single bit errors are corrected automatically, and logged to simplify preventive maintenance.

We designed our in-1670 for easy expansion, too. It gives you up to two megabytes in a single frame. As your needs grow, you can expand easily by adding memory cards in convenient 128K byte increments.

We're proud of our worldwide service organization, too. It's the support you'd expect from the independent

that delivers more memory systems than anyone.

Finally, there are economic advantages. Choosing Intel can give you clear-cut cost savings. And the added peace of mind you get when you go with a leader. That's true of all our memory systems, for PDP-11 and LSI-11 computers, and 370 computers, too.

Why wait? Pick up the phone and call your local Intel sales office. Or, for more information, call us at 408/734-8102 or use the coupon below.

intel® delivers.

Intel Memory Systems

1302 N. Mathilda Avenue, Sunnyvale, CA 94086

CW21378

Send me more information on memory for my

PDP-11/_____, LSI-11_____ Other_____

Call Me_____/_____

Name_____

Company_____ Position_____

Address_____

City, State, Zip_____

**“Intel delivers PDP-11/70
memory with
MOS performance,
ECC-and no waiting.
We planned it
that way.”**



COMPUTERWORLD

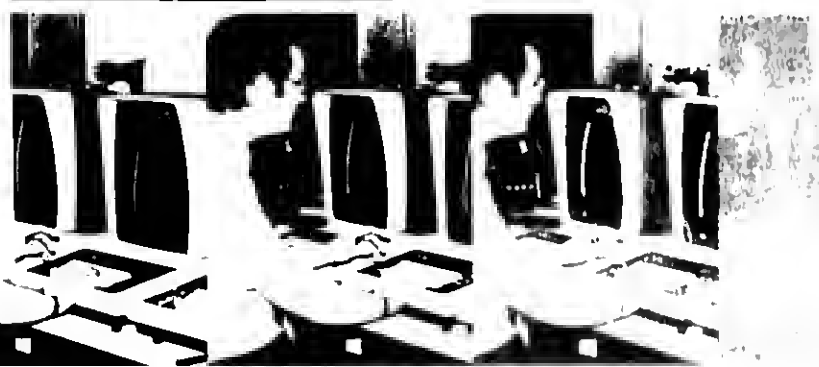
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

8

February 20, 1978

75¢ a copy; \$18/year



CRTs Exonerated as Cause Of Copy Editors' Cataracts

By Ann Dooley
CW Staff

NEW YORK — Radiation emitted from CRTs is not responsible for the cataracts developed by two *New York Times* copy editors after that newspaper switched to an electronic editing system, an investigation has concluded.

The study was conducted by the National Institute for Occupational Safety and Health (Niosh) at the request of The Newspaper Guild to determine whether CRTs are harmful to workers [CW, Aug. 1].

The CRTs were found to emit several types of radiation — X-ray, radio frequency, visible and ultraviolet — but all were found to be well below safety standards. While those types of radiation have been found to cause cataracts in laboratory animals, massive doses would be needed to cause the same condition in humans, according to William Murray, chief of the Niosh radiation section, who concluded the emission from the CRTs was very low to nonexistent.

Previous studies have measured the X-radiation emitted from CRTs, but this was the first study to measure all other types of radiation emitted from the machines.

The CRTs examined by Niosh were the Harris Corp. 1500A, the IBM 3270, Inforex, Inc.'s 1303, the Telco Products Corp. 40 and the Incoterm Corp. SPD 10/20, as well as several others.

Dataspeed 40/4 Can Be Tariffed, Court Affirms

By Ronald A. Frank
CW Staff

NEW YORK — The Dataspeed 40/4 can be tariffed by AT&T because it is not a DP device. That is the substance of a ruling by the U.S. Court of Appeals for the Second Circuit here, which upheld a decision by the Federal Communications Commission (FCC) to tariff the CRT terminal.

In upholding the FCC, the court said it considered "unexceptional" the commission determination that the 40/4 was similar in kind to established

(Continued on Page 6)

The causes of the cataracts diagnosed in the two copy editors is still unknown.

The Newspaper Guild was concerned with the outcome of the study since the *New York Times* has 90 CRTs in operation and plans to double that number within the year. Niosh estimated between five million and 10 million CRTs are used in this country.

The Niosh study did indicate that continual viewing and work with CRTs, in conjunction with the working environment and background lighting, can lead to fatigue and eye strain.

Mini Makers Offer More Options

• Interdata 'Bundles Up'

By Esther Surden
CW Staff

NEW YORK — Interdata, Inc. gave users a Valentine's Day present last week — two small business packages complete with bundled service, support and software based on the firm's 8/32 and 7/32 32-bit minicomputers.

Dubbed the 700 and 800, the two systems include standard Interdata hardware and software and are contained in a cabinet designed for the business environment. The systems are reportedly in the performance range of Data General Corp.'s Idea system and Digital Equipment Corp.'s Datasystem.

An integrated software package delivered on disk and designed around Interdata's standard software offerings as well as support policies that are unusual for a traditional mini manufacturer make up the bulk of the announcement.

Also included are Cobol, operating under the company's OS/32 MT multiprogramming operating system; a multiterminal monitoring that provides "a time-sliced interactive programming environment" for up to 16 concurrent users; an indexed sequential access method file management system; a transaction controller to help designers develop, implement and maintain the transaction-processing system; utilities; and Interdata's Common Assembler Language.

The service and support package includes two days of preinstallation planning and consultation, system installation and checkout, two days of on-site software consultation and informal training, support and start-up assistance.

(Continued on Page 5)

Coal Strike May Force Midwest DP Shutdown

By Ann Dooley
CW Staff

Computer sites in several Midwestern states are threatened with drastic power reductions or even a complete shutdown of their operations if much-needed coal supplies are not made available soon.

The critical coal shortage is a result of the longest strike ever by the United Mine Workers union.

Many businesses in Indiana, Ohio, West Virginia and other surrounding states have cut back energy usage by 25%. Most electric utilities have enough supplies for 25 to 40 days, depending on the area, but once supplies drop below a 20-day reserve level, mandatory cutbacks of up to 50% will be imposed in many places.

In the meantime, lights are being turned off, heat is being reduced and water temperatures are being lowered in offices and DP centers. Even businesses that have already installed

energy-saving devices are being forced to find ways to cut back further.

There's not much that can be done except try and ride it out, according to Robert Skudlarek, DP manager for Bendix in South Bend, Ind. "There are only so many lights you can turn off."

"Right now we're in the first phase where we can live with it, but by next week, it will be critical," he said.

Bendix has switched off its sorters, keypunches, card readers and other devices that can be powered down.

The computer center has the highest priority in the building and operations are on schedule even with the 25% reduction, he said, but noted that if reductions reach 50%, there will probably be substantial shutdowns.

The local utility company is considering rotating blackouts or brownouts in that area to stretch remaining coal supplies, he added.

Blue Cross/Blue Shield of Indiana, (Continued on Page 4)

• HIS Extends Level 6

By Esther Surden
CW Staff

WALTHAM, Mass. — Honeywell Information Systems, Inc. announced four Level 6 minicomputers last week, two of which — the Model 53 and Model 47 — it aimed at the hearts of commercial users. The other two systems — the Model 33 and Model 43 — are more general-purpose minis.

HIS also introduced memory modules, peripherals, an option to allow users to link two or more Level 6 systems together and a writable control store option.

Present HIS Level 6 users can upgrade to the systems in the field, a spokesman noted.

The system directly targeted for business users is the Model 47, which HIS said was designed for those with large

(Continued on Page 4)

Two-Year Project Pays Off: 'Back-End' DBMS Succeeds

By Don Leavitt
CW Staff

WELLESLEY, Mass. — Cullinane Corp. has successfully implemented a prototype "back-end" data base management system (DBMS) including data communications software.

The initial data transmission linked a Digital Equipment Corp. PDP-11/70 in Atlanta with a host IBM 370/158 in Kansas and capped a two-year research and development effort concerning the back end DBMS approach, according to Cullinane's project leader, Robert Goldman.

Under such an approach, most of the

DBMS software is moved from a mainframe to another, usually smaller, machine, relieving the host's processing load in much the same way front-end processors handle communications chores for the central CPU [CW, April 4, Oct. 31].

The existence of a "back-end" machine and its operation remains totally transparent to the application programs in the host machine. Consequently, the terminal user or programmer need not be concerned with which machine services his data base requests, a spokesman explained.

(Continued on Page 6)



EDITORIAL

Editor E. Drake Lundell Jr.
 Deputy Editor Ronald A. Frank
 Managing Editor Nancy French
 Associate Editor Donald Leavitt
 Associate Editor Esther Surden
 Associate Editor Molly Upton
 Associate Editor Frank Vaughan
 Washington Bureau Edith Holmes
 Staff Writers Catherine Arnst
 Jeffrey Beeler
 Timothy J. Scannell
 Brad Schulz
 Cheryl M. Gelb
 Barbara T. VanScoyoc
 Susan Gerrard
 Ann Dooley
 Denise Petski
 Jim Orton
 Chief Copy Editor
 Copy Editors
 Photography Editor
 Editorial Assistant
 Editorial Cartoonist
 Bureaus:
 London Roger Frampton
 Munich Hans-Jurgen Ballnath
 Asia Hidetsuna Sasaki
 Contributors:
 Education J. Daniel Couger
 Legal Roy N. Freed
 Taylor Reports Alan Taylor
 Human Connection Jack Stone

SALES

Vice President/
 Marketing Roy Einreinhofer
 Advertising
 Administrator Terry Williams
 Display Advertising Mary Anne Furlong
 Classified Advertising Donna Whalen
 Recruitment
 Advertising Kathy Sieinberg
 Sales Promotion
 Director Jack Edmonston
 Market Research Kathryn V. Dinneen
 CIRCULATION
 Vice-President/
 Circulation Margaret Phelan
 Circulation Manager Barbara Jeannetti
 Customer Service Rep Peggy Kelly
 Assistant Maureen Burke
 PRODUCTION
 Manager Lee Vidmer
 Supervisor Henry Fling
 Assistant Manager Peter Holm
 Typesetting Supervisor Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 Munchen 40, Tristansstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S.—\$18 a year; Canada and PUAS—\$28 a year; Europe and Middle East—\$50 a year; all other foreign—\$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/
 Publisher Patrick J. McGovern
 President W. Walter Boyd
 VP-Marketing Roy Einreinhofer
 VP-Finance William P. Murphy
 VP-Circulation Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Court Turns Thumbs Down on Bid To Change Man's Name to '1069'

By Leigh Lundin
 Special to CW

MINNEAPOLIS — As television news crews jammed equipment in revolving doors and ran the wrong way up escalators, a Minnesota court ruled here last week against a man wishing to change his name.

The excitement and curiosity seemed to portend Renee Richards or at least Billy Carter. But it was just a private individual, in most ways like other individuals. Quiet. Intense. Intelligent.

But a man with a difference: His friends call him "One Zero." A man in court to have his name legally changed to "1069."

He had an impressive array of identification: a Social Security card, various state working permits, even two checkbooks — all imprinted with the name "1069" and his elegant, if unusual, signature. Various companies and utilities bill him under his new name and even the court fee was paid by a "1069" personal check.

So what's the problem? The telephone company will not issue him a telephone number and the Department of Motor Vehicles will not grant him a driver's license. Both asked for a court order making the name official.

'Borderline Case'

1069 was born near the end of World War II in what is now East Germany near the Czechoslovakian border. "I have always been a borderline case," he has said with a wry smile.

What led 1069 to change his name? He had been looking for a label with no overtones of race, religion or sex, yet one that could be translated into any language. In time he stumbled across Renee Thom's *Structural Stability and Morphogenesis* in an engineering library and, combined with some philosophy, arrived at the name "1069."

What does "1069" mean? It cannot be satisfactorily explained in either

mathematics or natural language, although some computer-oriented descriptive languages might help. It has, instead, more of a mystical significance, such as that attached to certain numbers in medieval times:

In a nutshell:

- "1" stands for nature. Political sophistication. Food, clothing, shelter.
- "0" represents time, color, motion and emotion. Magnetism and gravity.
- "6" is the symbol for universe, harmony and disharmony, accord and discord.
- "9" stands for essence, meaning differential, energy.

The Man Himself

And what is 1069 like? He is a private person, somewhat retiring, not one to force his beliefs on others. He has several college degrees and experience in all levels of teaching. He knows business, law and economics, and has gradually drifted toward the computer field, particularly graphics.

He is also without work, having lost his teaching position when he changed his name. He constantly encounters personnel managers who are frankly impressed by his manner and qualifications, but hesitate to recommend him to upper management.

Typical among these is Xerox, a company whose name, so the story goes, was selected simply to be unusual. Xerox couldn't hire him without a proper name. Come in here with a name, they told him, and we'll give you a number. 1069 insisted he was an original, not a copy.

Of course, the phone company gave him a bad time, refusing to put his numbers in the book and complaining its computers could not handle it. Among its insurmountable problem was whether to put numbers before or after alphabetical listings.

Either was OK with 1069, he wasn't picky. After all, what does the phone company do with 76 gas stations, 3M

Co., A-1 Used Cars and the 1st National Bank?

The computer's ability to deal with numerical names (numbers?) was raised in court. Steve Nachtschiem, assistant director of the University of Minnesota Computing Center, put most fears to rest. The only potential problems, he pointed out, might be data validity tests (if anyone still uses them) and the IBM collating sequence, which is contrary to the Ascii standard of numerics preceding the alphabet.

In short, it would be easier to reprogram computers to accept 1069 than it would be to deprogram people.

The court ruled against 1069. The ruling limited a person to certain arbitrary names while a corporation (legally defined as an individual) can choose any name or number it wishes. The ruling was unusual because it granted a corporation more rights than a person.

1069 is now quietly trying to resume his life. He is disappointed about the court's decision, but he just smiles shyly and sips his seventh or eighth cup of coffee. He mentions "The Prisoner" in which Patrick McGoohan defiantly screams, "I am not a number, I am a free man."

He was trying to say the same thing, he said, only in reverse.

A pity to think that with all the numbers assigned to us, we cannot choose one of our own. Sadder still that a person would resort to a number to achieve a bit of individuality.

Correction

In "Britons Laud HIS 'Bachman'" [CW, Feb. 13], Charles Bachman should have been identified as the current chairman of the American National Standards Institute's X3/Sparc study group on distributed processing. Bachman has been active in the study group on data base systems, but does not chair that group, a spokesman for Sparc explained.

On the Inside This Week

NEWS

- Teamwork Keeps Snowbound Center Operating ... 5
- Univac Found Guilty in Breach of Contract Suit ... 7
- Sakharov Commends ACM Action ... 8
- Ribicoff Agrees to Delay DP Crime Bill ... 9
- Experts See Lack of Cost Models for Privacy ... 10
- Medical, Finance Privacy Seen in '78 ... 11
- Memorex vs. IBM May Differ from Other Suits ... 12
- NCC to Feature Personal Computing Contest ... 13

EDITORIAL

- Legal Threat to Competition ... 14
- Human Connection: Micros Skunk Bettors ... 15
- Taylor Report: Do Your Legal Homework ... 15
- Societies Wrangling for Share of Readership ... 17

SOFTWARE & SERVICES

- Managers Offered Performance Plan ... 19
- UK User Forum Urges Strong Standards Work ... 20
- Package Plots Project Progress ... 22
- CICS/VS Use Reported, Billed ... 24

COMMUNICATIONS

- Thinking About POS? Figure on \$5,283 ... 25
- Modem Replaces 101C ... 26
- RJE Software Links HP 3000-II to 360s, 370s ... 29

TERMINAL TRANSACTIONS

- Teleray 4041B Burroughs-Competible ... 28
- TI 770 Terminals Get Price Reduction ... 28

SYSTEMS & PERIPHERALS

- IRS Planning to Relieve Overtaxed Operation ... 33
- DP Service Caters to Heavy Equipment Dealers ... 34
- Big Savings Seen Likely Via 6,250 Bit/In. Code ... 36
- Memorex Hes 15M-Byte Add-On for 370/168 ... 37

MINIWORLD

- Mini Gives Firm Paperwork Holiday ... 39
- Cosmetics Firm Faces DP With On-Line Mini ... 41
- Hospital Finds Mini Upgrade Easy to Swallow ... 42

MICROCOMPUTING

- 16-Bit Micro Takes a Dive Inside Explorer ... 43
- Boards from Zilog Meet European Standards ... 45

COMPUTER INDUSTRY

- IBM Meant to Frustrate PCMs: Gerdner ... 47
- CCIA Adds to Census Plans ... 47
- Independent Supplier Plugs Into Switchers ... 49
- Univac Opens Growth for 'Deed-Ended' BC/7 ... 50

Congratulations IBM on improving SPM II. Now ADR's LIB/OL is only 20 ways better, at about the same price.

	IBM's SPM II (1.3)	ADR's LIB/OL (2.5)
1. Function key control	NO	YES
2. Dual screen	NO	YES
3. ERASE, INSERT, DELETE key support	NO	YES
4. HEX data entry	NO	YES
5. Number of commands to learn	40	12
6. Maintenance-free libraries	NO	YES
7. Simultaneous batch/on-line library access	NO	YES
8. Full compression of program libraries	NO	YES
9. Fully-compatible online/batch functions	NO	YES
10. Tape library support in batch	NO	YES
11. Basic Mapping Support	Req'd.	Not Req'd.
12. Number of transactions for a typical session	16	12
13. CPU time for a typical session (seconds)	12	9
14. Number of EXCPs for a typical session	204	99
15. Number of characters transmitted per field	1520	79
16. Supports TP monitors other than CICS	NO	YES
17. Conversion programs supplied	NO	YES
18. Class A support	NO	YES
19. Installation support included	NO	YES
20. Training included	NO	YES

SWITCH NOW!

Contact ADR today for its competitive analysis of SPM II and LIB/OL and for additional information on why over 500 companies have selected LIB/OL.

Name/Title	Company		
Address	City	State	Zip
Telephone	Computer Configuration		



APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS™

Route 206 Center, Princeton, N.J. 08540, 609-924-9100

Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.

ADR software products: In use at over 8000 installations worldwide. U.S. offices in Atlanta (404) 252-9130, Boston (617) 245-9540, Chicago (312) 694-2244, Cleveland (216) 826-0190, Houston (713) 526-3188, Los Angeles (213) 828-5527, New York (212) 986-4050, Princeton (609) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 281-2011. International offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.



Strike Bruises Midwest DP

(Continued from Page 1)
located in Indianapolis, will begin a curtailment of certain on-line jobs if power supplies get much lower, according to Kenneth Landeck, director of data center operations.

The center has an IBM 370/168 and a 158; since the 168 uses the most power, it will be shut down 2-1/2 days over the weekend.

"We must keep one system up at all times to serve hospitals that are on-line," he added.

The center has some excess capacity, so more work can be done in a shorter amount of time if it comes to that, Landeck said, but claims payments are expected to be kept on schedule regardless of any cutbacks.

If the supply should drop to as low as 20 days' reserve, the building will be put on a maintenance schedule only, but the computer center will still stay up to some degree, he noted.

A spokesman for an Indiana university said, "We're doing everything there is to save on energy, but we've been told the universities and schools will be the first to be closed down."

Power has been cut to 50% and while the lights have been dimmed, the CPU is still functioning. If things get worse, the plan is to "cut the cream out of everything" and run only the most essential jobs such as payroll, the spokesman said.

But if things don't change soon, on March 4, when spring break begins, the university will have to close down for several weeks, he added.

Betsy Ross Foods of Mogadore, Ohio, on the other hand, is more fortunate, according to its DP manager, Dennis McCowin.

"We've turned off the sorters and keypunches and other off-line equipment, but since we're in the food in-

Blizzard Bloop

In the confusion of getting out *Computerworld's* Feb. 13 issue with only a skeleton crew during the Northeast's recent blizzard, CW inadvertently left out the name of the author of "Transnational Data Flow: The Need for Action."

The story was written and contributed by John M. Eger, an attorney and consultant in com-

munications law and regulatory policy in Washington, D.C.

Eger was acting director of the White House Office of Telecommunications Policy during the Ford Administration. Prior to that appointment, he spent four years as legal assistant to Federal Communications Commission Chairman Dean Birch.

dustry, power should be maintained here to the last," he said.

City National Bank & Trust of Columbus was in the lucky position of instituting a contingency plan a year ago after the local electric company lost a generating station and had "frozen coal" in its stockpiles, John Alexander, vice-president and DP

manager said.

He explained that lights have been cut back by 25% in the building and if things get worse, the plan is to power down a CPU for a few hours each day.

Alexander added that City National is installing its own diesel power, which it hopes will be ready by the end of the month.

HIS Adds Level 6 Offerings

(Continued from Page 1)
business DP programs. All of the Level 6 systems run Cobol, RPG and Fortran and operate under the Gcos 6 operating system, the firm said.

The Model 47 comparable to the Data General Corp. Eclipse C/300A can also be used in distributed processing applications, the spokesman added. A user with both Level 66 and Level 6 systems will be able to fully implement the firm's Higher Level Data Link Control (HDLC) protocol since the Level 6 contains compatible subsets of the Level 66 IDS/II data base management system and the transaction-driven software.

A typical Model 47 configuration includes 320K bytes of memory with error correction, a 30 char./sec console, two 256M-byte disks, a 300 char./min card reader, two 800/1,600 bit/in. tape systems, a 900 line/min printer and 12 CRTs. It costs \$182,170.

The top of the Level 6 line, the Model 53, was designed for users who require processing of a general mix of stand-alone or data entry, remote batch or time-sharing programs. Reportedly in the range of the Digital Equipment Corp. PDP-11/45, it contains a different processor than the rest of the line and also uses 4K words of cache memory. The processor is said to have been optimized to handle the cache.

A typical configuration includes 256K bytes of error-correcting memory, a scientific instruction processor, 120 char./sec console, two 67M-byte disk units, a 500 card/min card reader, a 600 line/min printer, 800 bit/in. tape unit, communications link and 20 asynchronous communications lines for the price of \$145,740.

General-Purpose Units

The general-purpose models 33 and 43 systems allow users to easily upgrade between members of the family, HIS said. "With the standardized control panels and power supply, upgrading to the larger Model 43 involves changing a single-board processor," according to the spokesman.

Operating under Gcos 6, the Model 33 can process several on-line tasks concurrently with batch or program development and serve as a stand-alone or distributed system.

A typical Model 33, which is in the DEC PDP-11/34 range, includes 128K bytes of memory, CRT console, 10M bytes of disk, a 160 char./sec printer, a

communications link and four CRTs. It costs \$46,690.

The Model 43, which can address up to 2M bytes of memory, can accommodate an optional scientific instruction processor and an optional memory management unit. The memory management unit is said to provide memory segmentation and "Multics-like" storage protection within separate read, write and execute rings.

This system comparable to both the DEC PDP-11/34 and 11/35, can act as a "free-standing processor" with several on-line terminals doing transaction processing, according to the firm. A typical configuration includes 192K bytes of memory, CRT console, two 33M-byte disks, a 300 line/min printer, a communications link and eight CRTs for \$98,030.

Performance Data

HIS offered the following information about performance of the Cobol-oriented models 33 and 47 business systems based on the processing of hundreds of user Cobol programs. The Model 33 averaged 1,950 Cobol statement/sec at a speed of about 500 microsec per statement. The Model 47 ran 13,000 Cobol statement/sec, a rate of 75 microsec per statement.

The general-purpose minis — the 43 and 53 — were measured in a slightly different manner, but central processor performance in this case was also compared to that of the Model 33. Here the firm ran 10 kernels, or programs, that represented typical functions, such as moves or code conversions. The Model 33 averaged 3.28 microsec per instruction, the 43 averaged 2.05 microsec per instruction and the 53 averaged 1.45 microsec per instruction, a spokesman said.

Introduced with the systems was an option called the Intersystem Link (ISL), which HIS said allows users to have multiple-processor configurations. The ISL transfers command interrupts and memory access from any unit on one of the system's bus data paths to any unit on another system's data path, the spokesman explained.

A device address table located in the ISL determines which commands should be transferred. With two duplicated sets of registers, simultaneous bidirectional operation can take place, the company added. The ISL option costs \$8,000.

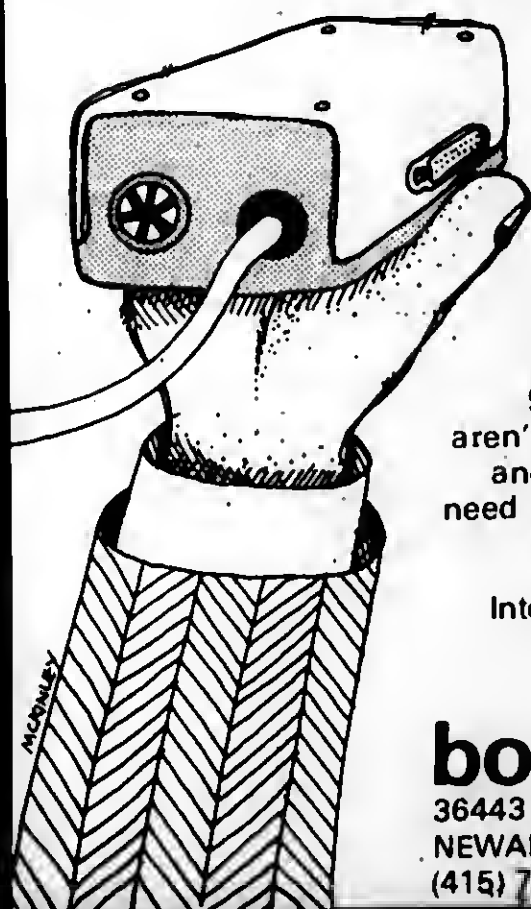
the terminal connection

We can match your terminal needs with our off-the-shelf price and delivery. A wide selection of terminals like DEC LA-36 with all options in stock, LS-120, LA-180 and VT-52, Datacassettes, all new Teletype 43 KSR, TI-745, and acoustic couplers.

For your free quote, call us TOLL FREE:
800/323-2135

*management response corporation
660 busse highway/park ridge, illinois 60068/(312) 698-3377

THE \$99⁰⁰ MODEM*



You're suspicious aren't you? OK, we confess. Our M-1 asynchronous short haul modem won't do what a lot of other modems will do.

However, the M-1 will solve many of your local or in-house communication problems up to 10 miles or 9600 bps. And because you aren't paying for a lot of options and capabilities that you don't need in those situations, you'll be saving a bundle of money.

Interested? Write or call us now for a data sheet and complete price information.

bo-sherrel co.

36443 SHELLEY COURT
NEWARK, CA 94560
(415) 792-0354

*100 Quantity

Teamwork Keeps Snowbound Center Operating

By Don Leavitt
CW Staff

FOXBORO, Mass. — Skis and a vehicle with four-wheel drive were among the pieces of peripheral equipment used to keep a big commercial data center here running during New England's recent "Blizzard of '78."

The center belongs to Keydata Corp., which provides on-line business DP services for customers throughout the U.S. and Canada. The users are a mix of small firms with no other DP facilities and larger companies which use Keydata facilities to supplement their own equipment.

Since many of the clients are not in New England, Keydata felt it had to keep the center functioning no matter what the local weather was like. The decision was justified by the workload it handled throughout the storm week — "60% to 75% of our customer base was able to operate" and used the service during that time, according to operations manager Jack Sheehan.

But it wasn't easy. Thirteen members of the operations crew came to work, on schedule, at 7 a.m. Monday, Feb. 6; most of them didn't get home again until Thursday. The center wasn't set up for lodging "overnight guests," so even when they were off-duty it was tough to relax or sleep.

But the original crew was not alone in the four-day marathon. Two other

Keydata employees skied in on Wednesday, including operator George Want, who covered 10 miles to reach the center.

'Vendor Support'

Wednesday was also the day "vendor support" took on a new aspect. Stanley Szretter, one of the site crew provided by Univac, used his four-wheel vehicle to bring fresh food, cigarettes and other niceties to the center.

Much as that was appreciated, it wasn't the first time Keydata called on Univac for help that week. Late Monday afternoon, a surge on the incoming power line lasted so long the protective equipment at the center couldn't handle it.

The equipment went down, but replacing its fuses was fairly simple, Sheehan said. Once power was restored, however, the staff discovered several fuses were also blown in one of the memory banks supporting the center's three Univac 494s. And there were no Univac personnel on hand who could fix that problem.

Keydata's instructor, John Donahue, managed to reach Univac's crew chief Bob Masalsky by phone and, by following instructions, was able to restore the system; the center lost only one and a half hours of processing time.

That's not the way repair work is supposed to be done, but with good people at each end of the phone line "it worked," Sheehan said with obvious pride.

The center was lucky in another way, Sheehan noted, explaining that all of the January month-end reports printed at the center here had been shipped out before the storm crippled the U.S. Postal Service.

None of the ad hoc reports requested by U.S. customers during the week could be shipped, but Canadian users got theirs promptly through a data transmission operation between here and Keydata Canada in Toronto.

One of the toughest parts of the long-haul work period occurred when the time came for transferring all the disk files to tape for backup in case of trouble. That involved mounting and dismounting 160 disk packs and about the same number of tapes in as short a time as possible.

Two Systems Come Bundled

(Continued from Page 1)

During the first 90 days of operation, users can receive 30 days of on-site software consultation. Also provided are one year of hardware maintenance with 12-hour coverage and eight man-weeks of customer training that includes two programmers for three weeks each and two operators for one week each. Two sets of documentation also come with the system, a spokesman pointed out.

The start-up assistance and user training are optional after the purchase of the first system, he added.

The basic 700 system includes the 7/32 CPU with 256K bytes of memory; four CRTs; one 80M-byte disk drive; one 1,600 char./in., 45 in./sec tape drive; and a printing console terminal. The system can be expanded to 512K bytes with up to 16 CRTs, two disk drives and two tape drives.

The 800, based on the 8/32, also has 256K bytes of memory, four CRTs, an 80M-byte disk drive and a printing terminal. It includes an 800/1,600 char./in., 75 in./sec magnetic tape drive. The 800 can be expanded to 1M bytes of memory, 32 CRTs, eight 80M-byte disk drives and six tape drives.

Up to two card readers, a communications line and up to two 300- to 600 line/min printers are options for both systems.

Available initially in New York, Chicago, Los Angeles and Toronto, the basic 700 system costs \$141,434 in the U.S. The 800 costs \$177,929.

The systems will be available in other cities within nine months, according to the company, a division of Perkin Elmer, located at 2 Crescent Place, Oceanport, N.J. 07757.

SEVEN REASONS THAT DYNAM/D IS THE FASTEST SELLING DISK SPACE CATALOGUE MANAGEMENT SOFTWARE SYSTEM IN THE WORLD

DYNAM/D is the only effective software system in the world that solves the most vexing and time-consuming design deficiencies of IBM 360/370 DOS and DOS/VS systems! And DP Managers world-wide have acclaimed the operating results, the better use of physical resources and file security offered by DYNAM/D! Here are just 7 reasons for testing DYNAM/D in your installation: ●1) Automatic disk space allocation with full recovery capabilities as the file is opened, not before the job is initiated. ●2) Catalog Management that allows you to control the physical attributes of the disk file separately from job control. ●3) Total file security is assured by matching password that prevents both accidental erasure and unauthorized access to confidential data. ●4) Device independence makes it easy to add new DASD devices without modifying existing programs. ●5) Complete utility programs for disk and catalog management as well as full disk space usage reporting facilities. ●6) Full secondary automatic allocation of additional disk space if user runs out of original space. ●7) DYNAM/D is from Computer Associates with a world-wide network of offices to serve you ... 8 regional offices in the United States alone! Take just a few minutes right now to send for the FREE Information Kit and details of a no-cost Trial Installation of DYNAM/D.

MAIL THE COUPON OR
CALL COLLECT TODAY!

YES! Please rush my FREE DYNAM/D Information Kit along with details of the FREE 15-day trial. cw 2/20/78

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone No. () _____
Computer Model _____ System _____

(212) 355-3333

U.S. OFFICES: New York,
Georgia, Illinois, Ohio, Texas,
Connecticut, California,
District of Columbia, Missouri

WORLD-WIDE OFFICES:
Australia, Austria, Belgium,
Denmark, France, Germany,
Holland, Italy, Japan, Switzerland,
United Kingdom, South Africa

655 MADISON AVE. NEW YORK, NY 10021

COMPUTER ASSOCIATES

TERMINAL RENTALS

MODEL
43
TTY
\$ **67**⁵⁰
MONTH



33 ASR-FF
\$ **54**⁰⁰
MO.
TWX-DDD
79⁵⁰
MO.
TELEX
76⁵⁰
MO.



33
KSR-FF
\$ **49**⁰⁰
MONTH



ADM-3A
\$ **49**⁵⁰
MONTH
ADM-1A — \$73.00 mo.



COUPLERS/MODEMS

TC 3002
D/A Acoustic **12**⁰⁰
mo.
TC 5001
202T **18**⁰⁰
mo.
TC 4001
113B
Auto-Ans. **18**⁰⁰
mo.



MODEL
40
TTY
LINE PRINTER
300 LPM
325⁰⁰
MONTH



All equipment includes national service
Get complete details with a direct call:

800/527-7700

or 214/252-7502 • Service 800/527-5608
TWX 910/806-5761 • TELEX 73-0022

vardon

& associates, Inc.
930 N. Beltline Road • Irving, Texas 75061
A Subsidiary of Pioneer Texas Corp.

SERVICE PROBLEMS?

NATIONWIDE SERVICE
356 CITIES
CALL

800/527-5608

IN TEXAS CALL
800/492-9602 or 214/258-2620

'Back-End' DBMS Project Successful

(Continued from Page 1)

Cullinane's back-end system, created under a contract with the Army Computer Systems Command, (ACSC), required more than a mere shifting of the DBMS software to the mini. The company also built and installed copies of a generalized Intercomputer Communication System (ICCS) in both the PDP-11 and the 370.

ICCS permits use of different hardware configurations in the back-end system by packetizing/depacketizing the data being transmitting between the host and the data base machine. ICCS facilities are said to provide synchronization between tasks and processors, buffer management in both the host and back-end processors and message switching for transfer of data and control informa-

tion.

The initial work began two years ago, when another government agency asked Cullinane to determine if the back-end approach could be implemented.

The outcome of that first study were the findings that a back end was feasible and that the Interdata, Inc. 8/32 appeared to be the best machine for the job.

Shortly thereafter, four more government agencies, including ACSC, contracted with Cullinane to continue the research through the point at which a the use of back end could be actually demonstrated.

With that assignment, Cullinane switched its attention to the PDP-11 because it already had a version of its

DBMS, IDMS, running on the DEC equipment. In the demonstration, the mini received data base requests from the host-resident application program and IDMS-II performed all the necessary data base processing before transferring data back to ICCS for subsequent return to the user's program.

Summing up the effort which ended last December, Goldman said it showed the DBMS could be taken out of the mainframe. But, he acknowledged, that gain was largely offset by the addition of the ICCS, with its own memory requirements and processing overhead.

On the other hand, the success of the project pointed to another, usually unforeseen, benefit. Since ICCS is capable of supporting data base requests coming in from multiple host CPUs, the back end can provide a single, well-protected environment for an organization's data.

This, Goldman pointed out, ensures the accuracy of the data and avoids most of the hazards inherent in attempting to maintain multiple copies of the same data base.

In the demonstration, IDMS-11 on the ACSC's PDP-11/70, running under IAS, managed an order entry type of data base similar in makeup to the sample Cullinane uses to demonstrate IDMS on mainframes.

The application programs, written in Cobol, were residing on an OS/SVS-oriented 370/158 at Kansas State University in Manhattan, Kansas, which was available to ACSC.

Court Approves 40/4 Tariff

(Continued from Page 1)

communications devices and thus could be properly tariffed.

If the commission had decided the CRT is a DP device, it would have denied the AT&T application to tariff the unit. It would have done so under the rules of its original Computer Inquiry, which prohibits common carriers from providing DP services except through separate subsidiaries, the court said.

Challenging the FCC's classification of the 40/4 as a communications device "is an invitation to second guess a specialized agency's application of its own rules," the court said.

The court decision recognized the FCC had the mechanisms to reexamine the question of DP versus communications devices, and it alluded to the possibility that the commission could reverse itself if its conclusions change. The decision referred to the FCC's "obvious awareness of the problem and initiation of inquiries designed to eliminate" any conflicts between DP and communications — an obvious reference to the second Computer Inquiry now pending before the commission.

The appeal of the FCC tariff had been filed by IBM, the Computer and Communications Industry Association (CCIA) and the Computer and Business Equipment Manufacturers Association (Cbema).

A spokesman for Cbema said its telecommunications committee would meet soon to discuss the court ruling, but in the meantime its members are studying the decision. An IBM spokesman said the company would not comment on the ruling, and the CCIA said it was not yet prepared to comment.

Essence of Appeal

A key issue in the appeal had been contentions by IBM that the 40/4 was actually a DP terminal and thus should be offered as a nontariffed competitive device. Speaking to the economic impact of the court ruling, Dr. Manly Irwin, a regulatory expert at the University of New Hampshire, said "the public policy implications of the decision in terms of regulation versus competition are immense. This [DP] market is competitive, it is dynamic and it should be characterized by free entry and price and product rivalry."

One regulatory expert said the court ruling means the FCC will now have to

examine what constitutes the proper rates for terminal equipment supplied by the Bell System. This issue has not yet been fully explored by the commission, he said.

Industry observers said the door will now be open for AT&T to offer additional expanded versions of the 40/4 under the guise of regulatory protection.

The CCIA or Cbema would have to appeal the appellate ruling before the U.S. Supreme Court. One source close to the situation said that is a very serious next step that will have to be carefully weighed by the parties.



If you can afford an electric typewriter . . .



YOU CAN AFFORD A MICON TERMINAL

Terminal cost need no longer be a stumbling block to the convenience of data acquisition. Micon's full line of timeshare and direct access computer terminals breaks through the price barrier bringing true computer access within reach of every business.

THE CASSETTERM This battery operated timeshare or direct access terminal uses familiar ASCII code and features a mini-cassette memory system. An acoustic coupler allows for complete wireless mobility. An RS-232C connector is also provided for direct connection to most minicomputers. \$1995

THE MIGET The Miniature Interface General-purpose Economy Terminal is all that name implies. It provides direct access to minicomputers through a standard RS-232C connector, standard ASCII code and features a bright 32 character display. \$400.

THE TIGER Micon's Television Interface General-purpose Economy Terminal makes any standard TV set into a timeshare terminal. 1024 characters of simultaneous display are switch selectable for 8 or 16 lines of 32 or 64 characters per line. Acoustic coupler provides for timeshare use and standard RS-232C connector gives direct access. \$500.

For full information, call or write



252 Oak Street
Oakland, California 94607
(415) 763-6033

In Spite of Liability Limits

Univac Found Guilty in Breach-of-Contract Suit

By Molly Upton
CW Staff

SAN FRANCISCO — In a lawsuit that documents the story of a user's fruitless effort to obtain a system whose hardware and software were still under development by a manufacturer, a court here found that clauses limiting the manufacturer's liability in that systems contract were not all-inclusive. As a result, Teamsters Security Fund (TSF), the user, was awarded \$360,000.

Univac was found guilty of breach of contract and breach of warranty.

Univac breached the contract when it failed to deliver in accordance with its schedule and when it failed to provide an operational on-line insurance claims processing system contracted for by the parties, magistrate David R. Urdan found.

However, he did rule that Univac's contract exempted it from TSF's additional claims of "unrealized savings," and the firm was thus innocent of fraud in representations it made to the user in 1969. The system involved was a Univac 418-III.

Urdan ruled out Univac's counter-claims for maintenance fees in the suit, even though the user had responsibility for and was late in completing applications programs because he did not consider this to be a prime factor contributing to the machine's malfunctions.

Univac had no comment on the suit, but sources indicated Univac has paid the assessment.

The case, which was heard in the U.S. District Court for the Northern District of California, grew out of events that occurred from late 1968 through April 1972.

The system, scheduled to be delivered in May 1970, was delivered in November, but was not operational then.

Promises Unfulfilled

Rather than being an on-line system that could perform multiple applications simultaneously, the 418-III could perform only one application at a time despite promises made in correspondence, the court found.

Urdan found Univac guilty of breach of warranty despite the clause in the Univac agreement stating: "There are no warranties, express or implied, oral or written, in fact, by operation of law or otherwise except as herein expressly stated."

The last clause, "except as herein expressly stated" included statements made in correspondence which Urdan ruled were part of the contract and which were classified as express warranties.

But Urdan upheld Univac's clause limiting its liabilities, which read: "In no event shall Univac be liable for any indirect, special or consequential damages such as loss of anticipated profits or other economic loss. . . ."

Urdan reduced TSF's claims for out-of-pocket expenses, such as equipment and supplies and outside services and personnel payroll costs, from \$641,913.51 to \$360,000.

Univac's Difficulties

The ruling also details the problems Univac had in delivering the system,

almost none of which, it seems, was developed as of the due date, May 1970.

At the time of its order, TSF had a batch-oriented Burroughs Corp. B300.

The agreement between the parties signed Sept. 5, 1969 consisted of standard Univac forms covering lease and maintenance and was understood to include system software. The hardware included the Univac 418-III, Uniscope 100 terminals and the Fastrand III drum.

The operating system, RTOS, was to be tested and operational by December 1969.

In a July 1969 letter, Univac had indicated the software for the 418-III

was "alive and well in the U.S.; its operating system has been demonstrable for several months."

But as of Jan. 5, 1971, Univac had been unable to generate an RTOS system for TSF's specific configuration. Although TSF ran through three releases of RTOS, none was stable, Urdan found.

And the Cobol compiler "made it impossible to operate in a real-time, on-line mode — the purpose for which the system had been ordered," he added.

Compiler Unavailable

Although Univac had promised an operational Cobol compiler in January, 1970, the Univac branch manager said

in a Jan. 21, 1970 memo that the Cobol compiler on the 418-III was unavailable even in a field-test version. The compiler was not available until July 1, 1970, two months after the TSF project was to have been completed, and never could operate in a multiprocessing environment.

Univac said it would deliver a CPU adapter in April 1970 to interface the CPU with the terminals. But in November 1969, the firm admitted internally that it would not begin to design this device until mid-1970 and that no provision had been made to use it with a 418-III and Uniscope 100s, Urdan observed.

(Continued on Page 8)

Shadow II HALVES YOUR TP BUDGET

Going on-line on a 360/370 costs a lot of money. But SHADOW II users are saving anywhere from \$30,000 to \$500,000 each year.

SHADOW II is a Teleprocessing Monitor. And it will cost you very little more than CICS for example. Yet compared with CICS, SHADOW II will normally save you:

- 80% of your mainframe hardware required for TP.
- 20% of TP Systems Design time.
- 50% of TP Program Development time.
- 60% of TP Program Testing time.
- 50% of TP Applications Maintenance time.
- 90% of Software Maintenance and Tuning time.
- 85% of Programmer Learning time.

And your Response Times will be faster.

And our Technical Support is better.

And we have a CICS to SHADOW II conversion package for existing CICS users.

Return the coupon for your copy of the SHADOW II Concepts and Facilities manual, and discover how you can really stretch your TP dollar.

Shadow II
The World's most advanced TP Monitor
altergo

Altergo Software Inc.
Wellesley Office Park
55 William Street
Wellesley
Massachusetts 02181
Telephone: (617) 237-6132

Please send me the Concepts and Facilities Manual right away.

Name

Title

Organization

Address

Zip Phone

My computer is IBM Op. System

Present TP Package

- Our need is ☐ immediate
☐ 3-6 months
☐ over 6 months

Sakharov Commends ACM Action

By Ann Dooley
CW Staff

NEW YORK — Nobel prize-winner Andrei Sakharov and Soviet mathematics professor Nohim Meiman have praised the Association for Computing Machinery (ACM) for being the first scientific organization to sever relations with the Soviet Union because of its treatment of its dissidents.

The message of encouragement was smuggled out of the Soviet Union after ACM announced it will refuse to cooperate or cosponsor any meetings held in the Soviet Union or participate in meetings that have Soviet support until the "climate of intellectual freedom improves."

The dissidents' letter indicated

that no other action would so effectively induce the Soviets to try to maintain scientific cooperation between countries.

Sakharov also called upon others to follow ACM's actions and boycott Soviet scientific exchange on behalf of their professional colleagues who may be in conflict with the Soviet system.

"Do not believe and do not take seriously any assertion that your decision could only embitter the Soviet authorities and aggravate the situation of Soviet scientists. Do not doubt that your humane and professional solidarity will bring positive results," the letter said.

The ACM first became involved in the human rights issue in 1975

when it urged the Soviet Union to allow computer scientist and ACM member Valentin Turchin to leave the country.

Turchin, who recently immigrated to this country, also commended the ACM position CW, Jan. 16].

The letter arrived here shortly after ACM president Herbert Grosch wrote to Anatoli Dobrynin, Soviet ambassador to the U.S., urging Soviet authorities to "relax their cruel grip on Sharansky." Anatole Sharansky is a computer chess expert who was arrested on March 15, 1977 and remains in a Soviet prison held without formal charges or contact with the outside.

No official Soviet response has been made to the letters.

User Wins Suit Against Univac

(Continued from Page 7)

Furthermore, the software required to use a substitute device would not be available before July 1970, two months after the designated project completion date.

Potential Disaster

In December 1969, Univac's development of the terminals was behind schedule. Although promised availability was May 1969, they weren't available for use with the 418-III until at least a year later, according to Urdan.

By January 1970, when the project was four months behind schedule, Univac's San Francisco branch manager, Derrick Welsh, was warning Univac management the project was "a potential disaster situation." The RTOS system at that time was not near completion, and it never worked properly for TSF. The Cobol compiler was also unavailable in January 1970, Urdan found.

The system Univac provided TSF for remote testing of its programs could be used only for batch, not real-time processing, which was needed.

In March 1970, Univac assured TSF it would assign a field engineer with "over 10 years experience in medium- and large-scale systems," including the 418-III, but in fact the person did not have that background and had never worked with the 418-III, according to the finding.

On-Line 'Unknown'

Although in June, Univac was proposing to ship that hardware in July, the Univac project leader, Robert Tapp, acknowledged concerns regarding both hardware and software and said, as quoted by Urdan in his opinion, "the use of U-100's on-line is virtually unknown to us."

TSF told Univac that delivery date was unrealistic and refused delivery in September because of lack of satisfactory acceptance criteria.

In October 1970, Univac's new branch manager, Charles Nicolosi, indicated Univac's intent to honor its previous commitments to TSF and to commit necessary resources to ensure a tested on-line claims system and conversion of B300 programs by Jan. 31, 1971. Equipment was to be delivered in November with a completion date of March 1, 1971.

The situation at TSF was so bad that on Feb. 9, 1972, nearly 2-1/2 years after the quoted installation date, Univac vice-president G.R. Cross said the system at TSF was "a lemon" and recommended replacing it. Univac acknowledged it had underestimated the task to be done at TSF, Urdan indicated in his ruling.

PDP-8 users: Now you can turn your computer into a multi-user system for far less than you think

No matter which single-user PDP-8 operating system you have, Quodata's ETOS package can convert your computer into a time-sharing system that handles up to 16 users at one time.

For example, ETOS will time-share DIBOL Programs under COS-300. And it supports extended BASIC FORTRAN IV and all OS/8 languages. Whatever the operating system, each user virtually has his own 64K byte computer. In addition, you can employ operating systems simultaneously, even running batch, interactive and real-time at the same time.

Another major advantage of ETOS is overlapping of I/O and compute time. For example, the printer can operate while the terminal is being used for further job processing.

So if you're pressed by demand for computer time, don't add additional computers -- add ETOS and save yourself a bundle.

It costs only \$5,950, hardware and software included.

Join more than a hundred other ETOS users.
Write or call now: Mo Kenneally, (203) 728-6777.

quodata
Specialists in DEC Software

196 TRUMBULL STREET · HARTFORD · CONNECTICUT 06103

BLIS COBOL
MULTIUSER OPERATING SYSTEM

**SYSTEMS
WORLDWIDE**
in the USA and 14 countries

For information call today

IP Phone (305) 647-2200 USA
TWX/Telex 610-853-5033
1850 Lee Rd., Winter Park
(Orlando), Florida 32789

Ribicoff Agrees to Delay DP Crime Bill

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — Legislation designed to clamp down on computer crime will be discussed in congressional hearings this year if Senators Abraham Ribicoff (D-Conn.) and Edward M. Kennedy (D-Mass.) have anything to say about it.

In recent deference to Kennedy's desire to see the codification of criminal laws quickly approved by the Senate, Ribicoff withdrew his Federal Computer Systems Protection Act as an amendment to that bill. In exchange, he obtained Kennedy's assurance that hearings will be held on computer fraud.

The computer crime bill, S. 1766, introduced by Ribicoff at the end of June [CW, July 4], would make a crime the illegal or fraudulent use of any computer owned or operated by the government, certain financial institutions and organizations involved in interstate commerce. The proposed law suggests fines of up to \$50,000 and imprisonment for as long as 15 years.

A co-sponsor of S. 1766, Kennedy has promised to help Ribicoff bring the measure before the Senate Judiciary Committee's Subcommittee on Criminal Laws and Procedures.

Security Directive Stymieing Agencies

Federal government users have had their minds on computer security, too, in hopes of finding ways to comply with a soon-to-be-finalized directive on DP security from the Office of Budget and Management (OMB).

At a recent meeting with OMB officials, federal agency DP personnel were reluctant to indicate they would be in compliance with the proposed computer security policy when it takes effect.

Under the draft policy, each agency head will be responsible for assuring "an adequate level of security" for all agency data — whether processed in-house or by commercial services.

Describing the minimum amount of effort it will allow in an agency's computer security program, OMB said it expects the security of each DP installation to be assigned to a management official with both DP and security experience.

Agencies must establish personnel security policies for all those designing, operating and maintaining a system in addition to those people with access to the data contained in the system.

A "management control process" should be set up in each agency to ensure that all new computer applications meet administrative, physical and technical safeguards, and the security of all applications should be audited periodically, OMB stated.

Agencies must be sure they include security requirements in their specifications for the acquisition or operation of computer facilities, and they should conduct periodic risk analyses for each computer installation they run or to which they contract work.

The Commerce Department has been directed by OMB to develop standards and guidelines for assuring security of automated information. The General Services Administration is to issue policies and regulations governing

Washington Update

computer room security and the security requirements included in agency procurements, and the Civil Service Commission must help with personnel security policies and procedures.

Budget Gives Clue On NTIA Character

Ever since President Carter's "Reorganization Plan No. 1" abolished the White House Office of Telecommunications Policy (OTP), many in the computer, communications and

information industries have wondered what its partial replacement, the National Telecommunications and Information Administration (NTIA), will look like.

The federal budget for fiscal year 1979 finally gives some clues on the new agency's character.

Part of the Commerce Department, NTIA will have an \$11.981 million budget if Congress approves it, according to the appendix of the proposed federal budget. Comprised chiefly of a merger of OTP with the Commerce

Department's Office of Telecommunications, it will be staffed with 250 people in 1979.

The budget identifies two of the three major program areas assigned NTIA as the development of a national and international information policy and the improvement of applications of telecommunications and information technology.

NTIA will have \$2.118 million in 1978 and \$4.694 million in 1979 to devote to the formulation and adoption of a "coherent" domestic and international telecommunications and information policy.

The agency will work to improve telecommunications and information applications with a budget of \$1.576 million in 1978.

Why not the best?

We need top-flight people to stay first among tough competitors. If you are the best in your field we would like to talk to you — we are too. We're specialists in on-line systems. Perhaps you know our products:

- **TASK/MASTER**, the world's most successful independently-supported telecommunications monitor; easier to install, easier to use, flexible, and with incomparable features.
- **Flexicom**, the only 360/370-compatible hardware/software system for stand alone, front-end, or distributed networking.
- **KEY/MASTER**, the on-line data capture system that reduces or eliminates programming effort for any data entry application.

We need people for nearly every aspect of our business:

- Marketing Representatives, with commission sales responsibility for all TSI products.
- Customer Service Representatives, with field-level product support responsibility.
- Product Development Specialists, with project-level design and programming responsibilities for our new products.

- Educational Services Representatives, to extend our successful Customer Education Program to more topics and people.
- Technical Services personnel, to provide centralized and specialized product support to our regional offices.

Openings exist in our Western, Midwestern, Eastern, and European regions. If you're the right person with only a modest amount of training and experience, we'll train you (a college degree is required, however). If you're at the pinnacle of your career and want to go higher, let us know; our opportunities are unmatched.

TSI has just completed its 11th successful year. We have an industry-leading reputation for on-line systems expertise. Our major asset is our people, however, who we know to be first in our field. In return, we offer excellent benefits, top wages, and an enjoyable and challenging work environment. If that appeals to you, let us know by sending a biography or resume in confidence to our personnel department at our Norwalk address.

If you would like additional information about TSI or our products, we'd be glad to send it to you. Just call or write.



turnkey systems inc.
111 east avenue
norwalk, connecticut 06851
(203) 853-2884/telex 964351

839 mitten road
burlingame, california 94010
(415) 697-1833

tsi international, ltd.
19 bedford row
london WC1R 4EB, england
01-405-7304/telex 23302

additional representation worldwide



Experts See Lack of Cost Models for Privacy

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — "Privacy costs are an overhead expense that will have to be dealt with like any other overhead expense," Ronald L. Pleaser, former general counsel of the Privacy Protection Study Commission, told a meeting of industry representatives discussing privacy legislation here recently.

"The customer will pay. But, to quote Rep. Barry Goldwater Jr. [R-Calif.], 'Whatever the costs of privacy, they're worth it,'" he added.

But are they? The costs of privacy in time, money and personnel are of great concern to members of the private sector who attended the conference hosted by AMR International, Inc.

How much does it cost to alter an in-

formation system so that it is privacy-

sound? There are no good models, speakers in and out of government appearing at the conference agreed. Most often quoted and criticized was the Office of Management and Budget's (OMB) report of nearly a year ago, which stated that federal agencies spent "substantially less" than it was predicted in implementing the Privacy Act of 1974 [CW, March 21].

Jack L. Osborn, director of the Information Privacy Research Center at Purdue University, cautioned attendees against taking government estimates as gospel.

After studying privacy implementation experiences of several companies, including Equitable Life Insurance Co. and the aerospace division of another firm, Osborn concluded that notifying the public about the existence of a system and granting individuals the right to access and clarify their records "may be the most costly parts of implementing the privacy act."

The rate of employee and customer inquiry about individual files is believed by Equitable Life Insurance to be a key variable in annual privacy act operating costs, Osborn stated.

Initial costs will include filing notices of the existence of systems — and filing them with applicable state governments as well as the federal government, Osborn warned.

Private-sector privacy laws would mean the need to create and modify security safeguards and procedures, to train personnel to implement those procedures, to initiate and maintain devices that would display records for individuals seeking to examine them, to purge data bases of irrelevant information on individuals and to establish mechanisms for notifying third parties of changes made to records, Osborn said. All of these items would constitute initial and ongoing costs, he ad-

ded.

The privacy act coordinator for the Department of Health, Education and Welfare's (HEW) Public Health Service, Dorothea deZafra, said the direct 1976 privacy act costs for the health service were \$400,000 and the indirect costs \$1.7 million.

She called these figures "dubious," however.

Speaking for herself rather than on behalf of HEW, deZafra urged her audience to consider the psychological as well as the monetary costs of privacy legislation.

Psychological as well as dollar constraints should help to shape the corporate policy toward privacy implementation, she said. "You can expect two responses to the announce-

ment that privacy protection is about to be introduced into your recordkeeping systems," deZafra warned on the basis of her HEW experience.

"One is denial — 'This can't be happening; I'll ignore it and it will go away.' The other is, 'Okay, if I have to do this, tell me what I have to do; I can't think and don't want to and if anything goes wrong, it's your fault,'" she explained.

Climate of Support

Denial must be dealt with early by creating a climate of support for privacy that starts with the head of the organization, deZafra said. In March 1975, for example, HEW's Assistant Secretary of Health placed a priority on privacy and made all line managers

accountable to him for its implementation by September, when the privacy act took effect, she stated.

The "tell me what I have to do" response sounds like cooperation but really isn't, deZafra said. "It's quicksand for any manager who will get the blame if things go wrong."

For this reason, deZafra took issue with the privacy commission recommendation that one person be put in charge of implementing privacy legislation in an organization. "The privacy officer becomes a sitting duck. No one person can embody all the areas of expertise it takes to implement such a law," she added, naming such fields as management, personnel, public relations and data processing.



Osborn

deZafra

CW Photos by E. Holmes

Comdisco is First in the Second Market

Comdisco is the largest dealer of used IBM equipment in the world. Over 1,000 processors have already been remarketed by Comdisco, with an original IBM sales price of more than 1¼ billion dollars.

More important than our volume, though, is our commitment to our customers. We buy, sell, lease, sublease and completely arrange lease financing. We are their one single source for almost any IBM equipment upgrade.

When you're in the second market — buying, selling or leasing IBM equipment — the best deals are made by Comdisco.

Make us your first choice.

Business Sector Wary Health, Financial Privacy Seen in '78

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — Congress will focus this year on legislation to limit government access to private-sector records, particularly individual financial information, and to protect medical records, according to several representatives from and observers of Capitol Hill who addressed a recent privacy legislation conference sponsored by AMR International, Inc.

Privacy protection for education data insurance information and private-sector employee records contained in manual and automated recordkeeping systems probably will form a "secondary agenda" with which the 96th Con-

gress will deal in 1979, the speakers told industry members from such diverse companies as Mobil Oil Corp., Walt Disney World, General Electric Co. and Frito-Lay, Inc. who met here.

Entitled "Preserving Management Prerogatives in Privacy Legislation," the conference reflected private-sector concern over how federal and state governments will treat privacy outside their own domains.

These industry leaders fear drastic and expensive changes in their information systems and employee and marketing practices should laws limit the kind of information they can collect, the uses to which this data can be put and the techniques they employ

for collecting and disseminating personal information.

Future private-sector privacy laws are viewed as a further regulatory burden on industry, with paperwork and information system requirements on the scale of those demanded by Equal Employment Opportunity and Occupational Safety and Health Administration laws.

"What benefits will business experience as a result of better protection of personal privacy?" the industry representatives wanted to know.

"The point of privacy legislation isn't to benefit business," Sen. Edmund S. Muskie (D-Maine) answered.

"Businessmen and women are con-



Neustadt

Muskie

sumers and usually employees, too," Muskie added. "We all want to know that our most personal information is safe." In the end, increased credibility for government and business in the public eye will be the big plus.

Muskie supported comments by Rep. Barry Goldwater Jr. (R-Calif.) and Jim Davidson, counsel to Muskie's Governmental Affairs Subcommittee on Intergovernmental Relations, on the kinds of records needing privacy protection that Congress can reasonably deal with this year.

All three agreed "Congress cannot and should not try to complete this year the agenda for privacy set forth in the Privacy Protection Study Commission's report."

In the long run, "no one omnibus piece of privacy legislation is likely to be the final product" of congressional debate, Davidson said.

Adding possible legislation on polygraph tests and on emerging electronic funds transfer systems to the laws Congress is likely to seriously consider in the next few months, the Senate counsel suggested the 96th Congress will be "the Privacy Congress."

A year from now, hearings will have been held regarding an amended Privacy Act and proposals in a number of areas will have been refined. "We will be in the same kind of position we were in 1974 when the Privacy Act was passed," Davidson predicted. "At that point we will be able to move into such issue areas as employee rights, insurance and education record protection."

A key element working against the passage of further privacy legislation for the public or private sector is the fragmentation of privacy issues as a result of the House and Senate committee structures, Davidson said. An equally important supporting element is the strong endorsement privacy has received from the Carter Administration, he stated.

Appearing on behalf of the Administration, Richard Neustadt, a member of the White House Domestic Policy Staff group working on Carter's privacy position, said the President will present his privacy recommendations to Congress in May or June.

These "preliminary" recommendations — dealing with the management of federal recordkeeping systems; law enforcement, nongovernment medical and social service, state, employment and other private records; and international privacy issues — probably won't find their way into legislative proposals until 1979 or 1980, he said.

Capitol Hill representatives and other speakers who had more private-sector interests at heart warned conference attendees not to be "reflexive" in their actions toward privacy and to be honest with Congress on how privacy legislation will affect them, particularly in the area of costs.

Twelve reasons why:

IBM Processors available

135 Short term leases available.	145 Wanted to purchase or sub-lease now. Limited machines available.	155 Available now with DAT. Sale or short term lease interim to your 3032.	165 4 megabyte system with DAT, just a shade slower than a 168. Sale or lease.	168 Wanted for Lease or Purchase.	3033 WALK AWAY LEASES now available.
--	--	--	--	---	--

IBM Peripherals available

3420 6250 BPI Models 4&6 available immediately.	3420 1600 BPI Will purchase or trade for models 4&6 (6250).	3830-2 Wanted to purchase.	3330/33 Models 1&11 available now for sale or lease.	3340/44 Wanted to purchase or trade.	3350 Limited quantities for sale or lease.
---	---	--------------------------------------	--	--	--

IBM 3031, 3032, 3033 Operating Leases available.

Atlanta 404/256-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107

COMDISCO®

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

New York 201/568-9666
San Francisco 415/944-1111
Paris, France 374-1130

Your first choice in the second market.

Memorex vs. IBM May Differ from Other Suits

By Molly Upton

CW Staff

SAN FRANCISCO — "One antitrust trial against IBM is like the next one."

"Seen one, you've seen them all."

Are these opinions true of the Memorex vs. IBM case, which has followed close on the heels of the California Computer Products, Inc. case?

Not quite, although currently — four weeks into the trial — the differences seem to be more of style than substance. But that could well change.

With 14 million pages of documents floating around, there is bound to be some information that will come to light for the first time, Telex, Greyhound and Calcomp trials notwithstanding.

A significant contrast between the IBM case in the Calcomp trial and that in the Memorex trial may be found

in the firm's opening statements. Although Cravath Swaine & Moore attorney David Boies argued with great flair in Calcomp vs. IBM, he did so with very little substance. Boies said basically that IBM is a wonderful company that cares for its employees and is committed to product excellence.

Another attorney for IBM, Jack Brown of Brown & Bain in Arizona, wore the "black hat" and attempted to paint a picture of Calcomp as not always being "the good guy," indicating it had participated in some unethical if not illegal acts pertaining to designs of its disk drives.

The IBM opening statement in Memorex, on the other hand, devoted most of its attention to the alleged innate weaknesses of that firm which resulted in its financial and market share downturn. Attorney Patrick Lynch of

O'Melveny & Myers in Los Angeles also cited the litany of IBM strengths, but he clearly alerted Memorex that he plans to be on the offensive during his defense.

Lynch also has a person in a "black hat," cohort Frank

at times benefit the plaintiff, but one wonders whether the jury can pick the wheat from the chaff that blows from the witness stand.

One is tempted to conclude that the length of an answer on cross-examination is proportional to the degree to which it is unfavorable to the plaintiff, Memorex. With long answers, the jury may have forgotten the original questions. Admittedly Lynch has proved himself an inordinately adept cross examiner, surprising many in the courtroom by his ability to grasp minute technical details of the drives, interfaces and CPUs under discussion.

Lynch's adroitness must come as a relief to IBM, which will lose the services of one of its peripherals specialists, Boies, when he moves to the Senate Antitrust and Monopoly Subcommittee.

IBM will likely need still more capable trial attorneys, as the Transamerica case conceivably could start before the conclusion of the Memorex suit — this in addition to those facing their second rounds in court.

Memorex's opening statement indicated it will more thoroughly cover the IBM policy decisions of attachments for its 3330, 3340 and 3350 drives, and the "smash" announcement than did Calcomp.

Other than that, in content they are fairly similar, focusing not only on disk drives but also on IBM's exercise of strength in other areas, such as CPUs, to aid in price balancing, a move which adversely affected the PCMs, Memorex indicated.

Style Differences

Focusing on the style, there are differences. Calcomp attorney Max Blecher is a

dynamic man who created verbal images for the jury. He was not afraid to show his temper and thus was a source of potential surprises. His presence and rapport with the jury are unparalleled as yet by anyone in the Memorex case.

In contrast with the stylishly dressed Blecher was David Boies, whose "uniform" of a blue suit set the stage for a relatively quiet, determined demeanor. Boies earned a reputation for doggedness and was known for his ability to retain facts.

Lynch reminds at least this observer of Boies. Although he does have suits of different colors, his voice and manner seem similar to those of Boies.

Boies' cohort is Jack Brown, known for his jokes to the jury and for being "turned loose for the kill" on issues that might or might not seem below the belt.

Up against Lynch is John Endicott of Gibson Dunn & Crutcher, also of Los Angeles. It seems ironic that a large antitrust suit being tried one floor above the offices of the U.S. Antitrust Department has to import both its lead attorneys from Los Angeles.

Endicott is a tall, soft spoken man with black-rimmed glasses. His voice does not carry particularly well in the courtroom, and he does not seem especially at ease. One observer characterized Endicott as a "field marshal."

Colleague F. Lee Coulter, an experienced trial lawyer, will probably assume a major role. He examined Collins whereas Endicott's first witness, was Phister.

Three law firms are engaged in Memorex's efforts, while IBM has but one. Memorex has spent an estimated \$3 million to \$4 million in preparing for the case, Lynch told Judge Samuel Conti.

Analysis

Pisano, who was kept busy the first few days objecting to Memorex actions in the courtroom.

By dividing the legal duties in this manner, IBM attorneys probably hope to manage to preserve in the eyes of the jury the image of a lead attorney who does not get his hands dirty in the daily courtroom scrapping.

Difference in Course

Another substantial difference is the initial course of the trial. Calcomp dove right in to market share, which seemed to consume much of the nearly four months before Judge Ray McNichols issued his directed verdict.

In addition, in the first few weeks Calcomp read transcripts from other trials pertaining to why mainframers and others exited from the computer business.

Memorex chose to focus first on what will be a key point; the financial community's reluctance to provide financing to plug-compatible manufacturers (PCM). A witness who was part of the financial scene then, Eugene K. Collins, got Memorex off to a fast start in that area, answering questions directly. Much of his testimony included documents from other financial analysts as well as IBM's assessment of the PCM situation at various times.

Either IBM's tactic of drowning Memorex in paper is working or else Memorex has decided not to explain to the jury the positions of IBM document authors.

By giving the authors' current titles, Calcomp attempted to establish in the mind of the jury the relative importance of the document. But Memorex is neglecting to do that, rushing instead to the content of the document.

Same name, different subject. Montgomery Phister probably lists his second career as antitrust witness. On the stand for Calcomp to provide background about the industry, with some mention of market share, Phister testified for Memorex as a technical expert, calling upon his background as vice-president of development and of the systems divisions at Scientific Data Systems.

Phister's apparent inability to give succinct answers may

PROFESSIONALS WANTED

Our rapid success in implementing Data Terminal Management Programs at Fortune 500 companies necessitates additional personnel in our Boston, New York/New Jersey, Philadelphia and Washington offices.

Eighty percent of our business is generated from our existing customer base and we need Area Managers, Account Managers, Sales Persons and Electronic Technicians. Qualified Computer Professionals are invited to join in our success — We double revenues every other year, and earn 10%+ profits. Contact Eric S. Taylor, Personnel Manager.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300
AN EQUAL OPPORTUNITY EMPLOYER M/F

NCE

LEASE • RENT PURCHASE

- DIABLO 1620, 1641, 1660
- ACOUSTIC COUPLERS
- DECWRITERS LA 36, 120, 180
- ADDS CRT's
- TRI DATA FLOPPY DISC
- TELETYPES—TWX/TELEX 32, 33, 35, 43

*SEE US AT INTERFACE '78



NCE

Call or write for more information...

NCE TERMINALS & COMMUNICATIONS, INC.

Regional Office—East
300 Raritan Ctr. Pkwy.
Bldg. 806
Edison, NJ
201-225-0872
Toll free #
800-631-5366

**Headquarters Office
Midwest**
1536 Brook Drive
Downers Grove IL 60515
312-629-7810
Toll free #
800-323-1780

Regional Office—South
1110 Busch Blvd.
Tampa, FL
813-932-2666

COMPUTER TERMINALS

Save Up To 40%

On purchase or lease of the following: Hazeltine, Intofon, Diawriter, LA 36, LA180, LS120, Diablo 1620, Texas Instruments 745, 743

Example: Texas Instruments 745: \$1825

CALL FOR A QUOTE

201-469-9344

Terminal Sales & Development Inc.
867 Sebring Ave., Bound Brook, N.J. 08805

The Computerworld
Index
Tells You What
You Need To Know

Conference Set for June 5-8

NCC to Feature Personal Computing Contest

ANAHEIM, Calif. — The National Computer Conference (NCC), which will be held here June 5-8, will feature a Personal Computing Festival, a Professional Development seminar series, special interest sessions in 25 areas, product displays by more than 300 organizations and some 4,000 industry representatives to answer questions.

The Personal Computing Festival will be highlighted by a Personal Computing Contest. "Demonstrations are welcome in such areas as speech synthesis and recognition, computerized music systems, hardware and software design, computer graphics, computer games, communication systems, small business systems or whatever you happen to be into," Contest Director Larry Press said.

Prizes will be awarded for the most outstanding exhibits, he noted.

A technical and professional program of sessions addressed to 25 topic areas dealing with methodology, applications, systems, and people and society

is planned to meet the information needs of computer specialists, managers and data processing users, according to its chairman, Dr. Leonard Liu.

"We plan to focus on the latest developments in computer technology and methodology and identify the potential impact of these innovations on many user areas, including some sectors which as yet have not received sufficient attention from the industry," Liu said.

Methodology will include topics ranging from software project management, DP management and administration and performance measurement and evaluation to programming methodology, automatic pro-

gramming and software tools and techniques.

Applications will cover a variety of subjects ranging from electronic funds transfer to artificial intelligence.

Systems will feature such topics as computer architecture, data networks and communications, data base management systems and operating systems.

The impact of computers on people and society will be examined in sessions focusing on communications and regulatory policy, legislation and its impact, computing careers and education and current computer progress in Japan.

Registration for the full conference

will cost \$75, but attendees can register in advance for \$60. This entitles one to admission to all activities, advance housing information, a copy of NCC '78 Proceedings and the option of allocating \$10 of the fee to first-time membership in any one of the 15 member organizations of the American Federation of Information Processing Societies (Afips), the NCC sponsor.

Afips has also announced plans to publish free a bimonthly newsletter providing information on NCC.

Subscriptions to the newsletter, "NCC Preview," and other information may be obtained from Afips at 210 Summit Ave., Montvale, N.J. 07645.

DP Rep Serves 'Untiring' Role

LEWISTON, Idaho — Computer representatives are called on to do a lot of things in the course of a business day. But Fred Christlieb, a service rep for a computer company, went well beyond his normal job description last month.

When the DC-9 airliner on which he was riding developed a flat tire here, Christlieb got out and changed it.

The alternative, in this somewhat remote Idaho community, was to wait for an airline mechanic to drive about 100 miles from Spokane, Wash., to do the job. Christlieb, who is licensed by the Federal Aviation Administration as a qualified DC-9 mechanic, flashed his license at airline officials, donned a pair of coveralls and did the job.

Call for Papers

1978 WINTER SIMULATION CONFERENCE, Miami Beach, Fla., Dec. 4-6, 1978.

Topics for papers on simulation methodology include experimental design, language developments, debugging aids and random number generation. Application paper topics include planning models, scheduling, financial models, agriculture and forestry, energy and military.

Unpublished papers are solicited on all aspects of discrete and combined simulation. Authors are requested to promptly contact Dr. Norman R. Nielsen, WSC 78 Program Chairman, Information Science Laboratory (J-1041), SRI International, 333 Ravenwood Ave., Menlo Park, Calif. 94025. Four copies of a summary, 1,000 words long and including a list of key words and references, should be sent to Nielsen by April 14.

1978 ANNUAL CONFERENCE OF THE ASSOCIATION FOR COMPUTING MACHINERY, Washington, D.C., Dec. 4-6, 1978.

The program will cover all aspects of computer science and applications. There will also be a program addressing current applications and policy matters related to computers in the federal government.

Five copies of all papers and/or session proposals should be sent by July 1 to Gerald L. Engel, Department of Math and Computing Sciences, Old Dominion University, Norfolk, Va. 23508. Papers for the federal government program should be sent to Dennis M. Conti, Systems and Software Division, National Bureau of Standards, Washington, D.C. 20234.

INTERNATIONAL USER'S CONFERENCE ON COMPUTER MAPPING SOFTWARE AND DATA BASES, Cambridge, Mass., July 23-28, 1978.

Focus will be on computer mapping programs and cartographic data bases, with emphasis on user applications, availability for use in thematic map preparation, results of recent research at the Harvard Laboratory and procedures for distribution by governmental agencies and educational institutions.

Presentations will be 15-40 minutes long, with criteria for selection being originality and interest to government, industry and education. Application areas include city and regional planning, forestry, health care, public safety and marketing research.

Abstracts of no more than 500 words should be sent by March 15 to Allen Schmidt, Conference Chairman, Harvard University, 520 Gund Hall, Cambridge, Mass. 02138.

SUCCESS



We wrote the Book.

Get your free copy of a new booklet that gives you an inside look at marketing career potential with Tymshare, a singular success in the exploding computer services industry. Sustained, profitable growth and success of Tymshare result from giving good people a place to develop and succeed as individuals.

Find out now what we have to say about success ... yours and ours. They go together.

Simply send a note to Paul Weikert, Manager of Sales Development, Tymshare, Inc., Corporate Headquarters, 20705 Valley Green Drive, Cupertino, California, 95014.

Or call one of our offices nationwide and ask the branch manager there to send you a copy. We're listed in the White Pages in major cities across the country. Professional marketing opportunities nationwide in sales and customer support.

TYMSHARE®

An equal opportunity employer M/F.

Editorial

Legal Threat to Competition

The recent appellate court ruling on the Dataspeed 40/4 has far-reaching implications for the future makeup of the DP and terminal industry.

In upholding a Federal Communications Commission (FCC) decision to tariff the AT&T CRT terminal (see Page 1), the court neatly sidestepped the fact that DP equipment has traditionally been provided in a free competitive environment. In reaching its decision, the court said the FCC should be looked on as the specialized agency with the competency to decide what constitutes DP and what constitutes communications.

What the court conveniently overlooked is that the commission has been wrestling with this problem for years. It has reopened its Computer Inquiry in an effort to determine the boundaries between DP and communications. In the meantime, it has said that common carriers may not provide DP devices under the terms of the first Computer Inquiry.

It is all well and good to decide that carriers should be excluded from the DP area. But if the commission is unable to determine where teletypewriters leave off and intelligent CRT terminals begin, it has made a mockery of its own findings.

The stage is now set for Bell to introduce additional advanced versions of DP compatible terminals. Presumably, these will be challenged on the same grounds as the 40/4. If so, at some point in the future, a device will finally be judged a DP peripheral. When that happens, the Bell System will have backed into the DP arena with the implied good wishes of the commission.

In the long run, users will only benefit by free and open competition among terminal suppliers. The potential for common carriers to subsidize tariffed DP-like equipment with revenue from other services is very real.

In later years, it would be tragic to realize that the still fictional Dataspeed 40/8 or 40/12 had been protected by FCC tariff and has been priced so low that major terminal suppliers had fallen by the wayside because they could not match the subsidized prices.

The Datanet network allegedly floundered because AT&T offered its Dataphone Digital Service. It remains for the courts to determine whether that charge is valid. Hopefully, the courts will never have to decide whether Bell forced terminal makers out of business in the same manner.

Data Past

Five Years Ago Feb. 21, 1973

WASHINGTON, D.C. — A Census Bureau study of the American job and skills market reported that in 1970 161,337 people were working as computer programmers and 79,949 as systems analysts. According to the report based on 1970 decennial census data, the largest numbers of computer specialists were employed in computer manufacturing and computer programming services.

WASHINGTON, D.C. — AT&T's plan to sell its CRT terminal outside the Bell System would be in violation of Federal Communications Commission and antitrust agreements, Incoterm Corp. charged in a letter to the FCC. If the Model 40 display terminal, built by Teletype Corp., a Bell subsidiary, were sold to non-Bell suppliers and then attached to AT&T lines, it would "constitute the furnishing of a [DP] service," Incoterm told the commission.

Eight Years Ago Feb. 25, 1970

WELLESLEY HILLS, Mass. — Honeywell's EDP division announced a family of computers, consisting of its first small scientific system and a communications-oriented processor, developed from the 316 minicomputer offered by Honeywell's Computer Control Division. The Series 15 consisted of the 1530, intended by Honeywell to compete with the IBM 1130, and the 1540, for Series 200 users.

WASHINGTON, D.C. — The American Civil Liberties Union (ACLU) last week filed suit against the Army's computerized data bank on lawful civilian political activity. Rep. Cornelius Gallagher (D-N.J.) announced that his Right to Privacy Inquiry would hold hearings on the data bank during the week. The computerized file of Civil Disturbance Incident Reports contained information on lawful, nonviolent meetings and included groups such as labor unions and the ACLU.



'This Way, We Eliminate the Hassle With Those Petitions ...'

Letters to the Editor

ACM Doing the Right Thing

The Association for Computing Machinery (ACM) hasn't severed ties with the Soviets, as H.R. Sides charged ["Missed the Point," CW, Feb. 6].

We have resolved, as an association, not to sponsor or cooperate with meetings held in the USSR or with strong Russian support. Much stronger expressions of disapproval were possible and can be explored if we think they will help.

And that is the key to what we are doing: We want to help Sharansky and the other computer people and scientists now imprisoned or mistreated in the Soviet Union. We aren't cold warriors or CIA dupes; we're honestly concerned.

In my judgment, the Russian government will ignore silent disapproval and gentle reprimands; I remember the story about how to get a mule's attention. Obviously, the National Academy of Sciences and the American Physical Society also remember it.

Turchin and his family got out. Surely we helped a little.

Herbert R.J. Grosch
President

ACM
New York, N.Y.

Do-It-Yourself Calculator

To all of you IBM 360/370 programmers out there who have considered (and who has not?) purchasing a hexadecimal calculator:

CHI-SON-BOP (use of the fingers as a calculator) can be done in hex by assigning the following values:

Finger	Left	Right
Thumb	x'80'	x'8'
Index	x'40'	x'4'
Middle	x'10'	x'1'
Ring	x'10'	x'1'
Little	x'10'	x'1'

Addition is performed by laying down fingers in counting sequence while counting to yourself from 1 thru the added digit.

Subtraction is performed by counting backwards from F through the subtrahend digit as you add on your fingers, then making the adjustments for sign and complementation.

That's as much as I know so far. I've tried it, and it works.

Guy B. Chase Jr.

St. Paul, Minn.

How About a Full Survey?

I'm surprised that a national paper directed toward professional people would print an article such as "Users Award Xerox, Amdahl Top Grades in Annual Survey" [CW, Jan. 23].

The sample is a ridiculously small number. Is Datapro Research Corp. stating this is the total number of subscribers it can muster? If CW is to report a survey, why not do a complete survey of all users, instead of accepting an inept attempt, adding your own bias and printing the result?

J.D. Raymer

Fresno, Calif.

Quick Shot in the Arm

"Creativity Seen Vital Factor, Even in Maintenance Work" [CW, Jan. 23] was a quick shot in the arm to those of us supporting maintenance/enhancement departments.

With a technological quick-fix attitude, management and functional departments fail to put enough emphasis on this type of work, instead glorifying new systems development. It is no wonder programming maintenance has come to mean difficulty, frustration, boredom and an overall thankless job.

Nancy A. Fritog

Kendall Park, N.J.

Terrific Cost/Performance

Micros Skunk Bettors at Las Vegas Casinos

By Jack Stone
Special to CW

Cost-justify a computing machine in a casino? You bet!

Shortly after our arrival at the Marina Hotel in Las Vegas the day before New Year's, we were ambling over to Shipwreck Kelly's for coffee when I sensed an unusually strong force. It seemed to originate from the center of a large group of machines scattered all over the main lobby.

It intensified and, although I fought vigorously, it dragged me across the floor to a change booth where several hundred dollars were yanked from my wallet by unseen hands, which then slapped gobs of coins into my sweaty palms and shoved me against a nearby "slot."

The force quickly subsided as I surrendered my first coin to an odd-looking one-armed bandit and pulled the starting lever. I was quite surprised at not hearing the clanking sounds as the reels spun around or the crunching noises when they stopped. The reason? Because the action was cleverly simulated by a microcomputer which fed a silent, eight-color CRT display.

The machine also jacked up the betting action by offering "five ways to win" (or "to lose," says I) compared with only one in the latter day technology. It displayed nine items instead of three for each play and paid off on three rows and two diagonals. (Of course, each

way-to-win requires another coin, so the odds aren't increased, only the amount of the bet is!

Some hours later, having paid for at least half a dozen micros with my losses, I decided to try and win at the \$1.49 buffet lunch at the Holiday Inn.

As I strolled to luncheon down the "strip," I went "window gambling" at the various hotels and found the "Computer Corner" at Aladdin's casino where micro dealers were hustling "21" and "Five-Card Stud."

But in a short while, I was skunked again by those octally programmed wizards. Suffice it to say that I lost at about 3.4 times the rate I lost at the "live" gambling tables. Now that's cost/performance!

Hope Still Alive

When the buffet lunch turned out to be a bummer, I decided that my luck simply had to change, so I sauntered across the street to the Westward Ho casino. There I took on the "Electronic Super Progressive" slot.

This 10-foot high monster (probably housing a couple of .1 sq-in. chips) gulps up to \$3 (coin or paper!) per play for "three ways to win," spins four electronic reels in living color, pays off on 16 different patterns of three or four items with right- or left-read and calculates cumulative jackpots and special bonuses. It even projects exhortative comments like "I'm hungry! Feed me!" and "No venture, no

gain!" to get your spending energy up.

Alas, I left behind about 23 times what my children gave me to gamble for them. So I decided to move on to the Circus Circus for some R&R and to reassess my gambling technique, what miserably little I possessed.

I had no trouble bypassing the CC

The Human Connection

casino as I went up the back stairs directly to the mezzanine. Hot dog! No gambling allowed here!

Not much! Just a massive 25¢ amusement arcade filled with fun and games to get the dough from the kiddies while the folks lose their shirts to the man and machine dealers on the main deck.

Beating down pangs of ignominious defeat, I gloated as I spotted a crusty-looking, freckle-faced, knockkneed boy of about 11, whom I promptly challenged to a shoot-out on "Boot Hill." We stomped over to this micro game and each grabbed a joystick with which to seek cover and a pistol grip with trigger to adjust gun elevation and fire the electronic bullets. The guns blasted furiously during the fight, but taps soon sounded and a body was carted to Boot Hill. The awesome adolescent "done did me in!"

I felt a severe case of loser's de-

pression coming on. But what now? The "Indy 400" game! This electronic jewel lets you drive your motor racer like a madman without a whole heck of a lot of damage resulting. I entered the fray with a skinny-legged, four-eyed, pig-tailed girl, about nine years old.

I floored my gas pedal from the start, grabbed the wheel and drove for Old Glory. "Zonk! Zonk!!" Those dumb barrlers kept getting in my way and slowing me down.

Finish line! I beat her, or so I thought until she gave me that buck-toothed smile of victory and pointed to the score. I had actually lost on point penalties for my crashes.

I thought I was down, out and finished, when I thought I heard it! Yes, it was the theme song from "Star Wars." It was emanating from the "Starship" micro game! Two quarters plus a split second later, there I was — commodore of a fleet of spaceships, the last line of defense protecting our planet against invading alien spacecraft.

Laser guns fired and proton torpedos launched! Oh no, almost out of fuel! I set all armaments on continuous fire in one last desperate move, and then — victory!! The message flashed "YOU HAVE SAVED THE FEDERATION!"

I went home happy, surely one of the few really big winners in Las Vegas's history!

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

In Tangles With Vendors

Lesson for Users: Do Your Legal Homework

In late January, I received a letter from a user who thought the readers of this column should know about something that happened to his firm in 1969-1970. It seemed, he said, that a major computer manufacturer had published unsubstantiated comparison throughput material and had supplied a machine under false pretenses, maintaining that it was another, more expensive, version. As a result, the user sustained various losses.

From my own experience, there was nothing factually unlikely in the story. Unchecked specifications certainly have been published in the past. Used machines have been mislabeled and delivered as new and equipment has been otherwise misidentified. Many losses have been caused to users.

In view of the incredibly severe clauses in standard contracts still being used, it is very much in the computer user's interest to know about just what happens when things go wrong. So, I decided to

look into the incident, to the extent of examining the papers he offered and, later, flying to the user's city to discuss the situation with him and his lawyer.

The papers included an amended complaint, with shorthand notes as to the vendor's responses: "D" for denied, "A" for accepted, "A in P" for accepted in part, etc. It was a multimillion-dollar complaint, based on the failure of the vendor to supply equipment with the productivity promised or of the type ordered. Frankly, there were no surprises except for the fact that each of the various claims — and there were quite a few — carried the same damage figure.

From my personal experience with other computer claims cases, indicated to me that the extent of the damage had probably not been thoroughly researched. Further, the differences between the very different claims would have to be detailed during the trial.

Chief Executives' Depositions

In addition, there were two depositions from the chief executives of the user company and the vendor. Depositions are extremely important in a law case. They are taken on oath, and during the trial itself, the inquisitor can use many

tricks to get a witness to talk. He can be friendly, talk about items that are just not relevant to the immediate issue and ask questions out of context.

Depositions can be very valuable if performed properly, but of course, they can take some time; once one is started, it continues until the court stops it (which is very infrequent) or the inquisitor runs out of questions.

The examination of this user's chief executive was thorough — many hundreds of pages long. In contrast, the examination of the vendor's chief executive was brief.

Equally dissimilar were the ways in which the two men handled the answers. The user provided, either at the time or immediately afterwards, everything that seemed to be requested. The vendor, however, denied personal knowledge of many facts, left blanks to be filled in later and apparently, according to the user, never filled them in — even though the depositions were taken years ago!

User Misled

But more important than the deposition's briefness and incompleteness was the way it misled the user and his management. The user was convinced that the

vendor's executive had agreed, under oath, that the vendor had not checked the claims made in the published advertising material and had, therefore, behaved recklessly. In fact, however, the man had said no such thing, and the user's lawyer had not asked even the most obvious type of questions to draw out what the executive really knew.

The user's failure to understand what had gone on became even more important when I found that this deposition — brief, incomplete, inadequate and misleading — was the only one the user's lawyer had taken. Moreover, he had asked no interrogatories, I could find no request for production of documents.

The situation on the damages front was equally disturbing. The one action the lawyer had taken — and, according to the user, without getting any substantiation or agreement from the user — was to increase the claimed damage by millions of dollars. The user made no attempt to match the facts with the claims and put little effort into separating the losses coming from the different claims.

By now, my reason for not identifying the vendor and user will be obvious. The user may or may not have a good case. In any event, he

(Continued on Page 16)

The Taylor Report

By Alan Taylor CDP

IBM Has the Edge In Rating Scheme

Roger Lightowler's letter of complaint [CW, Jan. 30] that ratings of Digital Equipment Corp.'s Decsystem-10 have not appeared in recent comparisons of mainframes reveals what may be an emerging DEC marketing strategy.

One should not forget that IBM has achieved its dominant position in the industry not because it builds the best computers (whether it does or not) but because it says it does. The reality of these rating systems is that they measure not how powerful each system is, but how powerful an IBM-type computer the system is.

It has been IBM's strategy to promote the idea that all computers are nearly the same. They are what IBM says they are. In this system,

no one but IBM can win.

DEC seems to believe its systems really are quite different from "real" computers. The firm, in fact, thinks that its systems are better notwithstanding the enormous financial and, therefore, emotional commitments so many others have made to IBM-type computers. To force the ratings of DEC computers with the others only plays into IBM's hand.

Sterling Smith

Washington, D.C.

Headline May Mislead

The headline on Bill Baxter's article in the CW Special Report [Jan. 30] is misleading. The implication is

that if packages are used, user participation is not vital in systems development.

Do Your Legal Homework

(Continued from Page 15)

totally misunderstands the strength of his case and is simply unable to evaluate whether he should pursue the matter. For that matter, he can't evaluate his lawyer's behavior.

The arrangement between the user and his lawyer is a contingency, plus fee and fee-and-expense budget of between \$25,000 and \$35,000. The trial is expected to last more than a month, according to the user.

Assuming that many readers (users included) have seen this excellent article, the subliminal suggestion that users need not participate in package selection, justification, etc. is damaging.

J.W. MacFarlane

Somerville, N.J.

Now, to my mind — and I know quite a bit about the costs of preparing for DP-related trials — this simply isn't enough, without, at the least, much better depositions and other preparation.

Up in Flames

Frankly, unless things get a lot better very quickly, any real claim the user has is going to go up in flames with the unreal claims that are currently going to be tried on unprepared subjects.

Still, I agree with the user that the industry should be aware of the situation, and I am grateful he sent me the material and provided me with the other information for transmission to my other readers. Owing to the current setup of the lawyer's responsibilities it is unlikely that even if the case is lost unnecessarily there will be any way for the user to recover from the people to blame.

Local lawyers are not expected to exercise special skills, there is no way that an ordinary lawyer can be blamed for omitting essential work in a complex DP case (there really should be a national, technical bar for such cases).

Damage Estimates

And, in any case, under the courts' theory of damages, although a jury can be allowed to estimate the amount of damage caused, this can only happen if the judge agrees some damage definitely occurred. Currently, lost cases are not regarded as having any certain loss if there is any chance they might be lost anyway.

In this case, there certainly is that chance. So going on to trial and trying to get redress from the lawyer in the event the user does not get what he wants from the vendor is going to get nowhere.

That is the important lesson of this case. It doesn't matter how good a case is; it is not the court's function to find the facts and evaluate them. The standard expertise of any lawyer does not cover the complexities of computer hardware or software. The responsibility of all this is on you, and you should be prepared to accept it.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

"Have You Heard About the Value Computing Easyspace Ratings?"



"The Latest Data Pro Rates Easyspace 3.9"

"Sure — Easyspace Is A Space Management Tool For DOS/VS Operating Environments. It Includes A File Independence Option Which Really Gives You A Lot Of OS Capabilities For Your DOS/VS System."

If You Haven't Heard . . . You Can Find Out More About Easyspace By Calling Value Computing Incorporated Toll Free At:

(800) 257-8242

Or By Forwarding This Coupon:

Value Computing Inc.

Please send me more information about EASYSPACE

NAME _____
COMPANY _____
TITLE _____
PHONE _____
ADDRESS _____

CITY _____
STATE _____
ZIP _____
CPU _____
OPERATING SYSTEM _____
Mail to: VALUE COMPUTING INC.
300 VCI Building, W. Marlin Pike
Cherry Hill, New Jersey 08002

VCI-7801

DECscopes

For Sale
•VT52

BEST PRICE
FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-279-1960

Data Equipment Group

ICE, INC.

772 N. Church Rd.
Elmhurst, Ill. 60120

'Gang War Breaking Out' Societies Wrangling for Share of Readership

By Joe Rigo
Special to CW

Open gang war is breaking out among our leading professional societies. The contest is to find out who can get more people to read scientific research reports.

The current fat cat is the Association for Computing Machinery (ACM). The ACM represents about 25,000 wealthy but frustrated computer scientists.

In this country, a computer scientist is a college professor who can't stand the thought of teaching Fortran to another class of freshmen. The government gives him grant money to hire graduate students to teach the Fortran classes. The professor is free to hide and commit scholarly research.

There is only one catch. Periodically, the professor, now a computer scientist, has to write a report and get it published by an independent agency. This proves his research is legitimate and qualifies him for additional grants.

Ideally, he wants to get his report published in *Datamation*. His friends will see it. His enemies will see it. He will get congratulations from all over and postcards from foreign libraries that want free reprints.

Datamation is choosy, though. Only a few of the scientists make it.

This is where ACM comes in. ACM publishes a whole assortment of respectable scientific journals. It thrives on the reports that can't get in *Datamation*. There is only one problem. No one reads them.

ACM journals are not meant to be read. Their whole purpose would be served by printing only one copy of each issue and mailing it directly to the National Science Foundation.

This leaves ACM with a large number of well-fed but lonely scientists. Other societies see the situation and get ambitious.

First and foremost, there is the American Federation of Information Processing Societies (Afips), which stages the National Computer Conference every year. Afips makes bundles of money on the sales of exhibit space, but it can't spend any. It has to share the profits with ACM and its other member societies.

Afips is campaigning to win the loyalty of ACM's scientists.

A couple of years ago, Afips opened a Washington, D.C. office to agitate for bigger and better research grants. Now it is about to start a new magazine that, it hopes, people will read.

The magazine should be called *Popular Research Illustrated*. Its official name is *Abacus*. Afips plans to sell it on newsstands, right next to *Hustler*, *People* and *Rolling Stone*. It will contain articles by computer scientists rewritten into simple English.

If the plan works, computer scientists will still send their best work to *Datamation*, but *Abacus* will be their second choice. This will leave ACM with sloppy thirds.

Meanwhile, the latest entry in the scramble for ACM's members is the

Association of Computer Programmers and Analysts (Acpa). This organization doesn't care about the professors, but it would like to take over the 10,000 or so nonscientists who belong to ACM.

Acpa's initial strike was to jump on a recent ACM resolution condemning the Russians. ACM said the Russians should stop persecuting computer scientists who criticize their government. Acpa said ACM should worry more about problems closer to home. Acpa did not get more specific.

It was a clever stroke. In this country, people who criticize the government get Pulitzer Prizes. We

only persecute citizens who sell dirty books. Acpa knows that ACM is not about to endorse the human rights of pornographers.

Reader Commentary

As I see it, the ideal resolution will be for Acpa's programmers to teach Cobol to ACM's computer scientists. As things stand now, the scientists are all wrapped up in Lisp, Pascal and other languages that exist only on government grant ap-

plications. Their graduates leave four years of computer education with no exposure whatever to the world's most popular programming language.

With luck, the programmers will get the scientists to think about the concepts involved in commercial applications. The scientists will discover business life does not begin and end with payroll programs.

The problem will be solved. The scientists will start writing about real systems. People will read their reports. And we will all thrive and prosper.

Rigo is president of Sysdoc, Inc. in New York.

PDP-11 RSTS/E users: QUODATA's new data management system saves you up to 80%

We call it QDMS. You'll call it unbelievable. Because QDMS gives you about 80% of the features of a full-fledged data base management system at 20% of the cost -- only \$5,000.

QDMS provides a general purpose, powerful solution to the continuing problem of creating, maintaining, and subsequently extracting meaningful information from large amounts of data. Here are some of the highlights.

SAVE UP TO 80% PROGRAMMING TIME

A library of macro-level building blocks allows programmers to write sophisticated new applications in a fraction of the time you might expect.

ANYONE CAN USE IT

QDMS is video display-oriented and greatly simplifies data entry, maintenance and retrieval. Use by non-technical personnel was a major design consideration; virtually anyone can feel comfortable with the system in just hours.

COMPREHENSIVE REPORT GENERATION

The QDMS report generator also is easy to use and can produce any report you want -- anytime you want it -- with a minimum effort. Via the video terminal, the user is led step-by-step through English-language statements describing the report's contents and format. Simple. Fast.

Ease of use, outstanding report generator, greater programming productivity, tight system security, tailored screen formats, and much more -- all for only \$5,000. Believe it.

For more information, write or call, Nat Kennedy, (203) 728-6777.

quodata
Specialists in DEC Software

196 TRUMBULL STREET · HARTFORD · CONNECTICUT 06103

Why do more professionals prefer our financial and manufacturing software packages? Because they're...

- ... built with advanced data base design and on-line technology so that our software is always state-of-the-art,
- ... backed by financial and manufacturing specialists committed to the excellence of our software and the total success of your installation,
- ... highly flexible and adaptable to give users all the reports they want, when they need them, in the formats they find most useful,
- ... eliminating the cost and problems of designing and writing in-house financial software, within tight budgets!

SOFTWARE INTERNATIONAL'S PROFESSIONALS TAKE PRIDE IN PROVIDING THE MOST COMPREHENSIVE SERVICE IN THE APPLICATION SOFTWARE INDUSTRY. THAT'S WHY MORE THAN 1200 MAJOR CORPORATIONS AROUND THE WORLD LOOK TO US FOR THE BEST IN SOFTWARE IMPLEMENTATION.

Get all the facts. FREE!

Please send me my **FREE** booklets about your Professional Approach to Application Software Systems. I am particularly interested in:

Large Computer Systems

- Financial
 - ☐ General Ledger and Financial Reporting
 - ☐ Accounts Payable
 - ☐ Accounts Receivable
 - ☐ Fixed Asset Accounting
- Manufacturing
 - ☐ Material Requirements Planning
 - ☐ Master Production Scheduling
 - ☐ Capacity Planning
 - ☐ Shop Floor Control
- Comprehensive Report Generator
- ☐ FILETAB

Small Business Systems

- System/3
 - ☐ General Ledger and Financial Reporting
 - ☐ Accounts Receivable
 - ☐ Accounts Payable
- Burroughs B-1700/1800
 - ☐ General Ledger and Financial Reporting
 - ☐ Accounts Receivable

Other small computer system application products available soon. Please specify computer and need _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone _____

Computer _____

Atlanta (404) 252-9880
New York (914) 332-0040
Washington, D.C. (301) 770-6460
Philadelphia (302) 995-7101
Chicago (312) 729-7410

**SOFTWARE
INTERNATIONAL**
Elm Square, Andover, Mass. 01810 (617) 475-5040

San Diego (714) 292-9833
Toronto (416) 862-0521
Houston (713) 444-3348
Columbus, OH (614) 773-2167
San Francisco (415) 433-5797

CW3077

Help Asked on IMS Library System

REDONDO BEACH, Calif. — Personnel at TRW have developed a library circulation control system based on IBM's IMS/VS data base management system, but they would like to explore ways of extending the work done thus far with anyone working on a similar system.

Thus far, the developers have created a book checkout-and-return system that is operated from a CRT terminal and that requires neither book identification nor library card distribution to implement. They would like to add acquisition and indexing search modules, and that is where they need help, according to Management Systems Advisor William C. Napier.

In the system already in place, employee number and book number — based on the Library of Congress coding scheme — are

the principal factors. The employee number is used as a search key, extracting the employee's name, work location and other pertinent information from the company's personnel data base.

A library data base containing all relevant book information is accessed using the book number as the entry key. When the book title and title displayed at the CRT are deemed appropriate, the operator presses an "acceptance" key and the checkout or checkin transaction is complete, Napier said.

The library data base includes the permitted checkout period for each volume; the system triggers an overdue notice if a book is not returned in time. Other features include wait-listing and inventory control.

The wait-list function enables a librarian to develop queues for books already on loan.

When a wait-listed book is returned, the system notifies the librarian of its special status along with the names, work locations and phone numbers of patrons on the wait list.

Batch report capabilities of the system now include inventory control and listing of lost and overdue books, as well as library use statistics, Napier noted.

In line with the plans to add acquisition and indexing search modules, he said he'd like to explore secondary indexing and search approaches with any user who has suggestions based on practical experience.

Napier can be reached through the Financial and Administrative Systems Group, Mail Station EL-3005, Defense and Space Systems Group of TRW, Inc., One Space Park, Redondo Beach, Calif. 90278.

Managers Offered Performance Plan

By Don Leavitt
CW Staff

WELLESLEY, Mass. — Most DP organizations measure performance without recognizing it as a discrete management control program. A recently published book describes the desirability of consolidating these fragmented measures into an integrated program.

In *A Guide to EDP Performance Management*, authors David P. Norton and Kenneth G. Rau note that, to date, formal application of performance management techniques to DP have centered around measuring the performance of the equipment — the computer.

This function, which Norton and Rau refer to as "computer performance measurement," is considered to be only one component of the total DP performance management program they advocate in this "civilian" version of a book originally prepared for the federal government.

The basic concepts of performance management program include four items which Norton and Rau recognize as potentially new ideas for some of their readers. The first three are the need for a management information system for DP itself, a DP data base and a DP controller function.

Finally, the authors call for the integration of the DP performance management program

with a management by objectives program as applied to DP.

Oriented to Manager

Published by QED Information Sciences, Inc. here, the book is written for the DP manager and his superior. Understanding it requires no technical expertise, although it assumes an appreciation of general management planning and control techniques. "Guide" is a carefully chosen word in the book's title. The book covers more than 300 pages, but the authors warn it is not intended to provide complete detailed specifications for the technician or analyst assigned to implement the program.

On the other hand, the more technical tools and techniques needed to get the program in mo-

tion are available to readers who work with the annotated bibliography that makes up the last 75 pages of the book.

But the book is considerably more than a means of finding information elsewhere. It includes, for example, carefully structured definitions of nearly 50 performance management measures.

While practitioners may argue the validity of some — or even many — of these definitions, they do provide a comprehensible framework for the proposed program. Details of the performance management program are fleshed out in the narrative text of the book.

Program Benefits

In their introduction, the authors assert there are a number

of benefits to be realized by the organization that designs, installs and operates the DP performance management program they describe.

First on their list is the more effective accomplishment of the DP objectives, brought about largely by documenting what the objectives are and how to measure.

Almost as by-products of that, the program leads to more efficient use of assigned resources, improved communication, more satisfied users, more professional DP organizations and improved productivity, they said.

The book costs \$28.50 (\$24.50 prepaid) plus \$1.50 shipping charges and can be ordered from QED, 141 Linden St., Wellesley, Mass. 02181.

DYL-260 Gains COPY Capability

ENCINO, Calif. — A COPY facility working with DYL-260 parameter statements stored in a source statement library or on a partitioned data set is one of the enhancements built into Release 4.0 of the report writer/extended utility package from Dylakor Software Systems, Inc.

The COPY function is comparable to those available in Cobol compilers or assemblers, a spokesman said. It allows the user to include predefined file definitions and layouts, report formats and commonly used

arithmetic or logic routines in new programs, averting the hazards of manually recoding the work.

Other enhancements in Release 4.0 allow the DYL-260 user to work with meaningful data names, rather than with field locations and size parameters as in the past, the spokesman said.

Support is provided in both DOS/VS and OS/VS installations for IBM 3350 disk and 3540 diskette subsystems.

In addition, Dylakor has doubled the number of I/O files

the system can support; DYL-260 can now accommodate eight input and eight output or work files, plus the report file.

While the package was able to work with multiple files in earlier releases, it did so by concatenating them and treating them as if they were a single file. Now a file counter facility enables the user to identify when there is a switch from one file to the next.

DYL-260 rents for \$98/mo on a month-to-month basis. Dylakor is at 16255 Ventura Blvd., Encino, Calif. 91436.



**WHEN YOU'VE GOT IT...
FLAUNT IT!**

JASPER JOB ACCOUNTING SYSTEM

FEATURING:

- WIZARD REPORT GENERATOR
- FREE CICS BILLING CAPABILITY
- RJE ACCOUNTING

1977 MEMBER
datapro SOFTWARE HONOR ROLL

DATA CHRON CORPORATION 174 FIFTH AVE. NEW YORK, N.Y. 10010 (212) 675-5333

NAME _____ CO. _____ TITLE _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____
TEL. _____ COMPUTER MODEL _____ SYSTEM _____

UK User Forum Urges Strong Standards Work

LONDON — The National Computer Users Forum (NCUF) met here late last month and called for a central coordinating body for computing standards in the UK.

Such an organization should establish priority areas for standardization, coordinate activities in those areas and submit proposals to the British Standards Institute, according to NCUF general secretary Eric Johnson.

Beyond that, the proposed coordinating body should also promote standards and encourage their wider adoption once they are published, he said.

A similar coordinating effort at the European level would enable European nations to give maximum weight to their views in discussions with the International Standards Organization,

the secretary added.

The NCUF meeting members said they feel it is important to develop standards rapidly in a growing number of relatively new areas, such as telecommunications and minicomputers. Portability of software, including operating systems, is also an important area, Johnson said.

Government Support

The group agreed government funding is "imperative" to get the coordinating activity started. Some of the funds should supporting applied to supporting users who want to participate in the meetings needed to develop standards, Johnson explained.

The forum also discussed the work of the National Committee on Computer

Networks. A further meeting on this subject is to be held March 14, according to Johnson.

Three representatives of the NCUF were appointed to represent the UK view at a meeting this month in Brussels, called to consider the establishment of a European user grouping

similar to NCUF. This meeting will also discuss a proposed four-year program for computing in the European Economic Community.

Johnson and the NCUF Secretariat are based at the National Computing Centre Ltd., Oxford Road, Manchester M1 7ED, England.

Minis Gain Gaussian Logic

SUNNYVALE, Calif. — Described as the most widely used system for quantum chemical calculations, programmed logic for the Gaussian 70 system for ab initio self-consistent field molecular orbital calculations has now been implemented on minicomputers.

Originally implemented on large-scale IBM gear, the software has been "extensively modified" by Program Designs to run efficiently on Data General Corp. Nova and Eclipse or Digital Equipment Corp. PDP-11 minis with 128K bytes of main memory and 10M bytes of disk storage.

All of the capabilities of the original version, including array sizes, are preserved in Qchem-Gaussian 70, Program Designs' mini-based version. This was done by taking advantage of symmetric matrices and extended memory techniques and using the disk as an extension of main memory, a spokesman claimed.

Quantum mechanical calculations are now being done routinely and are becoming accepted as a practical method for understanding chemical principles, he said, adding that running these calculations on a dedicated mini, rather than a mainframe, should allow more researchers to use them.

Although Program Designs can provide the total system in a turnkey hardware/software combination, the software is available separately for users who already have the appropriate minis in place. The license fee for the software ranges from \$6,000 to \$9,000 depending on the mini and operating system involved.

Program Designs can be contacted through P.O. Box 2053, Sunnyvale, Calif. 94087.

HP Announces Software Bonus For Calculators

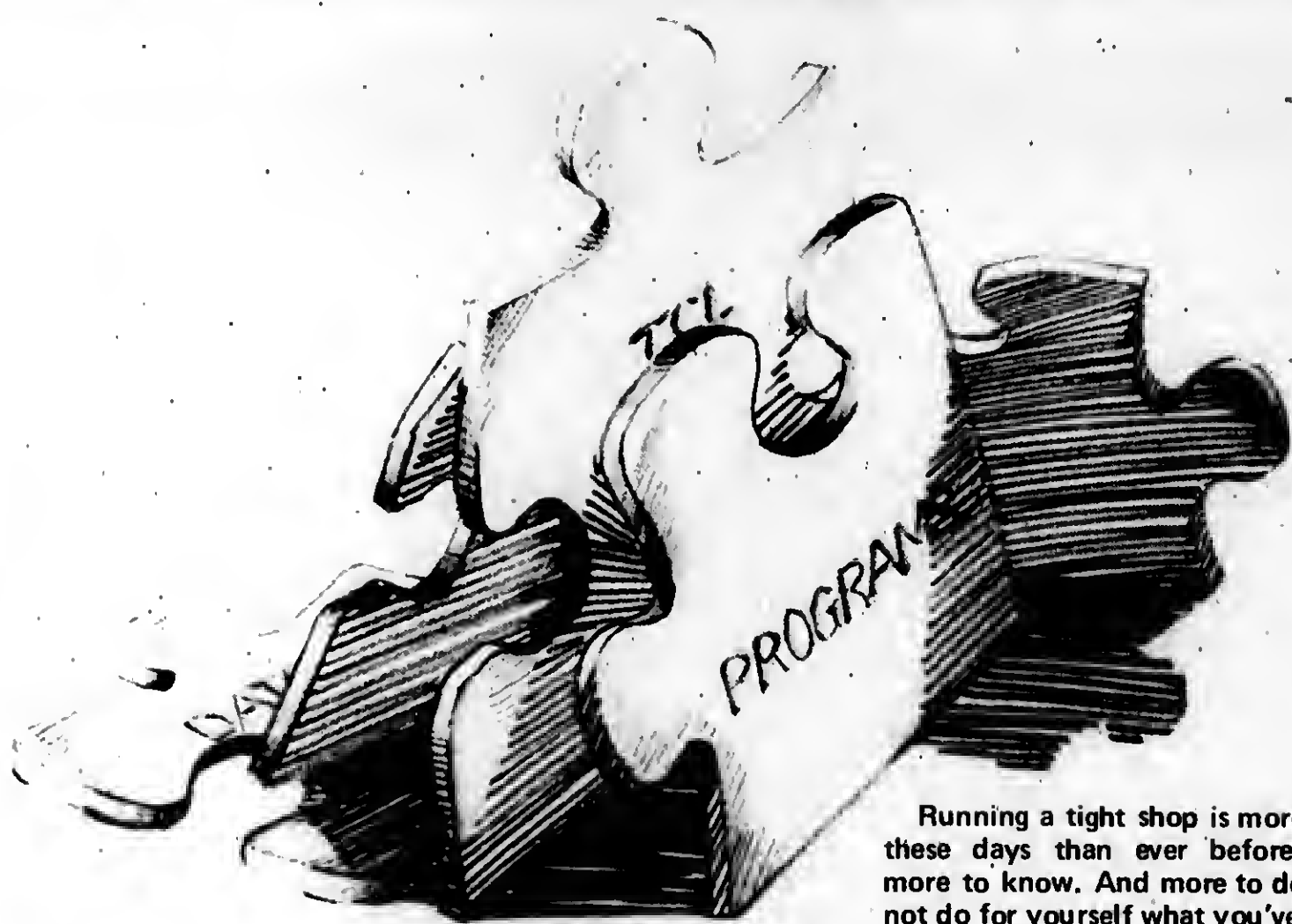
PALO ALTO, Calif. — Programming support packages worth as much as \$105 are being offered to purchasers of various Hewlett-Packard small calculators under a sales promotion campaign now in progress.

Between Feb. 1 and March 31, buyers of HP-67/97 card-programmable calculators will receive 40 blank magnetic programming cards, any five of the Library Solutions books (containing descriptions of approximately 12 programs each) and an HP-67/97 Application Pac containing descriptions and prerecorded magnetic cards for approximately 20 programs.

Buyers of the HP-19C/29C pocket-sized keystroke programmable calculators will receive their choice of five of the 10 Library Solutions books (each with 10 programs) recently announced for these units. Titles in this series include electrical engineering, mathematics, finance, student engineering and statistics.

The calculators and the programming support are available from all HP dealers, the company said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Get It All Together...



Running a tight shop is more difficult these days than ever before. There's more to know. And more to do. So why not do for yourself what you've done for your users?

With JOBDOC, you build a data base of everything you need to know about running your jobs. And then let JOBDOC go to work:

- Controlling Costs
- Monitoring File Relationships
- Generating Complete Job Requirements
- Cross Referencing All Job Related Information
- Providing Operating Statistics
- Giving You A Better Audit Trail Than You Ever Thought Was Possible.

JOBDOC: When you want an easier way to do a tougher job.



Gulf Computer Sciences Inc.
1775 St. James Place
Houston, TX 77027
Tele. 713-627-9320

If you're good, Boeing wants you to work in Seattle and hike and fish and ski and sail and enjoy the Pacific Northwest. Now.

Discover skiing just 90 minutes from work. Hike in abundant forests, catch a salmon, or set sail for scenic islands over the weekend.

You won't find a better opportunity to live in the Northwest than to work for Boeing Computer Services.

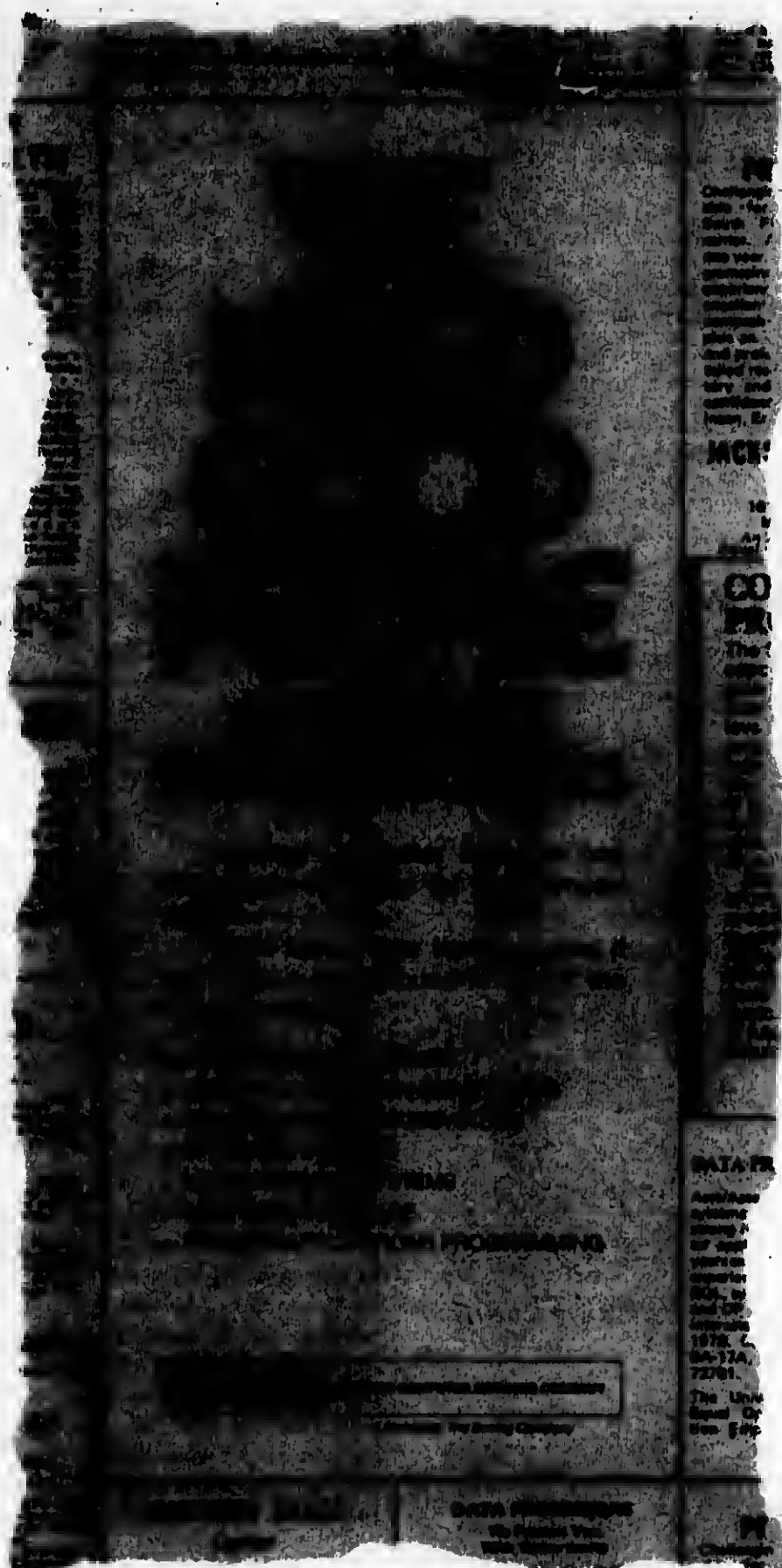
BCS provides local and remote computing, custom programming, application packages, training and consulting

services to The Boeing Company and a variety of commercial and government customers.

We're hiring people for the Seattle area right now, so if you're good, we'd like to hear from you.

Mail your résumé to Boeing Computer Services, P.O. Box 3707-JNI, Seattle, WA 98124.

An equal opportunity employer.



Cobol Concepts

DAYTON, Ohio — A self-instruction course designed to provide basic skills for writing programs in Cobol is available from NCR Corp.

The course, which takes approximately 40 hours to complete, makes extensive use of exercises so the learning of new material is constantly reinforced, according to a spokesman.

Described as general in nature and intended to prepare those taking it to become entry-level programmers, the course includes four student texts, an instructor or monitor guide, a handbook, a final test and programming forms.

The concepts covered are not limited to NCR's compilers; they are based on the 1974 ANS Cobol specifications and the course is available to anyone interested. It costs \$225 and can be ordered from NCR's Learning System Division, Dayton, Ohio 45479.

No Pert or CPM Used

Package Plots Project Progress

ST. LOUIS — The Project Monitor package developed by EDP Design Consultants, Inc. allows management to monitor actual vs. scheduled work progress with respect to elapsed time and dates.

Unlike most other project control systems, this one uses neither Pert nor the Critical Path Method (CPM) to determine the sequence of events required to get a project moving. In-

stead, it utilizes an outline structure — "It's Hipo-like, in rough terms," a spokesman volunteered — that allows summarization of information for different levels of management.

Reports and charts generated by the system provide management with a tool for identifying all work to be performed, early detection of potential project overruns, improved project status dissemination and information

for evaluation of employee work performance, the spokesman said.

The Project Monitor software requires 32K bytes of main memory and a CPU with a Cobol compiler. Thus far it has been implemented on IBM 360/370s, a Data General Corp. Eclipse and a Hewlett-Packard Co. 3000.

Documentation is complete enough to allow a using organization to install the package, the spokesman said, adding, however, that a four-hour workshop is available.

A perpetual license for use of the system costs \$5,900, which includes source code, documentation and the first year's maintenance. The optional workshop costs \$320 plus the travel expenses of the trainer.

EDP Design Consultants is at Suite 4, 140 Weldon Parkway, St. Louis, Mo. 63043.

NCR 'Total' Gains Option Backing On-Line Queries

DAYTON, Ohio — Designed for use in conjunction with the Total data base management system installed on NCR equipment, the Interactive Query Language (NCR Total IQL) enables non-DP personnel to retrieve informa-

tion easily, according to a spokesman.

NCR Total IQL allows users to make virtually any type of inquiry to the Total data base at any time, he said. However, access can be limited through the use of passwords or access codes, he added.

The basics of NCR Total IQL can be learned in an hour, he continued, noting that once the language becomes available to an organization's user community, demands for special work by the professional programming staff usually drop.

Total and Total IQL can be used with NCR Century or Criterion systems beginning with a 96K Century 101, NCR noted.

Along with its announcement of the availability of IQL, NCR said it will now be marketing both the data base software and the query language.

Total IQL is available for a one-time fee of \$15,000 or for \$572/mo under a lease plan.

'Smal/80' For Micro Called Pascal-Like

NEW YORK — A structured, macroassembly language for 8080 and 8085 microprocessors, Smal/80 provides a coding notation similar to Pascal and PL/M, according to Chromod Associates, which developed the language.

Smal/80 supports the basic structured programming constructs — the DO-END, IF-THEN-ELSE and DO-REPEAT logic — which may be combined with or nested within each other without limit to form highly complex statements, a spokesman said.

The Chromod package simplifies "considerably" the writing of Assembly language programs, but the code produced by the compiler is as efficient as that written in a traditional Assembly language, he claimed.

The Smal/80 system includes a preprocessor, itself written in Smal/80, which permits conditional expansion of statements and unlimited nesting of macros. A Translator program converts any logic written in Intel standard mnemonics into Smal/80, but without the structured programming constructs, the spokesman said.

Smal/80 requires 7K of memory. It is being offered initially in CP/M and Issi I disk formats.

The package including documentation costs \$75. Chromod Associates can be reached through P.O. Box 3169, Grand Central Station, New York, N.Y. 10017.

Utility Eases

PDP-11 Usage

MAYNARD, Mass. — A package that enables users of Digital Equipment Corp. Datasystem business configurations (based on DEC's PDP-11 minicomputers) to retrieve data and format reports, Datatrieve-11 is available now from DEC.

The software was designed to support personnel who are not skilled programmers in extracting information from sequential indexed files or support programmers in utilizing English-like commands to extract information from files with sequential, indexed or relative organizations.

Comparable commands are available to generate reports from the accessed data, a spokesman explained.

Datatrieve is said to be compatible with files accessed by PDP-11 Cobol, Basic-Plus-2 or other programming language. The package is intended primarily for use in stand-alone business systems or for systems distributed throughout large companies.

Datatrieve-11, including the Record Management Services (RMS-11K) logic, is licensed for \$4,500, DEC said from its headquarters here in Maynard, Mass. 01754.

'Wylbur' Available On Calldata System

WOODBURY, N.Y. — The Wylbur conversational text editor is now available through the Calldata Systems, Inc. remote computing service network.

The system provides text editing on a batch-oriented CPU — an Amdahl Corp. 470 — as well as word processing facilities including alignments and justification of text.

In conjunction with Calldata's remote job entry mode of operation, Wylbur jobs can be entered conversationally through keyboards, rather than on punched cards. The RJE user can check the status of any job, cancel it anytime and check output before any of it is printed, Calldata said.

Calldata is headquartered at 20 Crossways Park North, Woodbury, N.Y. 11797.

HIRE A SUPER-SLEUTH

FORTRAN debugging with TRACER

for NOVA/ECLIPSE and PDP-11 Users



If your program debugging efforts often seem like long-winded detective novels, odds are you're lacking the proper tools.

TRACER is a fully symbolic, FORTRAN debugging package that shows you exactly what happens as your program executes. So you can spot logic flaws at a glance. Examine variable values as they change. Determine if proper arguments are being passed to subroutines. And ferret out the culprit lines in your source code.

The cost? Minimal, if you figure in the time to be saved in software development and the increase in programmer productivity.

So, hire a super-sleuth. Call or write us today for a free TRACER User's Manual...Case closed!!!

TRACER from IPTC

2462 Embarcadero Way, Palo Alto, CA 94303
(415) 321-6284

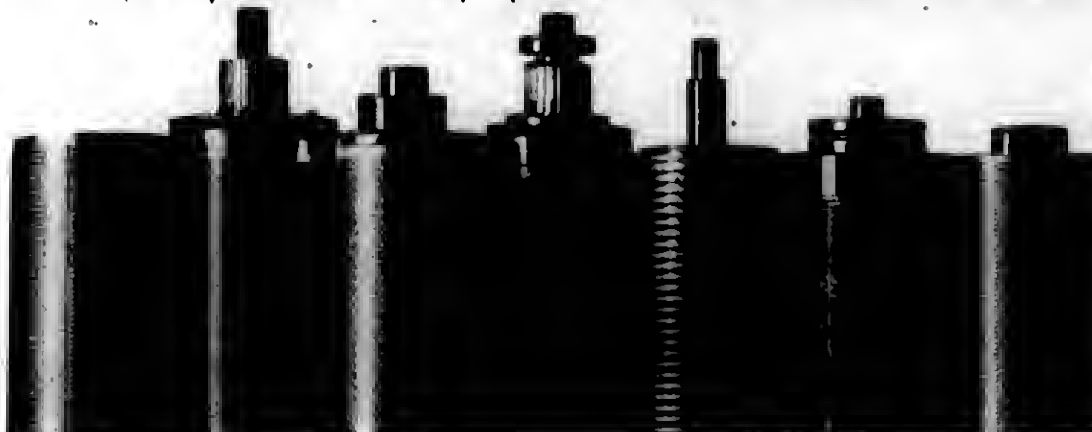
PRINT DRUMS

●REPLACEMENT ●SPECIAL SEQUENCES ●CUSTOM CHARACTERS & ASSEMBLIES

Our custom-designed character print drums and print-drum assemblies can fill your requirements. Industrial Engraving Company, Inc., P.O. Box 311 Easton, Pennsylvania 18042. Phone (215)253-3541



INDUSTRIAL



Cullinane Corporation Announces Free Seminars In Database and EDP Audit Software

IDMS the
only Database
System on the
Datapro honor roll
for the second
consecutive year.

Database Seminar

Presentations tailored to technical and management personnel on the Cullinane Data Management System (CDMS) including IDMS-DB/DC, INTEGRATED DATA DICTIONARY, ON-LINE QUERY and CULPRIT/EDP AUDITOR Report Generating Systems.

EDP-Audit Seminar

In-depth exploration of the capabilities and uses of EDP-AUDITOR, EDP-AUDITOR/3 and CARS 3, for IBM and non-IBM computers. Seminars include lectures, user presentations, examples of applications and discussion of auditing topics.

While these seminars are free of charge, they are conducted by individuals with extensive backgrounds in applied database and EDP audit technology to insure that the time spent at these sessions will prove of the utmost value for you and your staff.

John J. Cullinane
John J. Cullinane

Free Database Seminars

Cities	Dates
Louisville, KY	Feb. 21
Washington, DC	Feb. 21
Dayton OH	Feb. 23
Grand Rapids, MI	Mar. 1
Memphis, TN	Mar. 7
New York, NY	Mar. 7
Birmingham, AL	Mar. 9
Minneapolis, MN	Mar. 15
Buffalo, NY	Mar. 21
Anaheim, CA *	Mar. 21
San Francisco, CA *	Mar. 28
Ottawa, ONT	Mar. 30
Richmond, VA	Apr. 5
Vancouver, BC	Apr. 6
Kansas City, MO	Apr. 11
Piscataway, NJ	Apr. 11
Houston, TX *	Apr. 11
Albuquerque, NM	Apr. 13
Atlanta, GA *	Apr. 18
St. Louis, MO *	Apr. 25
Montreal, QUE	Apr. 25
Salt Lake City, UT	Apr. 27
Toronto, ONT	Apr. 27

Free EDP-Audit Software Seminars

Cities	Dates
Los Angeles, CA	Feb. 21
Washington, DC	Feb. 21
New York, NY	Mar. 7
Birmingham, AL	Mar. 9
Minneapolis, MN	Mar. 15
Anaheim, CA *	Mar. 22
San Francisco, CA *	Mar. 29
Clark, NJ	Apr. 4
Seattle, WA	Apr. 4
Memphis, TN	Apr. 4
Richmond, VA	Apr. 5
New Orleans, LA	Apr. 6
Kansas City, MO	Apr. 11
Denver, CO	Apr. 11
Houston, TX	Apr. 12
Toronto, ONT	Apr. 12
Atlanta, GA *	Apr. 19
Hartford, CT	Apr. 25
Houston, TX	Apr. 25
Idaho Falls, ID	Apr. 25
St. Louis, MO	Apr. 26
Atlanta, GA	Apr. 27

How to register

For further information and registration mail coupon or telephone (617) 237-6600

I plan to attend your _____ IDMS _____ EDP-Audit
seminar in _____ on _____
City Date

Name _____

Co. _____ Title _____

Address _____

City _____ State _____ Zip _____

Tel. () _____ My computer is: _____

Send confirmation to: _____

* These are mini-seminars to be held at the Computer Caravan.



Cullinane Corporation

Wellesley Office Park, 20 William St., Wellesley, Mass. 02181 (617) 237-6600

NECMG to Meet in N.Y.

NEW YORK — The Northeast region Computer Measurement Group (NECMG) will meet here next Monday, Feb. 27, and the program will include a discussion of a data base system for performance measurement data, according to program chairman Jeff Buzen.

Other topics planned for the day-long session include "A User-Oriented Method of Computer Scheduling," "Performance Evaluation at New England Telephone" and presentations on modelling IBM's MVS environment.

There is a \$3 registration fee but no reservations are needed. The meeting will start at 10 a.m. in Conference Room 3 on the main floor at New York Life Insurance Co., 51 Madison Ave., between 27th and 28th St., Buzen noted.

CICS/VS Use Reported, Billed

McLEAN, Va. — The CICS/VS Utilization Monitor and Chargeback System collects data that enables the DP manager to account and bill for all resources used by each CICS/VS application and user, according to the vendor, Johnson Systems, Inc.

The package accumulates data at the transaction, terminal, file and program level. Three data logging options allow the user to control the amount of data collected and with it, the amount of both CICS/VS overhead and off-line reduction time, a spokesman added.

Extensive performance-related data is also recorded, he said, noting that chargebacks can be developed around such measures as connect

time, system and application CPU time, elapsed time and file I/O operations. The system provides the user with a flexible, table-driven mechanism for defining cost centers for CICS/VS billing, the spokesman added.

The cost center definitions equate the user accounting information fields to a combination of transaction, terminal or operator identification fields collected by the system, he said.

The system requires no CICS/VS source code modifications, uses no CICS/VS exits and does not require the user to have any of the IBM-supplied Performance Analyzers, he emphasized.

The product can be used in conjunction with the company's Job Accounting Report System (Jars) to provide a comprehensive system utilization and billing capability, he noted.

The CICS/VS Utilization Monitor and Chargeback System can be used under DOS/VS, Release 31 and beyond, or under OS/VS. The DOS/VS version for Johnson's system costs \$3,500; the OS/VS version is \$4,500, the company said from 8400 Westpark Drive, McLean, Va. 22101.

'Solve' Readies Tandem Logic

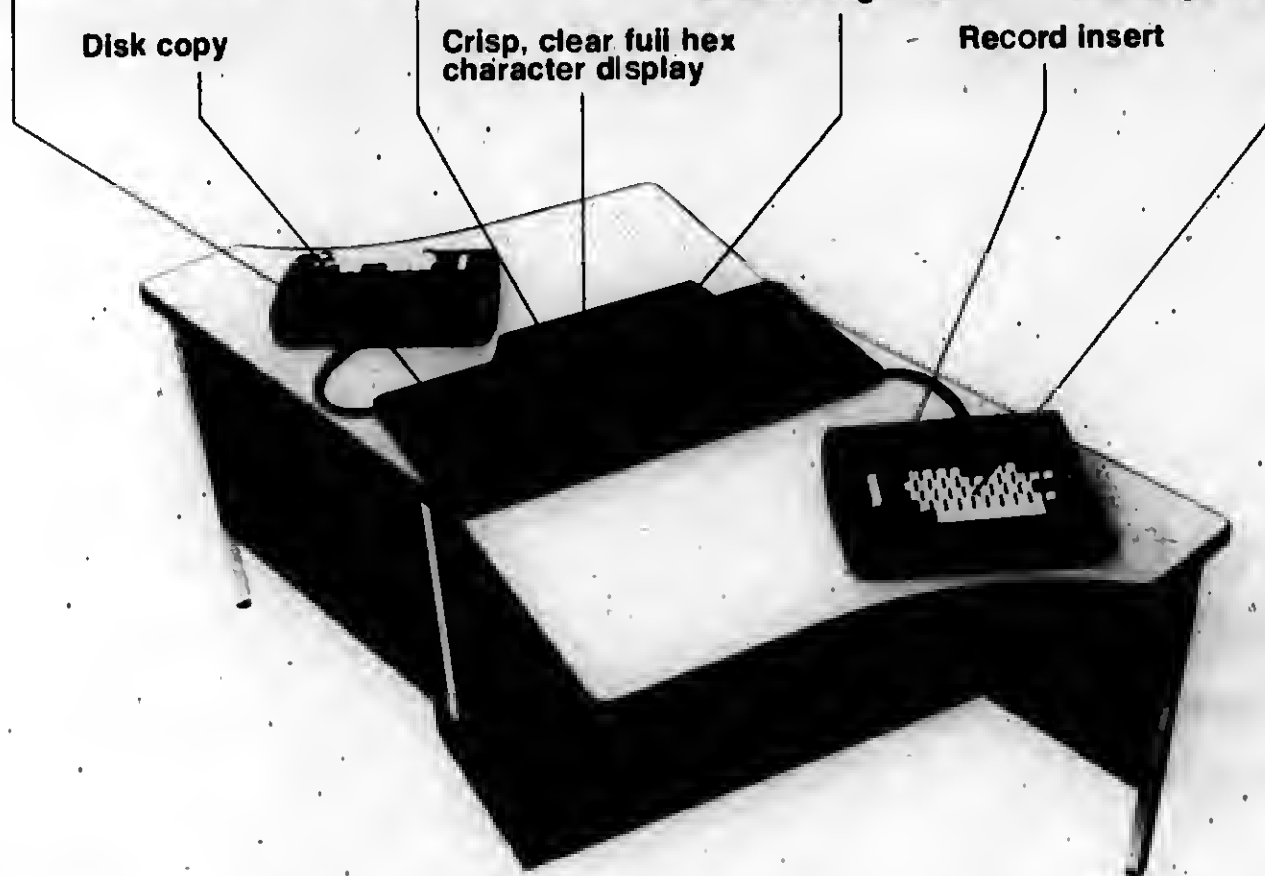
LAGUNA HILLS, Calif. — An interactive application program development language for use with Tandem Computers, Inc. Nonstop 16 configurations, Solve was developed by Systems Optimus. Solve is described as a high-level language that can be learned in a day and is "relatively easy" to debug. The language-processing software functions as a preprocessor for Tandem's Transactional Language (TAL), converting the user's Solve coding into TAL source statements.

Systems Optimus is at 25283 Suite 205, Cabot St., Laguna Hills, Calif. 92653.

New Tab System 700- Best price/performance yet in key to diskette entry!

The New Dual Station 702 Has These Standard Features At No Extra Cost

Four search methods Operator prompting 1 to 128 character variable length record Movable keyboard and large work surface



Additional Exclusive Standard Features Assure Better Performance

- High-speed diskette data searches
- Constants from memory and character insert/delete save keystrokes
- Operator productivity enhanced with six display lines
- Teleprocessing and optional interfaces provide for a wide range of attachments

Tab's System 700 Will Deliver Increased Throughput for your Dollar

The new TAB 700 System, single or dual station, is designed for operator efficiency and maximum data entry throughput. Our movable keyboard allows operators to select their most comfortable and productive positions. The CRT displays up to 240 characters to each operator, thereby allowing prompting and a complete display of the full

128 character record. In addition, the System 700 features extra large display characters for easy viewing and reference. The tabletop provides space for even the largest of source documents.

Exclusive Uninterrupted Data Keying

With 10 program levels and 84 characters of constants per station, the 702 allows each operator uninterrupted data keying. A data record can be located and displayed in less than sixty seconds. Our field-installable options provide the capability of attaching magnetic tape, printers, and our TAB 501 Microprocessor Punch-Verifier.

Whether your needs are distributed or central, local or remote, TAB offers you a complete key-to-diskette system. Want to know more?

Call your Tab representative, or write Tab Products Company, 2690 Hanover Street, Palo Alto, California 94304.

TAB
PRODUCTS CO

WHO'S WHO

In EDP management for the largest US users?
Consult the

1978 DIRECTORY OF TOP COMPUTER EXECUTIVES

All new for 1978

- Geographic organization
- Industry cross reference
- Government now included

Over 5500 senior EDP user executives in:

Manufacturing	Utilities
Banking	Education
Finance	Health Care
Insurance	Federal Govt
Retailing	State Govt
Transportation	Local Govt

Published semi-annually in Spring and Fall.

Single copy - \$75.

Annual Subscription - \$120.

Applied Computer Research
P. O. Box 9280
Phoenix, AZ 85068
(602-944-1589)



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

Expiration Date _____Zip Code _____

information on
Computerworld's Index



- 90 Other

Detach here, fold, and place in post-paid envelope attached through binding.

Thinking About POS? Figure on \$5,283

By Ronald A. Frank
CW Staff

NEW YORK — The average installation cost of a retail point-of-sale system is about \$5,283 per terminal, according to a consultant's report.

Called "POS Implementation," the report was prepared by Touche Ross & Co. for the National Retail Merchants Association (NRMA).

The objectives of a POS terminal project should be more than just a cash register replacement and the process should include a "review of merchandising barriers (real or imaginary) that have grown up as a result of the ... limitations of traditional cash registers," the report said.

The optimum size for a POS project team appears to be about five persons, the researchers suggested, with representa-

tion from systems and programming, store operations, methods and procedures, training and engineering departments.

The first store in a chain to shift to a POS terminal system may require a one-year project; after that, however, a trained POS project team can install POS terminals "in more than five stores per year," the report said.

Overcoming Fear

A retailer planning to install POS terminals should take advantage of experience gained by other such terminal users. Special consideration should be given to training persons who "have trouble adapting to new systems and technology," the study advised.

"Overcoming the sales person's fear of

the equipment is a major goal of any training program," it added.

Success or failure of the POS terminal project rests with the user. "The assumption that the vendor will automatically think of everything is a prime cause of implementation problems," and it is "a common mistake" to assume that if the vendor is a large, technically oriented company, the service personnel will know all the answers.

In addition, none of the vendors of POS terminals "have completely bug-free software," the report said, and this situation is likely to continue.

The study contains a series of forms that can be used by a retailer in developing a POS implementation plan. The NRMA is at 100 W. 31st St., New York, N.Y. 10001.

Shared Costs Called Key

Net Lets Small Banks Support Cards

CAMBRIDGE, Mass. — Credit card processing in New England has been expanded to serve smaller banks because the New England Bankcard Association (Neba) found a way to let those banks share network communications.

As a result of expanded support for terminal-based credit systems, smaller banks can now connect to Neba services and do not have to be left out of credit card services, according to Edward B. Stevens, Neba's president and chief executive officer.

Neba, based here, has 134 member institutions ranging in assets from \$2 billion to \$10 million, with combined assets of \$13 billion. Formed in 1969 by 122 banks to handle credit card processing, the association's operating area includes all the New England states except Connecticut.

The northernmost member is in Presque Isle, Maine. Neba "went dual" in 1976, and 74 members now give merchants the right to deposit both Master Charge and Visa drafts.

Because of Neba's wide geographic area, remote banks found it expensive to pay the communications costs in order to become part of the on-line network. The system is based on an IBM 370/148 and 3600 finance terminal system.

Neba decided to divide total

communications costs among all members so geographic location would not impose a penalty. That action added 26 more members to the network, including banks in Camden and Bar Harbor, Maine.

About 50 member banks are now part of the network, with

over 70% of the credit cardholder file directly accessible on-line at the bank level. Credit card accounting for other members is through conventional off-line batch processing.

The member banks have 28 IBM 3604 terminals installed.
(Continued on Page 26)

CRT Built for 8080 Programmers

PALO ALTO, Calif. — A program development terminal designed to aid programmers who develop test and debug programs written for 8080 microprocessor-based systems has been introduced by Hewlett-Packard Co.

With debug/assembly software that is loaded via tape cartridge into the random-access memory (RAM) of the microprocessor-controlled HP 13290B CRT terminal, a programmer can display and change an 8080 processor's registers and any portion of a user-written program, HP said.

Programs completed on the HP

13290B can be run on HP 2649A controller/terminals to perform user-defined functions in a variety of applications such as controllers in industrial and point-of-sale systems or specialized data entry and retrieval terminals, a spokesman noted.

The RAM boards, available in 8K-, 16K- and 32K-byte sizes, enhance the use of HP 2649A controller/terminals in applications requiring flexibility, the firm said.

The debug/assembly software enables users to find, examine and alter any selected portion of a program; stop execution of a program at a specified point by

setting debug commands to allow examination of all functions executed until then and trace a program by displaying each instruction in mnemonic form on the screen as it is executed.

Debug commands and data can be displayed alternately to avoid confusion, the spokesman said, adding completed programs can be recorded on the terminal's built-in, dual-cartridge tape drives or on a variety of output devices including several HP printers.

The HP 13290B is priced at \$6,950. HP is at 1507 Page Mill Road, Palo Alto, Calif. 94304.

COMMUNICATIONS

modems

save up to 50% over Bell modems
with stand alone . . .

☐ Series 302F,D

300 baud asynchronous, 13 models.
Dial-up or private line, auto-answer.
Simultaneous EIA/20ma interface.



\$245 - \$345

☐ 212

Data rate to 1200 baud.
Originate/auto-answer.
Remote or local loopback.
Synch or asynch operation.
FDX operation on unconditioned lines.



\$750

or rack mount . . .

☐ Series 330

Up to 48 modems and DAA's in single cabinet.
Up to 16 modems in 19" rack.
Each modem provides:
Integral power supply.
Multicolored display of 4 control and 2 data functions.
Auto-answer.



cabinet	\$465
private line 300 baud	\$150
auto-answer 300 baud	\$170
private line 1200 baud	\$205
auto-answer 1200 baud	\$225

☐ Acoustic couplers ☐ High speed modems ☐ Data access arrangements

Check modems of interest and return to us for additional information

COMDATA

8115 Monticello
Skokie, IL 60076
312/677-3900

New York
212/267-3696

Los Angeles
213/624-0550

name _____
company _____
street _____
city _____ state _____ zip _____
telephone _____ ext. _____

INFONATIONAL RUNS FIRST*

*IN DATAMATION'S, 1977 RATINGS



CHECK OUR TRACK RECORD . . .

... **INFONATIONAL'S** General Ledger and Accounts Payable systems finished first in overall satisfaction in the prestigious Datamation/Datapro software package ratings.

INFONATIONAL ran ahead in the 1977 race because our integrated accounting packages —

- are easy to implement and modify
- are supported by professional consultants
- run on most major hardware
- are installed in 600 leading companies

To keep our systems ahead this season, **INFONATIONAL** —

- introduces on-line data entry for all systems
- provides greater throughput & efficiency for G/L
- adds custom report writing for all systems

Choose the winner —

**RUN WITH THE BEST
IN INTEGRATED ACCOUNTING SYSTEMS!
INFONATIONAL**

6626 CONVOY COURT • SAN DIEGO, CA. 92111 • (714) 560-7070

Your data is not interterminalable!

Whether your data is bar-coded, written, fast, slow, continuous or intermittent, there's a terminal that can handle it. And our March 27th Special Report will help you find just the right one for you.

Edited by Ron Frank, *Data Communications Terminals* will focus on the choice and selection of special terminal equipment for specific types of data communications networks, such as point-of-sale or EFTs. It will include topics like these:

- The use of terminals in private line, dial-up and public packet networks.
- General-and special-purpose terminals in dedicated networks.
- Characteristics of terminals that help to improve the man-machine interface and make them easier to use.
- Fitting the terminal to the job instead of making management rearrange itself to fit the equipment.

Whatever kind of data communications you're involved in, you need terminals. So dial up this special report and stay ahead of this rapidly changing field.

If you're marketing terminal products or services, your ad should be there on March 27th. Closing date is March 10th. For more details, contact your *Computerworld* sales representative. Or call Terry Williams at (617)965-5800.



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486

Modem Replaces 101C

PHOENIX — Omnitech Data has introduced the Model 4500 Omni-Datx modem, designed to replace the Bell 101C data set and to operate over the dial-up telephone network at 110 bit/sec.

The principal mode of operation of the unit, which mounts directly into a teletypewriter, is two-wire, half-duplex over the telephone network. It interfaces to the telephone line via a Data Access Arrangement (DAA) type of CBT hard-wire interface and provides full auto-answer capability for un-

attended operation.

Since the model provides power to the CBT, it eliminates the need for a telephone company-supplied power source, Omnitech said. Calls are placed manually via the control panel using the rotary dialer, the firm noted.

Calls can be manually terminated through a control panel switch. The modem will automatically terminate the call if no answer occurs within 10 seconds. Delivery for the unit costs \$625 from Omnitech at 2405 S. 20th St., Phoenix, Ariz. 85034.

Datanet Package Turns DEC Micro Into RJE Unit

EUGENE, Ore. — Datanet, Inc., a communications software and consulting firm, is offering a remote job entry (RJE) package for the Digital Equipment Corp. LSI-11 microcomputer.

The software uses the multileaving protocol to emulate Hasp workstations, according to a spokesman. Standard features reportedly include full support for multiple concurrent I/O streams, automatic data compression and an operator console for job control at the central site.

The Datanet package also includes

enhancements that can accommodate specialized or distributed processing requirements. I/O streams use runtime device-independent data set specifiers, rather than being associated with unit record equipment, the firm said.

Communication can be with other remote workstations as well as central systems, the spokesman noted.

The Hasp-11 software is available in two versions. An object code system costs \$3,500 while the source code costs \$4,500 from Datanet, P.O. Box 30008, Eugene, Ore. 97403.

Banks Get Help With Cards

(Continued from Page 25)

performing their own account inquiries, entering and updating accounts on-line and handling functions such as changes in credit limits.

Another 38 IBM 3604 terminals are used at Neba headquarters for a range of functions beginning with authorizations, which are still handled through Neba for security purposes. About 15,000 authorization calls are handled daily.

These calls rose by 42% in September 1977 compared with the prior year; the rate is expected to increase 50% by the end of the year.

The terminals at Neba also speed master file updates, name/address changes and similar functions for members not on the on-line network. The cardholder data base is about two million, with 500,000 statements mailed monthly.

Neba has a direct line to the Omni switch in New York, linking it to other Master Charge and Visa data bases across the country. A direct line to the Base I Visa authorization center in San Mateo, Calif., has just been implemented, and Neba is working on a direct link to the Interbank National Authorization Switch, which will eliminate the need to go through Omni.

EFT at Work

Stevens noted the on-line network is already addressing the electronic funds transfer (EFT) goals of reducing the mountain of paperwork inherent in purchase-and-sale activities and speeding across to deposited dollars. The \$35 million worth of credit card slips generated in August 1977 left New England in the form of electronic messages; the slips themselves are in Neba's vault.

The potential for further development — automated teller terminals that can work 24 hours a day, seven days a week and terminals in merchant locations — has been established.

Neba also handles 15,000 requests monthly for photocopies of individual transactions. "This means we must have automated retrieval systems as sophisticated in their way as network transactions are on the money side," according to John B. Parker, Neba vice-president.

"In the EFT world, heavy volumes must be handled expeditiously and error-free, or with the ability to correct errors quickly, without setting up consumer obstacles," he added.

Close Estimates

Neba utilized the IBM Network Design Tool to determine the configuration of communications lines and to project initial network costs per terminal. Actual monthly costs were within 5% of the original model.

Other analytical programs help analyze network efficiency and transmission load distribution.

"We have adopted the Systems Network Architecture concept with Synchronous Data Link Control," according to Kenneth G. Longo, Neba vice-president for DP. "This means we will be able to add different terminals as our members need them without escalating costs. Also, the shared-line concept helps hold down current costs."

Neba transmits 25,000 items electronically every day and receives an equivalent volume. Daily monetary transaction journals are prepared for each member bank that lists the deposit activity for each merchant and every transaction for each cardholder.

DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals



Most homeowners today want to keep warm without wasting energy. At MIT, computer simulation has shown that a 24-hour thermostat setting of 63 degrees saves as much fuel as a night setting of 55 degrees.

Fast Answers to Tough Energy Questions

"Suppose the government made major changes in national energy policy," speculates Prof. John J. Donovan of MIT. "What would be the economic impact on each region of the U.S.? How would the economy change if the fuel supply were to be altered? If prices were to change? What effective actions can be taken by homeowners, industry and public policymakers?"

To help provide prompt answers to such questions, the Generalized Management Information System (GMIS) was jointly developed by IBM, MIT Sloan School of Management and the MIT Energy Laboratory. IBM provided staff support and the use of a System/370 Model 158 at its Cambridge Scientific Center. GMIS has been used to analyze conservation strategy in, for example, the consumption of energy for residential heating across the United States. And it has been used to produce programs and a data-base for energy policy analysis in New England. Called the New England Energy Management Information System (NEEMIS), this application was developed through a collaborative effort among MIT, the New England Regional Commission (a Federal-New England states partnership) and IBM.

What can the homeowner do? According to Donovan, an associate professor at the Sloan School: "An econometric model shows that, for a homeowner in the Northeast or upper Midwest, a thermostat setting of 65 degrees (daytime) and 55 at night—or 63 degrees around the clock—will save him 15 per-

cent of his energy costs.

"Other computer models produced using GMIS suggest measures for commercial buildings. For some institutions in the Boston area, these models identified ways to reduce energy costs by 40 percent (of which 20 percent required no capital improvements).

"To answer questions like these," he continues, "the Energy Laboratory has collected data and computer programs from government research, professional and technical groups, and university research efforts. A user can scan the data base interactively to locate and define the needed data and select a suitable modeling system.

"GMIS is a universal bridge to this diverse collection of data. Whatever type of analysis is to be used—a simulation or a regression analysis, for instance—GMIS provides the interface between the required language and the data."

Users with terminals in their offices are now working out solutions interactively. Using programs created under GMIS, engineers in the government of the state of Maine are conducting studies to determine the best use of the money available for energy conservation.

GMIS data has helped the New England region avert a proposed oil tariff by demonstrating its negative economic effects there.

"Sound public and private policymaking and resource management require prompt, accurate information on many such issues," Donovan says. "GMIS is designed expressly as a tool to provide that information."

Farsighted Financial Planning at American Optical

"Eighty percent of our major investment decisions, that's five a day, are evaluated for internal rate of return. On the average, our actual performance is within 10 percent of what we predict."

Marvin M. Eisner, chief financial officer, American Optical Corporation, is talking about a computer based financial simulation model. It uses the IBM Planning System Generator II (PSG II/VS), which is run on the company's System 370/Model 158 and uses a program language oriented to financial planners.

American Optical Corporation, a subsidiary of the Warner-Lambert Company, is the world's largest manufacturer of optical products. Inherent in the business are a wide range of investment opportunities that have vastly different conditions. For example, a line of designer eyeglass frames may have a short selling life and high promotional expenses. A new microscope, however, may incur costly research and development, but have a long selling life.

"We need information that is timely and relevant," says Eisner. "But we take a farsighted look at investment horizons

of 10 years, so we apply discounting to the time value of money.

"R & D is one of our more uncertain investment opportunities. In order to evaluate R & D project feasibility, we work backwards from a desired rate of return, which we call a hurdle, and through a series of iterations determine the maximum allowable capital expenditure."

"To do this, we created a program called Capital Simulation, which gives us a series of project income statements and cash flow reports," says Wayne Krautkramer, manager of financial analysis, optical products division. "Each one reflects a different set of assumptions of capital and its relationship to variables for which we have estimates, such as direct cost, market penetration and selling price."

Fifty percent of finan-

cial modeling at American Optical evaluates capital expenditures, such as new investments in plant and equipment. New ventures and improved products cover 35 percent. The remaining 15 percent is on alternatives such as

buy vs. lease, buy vs. make and budgeting functions.

"We've seen a positive behavioral change in the corporation as a result of using the modeling," Eisner reports.



Teleray 4041B Burroughs-Compatible

MINNEAPOLIS — The Teleray Model 4041B now has Burroughs Corp. TD-830 standard protocol, polling and line discipline compatibility. It will function with Burroughs standard network software, reportedly requiring no modifications.

The terminal is said to be compatible with the Burroughs multipoint polling software (including contention, specific select, specific poll, fast select, broadcast select and group select). Compatibility exists for programmable cursor, cursor control, tabbing, clear functions, line and character insert and delete, inverse and blink fields and program-

mable mode control, the firm said.

Features include two pages of buffer (3,840 characters), a 1,920-char. display, Bell 103/113/202 modem interfaces, full edit typewriter-style keyboard, upper and lower case, 15 function keys and forms (protected data), Teleray said.

The price is \$1,950 purchase and \$81/mo for a one-year lease. A full edit keyboard version, with an expanded keyboard, is available at \$2,195 or \$92/mo.

The Teleray Division of Research, Inc. can be contacted through Box 24064, Minneapolis, Minn. 55424.

TI 770 Terminals Get Price Reduction

HOUSTON — A price reduction on the Series 700 Model 770 intelligent terminal was announced today by Texas Instruments, Inc. The Model 770 is available in two versions: the basic Model 770/1 and the Model 770/2 with built-in thermal printer.

The price of the Model 770/1 was reduced from \$6,400 to \$4,995 and the Model 770/2 was reduced from \$6,500 to

\$6,095.

Maintenance rates on the 770 were also reduced. On an annual basis, the rate is down over 14% for both models of the 770: from \$68 to \$58/mo for the 770/1 and from \$83 to \$71/mo for the 770/2. The monthly rate for the 770/1 was dropped from \$72 to \$64 and that for the 770/2 from \$87 to \$78.

Terminal Transactions

In addition, lease rates for the Model 770 were reduced across the board. On the 770/1, the 90-day rate was reduced from \$280- to \$270/mo, the one-year rate from \$220- to \$210/mo, the three-year rate from \$200- to \$190/mo and the five-year rate from \$185- to \$175/mo.

Changes in lease rates for the 770/2 were from \$390- to \$378/mo for the 90-day lease; from \$300- to \$288/mo for the one-year lease; from \$265- to \$253/mo for a three-year lease; and from \$250- to \$238/mo for a five-year lease.

The new Model 770 prices and maintenance rates went into effect Feb. 1 for both new orders and unshipped backlog.

Ti can be reached through Box 1444, M/S 784, Houston, Texas 77001.

Book Discusses Smart Terminals

WELLESLEY, Mass. — Q.E.D. Information Sciences, Inc. has published a 320-page book entitled *Intelligent Terminals: Functions, Specifications and Applications*.

Written by George B. Bernstein, R&D Program Manager for Information Systems, Naval Supply Systems Command, and Arnold S. Kashar, president of Technogenics Group, Inc., the book describes the functions, specifications and major applications of intelligent terminals.

The book costs \$28.50 (\$24.50 prepaid), plus \$1.50 for postage and handling, from Q.E.D. Information Sciences, Inc., Box 181, 141 Linden St., Wellesley, Mass. 02181.



SMIDLEY! AREN'T YOU TAKING DR. CHAPIN'S WORKSHOP TOO SERIOUSLY?

Mr. President. There are four good reasons your programmers and analysts should attend Ned Chapin's new 1978 workshop on Advanced Structured Techniques. You can gain from:

1. Lower cost and easier maintenance.
2. Fewer bugs in software.
3. Reduced cost overruns and schedule slippage.
4. Improved personnel productivity.

Superior new techniques in practical ready-to-use form are available now to help you enhance gains from the structured approach. A second workshop developed by Dr. Chapin shows how to reduce software complexity.

Advanced Structured Techniques Shows ways to improve the gains from using structured design and structured programming techniques, and concentrates on those advanced techniques that are most powerful. This workshop is open only to persons with training or experience in either structured design or structured programming.

Reducing Software Complexity Shows ways to measure software complexity in objective quantitative terms, and what to do to reduce software complexity. Techniques help in design, implementation, and maintenance. Improve even structured designs and programs.

Dates and Places
Advanced Structured Techniques (\$450.)

- ☐ April 3-4 in Washington D.C.
- ☐ May 1-2 in San Francisco

Reducing Software Complexity (\$450.)

- ☐ April 5-6 in Washington D.C.
- ☐ May 3-4 in San Francisco

Instruction

Dr. Ned Chapin,
Data Processing
Consultant.

Information and Registration

For course outlines and descriptions, for hotel and other information, call "Susan" (415) 854-1567, or return this coupon now to:

INFOSCI INC.

InfoSci Inc.
Practical training since 1965
Box 7117, Menlo Park, CA 94025

Please send complete information on Washington D.C. and San Francisco workshops.

- ☐ Advanced Structured Techniques
- ☐ Reducing Software Complexity

Would like more information on other courses you offer.

- ☐ Structured Programming
- ☐ Structured Design
- ☐ Have your consultant call.
- ☐ Send brochure.

Name _____

Position _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

**DECwriter II's & III's
For Sale**
•LA36
•LS120

BEST PRICE
FAST DELIVERY

CALL TOLL FREE 800-323-2288
IN ILL. CALL 312-279-1960

Data Equipment Group

ICE, INC.

772 N. Church Rd.
Elmhurst, Ill. 60120

RJE Software Links HP 3000-II to 360s, 370s

PALO ALTO, Calif. — Distributed networks of HP 3000 Series II small business systems can now use multileaving remote job entry (RJE) software to interface to IBM 360/370 mainframes, according to an HP spokesman.

The software offering, called MRJE/3000, "will enhance our array of software products" including the Image data base management package with its interactive Query facility and the transparent intersystem communications capability, DS/3000, he said.

Users reportedly can submit jobs to and retrieve job output from IBM 360/370-compatible host systems that use Hasp II or JES2 job entry subsystems. With HP's DS/3000 networking product, individuals on both local and remote HP 3000 systems can be serviced at the same time through a single MRJE/3000 site.

Any or all HP 3000 terminals can be used to automatically queue jobs for transmission, whether or not the HP 3000 workstation is actively connected to the remote IBM host, HP said.

Vardon Offering Teletype 43 Unit

IRVING, Texas — The Model 43 teleprinter from Teletype Corp. has been added to the Vardon & Associates, Inc. line of communication equipment. Equipped with special features, the Model 43 is available from Vardon for \$67.50/mo rental or \$1,295 purchase price. These prices include a Vardon-styled "VS" stand and "VCH" copy holder keyed to complement the Model 43 cabinet, a spokesman said.

Vardon is also offering 20/60 mil and EIA interfaces for the Model 43 and plans future offerings including tabbing, forms control, selective calling and TWX/Telex capabilities.

The Model 43 delivers a 30 char./sec print speed and upper/lower case printing with up to 132 char./line on 11-in. fanfold paper.

The terminal is operator-selectable to send or receive at 10- or 30 char./sec; it also provides half- or full-duplex mode selection.

Vardon & Associates is at 930 N. Beltline Road, Irving, Texas 75061.

MRJE/3000 commands were designed for those unfamiliar with computers, but they provide "full power and flexibility to the experienced user," according to HP. Individuals can simultaneously share common JCL files for program preparation and submission.

Jobs can be submitted from any HP 3000 input device or file with output directed to one or more user selected output devices or files, the firm said.

The user can submit a job, display its status, cancel it or receive the output from the HP 3000 workstation without needing to know IBM-compatible host commands. It is also possible to monitor host activity, since MRJE/3000 recognizes and transmits Hasp II and JES2 console commands.

Although not required for system operation, any HP 3000 terminal may be used in the Hasp or JES console mode, the spokesman noted.

MRJE/3000 can be operated in a full HP 3000 multiprogramming environment. As many as seven job input streams, seven print streams, seven punch streams and one interactive Hasp or JES console stream can be interleaved on the same communications line, he said.

With the software, a single HP 3000 can simultaneously communicate with multiple IBM 360/370-compatible hosts at rates up to 9,600 bit/sec per line. Multiple lines can also be connected between one HP 3000 and a single host.

The initial fee for MRJE/3000 is \$2,000 and the monthly software fee is \$75. HP is at 1507 Page Mill Road, Palo Alto, Calif. 94304.

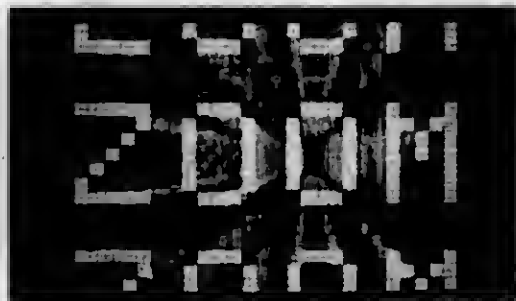
Even expensive models get tongue-tied when it comes to alphanumerics. But now there's a bright new graphics terminal that has a lot to say for itself.

Most graphics terminals are too dumb for words.

Even expensive models get tongue-tied when it comes to alphanumerics. But now there's a bright new graphics terminal that has a lot to say for itself.

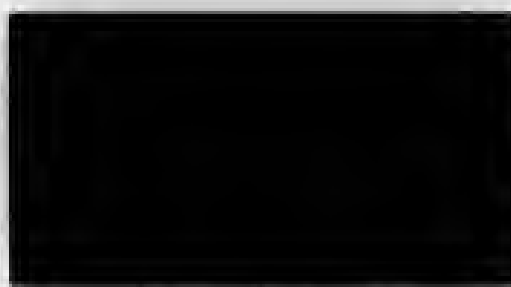
Alpha-graphics: the perfect combination.

It's the Hewlett-Packard 2648A alpha-graphics terminal. For just \$5500*, it will dazzle you with a



virtuoso display. You'll see zoom and pan, area shading, pattern definition, rubber band line, scientific plotting and graphics text composition. Having independent memories for graphics and alphanumerics, you can do auto-plots with or without words and figures on the screen.

And when you need a smart alphanumeric terminal for on or off-line work, stay right where you are.



How smart is smart?

Ever seen a graphics terminal scroll 200 lines of interactive dialogue? And store up to 220K bytes of data (words and pictures) on twin cartridges? And cut out repetitive routines by storing up to 80 characters on each of eight "soft keys"?

The HP 2648A can also edit with the best of them. Communicate with a computer at rates up to 9600

baud. And accept a plug-in forms drawing mode to generate just about any form your company uses.



Strong as well as intelligent.

Like all our terminals, the HP 2648A has a clean, tough, modular design. Open it up like a suitcase, and you'll see the neat row of plug-in PC boards.

That makes it easy to add options or take care of maintenance. Not that downtime is a problem. Our terminals have such a good track record that we've lowered our maintenance price three times in the past two years. When you do need service, more than 1000 Systems and Customer Engineers worldwide are ready to take care of you. So why settle for any dumb graphics terminal when ours can figure in your picture? See for yourself by calling the Hewlett-Packard office listed in the White Pages. Or send us the coupon and give our 2648A alpha-graphics terminal a screen test.



Yes, give me the good words (and pictures) on the HP 2648A terminal.

☐ I'd like a demonstration. ☐ Send me information.

Name _____ Title _____
Company _____
Address _____
City/State/Zip _____
Phone _____

Mail to: Ed Hayes, Marketing Manager,
Hewlett-Packard Data Terminals Division,
19400 Homestead Road, Dept. 314, Cupertino, CA 95014.

*U.S. domestic price

HEWLETT  PACKARD

42801HPT5



(402) 392-2606

VOLUME DATA ENTRY SERVICES...

TAPE OR CARDS

"QUALITY AT A LOWER COST"

AMERICAN KEYDATA

Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

ENHANCING IS OUR

H-P 3000 USERS: ONE BIG TELEFILE DISK DRIVE DOES THE WORK OF FIVE SMALL ONES.

The Hewlett-Packard 3000 is so powerful that people have trouble positioning it.

Is it a mainframe or a mini?

It's sold against other minis, with little disk drives. But talk to the users—especially those who have come to Telefile for big disk system enhancements.

They think of their H-P 3000's as mainframes.

One 300-megabyte Matchmaker drive does the work of five little ones from H-P, therefore uses about one-fifth the floor space. Less power and fewer spares are needed.

At comparable low storage capacities, Telefile systems cost less than half that of H-P. But as needs grow, the savings increase dramatically:

A Telefile four-300MB-drive system is priced at \$82,500. It would take 18 drives, a very large room, and a check for \$240,000 to get that same capacity from H-P. Your direct savings: \$157,500!

And that's not considering real estate. Or the dramatic performance advantages our users claim through Telefile's "virtual transparency"—proprietary software drivers that bring additional power without disturbing any H-P systems software or user application software.

There are several advantages: First, no operator retraining or surprises. Second, enhanced performance (our growing user base claims significant improvements). And third, easy adaptation to future system changes.

A copy of our white paper on virtual transparency will bring you up to speed on the subject. Write for it.

And speaking of speed... we can now back up your 300MB disks with the latest in high density 1600/6250 bpi tape drives. It's all part of our new Matchmaker I—mass storage systems that match virtually any minicomputer to the latest disk and tape drives.



REMEMBER THE OLD SIGMA 5'S, 6'S & 7'S? THEY ARE NO LONGER LIMITED BY MEMORY.

Sigma machines are classic cases of what Telefile does when it sets out to enhance computers.

All three computers—designed by Palevsky's whiz kids at SDS—handle scientific problems with ease. Now, thanks to work done by Telefile, they're far more powerful than either SDS or Xerox ever intended.

Take the Sigma 5.

First, we designed and built a special memory map that lets users take advantage of CP-V and CP-R operating systems—still deemed the best in the world by Datapro survey.

When an Ohio user brought up their mapped Sigma 5 under CP-R, they found that it actually outperformed an adjacent, supposedly more powerful Sigma 7!

Originally, all three Sigma machines were saddled with a memory capacity of 128K words.

No longer.

Telefile now offers users of these computers a remarkable upward growth path without changing CPU's. It's a simple modification that allows memory capacity of Sigma 5's to grow to 512K words. Sigma 6's and 7's can grow all the way to 1024K words. That's a four-to-eight-fold improvement!

Further reason why Xerox users look to Telefile to bring a longer, fuller life to their computers.



Telefile

Telefile Computer Products, Inc.,
17131 Daimler St., Irvine, CA 92714, 714/557-6660

COMPUTERS BUSINESS.

FILLING THE UNIVAC-UUM. TELEFILE MEMORY BOOSTS 1108 SYSTEM THROUGHPUT BY OVER 25%.

When Telefile announced compatible, multi-modular core memory for Univac computers last year, we knew that it took only one-third the floor space, used 70 percent less power and cost only about half of that it would replace.

But it took an installation of nearly half a million words before the first real performance results came in.

They showed an overall system throughput improvement of some 30 percent!

Part of this was due to reduced access time from 1500 nanoseconds to 750 nanoseconds compared to the older Univac memory it replaced.

The rest was due to Telefile's interleaving capability between memory increments which effectively redoubled the speed of memory operation.

And that's not all. Service technicians claim that Telefile's modular system design drastically cuts maintenance time. Faults can be easily pinpointed and memory subassemblies quickly replaced.

Telefile currently offers both multi-modular memory for Univac 494, 1106, 1108 and 1110 processors; and unitized memory for 1100, 1100/40 and 1106 processors.

And coming down the line is the most flexible mass storage facility Univac users have ever seen.

Enhancing an already great computer is what we do best.



TELEFILE FILLS XEROX VOID. INTRODUCES OVER 20 NEW PRODUCTS SINCE BLACK MONDAY.



For Xerox users, Black Monday was July 21, 1975.

It was the day Xerox announced its withdrawal from the main-frame computer business.

Users were left with great computers, an investment in the world's best software, and an uncertain future.

At the time, Telefile announced to the world that it was prepared to "fill the void" with new hardware, software support,

complete system maintenance—even total new computer systems.

Since then, Telefile has nearly tripled in size by rolling up our sleeves and rolling out the products.

To an existing array of eight Xerox-compatible products we added over 20 more.

Compact main memory, high speed printers, communication processors, solid state RAD's, array processors, Winchester-based mass store facilities, state-of-the-art consoles. And on and on.

Most represent powerful performance and cost advantages over the Xerox units they replace. All are available.

And now Telefile is taking the next logical step:

We're going right to the heart of the system by introducing—in 1978—a complete family of 32-bit computers designed to run all Xerox user software. Some models will outperform the fastest Sigma 9 four to one. That's computer enhancement.

Please send me information as follows:

☐ Telefile . . . and the Computer Enhancement Industry ☐ Virtual Transparency White Paper ☐ Matchmaker Disk Pack Drives ☐ Matchmaker Mass Storage Systems for the H-P 3000 ☐ Main Memory for Univac Computers ☐ Enhanced Computers from Telefile ☐ Telefile's Xerox-Compatible Products ☐ Matchmaker Disk Systems for _____ minicomputer.

Name _____

Co./Inst. _____

Address _____

City _____ State _____ Zip _____



A COMMERCIAL WITH NO PROGRAM INTERRUPTIONS.

The Data General CS/40 Commercial Systems. They speed up program development using ANSI '74 COBOL and unique screen handling extensions. And these interactive small business systems can be enhanced without redesigning original programs. So CS/40 systems keep saving you time and money.

CS/40 systems, with multiple interactive terminals, put data processing power right in the hands of the people who need it. When they need it.

CS/40 systems won't interrupt your growth. Adding hardware such as larger discs or more terminals, or changing to other models, need not affect application design structure or programming.

CS/40 systems. The best way to minimize the application development investment. And the best commercial for a business system supplier's sales. For more information, call (617) 366-8911, Ext. 4735, or write.

 **Data General**
We make computers that make sense.

Data General Corporation, Westboro, MA 01581, (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61 rue de Courcelles, Paris, France, 766.51.78.
Data General Australia, (03) 82-1361. Data General Ltda., Sao Paulo, Brazil. © Data General Corporation, 1977.

IRS Planning to Relieve Overtaxed Print Operation

By Frank Vaughan
CW Staff

WASHINGTON — The Internal Revenue Service (IRS) is planning to relieve its overtaxed production printing operation by using 13 nonimpact page printing systems (PPS), to be installed here and at 11 IRS ser-

Tax Returns Checked Out

WASHINGTON — The IRS has outlined the general procedure by which taxpayers will receive notices that will be printed by the page printing systems it recently ordered from Honeywell Information Systems, Inc.

Under the procedure, transcription operators will transcribe from the machine into the DP system at the various IRS service centers. A math verification is made on the data in a manner similar to that an adding machine would perform.

Following the math verifications, several hundred consistency checks are performed, and at this point, a return is likely to "fall out," meaning that something is incorrect. Such an error could have been made either by the taxpayer or in the transcription, an IRS spokesman said.

After a return "falls out," it is output onto an error register. Someone examines both the return and the error register and codes the error either as a transcription error or as a taxpayer error.

"If the error is due to transcription, we correct it. If it is a taxpayer error, that taxpayer will get a notice," the spokesman explained.

vice centers around the country.

"They will be able to pick up 80% to 85% of the print workload at the service centers, according to an IRS spokesman. "The only thing that they won't be able to pick up, at first, is our notice printing — that is, the notices that go to the taxpayers."

The systems from Honeywell Information Systems, Inc. will replace HIS and Data-products Corp. printers. "Generally, we are not retaining the old hardware, but we will be keeping some for the taxpayer notice printing until the page printing systems pick up that load," he noted.

"We produce formatted print tapes from various systems," he said, adding, "a lot of these print tapes are generated in Martinsburg (W. Va.) on IBM 360s and 370s and then are sent to the service centers for printing."

Those "various systems" include Control Data Corp. 3500s, HIS 2050As and H200s and General Electric 4020s in addition to the IBM 360s and 370s.

The formatting is done by the CPUs before the data is spooled onto the tapes, he noted. Both 7- and 9-track tapes are being used, with recording densities of both 800- and 1,600 bit/in., he added, noting that the primary recording density is 1,600 bit/in.

"We developed our own format and we have a simple little program that can print these print tapes. So when the system is delivered, it will be able to pick up everything that is formatted in our 'Quartet' format," he explained.

There were no unusual difficulties in getting the different CPUs to format in Quartet. It was "business as usual," he remarked, adding that prospective suppliers of the PPS all had to benchmark (read and process) these tapes as part of the evaluation process.

The systems will eventually pick up the taxpayer notice printing, he noted. "It will take some development — about one year —



It's that time of year again.

but it shouldn't be very difficult to do since the PPS is programmable and the contract calls for HIS to give us 24 months of systems analysis help, so it should be simple enough to do."

During that evaluation process, the IRS sized the ability of the PPSs to handle the production print load. Based on a two-shift, seven-day operation, the systems will be used to some 70% of capacity. With the inclusion of notice printing, the systems should be taxed to 80% of capacity. To accommodate future growth in printing requirements, the systems will be upgraded from 12,000 line/min to 18,000 line/min.

The IRS estimates the PPS will print between 200 million and 300 million pages of reports, notices and forms annually.

Doing the Job

Gathering data at its source can be a difficult, or at least challenging undertaking. If you have faced the challenge and feel like telling your story, *Computerworld* would like to hear it.

"Source Data Entry — Getting the Job Done" will be the theme of CW's special report for April.

Are you scanning in your operation? How about using shop floor data collection techniques? Perhaps you have "distributed" your data entry operation into user departments? If you have tried any of these approaches — or maybe something different — perhaps you would be interested in writing up your own "case history."

Simply send us about four typewritten, double-spaced pages, describing what you did, what you are doing now, what equipment you have and how your technique has been working. Send the 1,000-word article to Frank Vaughan, c/o *Computerworld*, 797 Washington St., Newton, Mass. 02160 before March 15, or call Frank at (617) 965-5800 and discuss your ideas for the article.

NCR Cuts Prices on Scanners

DAYTON — NCR Corp. has lowered prices on supermarket scanning modules by 20% and introduced software packages for linking a number of supermarkets together and analyzing the information fed into the data network, the firm said.

Under the new pricing, scanning modules used in each checkout lane will sell for \$3,995, down from the former \$4,995. The price reduction is the result of "advances in technology and manufacturing cost improvements as production volume has increased," a spokesman claimed.

The software introduced by the firm han-

dles communications between an N-8359 system and NCR 255 checkout systems at the store level. Also included are programs that analyze the data and produce reports for regional and corporate-level managers, the firm stated.

A basic N-8359 communications processor with associated peripherals sells for \$81,775. Monthly rental under a five-year lease is \$2,033/mo. The software for communications and reports will be released for sale in the second quarter, the spokesman said from the firm's headquarters in Dayton, Ohio.

SYSTEMS & PERIPHERALS

FIGHT TERMINAL INFLATION

- Low Rates
 - Fast Delivery
 - 1 to 3 Year Rent/Lease Plans
 - No Automatic Renewals on Any Rental or Lease
 - Choice of Rent/Lease/Purchase Agreements
 - Mix and Match Master
- AND OF COURSE
All Rentals and Leases Include
Complete On-Site Maintenance

BEEHIVE B-100
UPPER/LOWER CASE
ADDRESSABLE CURSOR

\$995

WHY PAY MORE?

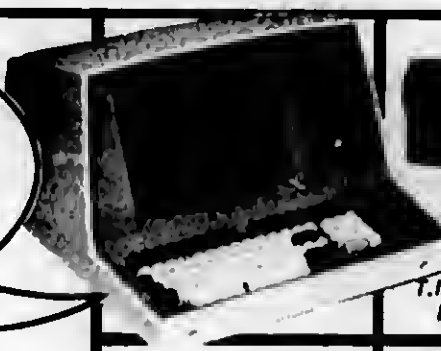


**NATIONAL
COMPUTER**
Communications Corp.

The Greatest Name in Terminals

Call **800-243-9006** TOLL FREE.

CONN 203-325-3831 NEW YORK 212-354-8000
BOSTON 617-235-7055 NEW JERSEY 201-788-4882



T.I. 745/743/733/765
Bubble Memory

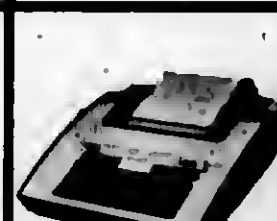
National Computer
1050 Reader Punch
1050 NC
for Numeric Control

NEW

NCC LA-36 ASR



Lear Siegler
ADM 1A/2/3A/400



Teletype TTY 43



Diablo 1620/1640
IBM 2741



DEC LA-36/LS-120
LA-180/VT-52

Techtran Cassette Drives
815/8410/8400/8420/8421

Data Entry, Communications Setup DP Service Caters to Heavy Equipment Dealers

DENVER — A nationwide service bureau has made a narrow market area into a significant part of its client base through the use of a data entry and communications system.

E.B.S. Data Processing, Inc. is a large service bureau with major offices in six cities. Those offices provide batch processing and software support to clients in business, industry and the professions.

The firm claims to have been the first service bureau to offer comprehensive business DP service to heavy construction equipment dealers throughout the country. Eighty-five percent of the total workload at E.B.S.'s facility here involves that same group of clients.

More than 175 heavy equipment dealers — independent distributors for manufacturers such as Caterpillar, International Harvester, Euclid, Case, John Deere and others — have E.B.S.

Data Entry Dimensions

handle their inventory, accounting and related management reporting functions each week. The firm provides service to approximately 350 to 400 branch operations as well as to the main offices of its clients.

"In the mid-'60s, we were one of the first service centers in the U.S. to use Mohawk Data Sciences Corp. (MDS) data recorders for local data capture. As the technology grew, we and our clients grew with it. The availability of increasingly efficient and sophisticated data entry and communications systems literally made it possible for us to do business out of town," Don Penwell, vice-president of E.B.S., noted.

"Our MDS equipment allows us to serve a large enough number of clients within a specific but geographically scattered market area to make that service practical, both from our standpoint and the clients," Penwell added.

ed.

E.B.S. accomplishes 24-hour turnaround from the time data is received for processing on the Denver center's 750K IBM 360/65 to either the mailing of printed documents or return transmission to clients via the MDS systems.

The initial MDS configuration in Denver includes an MDS System 2400 key-to-disk system with a 64K-byte processor; 16 data entry keystations; an MDS Model 2478 disk drive with a disk storage capacity of 254 formats and 4,000 batches (150,000 records); a Model 2437 9-track, 800 bit/in. magnetic tape drive; and a Model 1310A 100 char./sec printer. The 2400 is used during two shifts for concurrent data entry and communications.

By May 1976, the heavy communications volume prompted E.B.S. to implement an MDS System 2400 with a Model 2437 tape drive. This System 2400 is used solely for communications.

Communication between those MDS systems and client locations can take place at 1,200-, 1,800-, 2,400-, 3,600- or 4,800 bit/sec — whatever transmission rate is required by the client, Penwell claimed.

Most dealers have on-site MDS Series 6400 data recorders, either owned outright or leased from E.B.S., which are used to enter and verify data on magnetic tape for transmission to either one of Denver's two System 2400s. Other dealers have their own key-to-disk equipment and/or peripherals.

One large-volume Salt Lake City dealer, for example, uses an MDS 2400 with four keystations, which is linked directly to the 2400 at E.B.S. Another dealer in Birmingham, Ala., has linked two MDS printers to his 6403 data recorders in order to print out E.B.S.-processed documents such as invoices, statements and inventory control reports.

Yet other dealers have a variety of computer equipment, a fact of life Penwell characterized as "... potentially chaotic if it weren't for the fact that the MDS System 2400 software includes communications protocol emulators for a variety of different vendors' equipment."

15-Year Evolution

Penwell described the system's development. "The distributed data entry and communications system we use now has actually been evolving over the last 15 years. Originally, our dealer clients mailed cards to us that had been keypunched on IBM 029s. Then, a little over 10 years ago, we went to MDS Series 1103 data recorders with communications capabilities and encouraged our clients to do the same.

"We got better data, faster turnaround and eliminated the risk of losing data in the mails. Further, each client had his own tape backup. Today, 80% to 85% of the E.B.S. clients among the heavy equipment dealers have either MDS data recorders or key-to-disk systems," he said.

The gradual upgrading of MDS equipment, both in the central processing center and in the field has also

(Continued on Page 37)

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.

NCR
Varian Graphics
Informatics
National Semiconductor
Data Rentals
Communication News
McCormack & Dodge
Data Rentals
Computer Sales International
Intel
Electronic Ventures
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing
S.E.A.
Tri-Data
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems
Shasta
Mostek
DIVA
SBC Magazine
Tele-dynamics

Control Data
Honeywell
Printronic
Codex
Lear Siegler
E.M.&M.
The Morley Company
Vanier Graphics
Total Typography
Wang Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Infotex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Informer
Computer Decisions
Infosystems
T-Bar
Corporate Systems
Dynatech

IBM
General Computer
Atlantic Research
Telefile Computer Products
General Electric
Qume
Moore Business Forms
DataMedia
Texas Instruments
Computerworld
NCI
Deltak
Kodak
BASF
Western Union
Anderson Jacobson
Computer Input Services
Paradyne
ComData
Genesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service

Ille Corporation
Peripheral Products
Applied Digital Data
Epic Data
Sykes Datatronics
Cummins Allison
American Microprocessor
International Data Corp.
Programs, Inc.
Beehive International
Interlec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini-Computer Systems
Tandem Computer
PCC/Pertec
Computrend
Extel
Mentel
Sycor
Digitronics
Computer Services
Dalamar
Courier Terminals
Trac/Hughes & Bomac
Modems Plus
Software Design
Curtis 1000
Spectron
K&K Associates

Sperry Univac
Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathematica
Rianda Electronics
Computer Corp of America
AT&T
Cullinane
Hewlett Packard
Pansophic Systems
General DataComm Industries
Continental Peripherals
Computer Associates
Qanter
Diablo Systems
Marketech
Racal-Milgo
Data Systems Specialists
Key Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
McGunn Safe
Allstate Computer
H/G Professional Forms
Nichols & Company
Datapro

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

For complete information on how the 1978 Computer Expo can work for you, use the coupon below or call Kim Wichert, toll free 800-225-4242. In Massachusetts, (617) 964-4550 (collect).



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
☐ Have Sales Representative call me
☐ Send Reservation Agreement
☐ Send Copy of 1977 Attendee Analysis

- | | | |
|--|---------------|---------------|
| ☐ Southern California Computer Expo | Anaheim/LA | March 21-23 |
| ☐ Northwest Computer Expo | San Francisco | March 28-30 |
| ☐ Southwestern Computer Expo | Houston | April 11-13 |
| ☐ Southeastern Computer Expo | Atlanta | April 18-20 |
| ☐ Gateway Computer Expo | St. Louis | April 25-27 |
| ☐ Midwestern Computer Expo | Chicago | May 2-4 |
| ☐ Mid-Atlantic Computer Expo | New York | May 9-11 |
| ☐ Great Lakes Computer Expo | Detroit | May 23-25 |
| ☐ New England Computer Expo | Boston | May 30-June 1 |

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (_____) _____

"I can give you ten reasons why our OMEGA 480 is the better business decision."



Donald E. Roepke, Group Vice President
Peripheral Systems, Control Data Corporation

First of all, there's the *price*. Our OMEGA 480-1 has greater *throughput* than a 370/138—yet it costs about the same. And our 480-11 exceeds 370/148 performance but costs substantially less!

And an OMEGA 480 system requires about one quarter the *power* and one half the *floor space* of the comparable 370.

Of course we designed it to be *field-upgradable*. That means you can start with the smaller OMEGA 480-1 now, and upgrade to the larger processor when your needs require the higher performance.

And there's software. OMEGA 480 supports, without modification, most IBM operating systems, program products and user programs.

Financing can be important, too. Several attractive options are available through our *Installment Sales Plan* or from a selection of 3- to 7-year *leases*.

But most importantly is the *service, experience and support* you want. You

get it from Control Data. Our support organizations have more than 8,000 dedicated hardware and software specialists—including many with years of IBM system experience.

That experience comes from servicing more than 1,400 current IBM users, and maintaining such Control Data plug-compatible peripherals as Disk, Tape, Memory, Printer and Mass Storage Systems.

Why not decide for yourself whether the OMEGA 480 is the better business decision for you. Call 612/853-7600. Or contact your local Control Data representative. Tell him Don Roepke sent you.

 CONTROL DATA
CORPORATION

More than a computer company

Big Savings Seen Likely Via 6,250 Bit/In. Code

WOODLAND HILLS, Calif. — Users of magnetic tape for archival data storage can save thousands of dollars by implementing 6,250 bit/in. coding, according to a spokesman from Pertec Computer Corp. here.

"Newer tape drives with formatters that can encode at 6,250 bit/in. reduce tape usage by a factor of four over conventional 1,600 bit/in. drives. The savings for organizations doing tasks that generate thousands of reels of data each week — such as geophysical research — could amount to tens of thousands of dollars," according to Ralph Gabai, vice-president of Pertec.

"This is especially true when the enormous requirements for storage and tape maintenance are taken into account over and above the fact that higher data transfer rates can be accommodated," Gabai said.

In the operational area, 6,250 bit/in. recording increases the rate of transferring data to or from the tape by the same factor of four associated with the density increase at a given speed. "This transfer speed improvement can be especially significant in applications where huge amounts of data must be collected and then analyzed quickly.

Data Devices Has Tape Cleaner

WOODLAND HILLS, Calif. — Data Devices International has introduced a magnetic tape cleaner that incorporates two self-sharpening cleaning blades, providing four separate cleaning phases during each cycle.

The Dual 200 features LED footage counter, a straight-line tape loading path, an automatic packer arm system and a vacuum collector system that prevents deposits by removing oxide and debris from the cleaning area, the firm noted.

The unit sells for \$3,495 from Data Devices International, 6301 De Soto Ave., Woodland Hills, Calif. 91367.

"High-performance tape drives operating at a speed of 125 in./sec can improve throughput. Obviously, when data is recorded more densely, more is transferred as it passes the read/write head," Gabai pointed out.

"A good example is the new body scanners used in medical diagnosis," he continued. "Hundreds of thousands of data points are recorded on tape to represent a cross-

section of the human body. These are then analyzed by computer and recorded in various patterns to assist the diagnosis. Analysis can be greatly accelerated by the higher recording density on the magnetic tape."

Newer 6,250 bit/in. recording also offers inherently better reliability in reading recorded data accurately, even when the tape is damaged, Gabai claimed. "To achieve

6,250 bit/in. recording, it has been necessary for tape drive manufacturers to implement both high precision in the recording format and procedures in the write/read electronics that ensure accurate reconstruction of missing data bits. For example, with conventional phase encode or 1,600 bit/in recording, data checking procedures permit the reading of correct data when one data bit in a nine-bit

segment is missing. In 6,250 bit/in. tape drives, two bits in nine can be missing and the read electronics will detect and self correct the data."

Gabai pointed out that the American National Standards Institute (Ansi) is proposing the recording density as a standard. This should provide users with assurance that their tapes will be compatible with other organizations and computer centers, he added.



Don't buy a 32-bit computer.

Buy a 32-bit computer company!

Buy a 32-bit computer from some computer companies, you get a computer and a handshake. Ten days later, you get an invoice. Sometimes you don't even get the handshake.

Buy a 32-bit Interdata computer system from Perkin-Elmer and you get the most advanced 32-bit computer in the world, the hottest 32-bit software in the industry, and an entire company dedicated to one purpose: making you successful. (You also get an invoice.)

There's no substitute for experience.

When you buy an Interdata com-

puter, you buy the company that pioneered 32-bit minicomputers. We've installed plenty of 32-bit minicomputer systems since 1973. And the experience we've gained, experience our competitors simply don't have, can mean the difference between having your system on-line in a few hours. Or waiting for weeks or months.

Systems that solve problems.

And speaking of systems, we build systems for solving problems. Big problems. Small problems. Big systems. Small systems. For science. Industry. Business. Government.

In every system there is one common element. All the pieces can literally be

plugged together and running jobs the day they arrive, which is a real advantage and a timesaver.

Systems with powerhouse software.

The biggest advantage we have, however, is our software. Software, incidentally, written especially for 32-bit machines, not made over 16-bit stuff.

We have gangbusters software. A full-blown transaction oriented operating system. File management. ITC for transaction processing. Communications packages for distributed processing. And high level languages including FORTRAN, COBOL, and BASIC. All designed to make your

ATTENTION!

If you buy, lease, or operate an IBM 3032, 3033, 370 series, COC 7600 series or other liquid cooled processor contact us.

We have a cooling system for large processors that can save you up to 50% operating costs. It can outperform, and outlast anything on the market. Also it does not take up computer room space.

For further information, call or write:

CONTROLLED ENVIRONMENT CORP.
640 Reynolds Ave.
Kansas City, Kansas 66101
(913) 342-3599

Over ten years experience in computer room environments.

Memorex Has 15M-Byte Add-On for 370/168

SANTA CLARA, Calif. — Memorex Corp. has enhanced its line of add-on memories for IBM 370/168 CPUs. The firm is now offering up to 15M bytes of external storage in a single cabinet, double the main memory currently available from IBM, according to a spokesman.

The increased storage capacity can result in greater system throughput, a spokesman claimed, noting that CPU cycles previously used in page swapping and I/O functions may be recov-

ered.

Memorex's 6368 memory system maintains full compatibility with the IBM 3168 address relocation capabilities, he claimed. In addition, the 6368 extends address relocation capabilities for memory sizes beyond IBM's 8M-byte capacity so that the entire CPU address range may be reconfigured as customer requirements dictate, he said.

The memory is based on 8K MOS random-access memory (RAM) de-

vices, providing 128K bytes per printed circuit board. Chips can be individually replaced, the spokesman noted, eliminating the need to replace a full 128K bytes in the event an error is detected.

The memory is available immediately and 1M byte on a 24-month lease without maintenance costs \$3,417/mo, the spokesman said. Memorex is located at San Tomas at Central Expressway, Santa Clara, Calif. 95052.

EMM Adds Backup Pack

HAWTHORNE, Calif. — Electronic Memories and Magnetics Corp. (EMM) has introduced a reliability package that offers IBM 370/158 and 168 add-on memory users protection for any two uncorrectable errors that occur during normal operation.

The Reliability, Availability, Service, Improvement (Rasi) feature consists of an additional 32K bytes of main storage and backup power supply that can be activated in 16K increments at the touch of a button, a spokesman said.

Replaced Failing Sections

The Rasi option replaces the failing section of memory with standby memory allowing operations to continue without memory loss, the firm reported. The system operates with Rasi memory until the installation of a new memory or power supply components, the firm stated.

The optional feature is available for an additional lease price of \$320/mo from the firm at 2311 W. El Segundo Blvd., Hawthorne, Calif. 90250.

DP Service Aids Dealers

(Continued from Page 34)

lowed E.B.S. to keep up with substantially increasing volumes of work without significant additions to the keypunching staff, according to Penwell.

"In the last 4-1/2 years, our business has almost tripled in gross volume, and we anticipate a 20% growth rate for the coming year. The MDS 2400 key-to-disk systems have boosted our own data entry productivity by about 30% over the old IBM 129 key-punch methods," he noted.

"More importantly, if it weren't for the distributed data entry and verification systems at the dealer locations and the speed of our own System 2400, we simply couldn't keep up. If, for example, we were to try to handle our present workload with mailed-in source documents and keypunch equipment, we'd need more than 300 operators to do it," he added.

programming easier.

But, most important, when you buy a 32-bit system from our Interdata Division, you get service. The old-fashioned kind. The kind where we go out of our way to make sure you're successful.

Good old-fashioned service.

We'll be with you when you configure your system. While it's being built. When it's delivered and installed. While we train your people. And for years thereafter.

If you need customer service, one toll-free call reaches us. Days. Nights. Weekends. We'll be there.

Think about that. And, instead

of just buying a 32-bit computer, buy a 32-bit computer company. Perkin-Elmer.

For more information, write Perkin-

Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free (800) 631-2154.

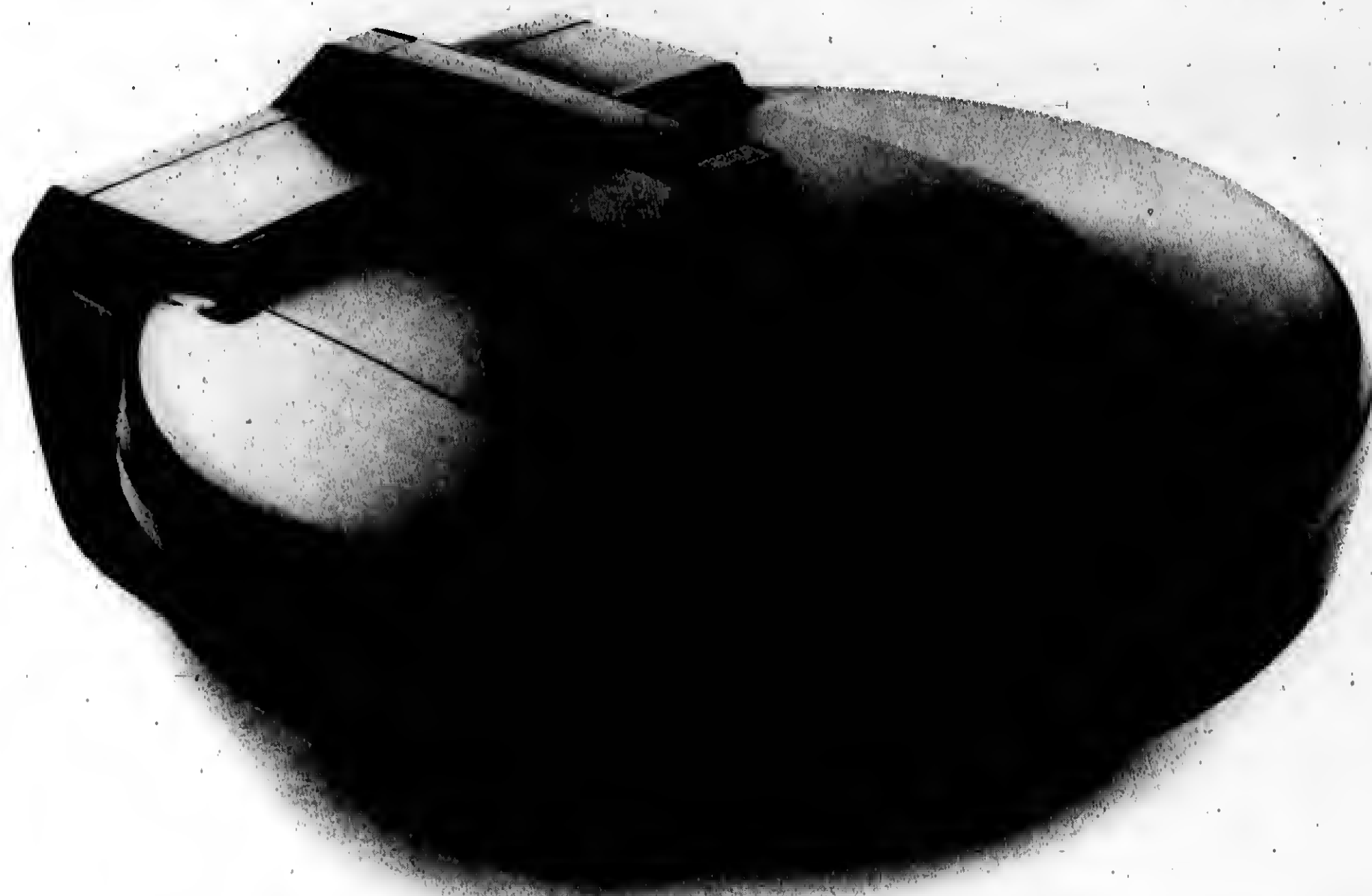
Here is my business card. Tell me more about computers in ☐ business ☐ scientific ☐ simulation ☐ OEM applications.

PERKIN-ELMER
Data Systems

Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3

BEST PRICE
FAST DELIVERY
CALL TOLL FREE **800-323-2288**
IN ILL. CALL 312-270-1960
Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

Compare...
BASF offers you
a 30% saving,
lifetime guarantee,
free field service,
and immediate delivery.



The first name you think of in computers may not be the best choice in data modules. While still completely compatible with existing 3340 drives, BASF data modules cost far less than the drive manufacturer's modules, are guaranteed for as long as you use them, offer free field service, and are available for immediate delivery nationwide.

Before you write your next order for data modules, find out why BASF has more to offer.

Call our nearest regional office: in Bedford, (617) 271-4007; in Los Angeles, (213) 451-8781; in Chicago, (312) 343-6618; in Clifton, N.J., (201) 546-9111; in Dallas, (214) 233-6607; in Toronto, (416) 675-3611; and in Montreal (514) 341-5411.



BASF The Original.

Computer Tape · Disk Packs · Diskettes · Cassettes · Mag Cards

Sales Effectiveness Increased

Mini Gives Firm Paperwork Holiday

By Esther Surden
CW Staff

SAN FRANCISCO — Inundated by the paperwork produced by acting as the interface between U.S. travel agents and thousands of property owners in Mexico and Hawaii, Creative Leisure here turned to a small business system.

The system has helped the firm increase its sales effectiveness by providing complete, up-to-date information and freeing employees for more creative work, according to Peter Henze, president of the company.

Creative Leisure was founded

in 1969 to provide an alternate form of vacation accommodations for people traveling to Hawaii and Mexico. These travelers, rather than staying in hotels, take up temporary residence in homes or condominiums.

At the same time, the firm also provides a marketing service to the owners of those properties by making sure their residences are brought to travel agents' attention.

Creative Leisure has grown from three to 23 employees since its founding. "We spent five years thinking about the future

and tracking the growth of the company before turning to a minicomputer," Henze said. "We tried to learn all about what was available."

Initial Search Fruitless

At first the company turned to vendors with systems running existing hotel reservation applications. But the software already available accommodated lodgings with a few inventory variables.

Creative Leisure needed software that could handle all of the aspects of studios and one-, two- and three-bedroom con-

dominiums and, in some cases, houses.

"We were dealing with a hodgepodge of products," tracking them on charts that showed the date property was available and its characteristics. A property was checked off the chart when a reservation was made.

After Creative Leisure defined the kind of inventory control it needed, it presented the specifications to "every hardware manufacturer we could find," Henze said.

"There was very poor response in terms of followthrough" not only because his company is a small one but also because the state of technology had not reached the point at which the vendors had something worthwhile to offer, he said.

Later Henze read in *Business Week* about Datapoint Corp. and met with the vendor's salespeople. Its hardware seemed to fit Creative Leisure's needs.

At this point, management began a search for software. Unhappy with software types who "tried to get us to use existing

(Continued on Page 40)

Truck Dealer Drives Down Costs

MINEOLA, N.Y. — A system that can provide greater accuracy and still cut costs is the goal of many business people. A small business system at Mineola Mack here has done just that, according to Dan Nelson, the firm's general manager and controller.

The company is the exclusive distributor for Mack Trucks on Long Island. It concentrates on heavy duty vehicles for the construction and fuel oil delivery industries.

Prior to the installation of the small business system, "we had a Burroughs bookkeeping machine that was on its last legs," Nelson said. Replacing that machine with another of the same capability would have been foolish, he contended, considering the increased sophistication of the company over the years.

Economic factors also came into play at the time the firm decided to buy the system. "It was during the recession and there was a need to cut costs," Nelson recalled, which the company hoped the small system would help do; the firm also "expected some savings in personnel."

Mineola Mack looked around

at the various systems on the market before settling on one from Mini-Computer Systems. Of the IBM, Singer and Burroughs systems considered, all were eliminated for various reasons. From a cost standpoint, the firm would have had to rent the IBM system and "we don't particularly like to rent," he said.

The Burroughs "couldn't handle a remote terminal" the company planned to use, and Singer "wanted us to adapt to their package of programs."

The system finally selected was programmed by F.G. Adams Co. of Farmingdale, N.Y. "The company we bought the system from gave us the best overall package," Nelson pointed out, and was willing to tailor the system to "what we wanted to do."

The installed system includes a Data General Corp. Nova 2 CPU, two disk drives, two printers and three Hazeltine CRTs. In addition, another CRT, located remotely, is hooked into the system.

Applications running on the mini include order entry, billing, inventory management, accounts receivable, accounts payable, general ledger, payroll and job

costing. The system performs the applications not just for Mineola Mack, but also for seven other companies owned by Mineola Mack's owner and for one user to whom the firm sells time.

Since the system was installed, four people in the front office handle the accounting work formerly done by 14.

(Continued on Page 40)

Diablo Model 3200 Gains 10M-Byte Disk Subsystem

HAYWARD, Calif. — Diablo Systems, Inc. has increased the disk storage capacity of its Model 3200 small business system to 10M bytes with the addition of a fixed/removable disk drive subsystem.

The Model 3200-14 disk system has a 5M-byte fixed disk and an additional removable 5M-byte disk cartridge which can be used in place of or in addition to the 630,784-byte diskette drives currently available on the Diablo 3200, the firm said.

The disk subsystem has a data transfer rate of 312,000 byte/sec, with an average access time of 50

msec, Diablo said. It is installable in a separate top-loading cabinet linked to the Diablo 3200 CPU.

The disk subsystem is controlled by a resident operating software system and associated file management, editing, sorting, merging and disk control utility programs.

A typical Diablo 3200 small business system with the 10M-byte disk drive is available for about \$29,000, according to Shasta General Systems, Diablo's U.S. distributor.

Diablo is headquartered at 24500 Industrial Blvd., Hayward, Calif. 94545.

DEC. CTS-500 DIBOL.

Business Software

- Accounts Receivable
- Order Entry with Inventory Control
- Sales Analysis
- Payroll • Accounts Payable
- General Ledger

End User and OEM/Distributor inquiries invited.

Call today (213-936-7131) or use the coupon.

MCBA

Mini-Computer Business Applications, Inc.
4929 Wilshire Blvd., #940
Los Angeles, CA 90010

Please send information about MCBA CTS-500 Software.

Name _____
Company _____
Address _____
City _____ State _____
Zip _____ Phone _____
____ End User ____ OEM/Distributor ____ Other _____

CWS

DEC® and DIBOL® are registered trademarks of Digital Equipment Corp.

MINICOMPUTER

Mini Helps Trucker Drive Down Costs

(Continued from Page 39)

Bills are completed and out by the end of the month. "Before, it took anywhere between two and three weeks. Obviously this has a large positive impact on cash flow," Nelson said.

Another improvement has come in labor cost analysis. "The system digests and analyzes a large body of information on just how much it costs us to service and repair vehicles," Nelson said.

"Here again we have more information and are getting it in time to react in our pricing or to spot trouble points. With labor such a large component of costs today, this information has a decided influence on profit margins.

"And where we needed six months or more to get a profit-and-loss statement

before the system, today we get one every month."

The system also serves a point-of-sale function. There are two CRT terminals and a printer at the service counter. When a job is finished or a part purchased, the counterperson will enter the pertinent data at the terminal keyboard.

The printer immediately creates a bill or receipt — in fact, it produces two, with one going to the customer and a second one, containing cost data, retained for company files.

Credit Information

The terminal will also display such information as the customer's credit line, whether all jobs are to be COD, etc.

The system performs other duties

simultaneously. It creates a job record, which becomes part of the vehicle's history. It picks out the vital labor cost factor for future analysis.

Also at the same time, it updates accounts receivable and parts inventories. With 27,000 items, \$400,000 worth of parts in the company's bins at any one time and a monthly parts bill of about \$100,000, having a clear inventory picture is useful. Nelson admitted complete use of the system for parts purchasing has not yet been achieved.

"Our highly experienced people, with almost no turnover, handle parts reorders quite well," he said. "After all, most Mack parts are rather large and, in any case, you don't need too many of any single item on the shelf.

IBM Takes Ax To 3/12 Prices

ATLANTA — IBM's General Systems Division has taken the hatchet to the purchase prices of the IBM 3/12 models B16, B17, B18, C19 and C20.

The B16 has been reduced from \$47,940 to \$40,750; the B17 from \$49,690 to \$42,500; B18 from \$51,440 to \$44,250; C19 from \$58,840 to \$51,650; and the C20 from \$69,590 to \$53,400.

The firm also cut the price of the power supply feature 5502 from \$831 to \$706.

The price cuts are the result of normal business review, according to a spokesman.

Firm Has Holiday From Paperwork

(Continued from Page 39)

packages" without considering the user's special needs, it turned to a custom software consultant, Virginia Winn, in San Jose. Together with her partner, Robyn McCormick, Winn designed the system and helped the company decide on its configuration.

'Watch-Out' File

Now installed, the system provides "real-time inventory control on thousands of resorts and condominiums in Mexico and Hawaii," Henze said.

All marketing information, previously contained in books, is now available from the system. Reservation operators can pull out information on a property, the manager's name, pricing, nearby restaurants, etc., from the static resort file.

That file also contains a portion on "watch-outs," or complaints registered by previous guests to that particular resort condominium.

The "resort prices" file runs on an 18-month availability, accepts deposits, keeps track of discounts and takes a requested property out of inventory, Henze explained. It also prints a notice of reservation which is sent to the travel agent and a notice that is sent to the resort manager.

Link Sought

"We are in the process of trying to refine the system now to allow it to link up to Wells Fargo," Henze noted. If the link is accomplished, all monies presently handled by Creative Leisure will be handled by the bank; the bank will be able to post directly to the company's customer files.

The primary advantage of the system has been its ability to increase sales effectiveness, Henze said: "We can tell travelers about the color of the carpets; we can tell them which condominiums can handle handicapped people."

One person at the firm has been appointed to maintain the system. The software was designed for flexibility, so the user can add such things as special discounts and package deals to its offerings at any time.

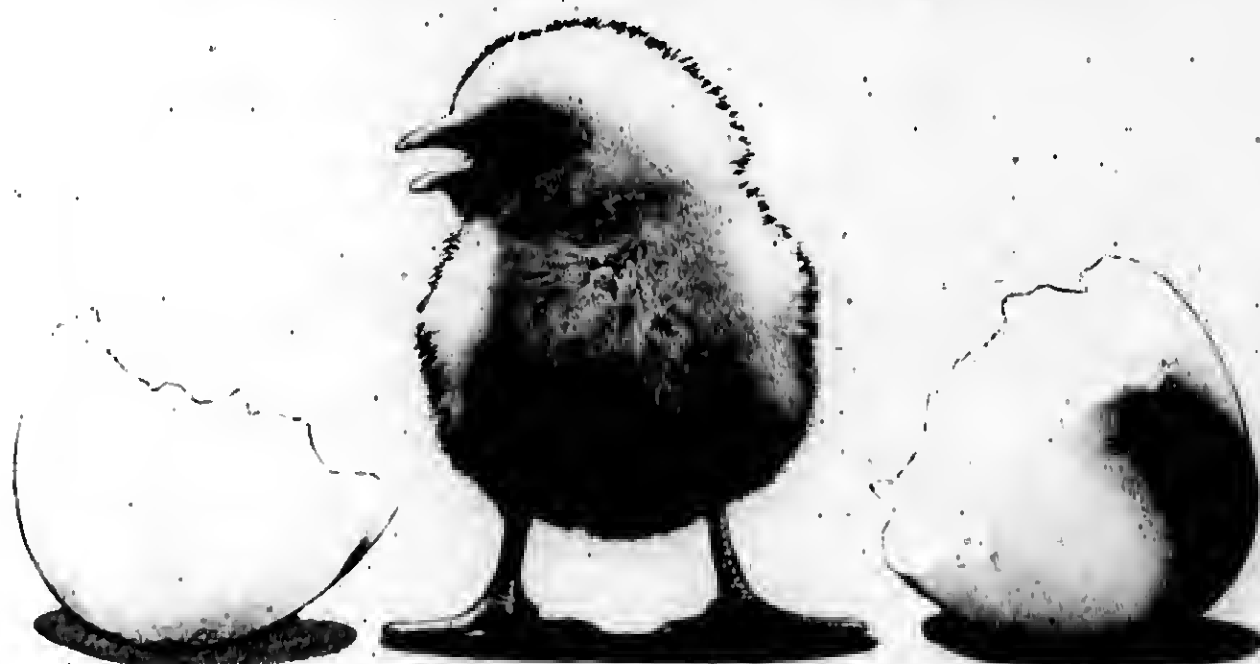
The configuration at Creative Leisure includes a Datapoint 4530 with 48K of user memory, 5M bytes of fixed and removable disk and a 132-character printer. Five CRTs are connected to the system.



SIM-14TM



It'll give your 1401* programs a new lease on life.



• IBM 303X, AMDAHL, CDC, ITTEL users...SIM-14 means no re-programming!

• IBM 360/370 users...SIM-14 means running multiple programs simultaneously!

If your new whizzer has made your 1400 series program old before its time, our simulator can give it instant new life with features like...

...a self-relocating problem program that's completely interruptable; no hardware restrictions other than decimal arithmetic set; no control storage or

micro codes; full tape and disc support; support for 1400 utilities and sort replacements included...

And more. Enough, in fact, to fill its own manual. To get your copy—and to find out how "cheep" SIM-14 can be—call your nearest Dearborn office.

*Includes 1440 and 1460 programs



dearborn
computer company

dealer-IBM computers
systems software
leasing

1460 renaissance drive/suite 400/park ridge, Illinois 60068 (chicago)/(312) 827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788

member, CLA; ADAPSO; SIA

System 'Runs Itself'

Cosmetics Firm Faces DP With On-Line Mini

By Esther Surden
CW Staff

AURORA, Ohio — A minicomputer that "essentially runs itself" is helping Fashion 220 here save time and increase throughput in performing its business applications, according to the firm's vice-president of finance and treasurer.

Fashion 220 is a cosmetic manufacturer that distributes its products through a network of independent franchised studio owners, Gary Terbeek said. The cosmetics are sold on the party plan method.

In October of last year, Fashion 220 upgraded from a Honeywell Information Systems, Inc. 61/58 system to a Hewlett-Packard Co. 3000 Series II minicomputer. "We simply outgrew the Honeywell; it wasn't nearly big enough for our needs," Terbeek said.

Although it superficially looked at almost every minicomputer available, the cosmetic maker finally limited its selection to HIS, IBM and HP. The firm considered these three vendors seriously, Terbeek pointed out, because HIS represented an upgrade, IBM appeared to be the industry standard and HP came highly recommended.

Fashion 220 placed the order for its HP system in the beginning of August. The system was selected on the basis of hardware capability, software support and price, Terbeek said.

"It has the best software support for the type of operation we wanted to run," he added.

Installed in September, the system "was operational within a couple of weeks thereafter," Terbeek said. The mini, programmed in Cobol, runs almost all applications on-line, with terminals installed in user departments.

"We do do some batch, but that's just to provide an audit listing of transactions already performed," Terbeek said. The same contract programmers

who installed the applications that ran on the user's HIS system converted the programs from that system to the HP unit.

"We have no DP department per se. With the HIS system, we did have one individual running the system eight to 10 hours a day. Now we don't even need to know we have a computer," Terbeek said.

The configuration at Fashion 220 includes the CPU with 256K bytes of memory, two 50M-byte disk drives and a 600 line/min printer. Now operating with about eight terminals on-line, the system is expandable to 16 terminals, Terbeek pointed out.

The system has significantly in-

creased the processing power available to the firm, he said. "We had three terminals with the old system and they literally crawled. Now we have about eight and they go faster than the operator's speed," he said.

The system runs all business applications for the firm, with the biggest single application order entry. The order entry program includes a back-order subsystem.

A finished goods inventory control system that ties into the accounts payable system and an accounts receivable system are also run on the mini. The general ledger system is tied into all of the other systems.

Other applications for the mini, in-

clude a raw materials inventory program, a manufacturing production schedule program and a fixed-assets accounting program.

A specialized program for its particular industry allows Fashion 220 to compute overrides the issue bonus checks to various studios. A manager reporting system records and updates the sales volumes of the studio managers and contrasts the figures with data from past years.

In addition, a sales conferencing system keeps track of the attendees at the firm's twice yearly national sales meetings, recording their names, status and types of accommodation packages, airline tickets, etc., they purchase.

Want a faster, cleaner, user-oriented financial application system? ACCOUNTING IV...right off the shelf and right on the money.

A lot of off-the-shelf accounting systems can make you wish that's where you'd left them... on the shelf.

But not ACCOUNTING IV... Unlike other financial application packages, ACCOUNTING IV is as flexible and comprehensive as a custom-built system costing five times as much. And it's easy-to-use — requires none of the special programming that ties up valuable DP time and makes most packaged systems unduly slow in getting information back to the requesting party.

There are four members of the ACCOUNTING IV family — each providing smooth integration with existing programs, each written totally in ANS Cobol, and each boasting a wealth of unique features that makes it easy to install and easy to adapt to the user's needs.

ACCOUNTS RECEIVABLE, for example. A fully integrated module providing tight monetary controls, a wide range of billing options, and complete automation of every receivables function. Over 25 management reports available to suit the user's requirements. Everything from detail aged A/R to sales analysis by product.

Or ACCOUNTS PAYABLE. An extremely flexible system offering more than 50 statistical and informational re-

ACCOUNTS
PAYABLE/
PURCHASE ORDER

ACCOUNTS
RECEIVABLE

GENERAL
LEDGER &
FINANCIAL
REPORTING

ports, from check reconciliation to inventory analysis. The Purchase Order module performs the three way match-up of purchase orders, receivers and invoices.

And, the mainstay of the ACCOUNTING IV family... GENERAL LEDGER & FINANCIAL REPORTING. A powerful system with a broad data base for financial and statistical collection and reporting. Offers capabilities for profit-planning, budgeting and forecasting, responsibility reporting, transaction analysis, cost allocation, multiple-currency accounting, and more.

New enhancements include on-line data entry and inquiry as well as interfaces to TOTAL, IDMS, DL/1, and IMS data bases.

What all these features add up to is an entirely new level of control over business operations. A strong claim? Yes, but one that over 250 companies have already seen us make good on.

So contact Informatics today and let us show you how in as little as four weeks you can be up and running with an accounting system that's right off the shelf and right on the money.

ACCOUNTING IV is sold and supported by Informatics Inc., the world's largest independent software vendor.

Informatics Inc. Software Products

World's Leading Independent Supplier of Software Products

Informatics Inc., Software Products
21050 Vanowen St., Canoga Park, Calif. 91304 (213) 887-9121

Please send literature on:

- ☐ General Ledger & Financial Reporting.
☐ Standard Product Cost.
☐ Accounts Payable. ☐ Accounts Receivable.
☐ I would like to attend a free ACCOUNTING IV seminar.
Please send dates and tell me when the next seminar will be in my city.

Name _____

Position _____

Dept. _____ Computer _____

Firm _____

Address _____ Tel. _____

City _____ State/Province _____ Zip _____

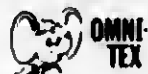


TOTAL SYSTEM FLEXIBILITY MEANS OMNITEC COUPLERS...

Get the most out of your remote computer time-sharing system with a proven coupler from the nation's leading supplier of acoustic telephone coupling devices.

A good example is our 702-3B Series — data rates of 300 baud (600 optional); switchable half or full duplex operation plus simultaneous TTY & EIA outputs. Other features include originate/answer/auto-answer plus hardware DAA line coupling with auto-answer and Bell 103A compatibility. For overseas, our 704B operates on 220V 50 Hz power and is compatible with CCITT Vol. 24 international frequencies.

More information?
Write Dept. 26 or
call (602) 252-2083 collect.



OMNITEC DATA
"New Dimensions in Modems"

2405 South 24th Street • Phoenix, Arizona 85034

Member SIA Software Industry Association

Hospital Finds Mini Upgrade Easy to Swallow

Special to CW

HOBOKEN, N.J. — "Our prime activity is operating a hospital, not running a DP training school," Frank A. Miles, director of systems and DP at St. Mary's hospital here, pointed out in explaining why he recently upgraded his small business system.

His department has replaced its Singer Business Machines System Ten Model 20 small business system with a System Ten Model 220 from International Computers Ltd. (ICL). The 220 was introduced last year as an upgrade path for Singer users.

"We were looking for cost-effectiveness, but beyond that, the strongest requirement was simplicity of operation," he noted. Staying within the provided upgrade path al-

lowed the hospital to gain more capability without changing "a line of code, an operating method or software."

Miles and Charles Wade, director of fiscal affairs, developed all the software for the system.

The present configuration uses RPG-II and Assembler as the basic languages. "We had specific needs," Wade said. "Hospitals have distinct requirements and it would be expecting too much to have 'cookbook' solutions waiting on software library shelves."

All Accounting Handled

The system handles all of the hospital's accounting functions. It processes the accounts of over 10,000

inpatient and 35,000 outpatients annually. General ledger, accounts payable and accounts receivable are also handled by the mini.

Other applications include an inventory management information system, which provides counts of supplies, baby food formulations and other materials that must be on hand.

Using information from the system, the hospital's medical staff and administration are provided with records about patient population. Information is available stating which patients are in the hospital, where they are located, how long they have been in the hospital and their basic diagnosis.

"This recordkeeping goes beyond routine patient care," Miles said. "We are required by a variety of local, state

and federal regulations to keep scrupulous records. Present requirements necessitate that this information be kept on file for a minimum of 20 years."

Microfiche Directory

The system generates a microfiche directory of the thousands of medical record files, which permits retrieval of the patient's record in cases of readmission to the hospital. It also provides the medical staff with a complete medical history of the returning patient.

Computer output microfiche (COM) tape is generated by the system, which captures basic patient data upon initial admission and updates that information for every subsequent admission. The microfilm records include patient's name, birthdate, address, Social Security number; parents' names, date of last admission, number of times admitted, and the patient's hospital medical record number.

Multiple access to the fiche files is available through a network of microfilm reader stations in the hospital. This lookup method not only saves time and improves accuracy, but it also saves money. "Instead of printing out this data as hard copy, the COM system, by generating microfilm, has resulted in a savings of paper cost that paid for our microfilm readers in three months," Miles said.

Monthly reports on activity levels for each of the medical specialties are also provided. This enables St. Mary officials to review how many patients were treated in each department category, whether their status was "private" or "service" and other data about them. Management can also get reports of year-to-date figures on departmental activity.

Nursing Measure

For the hospital's school of nursing, a data base is being established to correlate such characteristics as I.Q. and academic grades, which experience indicates as determinants in development of qualified nurses. This will be used both as a guide in evaluating candidates and as an educational assistance tool in helping those admitted to the school.

The system also helps management make long-range plans. Future bed requirements, staffing needs for tomorrow, financial information, etc. can now be culled from the data base.

"We also use our system to provide all the logistic support possible to our staff. In a hospital with high traffic like this, each doctor must handle many cases at once. Through our reporting systems, we are able to provide help with unified, periodic updating of medical charts."

WALK AWAY LEASES
for
IBM
3031
3032
3033

158, 168 and most other
Processors and Peripherals

- Lowest Lease Rates
- Contract Flexibility
- Simple Documentation

Call or Write

alanthus leasing company

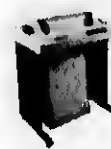
2001 N. 1st St.
Chicago, Ill. 60614
(312) 311-1111

2001 N. 1st St.
Chicago, Ill. 60614
(312) 311-1111

2001 N. 1st St.
Chicago, Ill. 60614
(312) 311-1111

DECprinter I's

For Sale
•LA180



BEST PRICE
FAST DELIVERY

CALL TOLL FREE 800-323-2288
IN ILL. CALL 312-279-1960
Data Equipment Group
ICE, INC.
772 N. Church Rd.
Evanston, Ill. 60126

Micro Bytes

Floating-Point Board Works With SBC 80

BERKELEY, Calif. — A hardware floating-point board that is reportedly compatible with the Intel Corp. SBC 80 and designed for fast floating-point processing has been introduced by North Star Computers, Inc.

Number representation of the FPB-B is binary-coded decimal and the precision is software-selectable up to 14 digits, a spokesman said.

An operation is performed via an 8080 or Z-80 processor, which passes the instructions and operation commands to the board. The board then executes the operation and returns the result to the processor.

The FPB-B performs decimal add, subtract, multiply and divide operations up to 50 times faster than 8080 software, North Star claimed.

Approximately 1K of memory is saved compared with software arithmetic, the spokesman added.

The FPB-B unit, which includes a version of extended Basic on paper tape, is priced at \$299 in kit form and \$399 assembled from North Star, 2465 Fourth St., Berkeley, Calif. 94710.

Tychon Sets Courses For Virginia in April

BLACKSBURG, Va. — A series of microcomputer courses will be held on April 6-8, 10-12 and 13-15 at Tychon, Inc.'s Learning Center here.

The courses are "Microprocessor Interfacing," "Introduction to Assembly Language Programming for 8080/8085 Processors" and "Intermediate Assembly Programming for 8080/8085 Processors," a spokesman explained.

Each course runs for three days and costs \$295 per person. Additional information can be obtained from the course director at Tychon, P.O. Box 242, Blacksburg, Va. 24060.

RS-232 Adapter Offered For KIM Microcomputer

BROOKFIELD, Conn. — The 20ma current-loop port of MOS Technology's KIM microcomputer can reportedly be converted to an RS-232 port with an adapter offered by Connecticut Microcomputer.

The Adapter does not affect the transmission rate of the micro and uses power supplies in the range of +5V and -5V to +12V and -12V, a spokesman said.

The KIM microcomputer is isolated from the RS-232 device by optoisolators, he added.

The adapter, known as ADA, sells for \$24.50 with drilled, plated-through solder pads for all connections or for \$29.50 with barrier strips and screw terminals.

Connecticut Microcomputer is at 150 Pocono Road, Brookfield, Conn. 06804.

Free Catalog Published By Camelot Publishing

ORMOND BEACH, Fla. — The Camelot Publishing Co. has released a 24-page catalog detailing its line of computer books, materials and teaching aids.

The catalog lists over 70 items that are recommended for use by teachers, students and computer users, a spokesman said.

The publication is available free from Camelot Publishing Co., P.O. Box 1357, Ormond Beach, Fla. 32074.

16-Bit Micro Takes a Dive Inside Undersea Explorer

SAN DIEGO — A pair of 16-bit microcomputers are providing the processing power for an "intelligent" undersea robot vehicle that uses a television camera for "eyes," sonar for "ears" and a three-foot-long manipulator as an "arm."

The micros, one on a surface vessel and the other in the undersea robot of the Remote-Controlled Vehicle (RCV-150) system, manage virtually all communications, display and control functions in a variety of undersea exploration, research and maintenance tasks, according to its manufacturer, Hydro Products here.

The undersea portion of the RCV-150 consists of a cable-tethered vehicle that measures about 4 feet by 3.5 feet by 4 feet and is propelled by four thrusters 10 inches in diameter. The vehicle's small size makes it easy to launch and retrieve while a large array of equipment gives the capability of much larger submersibles, Hydro Products said.

"The microcomputer approach we took further enhances the vehicle's flexibility," Jim Tierney, Hydro's senior electronics engineer, explained. "Our software and firmware approach allows us to add any number of features later on to meet the specific requirements of any customer application."

"Control firmware can be supplied on programmed read-only memory [Prom] for convenient field installation," he added.

Internal depth and yaw programs referenced to depth and turn-rate signals are under microcomputer control. This relieves the



This robot, an undersea inspection and work system, incorporates a microcomputer.

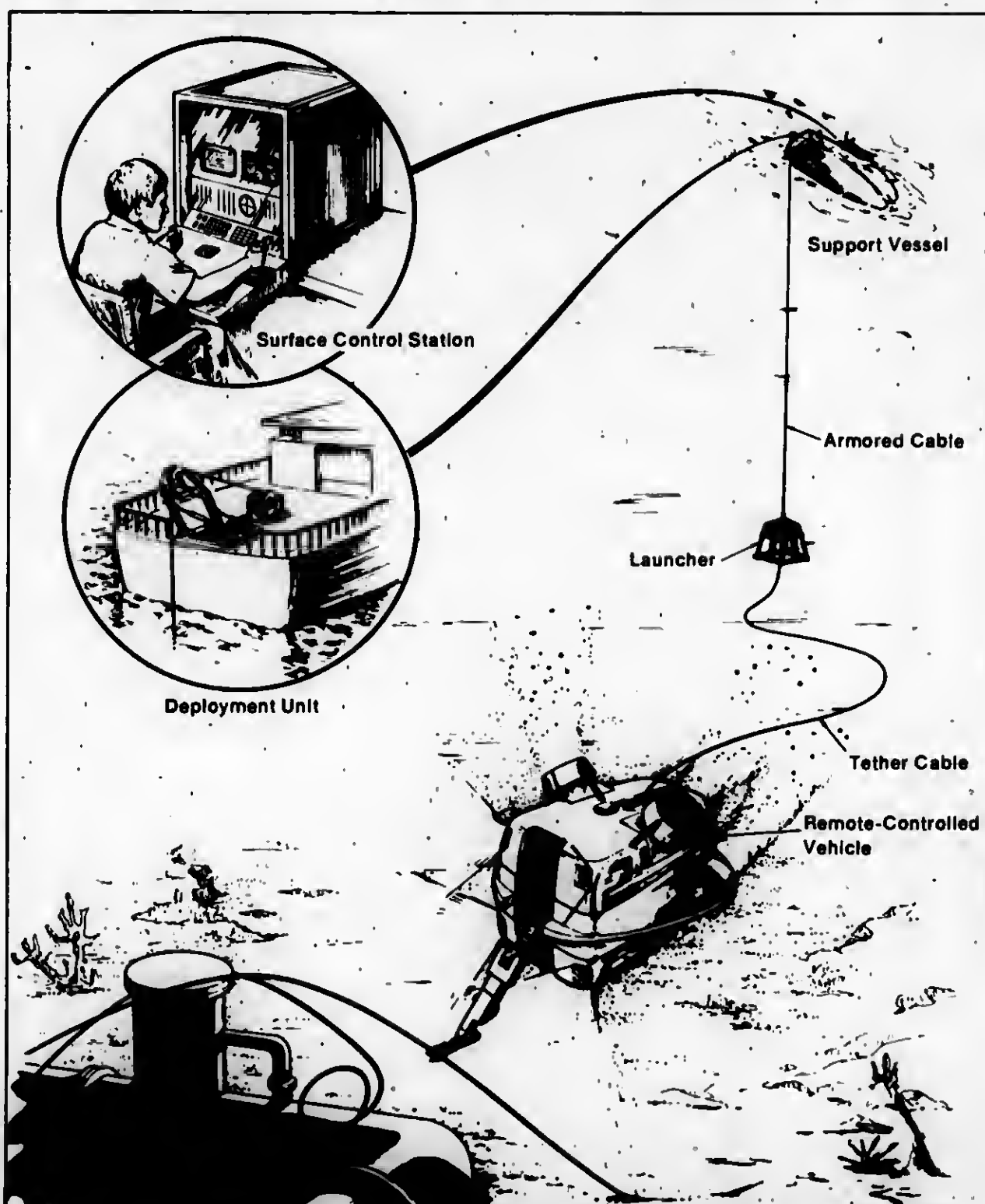
operator of many maneuvering tasks, allowing him to concentrate on observation, inspection and manipulation duties.

"Using the microcomputers has made system response faster. It turns smoothly and quickly and can stop on a dime," Tierney said. "Since it automatically controls its own depth and heading, it can remain stationary in these axes without operator intervention."

The development of the vehicle took nine months to complete; about 1.5 man-years went into the software development.

Three National Semiconductor Corp. Pace board-level computer cards comprise the vehicle's microcomputer, while the same

(Continued on Page 45)



Microprocessor-Controlled Remote Inspection and Work System

MICROCOMPUTING

KIT, BREADBOARD — These usually come with an assortment of sockets for custom circuitry. A number of circuit kits are available which allow the user to add special functions to the modular microcomputer system. Designed for insertion into a breadboard, in general each includes a collection of parts and sockets and full instructions. Such kits are available for interfacing to Ascii keyboards; to 8-bit parallel TTL input/output sources; to the Teletype ASR33; and to other makes of printers.

KSR (KEYBOARD SEND/RECEIVE) — A combination teletypewriter transmitter and receiver with transmission capability from keyboard only.

LABEL — 1. Various labels are concerned with or correspond to numerical values or to memory locations in tapes, disks, etc. The specific absolute address is not necessary in most cases because the intent of the label is a general destination. Labels are a requisite for jump and branch instructions as regards software. 2. A set of symbols used to identify or describe an item, record, message or file. Occasionally it may be the same as the address in storage. 3. A code name that classifies or identifies a name, term, phrase or document.

LARGE-SCALE INTEGRATION (LSI) — The accumulation and design of a large number of circuits (1,000 or more) on a single chip of semiconductor. Characteristic of many CPU circuits and memories introduced since 1970.

LATENCY — 1. The time required by a digital computer to deliver information from its memory. 2. In a serial storage system, the access time minus the word time. 3. The time spent waiting for the desired location to appear under the drum or disk heads or at the end of an acoustic tank.

LIFO — 1. Refers to Push Down Stack procedures and means Last In First Out, a buffer procedure. 2. A queue discipline wherein the newest entry in a queue or file is the first to be removed.

LINK EDITOR — A link editor generally includes all of the capabilities to support operating system peripheral devices and can load and link the object program output of a Basic or Fortran IV compiler as well as the object output by the assemblers. The output of the link editor can be saved for loading into memory or output to any output peripheral.

LOAD AND GO — A computer operation and compiling technique in which pseudo-language is converted directly to machine language and the program is then run without the creation of an output machine language.

LEARNERS

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc. 207 Kenyon Road, Champagne, Ill. 61820



COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

Microsoft ("Altair") BASIC for 8080/280/6502 and FORTRAN IV for 8080/280 now available to OEMs, end users. 808/280 BASIC has random, sequential files; double precision; IF... THEN... ELSE and more. FORTRAN produces optimized relocatable code, meets ANSI66 except complex, CP/M and ISIS-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 San Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 262-1486.

WANTED: Applications software in Basic for the Data General microNOVA with 28K and dual floppies. Outright purchase or royalty negotiable. CW Box 1415, 797 Washington St., Newton, MA 02160.

WANTED: Mortgage Banking Software Package for MicroNova or Nova 3. R.L. Christensen, 9204 El Dorado Dr., El Paso, TX.

OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS. California's Microcomputer Company's (CMC) previous ads in Computerworld has resulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved business software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927 (916) 891-1420.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02160.

I have read the rules, and would like to place my ad as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (_____) _____

Two Boards From Zilog Meet European Standards

CUPERTINO, Calif. — A microcomputer board and memory disk controller board, both designed to meet European specifications, have been announced by Zilog, Inc.

The Z80-MCB/E microcomputer board has a capacity of 4K bytes of dynamic random-access memory (RAM) and up to 4K bytes of erasable programmable read-only memory (Eprom), programmable read-only memory (Prom) or masked read-only memory (ROM), according to a spokesman.

The MCB/E can be expanded to include more I/O or memory; a strapping option allows users to substitute

16K by 1-bit dynamic RAMs in place of 4K by 1-bit RAMs, he added.

The Z80-MDC/E memory disk controller board provides 12K bytes of dynamic RAM plus a floppy disk controller capable of handling up to eight floppy disk drives, the firm said.

The unit also features a strapping option for setting the start address of each 4K-byte memory page and 16-bit cyclic redundancy check (CRC) code circuitry, the firm noted.

Price of the MCB/E and MDC/E is \$595 and \$895, respectively. Both are available in the U.S. from Zilog at 10460 Bubb Road, Cupertino, Calif. 95014.

16-Bit Micro Takes a Dive In Underwater Exploration

(Continued from Page 43)

three plus a second Prom board make up the surface control station microcomputer. The boards include the 16-bit Pace microprocessing unit (MPU), the 2K by 16-bit Pace Prom and the 1K by 16-bit Pace random-access memory (RAM).

The Prom firmware houses the operating programs for the vehicle and the control unit. The second Prom board in the control station contains the maintenance and self-test program and CRT display formats. The RAM boards temporarily store intermediate results during processing.

An array of standard sensors includes various depth, heading rate, roll, pitch and temperature sensors and sea-water intrusion sensors. The temperature of the electronics package and hydraulic system is constantly monitored as a safety feature.

Tools can be placed on the undersea vehicle, such as the three-foot-long manipulator, which has four degrees of freedom; a cable cutter, a softline cutter, cleaning brush, pinger dropper and a grabber arm.

The surface-ship control station has two monitors; one shows the video picture from the undersea television camera while the other displays operations data. Selected data can be superimposed on the video channel, annotating video tapes with position information, valuable in later review.

Illuminated bar graph displays on the control station indicate power levels and temperatures. Illuminated switches indicate control position and serve as warning annunciators.

Problems in the vehicle are immediately reported to the operator by the RCV's microcomputer, which continuously monitors vehicle performance.

The micro in the control station scans the control panel 20 times each second. When a control maneuver is given by the operator, the signal is encoded and passed through a RF-telemetry data link via coaxial cable to the vehicle microprocessor.

This microprocessor then interprets the command and activates the electrohydraulic servos, continuously solving the equations of motion at a rate of 30 times/second.

Data sensed by the vehicle sensors and detectors is transferred through

the microprocessors for surface display.

One of the problems that had to be overcome in designing the vehicle software system concerned the tight time constraints for program execution. It was first thought that a surface minicomputer would make the necessary equations-of-motion calculations and transmit the data to operate the RCV servos.

"The data transmission system couldn't handle high-speed data rate from the mini to the vehicle," Tierney recalled. "Using the microcomputer in the vehicle to perform its own calculations, we have less complex data transmission and a more reliable system."

Reduced Cost

"Cost was another consideration in selecting the microcomputers," Tierney said. "At the time we were designing the RCV-150, National Semiconductor was one of a few companies that was offering assembled, tested and warranted boards. Others offered only individual chips."

Another factor in Hydro Products' selection of National Semiconductor's Pace system was "the fact that the 16-bit microcomputer offered advantages such as increased efficiency compared with some 8-bit systems. The 16-bit machine requires less memory, access and it can handle 16-bit parallel data," Tierney said.

"National Semi's microcomputer development system featured a reasonably priced disk operating system and could accommodate a high-speed printer and other peripherals," he added.

"The disk-operating system contained an assembler. We could create files, shuffle and change them as we wanted. The development system was made to look just like the MPU, so when the software was tested, we could use the system to burn the program into the Prom and place it in the RCV."

"The development system not only served its purpose on the RCV-150 software development, but it will continue to be used for future program changes and as a stand-alone computer performing tasks such as maintaining parts list, running management programs and making engineering computations."



Head Crash Protection You Just Can't Ignore.

Shockwatch* turns bright red if subjected to a shock that could damage a disk pack or cartridge. So it instantly tells even your newest operator not to insert the damaged media in a drive. And that eliminates the major cause of head crash.

Shockwatch is so dramatic, so simple, and so visible, nobody can miss it. And it's so cost-effective, you can't afford to ignore it. Ask your disk supplier about Shockwatch, or call us — Media Recovery, Inc., 2550 Electronic Lane, Dallas, Texas 75220, (214) 350-5725.

Internationally, call your field engineering sales manager at the local Burroughs subsidiary head office.

SHOCKWATCHTM

Protection. Pure and Simple

*U.S. Pat. No. 4,068,613

CBC COMPANIES

A new name in front of an old reputation for reliability. We have a CONTINUOUS INVENTORY OF TERMINALS and we STOCK AND INSTALL OPTIONS. Immediate delivery on most items.

The popular ones

DEC

-Writer II (LA-36 Printer Terminal) \$1,600 ea.
-Writer III (LS-120 Teleprinter) \$2,600 ea.
-Scope (Video Display Terminal) \$1,500 ea.
(Model VT-52)
-Printer I (LA-180 High Speed Printer) . . \$2,690 ea.

D

1. IAL (614) 461-5496.
2. DESCRIBE YOUR NEEDS.
3. DEPEND ON THOSE WHO USE
DIGITAL EQUIPMENT FOR YOUR BEST
ANSWERS, PRICE AND DELIVERY.

CBC COMPANIES
170 E. Town Street
Columbus, Ohio 43215
Call-614-461-5496



Zero RPM. The Disk that doesn't Spin.

Megastore goes where a disk drive used to go.

More to the point, Megastore keeps going long after a disk drive quits. Without motors, bearings, heads or platters, there's nothing to wear out, burn out or crash. No moving parts.

Megastore is the astonishing new fixed-head disk memory replacement from Ampex that uses reliable cores instead of rotating media. In the long run it saves a lot of money.

Megastore provides increased throughput, increased system availability, increased system uptime and reduced maintenance costs. A vastly better return on investment.

Unplug your disk and plug in Megastore. You'll get a half-million to four million bytes of capacity (in half-megabyte increments) that your existing software can't tell from the disk it was designed for. The only difference you'll see is a major improvement in through-

put, because Megastore has a data access time that's anywhere from 1000 to 3000 times faster than the disk it replaces.

Megastore. Ready now as a software-transparent replacement for Novadisk (Megastore 1223) and DEC's RJSO3/RJSO4 Disk (Megastore 11). Also available as Megastore 4666 for users who wish to provide their own controller. Other versions on the way. Contact Ampex Memory Products Division, 200 North Nash Street, El Segundo, California 90245. Phone (213) 640-0150. Ask for Megastore. The disk that doesn't spin.

AMPEX

Novadisk is a trademark of Data General Corp.

Via 'New Attachment Strategy'

IBM Meant to Frustrate PCMs: Gardner

By Molly Upton
CW Staff

SAN FRANCISCO — IBM implemented its new attachment strategy (NAS) in order to frustrate plug-compatible manufacturers (PCMs), according to Thomas E. Gardner, Memorex Corp.'s director of engineering for large storage systems.

The plan, which integrated controllers for the 3330, 3340 and 3350 disk drives into CPUs, was not sound from an engineering viewpoint and represented no technological advances, he testified in the Memorex vs. IBM trial here.

By changing interfaces for disk drives, the NAS complicated PCMs' attempts to promptly produce plug-compatible drives

and obsoleted some products such as the 3671, he continued. The 3671 was the Memorex controller for the firm's answer to IBM's 3330.

As he previously testified in the U.S. vs. IBM case [CW, Feb. 28, 1977], Gardner said IBM's refusal to disclose interface information prior to first shipments represented a barrier to entry into the disk drive market. The resultant delay in product introduction by PCMs could exclude them from markets, he said.

Gardner postulated that the NAS — revealed in a year-long series of announcements beginning in the summer of 1972 — created problems for IBM and was costly because of multiple products, short product

life and other reasons.

But IBM pursued this scheme because it thought this would take away some market from the PCMs or at least make their lives more difficult, he indicated.

The NAS essentially split the function of the controller into various boxes such as a director, or integrated storage controller, and a blivet, making PCMs unable to attach to the CPU at the channel level.

NAS Chronology

The chronology of the NAS, according to Gardner, is as follows:

- The "Smash" announcement in August 1972 included two directors, the 3345 and the 3830-II, which would ship in October and the others on the 370/158 and 370/168 the next year.

- In October 1972, the 370/125 had an interface to a blivet rather than a conventional channel interface.

- In February 1973, IBM announced a four-blivet addressing scheme that allowed 32 drives to be linked. String switching permitted a blivet to be switched between two directors. The 370/115 accepted only the 3340 drive, which was attached via a director.

- In February or March 1973, the new 370/145 was announced, wherein the motor generator was moved from the CPU to a separate box and the director was moved from under a separate box to under the covers of the CPU.

- In June or July 1973, IBM announced the ability to attach Winchester (3340) and Merlin (3330) blivets to the same director.

Much of Gardner's testimony drew from IBM documents discussing the various reasons for and merits of the NAS.

Costs were a concern of IBM. The manager responsible for financial analysis at the San Jose direct-access storage devices facility wrote his boss on Oct. 27, 1971, indicating the NAS has "too many products, too much impact, too much inventory churning — resulting in high development engineering and engineering change costs, premium builds and returned boxes with high remaining net book value."

The first IBM product to implement the new attachment strategy was the 3330. After its announcement, its interface was changed to include the new director and blivet on the 370/158 and 370/168, he said.

(Continued on Page 48)

CCIA Adds to List of Speakers For Caucus, Sets Up Workshops

WASHINGTON, D.C. — The Computer and Communications Industry Association (CCIA) has announced three workshops and an additional speaker for its Washington caucus scheduled to be held here next week.

The workshops and speaker join several others announced recently [CW, Jan. 23].

The additional speaker is Frank Weil, Assistant Secretary of Commerce for Domestic and International Business, who will speak on international trade opportunities for computer firms, according to the CCIA.

The three workshops will cover such topics as capital formation, government procurement and barriers to international trade.

In the capital formation workshop, Thomas Unterberg, a partner in Rothschild and Tobin, will speak on new issues; Michael F. Holland, vice-president for pension investment at Morgan Guarantee Trust, will speak on special opportunities; Larry Lee, vice-president for commercial lending at Citibank Corp., will cover debt financing; and Joseph R. Witham, vice-president of the Export/Import Bank, will talk on export loan guarantees.

The session entitled "Recent and Anticipated Changes in Federal Procurement Practices and Policies" will be a panel consisting of Walter C. Anderson, associate director of the General Accounting Office; George W. Dodson, assistant commissioner

of ADTS in the General Services Administration; David Cohen, an attorney with von Bauer, Coburn, Simmons and Turtle; Walter Haase, director of information systems policy in the Office of Management and Budget; and Terry Miller, president of Government Sales Consultants, Inc.

The final workshop, called "Growing Barriers to International Trade in Computer and Communications Products and Services," will feature Dr. Ruth Davis, Deputy Undersecretary of Defense for Research and Technology; Benjamin Huberman, special projects officer for the National Security Council; Rauer Meyer, director of the Office of Export Administration in the Department of Commerce; William Root, director of the Office of East West Trade in the Department of State; and Hugh Donaghue, vice-president and assistant to the president of Control Data Corp.

In addition, the CCIA has announced three new members, including Datum, Inc. of Anaheim, Calif.; Formation, Inc. of Mt. Laurel, N.J.; and Telenet of Washington, D.C.

The organization now represents over 50% of the leading independent suppliers in the computer industry, according to president A.G.W. (Jack) Biddle.

Further information on the caucus is available from the CCIA at Suite 512, 1500 Wilson Blvd., Arlington, Va. 22209.



Introducing the lowest cost PDP-8 based business system in the business.

If you're an end user who finds programming easy, or a small systems house, here's an offer you can't refuse. Quodata Corporation is offering a complete PDP-8 based business system — with the very latest technology — for only \$9,990.

That's \$2,400 less than you'll find anywhere else.

And QDP78 is an outstanding system. It features QBOL, our own business-oriented language. QBOL is compatible with DEC's DIBOL, but it's better. One reason is that it runs under the more flexible OS/8 operating system. FORTRAN IV and

BASIC are also part of the system.

The QDP78 system is comprised of the latest LSI video display computer, the VT-78, and includes a processor, 32K bytes of MOS memory, a large 24 line by 80 character video terminal with upper and lower case characters, DECwriter II printer, dual diskette drives, and a portable mini-desk.

We have a limited number available, so call or write now: Richard Prendergast, (203) 728-6777.

quodata

196 TRUMBULL STREET · HARTFORD · CONNECTICUT 06103

IBM Strategy Seen as Vehicle to Harm PCMs

(Continued from Page 47)

Memorex spent about \$19 million in engineering expenses for the family of 3330-type products including its 3670, 3671 controller and, after the IBM changes, the 3672 controller, the 3673 equivalent to IBM's blivet and its 3675 double-density drive. In total, there were four interface changes involved, he said.

The interface changes cost Memorex around \$2 million. But Pat Lynch, attorney for IBM, later elicited from Gardner an estimate of IBM's costs for its 3330 family — between \$40 million and \$50 million. Gardner also admitted that when Memorex designed its 3670, it used existing IBM operating system software and did not have the overhead costs associated with support documentation and educational materials.

As evidenced by memos, IBM had other alternative methods for upgrading its gear. For instance, it could have

enhanced its 3830, the controller for the 3330, to handle 16 spindles instead of eight for a cost increase of only \$1,000 if it had designed its logic and power supply together, according to a document written in February 1971 by H.E. Cooley, the Systems Development Division's vice-president of development to the general manager of the Data Processing Group.

But IBM did not follow that approach and instead adopted the NAS.

Another memo indicated the way the PCMs designed their DC power was more efficient and less expensive than on the Merlin.

Cooley Memo

A memo in April 1971 from Cooley to B.O. Evans, president of the Systems Development Division, indicated "a priority list for those peripherals which should be attached was developed using, as a base, the number and point value of the control units in-

involved." Point value refers to the revenues from units.

And one IBM planner wrote that "one of the motives for the A box attachment strategy was to restrict our PCM vulnerability by embedding the initial drives in the A box."

Although illegible, the cost mentioned in the memo for NAS was "in the millions," Gardner recalled.

Other Views Within IBM

But not all at IBM viewed the move for its competitive advantages. A July 6, 1971 memo from Lewis Branscomb to Evans indicated the corporate technology committee "is not convinced that the director plan for machines noted above or the proposed NAM which integrates channels and control units is sound. The directors do not provide any technical or functional advance, cause some serviceability problems and reduce the flexibility for file switching."

Thus, IBM was planning to kill the 3830 before the product had even been shipped, Gardner stated.

On July 29, 1971, Evans indicated to Cooley that, concerning the director approach on tapes, "there is no new engineering with regard to logic on directors. Existing control units are merely split apart and repackaged with part of the logic in the drives and the remaining part in the appropriate CPU. On the Merlin control unit, \$3,000 in product cost out of \$10,000 can be bundled."

IBM also wanted to quell PCM activity in the 3330 by spreading word promptly that it had something else up its sleeve.

An August memo, circulated at about the time of the first 3830 shipment, stated the objective is to announce the attachment strategy "before there is significant competitive activity that could block us and be able to deliver more competitive hardware in 1972, when we expect to have a heavy PCM impact on 3330s ...

"It is our intent to price the inboard directors to cut off production of 3830s, but not to displace those already installed in small 155 and 165 systems," the memo said.

Gardner said that memo supports his conclusion that the cost and price of directors are disproportionate to the cost and price of the 3830-II. For instance, a 3345-III was priced at \$1,250/mo whereas the 3830-II was \$2,025/mo. Both functioned with 3330s. Gardner suspected the product costs were nearly identical.

As an example of the strategy, Gardner said in the new version of the 370/145, the 145-II, IBM separated the motor generator into another box and another product and packed the 3345-II into the 145 CPU. The price of the integrated storage controller dropped by \$1,250 a month to \$1,150/mo, but the price of the system to the customer only changed \$7 as a result of having to pay separately for the power, he said.

Information Hoarding Cited

SAN FRANCISCO — The quality of the information IBM made available on its interfaces degenerated at the same time its interfaces proliferated, around 1971, Thomas E. Gardner testified at the Memorex vs. IBM trial.

For example, up through 1970, IBM provided a good deal of information to OEM customers and also in its maintenance literature, according to Memorex's director of engineering for large storage systems.

An IBM internal memo from 1970 expressed the fear the plug-compatible makers would erode the 3330 market more rapidly than that of the 2314 and

suggested the firm not make any interface information available.

A Jan. 15, 1971 memo from the director of the laboratory at San Jose indicated there would be no information given to OEM customers prior to first shipment.

Rather than hoarding its interface information, IBM could have made it available when the product was announced or could have licensed Memorex to disclose its interfaces in advance, for which Memorex would supply payment and royalties on these products. IBM refused such a proposal from Memorex, Gardner stated.

Presenting the most dynamic business Opportunity since the Big Mac.

A National ComputerLand Retail Franchise

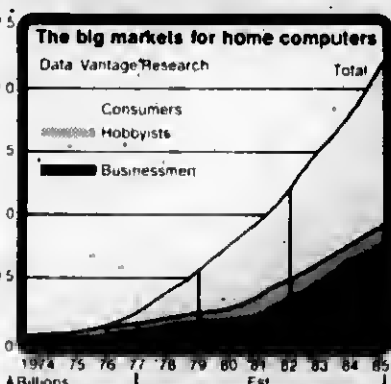
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Big Mac is a trademark of McDonald's Corp.

Mail to E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW San Leandro, CA 94577 (415) 895-9363

Name _____ Occupation _____
 Address _____ City _____
 State _____ Zip _____ Phone _____

This is a Dumb Bumper Sticker.

Dumb Terminal™ is a trademark of Lear Siegler, Inc.

Credits Success to Transition Independent Supplier Plugs Into Switchers

By Frank Vaughan
CW Staff

CHATSWORTH, Calif. — Powertec, Inc. credits its success in a field of 1,400 competitors in the independent power supply industry to switcher power supply units.

"We have been able to make the complete technical transition from the linear power supply to the switcher power supply line," Larry Keenen, vice-president of marketing, noted during a recent interview. "We now have a pretty broad product line and we are able to supply many of our customers with combinations of the two types of power supplies at a point in time when the economics of such power supplies are critical."

Powertec is one of 1,400 firms vying for about 25% of a \$3 billion market, up from \$1.5 billion in 1972. Only one-quarter of the market is available to the independents, Keenen explained, because many large firms, such as Honeywell Information Systems, Inc. and IBM, make their own power supplies.

The percentage of the market is changing in favor of the independent because of the technological changes from linear to switcher power supplies, he said, suggesting the market

flux is "just a case of supply and demand of engineering talent."

Of the 1,400 or so companies in the independent power supply industry, there are only about 80 which do in excess of \$1 million in annual business. Only about 30 do more than \$2 million and only 11 that do more than \$5 million, Keenen noted, adding "we happen to be in that elite group."

"Ours is a very, very competitive market and you have got to realize that although many of the computer peripherals companies get to over \$100 million in sales within a 10-year period in time, that is because of the fantastic growth in the peripheral area."

"But in the power supply area, because of the extreme competitiveness of the industry, to be able to get to a point above \$5 million puts us into an elite group. Our sales increased 20% from the last fiscal year and now, after celebrating our 10th anniversary, we are about a \$7 million company," he remarked.

Powertec has evolved from a firm that was totally involved with linear power supplies to one of the major suppliers of switchers. "At the present time, although the switcher is less than one-third of our total business, the switcher will become 50% as we plan to

double in the next three to five years."

Powertec is not taking its growth plans lightly, Keenen said. "We have had a significant change in upper management at all levels, except the presidency, to make the transition from being a \$7 million organization to be one of the top leaders, not only in technological terms, but in volume as well," he noted.

"We have such faith in the market and in our people that we have committed ourselves to having a 50,000 square-foot facility built for us. We plan to move into it sometime this spring or early summer and the facility will allow us to more than double our capacity," he added.

Differences Explained

What are the primary differences between linear and switcher power supplies?

"Basically, a linear, or series, type of power supply is one where the main regulation is done by dissipating

power, usually across a power semiconductor. It is a very inefficient way of converting power," Fred Heath, manager of marketing development, explained.

"The switching regulator works at high frequency. As the ac comes in, it is quickly filtered and made into dc, then it is switched at 20 kHz or 40 kHz or a similar high frequency. The regulation is done by a pulse-width modulation scheme that is not particularly dissipative."

"The magnetics, because you are working at a high frequency, are a lot smaller, so you get a smaller, lighter and more efficient and economical power supply," he continued.

Switchers are especially important when talking about 5V power supplies such as those used with computers and memory, where there is a lot of logic circuitry. A linear or series regulator is only about 35% to 40% efficient while a switcher runs at about 70% efficiency, Heath noted.

CSC Data Services Group Formed With Luke at Helm

EL SEGUNDO, Calif. — Computer Sciences Corp. (CSC) has established a Data Services Group to concentrate on "major opportunities for growth and diversification in the rapidly expanding data services field," according to the company's president and chairman, William R. Hoover. Initially, the major element in the new group will be Infonet, CSC's international network time-sharing service.

One element in CSC's diversification effort will be an acquisition program concentrating on companies offering data services products in the commercial marketplace, Hoover stated.

Initial areas of interest for acquisition

will be companies offering specialized services to the financial and health care industries.

Office automation and economic modeling services are also under consideration.

Luke in Charge

John W. Luke, formerly Infonet Division president, has been elected a corporate vice-president of CSC and named president of the Data Services Group.

Succeeding Luke as president of Infonet is John J. Kramer, who has been the division's vice-president of marketing for the last two years.

Last year 100 workers won \$125 million for EEO violations. This year you could be involved... Then let a software for your IBM/Burroughs sell to Joe Master (617) 464-1000, Lowell, MA 01861.

WANG

And that means the people in this car are pretty intelligent. Because they realize that the world's most popular video terminal is a steal at its new low sticker price of \$895.

With a 24-line screen and 1920 bright, easy-to-read characters included as standard equipment, the Dumb Terminal™ makes you wonder why anyone would settle for second best. Especially when it's an asynchronous terminal with 59 data entry keys. And 33 positive action switches that let you activate functions like 1 of 11 different baud rates, an RS232C interface, or a 20mA current-loop.

The Dumb Terminal. Without thinking, it started a



And that means
Because they
terminal is a

With a 2
characters in
Terminal™ m
for second be
terminal with
action switch
11 different b
current-loop.

The Du

Initial Offering Well Accepted

Univac Opens Growth for 'Dead-Ended' BC/7

By Esther Surden
CW Staff

BLUE BELL, Pa. — About one year after the introduction of its BC/7, Univac has decided to expand its product line and offer its customers a path for growth, according to Doug Russo, director of marketing for the small business system.

In January 1977, the firm introduced a "single product offering" BC/7 system which, Russo said, was well accepted. But customers were "dead-ended" with "no place to grow from or to," so Univac recently introduced systems designed to remedy that situa-

tion.

The firm brought out the BC/7-600 series and the BC/7-800 series of systems, both of which will be available for delivery next July while keeping its original offering as a member of the BC/7-700 series, [CW, Feb. 6]. In November the firm will put out a second release of the operating system for the 800 series, further increasing that system's capabilities, Russo said.

The acceptance of the BC/7 product can be documented by the number of systems in the field; he noted, and "we are on target in terms of sales, revenues and profits." Univac

expects to have "in excess of 1,000 BC/7 units" installed by March 31, the end of its fiscal year. Deliveries of the system started last May.

Packages Selling

Over 50% of the orders for the small business system are accompanied by orders for the firm's applications packages, Russo said, adding that many users "are finding our application software suited to their needs."

Between 40% and 50% of users are also ordering Escort, the company's first-time user language that carries a licensing price tag of \$40/mo, he said. For users with more sophisticated capabilities, the

system can be programmed in RPG-II.

As part of its announcement of the 600, 700 and 800 series, Univac restructured the pricing of the BC/7 line, discontinuing the initial charge for applications packages.

Univac is telling its salespeople to be "very specific in what you try to sell" when approaching users with the BC/7, the marketing manager said. Prime targets for the small systems are accounting machine users, and service bureau clients.

In its efforts to serve the small user marketplace adequately, the firm has decided not to provide certain applica-

tions packages for the small diskette-based system, he continued, since it feels a user who needs those programs also needs a larger system.

Univac will be "shortly moving into new markets via application software," Russo said. Although he refused to specify which markets the firm plans to zero in on, he did predict that some announcements would be forthcoming within the next three months.

The number of branches, salesmen and systems people serving the BC/7 product line have expanded since the system's introduction. "We started with 18 branches and have expanded to 20," Russo said.

The firm also has seven district offices to service the small system.

The sales force has increased from the initial 100 salespeople, to more than 200 and the company expects to have 300 salespeople for the BC/7 in 1978. The systems force has also increased from about 70 people initially to almost 140.

DEC® Data System Owners Need new reports within minutes? DEC® OEM's Having trouble speaking English?

SYMBOLIC SYSTEMS® INC.

(DEC's first and foremost business OEM)

PRINT IV®

a user-oriented, query type report writer

To print a report, simply:

- select data desired
- select order desired
- enter selection criteria and required totals
- watch report appear on printer

No programming skills required!

License price includes 1-yr. warranty

For free demo and further information
call, write or telex

FRANK J. PONZIO, JR.

SYMBOLIC® SYSTEMS

25 Chatham Road Summit, NJ 07901

(201) 277-6100/Telex No. 13-6476

Earnings Reports

NCR		MINI-COMPUTER SYSTEMS	
Year Ended Dec. 31		Year Ended Oct. 21	
1977	1976	1977	1976
(000)	(000)	(000)	(000)
Shr End	\$5.08	\$3.80	\$1.17
Revenue	2,521,626	2,312,713	6,616,000
Earnings	143,620	95,644	619,000
3 Mo Shr	2.07	1.41	
Revenue	774,336	715,646	
Earnings	59,265	38,868	

NORTHERN TELECOM		
Year Ended Dec 31		
	1977	1976
	(000)	(000)
eShr Ernd	\$3.22	\$2.91
Revenue	1,266,645	1,112,009
Tex Cred	3,422	3,163
Earnings	85,255	77,099
3 Mo Shr	81	67
Revenue	321,420	279,522
Tex Cred	1,537	1,109
Earnings	21,346	17,647

a-All amounts in Canadian dollars.

WANG LABORATORIES		
Three Months Ended Dec. 31		
	1977	1976
Shr End	\$3.30	a\$20
Revenue	47,146,000	31,643,000
Earnings	3,378,000	2,061,000
6 Mo Shr	.46	a.30
Revenue	63,369,000	56,232,000
Earnings	5,247,000	3,072,000

a-Adjusted to reflect a Class B stock dividend paid in July 1977.

COMSHARE			
Three Months Ended Dec. 21			
	1977	1976	
Shr End	\$.41		\$.20
Revenue	5,650,900	3,684,700	
Spec Cred	214,000	156,700	
Earnings	726,900	449,500	
6 Mo Shr	.75		.54
Revenue	10,661,500	7,610,600	
Spec Cred	292,000	261,700	
Earnings	1,322,200	788,300	

a-Restated.

DATA CARD		
Three Months Ended Dec. 24		
	1977	1976
Shr End	\$.24	\$.21
Revenue	9,212,000	6,711,000
Earnings	619,000	480,000
9 Mo Shr	.36	.40
Revenue	22,492,000	14,247,000
Earnings	1,446,000	910,000

a-Adjusted for 50% stock dividend paid in April 1977.

DIGITAL EQUIPMENT			
Three Months Ended Dec. 21			
	1977	1976	
Shr End	\$ 7.7		\$ 5.6
Revenue	348,602,000	241,000,000	
Earnings	32,529,000	22,896,000	
9 Mo Shr	1.42		1.01
Revenue	649,241,000	445,642,000	
Earnings	56,885,000	29,401,000	

MTS SYSTEMS		
Three Months Ended Dec. 21		
	1977	1976
Shr End	\$52	\$542
Revenue	9,716,800	6,958,700
Earnings	672,600	690,100

a-Adjusted for two-for-one stock split in February 1977.

ATTENTION COMPUTER GRAPHICS SUPPLIERS, SPECIALISTS AND USERS!

SIGGRAPH '78, the 5th Annual Conference on Computer Graphics and Interactive Techniques, will be held at the Hyatt Regency in Atlanta, Georgia, during the week of August 21, 1978. SIGGRAPH '78 (special interest group for graphics of the ACM) will feature two days of tutorials, an international 3-day conference, and an outstanding exhibition of graphic products.

Four parallel tutorials will provide a basic introduction to graphics, computer-aided design, raster graphics, and standards.

Papers on a wide variety of topics from 15 countries have been submitted, and several invited papers by international authorities will also be presented.

Last year's conference had a record-breaking number of sophisticated specialists and potential users. There are already as many exhibit booths reserved for SIGGRAPH '78 as there were exhibitors at any previous conference, with the leading vendors among the early subscribers.

Potential exhibitors desiring more information on SIGGRAPH '78 can contact: Mr. James Dow, Exhibits Chairman, Southern Co., 64 Perimeter Center East, Room 222, Atlanta, GA 30346 (Tel. 404-393-0650).

In early Spring, a brochure containing information on the preliminary program, a list of exhibitors, and registration, will be mailed to everyone who received the original announcement. If you are not currently on our mailing list and wish to receive this brochure, please contact Ms. Eileen Sondak, SIGGRAPH Publications, 75 Flagg St., Worcester, MA 01602.

TEXAS INSTRUMENTS TERMINALS

IMMEDIATE
DELIVERY



T.I. 733 A.S.R.

AVAILABLE FROM STOCK

T.I. PORTABLES
T.I. ASR & KSR
ADDS CRTS
DATA GEN.
TELEPRINTERS

DECWRITERS
DIABLO PRINTERS
FLOPPY DISKS
TECHTRAN DIGITAL
RECORDERS

Westwood Associates, Inc.
DATA COMMUNICATIONS EQUIPMENT

1442 Broad St., Bloomfield, N.J. 07003 / (201) 338-0200
N.Y.C. (212) 964-3018 Phila. Area (609) 829-7280

WHOLESALE PRICES

Reducing Inventory

TERMINALS

-DEC-
LA36 LS120
VT52 LA180

ADM-1

-TEXAS INSTRUMENTS-

T1745 T1743
T1765 T1810

Equipment Also Available for Lease

MEMORY

-DEC-
16K Core - 1104/34
8K Core - 1104/34
16K MOS - LSI 11
4K MOS - LSI 11

-MONOLITHIC-
16K MOS - LSI 11

-INTEL-
24K MOS - LSI 11

COMPUTERS

PDP 1103
Disk Systems
Call for prices

Equipment is in stock and
ready for immediate delivery.

MODULES & INTERFACES

Q Bus Converter DLV11 I/O
KVV11-A Clock DL11E-I/O
DRV11 Module
ADV11-A A/D Con
DD11-F LSI-11 CPU

EQUIPMENT RESOURCES INC

1022-3 Cherokee Rd

Smyrna, GA 30080

(404) 434-1382

Contracts

CFS, Inc. of Brookline, Mass., has been awarded a contract totaling \$204,120 from the U.S. Army for worldwide installation of its software package Docs — Display Operator Console Support.

Digital Equipment Corp. has signed a contract with the Union-Tribune Publishing Co. of San Diego, Calif., for supply and installation of computer systems and terminals to handle editorial, circulation, classified advertising and production tasks for the company's morning, evening and Sunday newspapers.

Vermont Research Ltd. of Leatherhead, England, has signed a contract to supply disk memory subsystems to Plessey Radar Ltd., of Addlestone, England. The value of the contract is in excess of \$1 million.

Hong Kong Philips organization has been awarded a contract by the Hong Kong government for the supply and installation of a PTS 6000 terminal system in the treasury department.

Honeywell Information Systems, Inc. has been awarded a \$2.1 million contract to provide increased computer services during the next two years for U.S. Customs' Automated Merchandise Processing Systems (Amps) Division.

The Raytheon Co. of Sudbury, Mass., and the Washington Post have entered into the second part of their two-phase contract for a 220-terminal news entry and editing system.

Vermont Research Ltd., Leatherhead, Surrey, England, has signed a contract to supply 200 Model 4016 drum memories to Bell Telephone

Manufacturing Co. in Antwerp, Belgium. The value of the contract is over \$1,750,000.

Data Terminal Systems, Inc. has received contracts and awards during the months of October and November totaling more than \$10 million. The following retailers have placed orders or made awards to DTS: Safeway, Albertson's, Price Chopper, Loblaw's, Allied Supermarkets, A.J. Baylees, CVS, Sav-on, Payless, Snyder, Wa Wa Markets, Valle's Steak House, Baskin-Robbins, Orange Julius, Host International, Wal-Mart Stores, Times Square Stores and the State Liquor Commission of Virginia, Vermont and Alabama.

Information Management International has signed a five-year contract to provide on-line services for hospital and contribution accounting for the Motion Picture Country Hospital, membership accounting for the Screen Actors Guild, pension accounting for the Motion Picture Industry Pension Plan and pension and health & welfare accounting for the Producers & Screen Actors Guild Health & Welfare Fund.

Texas Instruments, Inc. has been awarded a contract for 500 Silent 700 Model 733 keyboard send-receive data terminals by the McDonald Corp. to automate paperwork flow.

Datacrown Ltd. of Ontario has secured a three-year contract to provide DP service for the Excelsior Life Insurance Co. and its affiliate, Aetna Casualty Co. of Canada.

The Librascope Division of The Singer Co. has been awarded a contract in the

amount of approximately \$1 million by the RCA Corp. for Model CL107MA militarized mass-memory subsystems.

Control Data Corp. has signed a five-year agreement with the Business Systems and Communications Group of International Telephone and Telegraph (ITT) to supply computer printers including the 300, 600 and 900 line/min versions of CDC's 9380 band printer.

The Pertec Division of Pertec Computer Corp. has been awarded a two year \$350,000 contract from Data Systems Specialists, Inc. of Elgin, Ill. for Pertec's T8000 tape drives and D3000 disk drives.

Incoterm Corp. of Wellesley Hills, Mass. has received an order for equipment valued at approximately \$4.5 million from Mellon Bank. The equipment will be used to implement Phase III of Mellon's automation program.

Raytheon Data Systems Co. has received a contract from the State of New York to install PTS-100 programmable terminals in a DP network for the state's Department of Social Services. The contract is valued at \$6.4 million.

Entrex has been awarded a \$4.3 million contract from the Social Security Administration to process retirement, survivor and disability claims.

Honeywell Information Systems, Inc. has received a \$5.4 million contract from the U.S. Department of the Interior's Bureau of Land Management for a dual Model 66/80 large-scale system.

New Companies

Crown Communications, Inc. has been founded to offer products such as computer peripheral devices to users of centralized, time-sharing computer centers and to customers with extensive internal DP systems. The firm is located at 2750 Northhaven Road, Dallas, Texas 75229.

Gilmore Research, Inc., a consulting firm that specializes in distributed processing and the study of programmer productivity, has been formed. The firm is located at 1660 Cove Court, Naperville, Ill. 60540.

Sun Data, Inc. has been formed to serve the used computer industry in the reconfiguration, refurbishment and installation of IBM System/3s. The firm is located at Suite A, 6899 Peachtree Industrial Blvd., Norcross, Ga. 30092.

Expansions

Information Terminals Corp. has acquired a seventh building in the indio-Soquel Way area of the Sunnyvale, Calif., Perry/Arrillaga industrial park. The building contains 31,000 sq ft of new manufacturing space.

Memorex Corp. has broken ground for a 44,000 sq-ft manufacturing plant in Eau Claire, Wis., to produce high-density, multilayer printed circuit boards and associated components.

Infotron Systems Corp. has moved to the Cherry Hill Industrial Center in Cherry Hill,

N.J. The facility comprises 30,000 sq ft of a 50,000 sq-ft building.

Sycor, Inc. has selected a 21,000 sq-ft facility in Goldsboro, N.C. The company has also occupied another 14,000 sq ft of office space in Ann Arbor, taken an option on an additional 10,800 sq ft of office space there and activated 20,000 sq ft of space in a newly constructed Ann Arbor warehouse.

Vadic Corp. has moved into a new 95,000 sq-ft plant on a 5.3-acre Moffett Industrial Park site in Sunnyvale, Calif.

COURSE ANNOUNCEMENT

JES3/MVS INTERNALS

Logic and structure for systems programmers

MARCH 13-17
Toronto, Canada

PRESENTED BY
CSR

COMPUTER SYSTEMS RESEARCH, INC.

For information on live lecture/self study JES3/MVS and mass storage courses write or call collect:

Mike Daversa, 195 West Main Street
P.O. Box 45, Avon Connecticut 06001 203-678-1212

NAME and ADDRESS CAPTURE TYPE/SCAN

.025 Per Name

DATA-MIDWEST (A Division of DATA SYSTEMS INC.)
3050 Metro Drive, Minneapolis, Minn. 55420 612-854-1800

Upgrade to IBM 6250 BPI tape drives now!

SAVE IBM RENT — ELIMINATE DOWN-TIME
caused by field conversions

Now you can upgrade IBM 6000 BPI drives to new 6250 BPI drives immediately from inventory

Call Nick Dibari
312-698-3000
or your nearest MDISCO office

MDISCO

Proven Mini-Software Designed For Your Business

Pre-Packaged, Off-The-Shelf Programs Covering:

- | | | |
|--|---|------------------------------------|
| ☐ accounts payable | ☐ other accounting | ☐ marketing |
| ☐ accounts receivable | ☐ financial analysis | ☐ education |
| ☐ general ledger | ☐ statistical analysis | ☐ |
| ☐ payroll | | |

Programs Designed For:

- | | | |
|-------------------------------------|--|-------------------------------------|
| ☐ BASIC Four | ☐ PDP 8/11 | ☐ Four Phase |
| ☐ Burroughs | ☐ IBM 3/32/34 | ☐ |
| ☐ Datapoint | ☐ Hewlett Packard | |

Call now or return this ad for complete details to:
Douglas R. Johnson
Resource Software International, Inc.
140 Route 9W
Englewood Cliffs, New Jersey 07632
(201) 947-6104

Cw

Name _____
Title _____
Company _____
Industry _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Show and Tell.

To learn more about computers at any level, you have to hear. Discuss. Ask questions. Share ideas. Watch things work.

Computer shows dot the map every year. But Computer Expo 78 is different. An exhibit showing you all that's new. A conference telling you about new ways to use it.

The Show.

The Exposition. Your chance to hold a one-to-one consultation with hundreds of representatives in the know from the nation's top manufacturers. You don't have to travel all over. They're coming soon to a city near you.

And the Show is free! Including exhibitor seminars and demonstrations of the latest developments in:

Data Communications Terminals • Software • Minicomputers • Data Input Equipment • Computer Output Equipment • Supplies • Magnetic Media • Modems • DP Education • Small Business Computer Systems • Flexible Disk Drives • Data Communications Interconnect Equipment • Mini-peripherals • Magnetic Tape Transports • Cassette Systems • Power Supplies • Printer Terminals • Keyboards. And more.

Ask your questions. State your needs. Discuss your plans. This low-key atmosphere is your chance of the year to compare what's on the market, all in one place. As sophisticated or as simple a show as you need. You're the center of attention, whatever your level.

You're important enough to bring top people from all over the country to you. Find your show dates here:

ANAHEIM Southern California Computer Expo	March 21, 22, 23 Disneyland Hotel
SAN FRANCISCO Northwestern Computer Expo	March 28, 29, 30 San Francisco Civic Auditorium
HOUSTON Southwestern Computer Expo	April 11, 12, 13 Astrohall
ATLANTA Southeastern Computer Expo	April 18, 19, 20 World Congress Center
ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

COMPUTER CARAVAN'S



The Tell.

The Conference. Computer Expo's Conference takes place from 9 AM to 1 PM, leaving your afternoons free for the Exposition. The Conference includes keynote speeches, case studies, presentations, panel discussions and workshops. All put together by experienced conference planners, making this the most respected conference in the country. Well-known authorities — consultants and users — will share experiences, ideas, insights and foresights with you.

These are days that will bring you facts you need now, to put to practical use now. No frills, no fluff.

Whatever your level, you'll find at least one of these days a must:

Tuesday

For you on the executive level, dealing with data processing personnel, problems, payments, plans.

The Executive Briefing.

A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing. Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday — Simultaneous Double-Conference

For you who are bringing in a first computer system for a small company, or are involved in light inhouse computer use — maybe about to trade up — or just thinking about your own system.

Small Business Systems.

A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

For you who interface with computer personnel on a day-to-day basis and need to anticipate, communicate, elicit their best work.

Managing People Problems.

A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Thursday

For you, the manager or technician whose organization is thinking of distributing its computer resources to regional offices and plants.

Distributed Data Processing.

A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Take one, two, or all three days.

Send yourself. Send your key personnel.

The Exposition is free.

The Conference is just \$55 per single day, only \$135 for all three days.

Register now.

For the Show.

And for the Tell.

Write to
Conference Chairman
Computer Expo 78
60 Austin Street
Newton, MA 02160

Save time!

To register, to get more information or for your free advance tickets to the Exposition, call TOLL FREE: 800-225-4242. (In Massachusetts, call collect: 617-964-4550.)

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION ANNOUNCEMENTS

We Admit it

The PHILADELPHIA AREA is experiencing a severe shortage of available, high calibre PROGRAMMERS & PROGRAMMER/ANALYSTS. The demand is unparalleled within the business community. As a result, our clients are becoming increasingly aware of the need to import EDP talent to fill the following career growth apptys.

MANUFACTURING

SYS PROGRAMMER To \$28K
Proficient VM Internals
T/P SYS PROG To \$27K
Knldg CICS Sysgen nec.
SYS PROG To \$27K
Knldg SVS Internals, VS 2,
TSO
RPG II PROG/ANAL To \$18K
SYS 3 MOD 10 or 15D. Sys
develop & file structure bkgd
nec.
EAL PROG To \$17K
Sm dept; 370/155 environ-
ment

INSURANCE

SR. PROG To \$24K
H6000 Cobol &/or Easy-
coder
SYS PROG To \$23K
VM 370 CMS or CP67-CMS
bkgd
PROG/ANAL To \$20K
Reinsurance or Internatl In-
surance bkgd. ANS Cobol
nec.
EASYSOOPER PROG To \$19K
Oppty train Cobol on H6000
PROG/ANAL To \$18K
ANS Cobol, OS/DOS w/Mod-
ular Concepts
TROUBLESHOOTER To \$18K
Timesharing Support, APL,
PL-1 &/or Cobol

BANKING

MGR SYS & PROG To \$20K
Proficient Cobol & BAL -
Must come from sm-med
bank environment
ANS COBOL PROG To \$20K
2+ yrs DOS/VS environment
PROG/ANAL To \$19K
Knldg COBOL, Fortran
&/or BAL. Function as Chief
Programmer in proj environ.
For immediate, confidential
attention: please call or for-
ward resume to:

ROBERT HALF
PERSONNEL AGENCIES, INC.

2 Penn Center, Suite 706
Philadelphia, PA 19102
(215) 569-4580

New! 1978 Computer Salary Survey

Call for your FREE copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

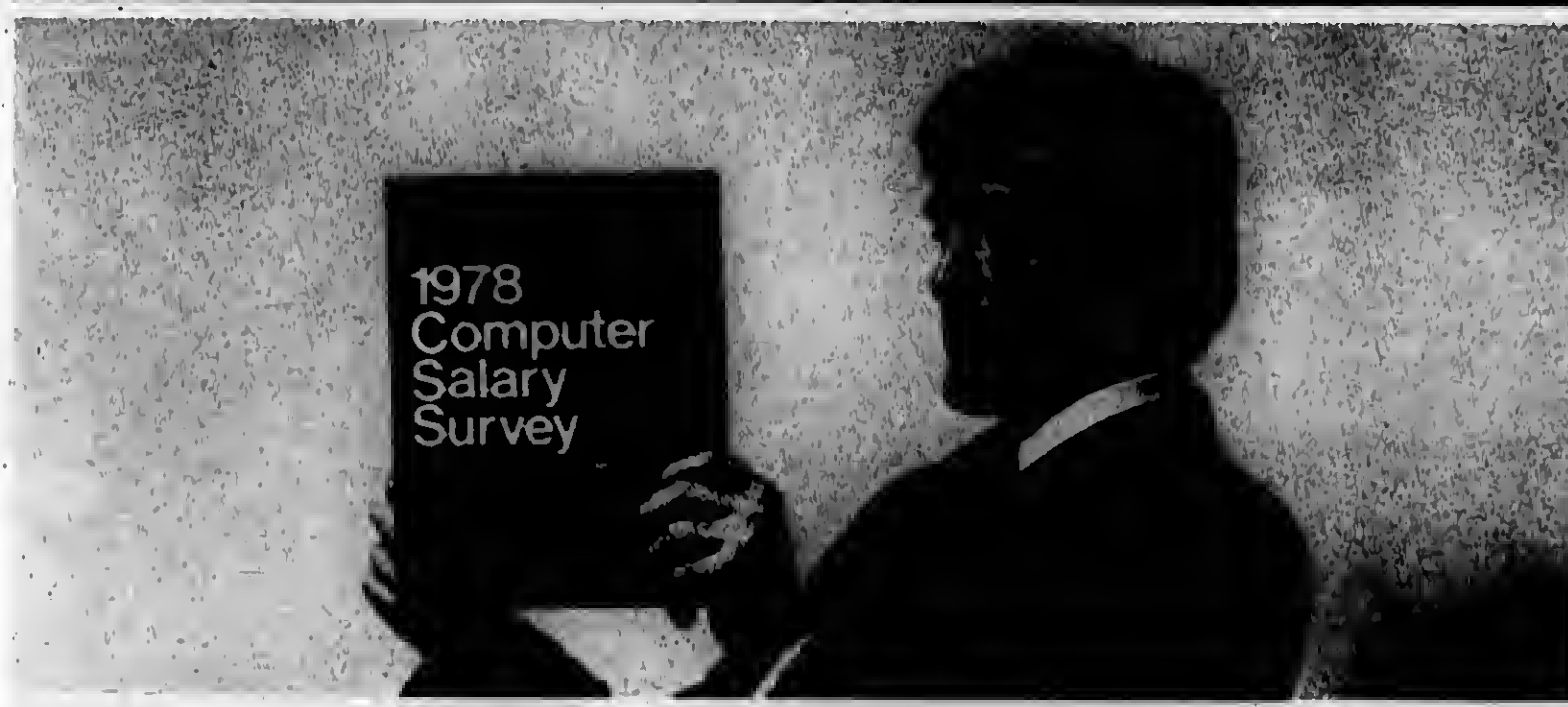
This comprehensive free report also gives you expert advice on a variety of important career topics such as:

- When you should consider a job change.
- What you need to do to break into management.
- How to make sure you're getting the proper exposure.
- Why timing is so crucial in your long range career development.
- How you can avoid stagnation.

And much more. The 1978 Computer Salary Survey has been compiled by

Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

source edp



For your FREE
1978 Computer
Salary Survey call
the Source Edp
office nearest you.

East:

Boston 617/482-7613
Hartford 203/522-6590
New York City 212/738-7445
Philadelphia 215/665-1717
Stamford, CT 203/329-8411
Union, NJ 201/687-8700
Washington, D.C. 703/790-5610
Wellesley, MA 617/237-3120

Midwest:

Chicago 312/782-0857
Cleveland 216/771-2070
Detroit 313/963-0510
Kansas City 816/474-3393
Minneapolis 612/544-3600
Northfield, IL 312/446-8395
Oak Brook, IL 312/986-0422
Rolling Meadows, IL 312/392-0244
Southfield, MI 313/352-6520
St. Louis 314/862-3800
St. Paul 612/771-0544

South/Southwest:

Atlanta 404/325-8370
Dallas 214/387-1600
Denver 303/773-3700
Fort Worth 817/338-9300
Houston 713/826-8705
New Orleans 504/561-6000

West Coast:

Encino, CA 213/995-8866
Irvine, CA 714/833-1730
Los Angeles 213/386-5500
Oakland 415/444-5955
Palo Alto 415/328-7155
San Francisco 415/434-2410
Seattle 206/454-6400
Torrance, CA 213/540-7500

Canada:

Toronto 416/364-2919

If unable to call, write:

Source Edp
Department C-1
721 Enterprise Drive
Oak Brook, Illinois 60521

When writing, please be sure to use home address and indicate position title.

SYSTEMS PROGRAMMER

A rewarding and stimulating career opportunity offering the professional and personal recognition you seek is available now at the new Earth Resources Observation Systems (EROS) Data Center. This facility is the national center for the processing and dissemination of spacecraft acquired imagery and electronic data of the Earth's resources. These positions are available immediately for individuals with the following qualifications:

- Degree in computer science or related discipline with experience in maintenance and trouble shooting of computer systems software including supervisors, compilers and utilities. Experience in systems support of B-6700 computer preferred. Major efforts include support of:
- B-6700 Multi processor systems
- Data communications network
- Large on-line data base
- Mini computer image processing systems
- Array processing hardware

Excellent income, comprehensive benefits, relocation assistance, and the advantages of our midwestern lifestyle await you. Join Technicolor Graphic Services, Inc., a wholly-owned subsidiary of Technicolor, Inc., Hollywood, California, for an exciting career opportunity at the EROS Data Center.

FOR PROMPT AND CONFIDENTIAL CONSIDERATION, OR ADDITIONAL INFORMATION, SEND RESUME TO:

Mr. J.C. Pfliger

TECHNICOLOR GRAPHIC SERVICES, INC.

P.O. Box 1242

Sioux Falls, South Dakota 57101
An Equal Opportunity Employer M/F

COMPUTER SALES SYSTEMS ANALYSTS FIELD SERVICE PROGRAMMERS

We currently represent leading firms with openings throughout the U.S. You must have 2-4 yrs of successful related experience. Total compensation packages range from 15K to 30K. Call Bill Coyne (617) 235-4670 or send resume to:



Personnel
Consultants

65 William St.
Wellesley, MA 02151

ASST. MANAGER

Data Base mgr/Asst. Mgr. Must be a Canadian citizen with: an M.A. from a quality University, 3-4 yrs of solid hardware/software experience, and management orientation. Will be a project leader in designing and programming data base applications. \$20-30,000.

Kath North, CPA, CDP

ROBERT HALF
PERSONNEL AGENCIES, INC.

2626 Rainier Bank Tower
Seattle, WA 98101
(206) 624-9000

HOOVER

We have immediate openings for college graduates or experienced applicants in the following areas:

SENIOR PROGRAMMERS

Must be able to implement CICS on-line D.P. systems by writing programs in COBOL for DL/1 data bases.

SENIOR SYSTEMS ANALYST

Degree. Business functions - Data Base - Telecommunications.

Build your career with Hoover - an expanding, progressive appliance manufacturer offering interesting and challenging positions with excellent growth potential. Please send details of education, experience and salary requirements to:

N.J. Feim

THE HOOVER COMPANY

North Canton, Ohio 44720
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Software Professionals

Put yourself at the top of our list.

For openings at our facilities in:

Arlington, VA
Beltsville, MD
Valley Forge, PA
Sunnyvale, CA
Daytona Beach, FL

Interviews can be arranged during the ACM Computer Science Conference

Call Bill Sarno at the Detroit Plaza, in Detroit, Michigan on February 21, 22, & 23

Or, send your resume to Mr. W. Sarno, General Electric Co., Valley Forge Space Center, Goddard Blvd., King of Prussia, PA 19406

While you're discussing the latest impacts of computer technology, discover the impact you'll make at General Electric. Meet with our representatives, and you'll get the details on our major commercial/government projects. You'll also hear about the chance to utilize the advanced technology we've developed in such pioneering areas as: information systems, major ground data processing, large and advanced software systems, multiprocessing/teleprocessing networks, diversified management support activities, R & D in processing techniques, software engineering and management, the space shuttle, and others.

We'll also tell you about the excellent compensation package we offer—including a fully competitive salary and comprehensive GE benefits. Positions are available for:

DATA BASE MANAGEMENT SPECIALIST (SR. LEVEL)

Requires experience with large scale systems—particularly in the data management systems and control of large data bases.

SYSTEMS ANALYSTS (HARDWARE & SOFTWARE)

Requires experience solving organization, management and workflow problems; analyzing information requirements; and planning procedural systems. Should also have experience collecting, analyzing and evaluating systems requirements for large-scale information systems. Will prepare feasibility studies, perform architecture selection systems design and specification for customer applications.

OPERATING SYSTEMS ANALYSTS (SR. LEVEL)

Requires the ability to analyze overall software processing control and support requirements and develop enhancements and event-oriented run control packages. Experience in IBM 370, U1160, Sigma, Honeywell 600 Series; PDP-11X, DEC10-20 or CDC 6600 and design of systems control software for large information systems. Will analyze and develop applications software architecture to maximize throughput, optimize major executive systems via systems generation parameters; analyze usage of major language processors; and provide guidance to data-base designers and software development teams.

PROGRAMMERS (ALL LEVELS)

Requires BS in computer science, math or equivalent plus knowledge of UNIVAC/110B/1110, IBM 360/370, COBOL, JCL, FORTRAN, PL1, M204, and DBMS. Will provide technical support in requirement analysis and design, development, and testing of software products for large multitile data system . . . and develop on-line DMS retrieval and file update programs for defined applications programs.

COMPUTER SYSTEMS ENGINEERS

Requires 5-10 years experience in large-scale systems design and implementation—including experience in the design and evaluation of large-scale distributed processing systems. Experience in both hardware and software, reliability, performance, and budgetary analysis.

SYSTEMS ANALYSTS

Requires BS or equivalent and 5 years of experience. Will be responsible for requirements analysis and functional specifications, resource scheduling, contingency planning, development & control of interface specifications.

SOFTWARE ANALYSTS

Requires BS degree and 5 years of experience. Background with FORTRAN IV & PDP-11's (RSX-11, RMX-11) also necessary. Will be responsible for software design and implementation using structured programming techniques.

SOFTWARE TEST ANALYSTS

Requires BS degree and at least 3 years of experience. Will be responsible for implementing software test plans, procedures, and specifications, and conducting tests and reporting results.

GENERAL ELECTRIC

General Electric takes pride in being an equal opportunity employer, M/F.

SYSTEMS ANALYST

We are seeking several key individuals capable of assuming project management responsibilities for the development and implementation of large scale sophisticated banking systems. Initial assignments will be in such areas as EFTS, Central File, and On-Line Teller systems.

These are non-programming positions, however, candidates should have a programming background preferably in an IBM DOS environment. Experience with on-line systems and CICS is desirable but not required.

If you are interested in a challenging opportunity, personal growth and earnings potential limited only by your ability, and the contentment of working in a pleasant midwestern city, please submit your resume to:

Gene Ketchmark, AVP

**BRENCO
AUTOMATION CENTER
INC.**

717 Mulberry, Suite 503
Des Moines, Iowa 50309
A Subsidiary of Breton Banks, Inc.

COMPUTER SERVICES

ADMINISTRATOR

FLORIDA

Salary \$18-24K

This position performs highly responsible, technical and administrative work in planning, organizing and directing the 24 hrs/day, 7 days a week operation of a computer facility.

Requirements: College degree + 6 yrs professional experience in computer based systems design or operation, 2 yrs supervisory level. Experience as required may be substituted on a year-for-year basis for required college.

Send resumes to: H.F. Goodwin, Management Systems & Services Director, Dept. of Health & Rehabilitative Services, Office of Management Systems, 1323 Windwood Blvd., Tallahassee, FL 32301.

COMPUTER SALES

\$40,000 +

Market mini-computers to selected major oil industry accounts with a base salary that can go to \$25,000 and incentive structure geared to \$40,000+ at quota. You'll be calling on top level executives with Fortune 500 companies. If you are successfully selling in the computer field, you'll want to investigate this unusual career opportunity today.

For further information, please contact Dot Chance at

(713) 658-9898

All Fees Assumed by Client Companies.

M. David Lowe
PERSONNEL SERVICES

403 Houston Nat. Gas Bldg.

Houston, TX 77002

(206) 624-9000

SR. APPLICATION PROGRAMMER/ANALYST

Our continued growth has created 3 new positions for Senior Application Programmer/Analyst. Job duties include assisting in generating and maintaining all system software and utility programs. Will write and maintain applications programs. Will perform programming and systems design routines to schedule and quality requirements. Require Bachelors degree or experience equivalent. Requires broad knowledge of systems and procedures techniques and their application to business data processing. Prefer oil and gas industry experience. Excellent starting salary and fringes. Position located in North Texas Metroplex. Send resume and salary history to:

CW Box 1431
797 Washington St.
Newton, MA 02160
An Equal Opportunity Employer

COMPUTER ASSISTED INSTRUCTION ASSOCIATE COORDINATOR

Northern Plains

Consortium for Education

DESCRIPTION OF POSITION: Assist Consortium of six North Dakota colleges in implementing computer programs which will augment instruction in undergraduate social and natural science courses. Aid in analyzing, designing and coding systems and programs requested by college instructors, and conduct technical training programs and subject matter seminars in computer assisted instruction.

REQUIREMENTS: Extensive knowledge in developing and implementing computer assisted instruction packages and courses. Knowledge of an interactive computer language and interactive computing. Doctorate or near doctorate required. One or more years' experience in college level teaching which involved use of a computer as a teaching tool would be beneficial.

ADDITIONAL INFORMATION: A twelve month position available July 1, 1978. Minimum salary \$18,000. Send resume, statement of interest and qualifications, and list of three references to:

Northern Plains
Consortium for Education
Jamestown College
Jamestown, N. Dakota 58401
An AA/EOE

San Francisco

PROGRAMMING CONSULTANTS

(Salary \$18-28K)

Allan Consulting Associates is an expanding, profitable corporation with a present staff of 15 programmers and analysts. We have a current need for 3 additional permanent employees with 5+ years experience in commercial applications preferably in merchandising, wholesaling or distribution. Positions include full benefits and reasonable relocation allowance to California.

Our business is providing data processing services to clients in the distribution industry requiring (1) expertise not available from their inhouse staff for specific studies/development projects or (2) supplemental development staff on an annual budget basis (Allan Consulting Associates staff based in Palo Alto with 10% travel to client's site).

Submit resume to:

2448 Watson Court
Palo Alto, California
94303

allan
Consulting Associates

**Immediate openings for Programmers - Analysts -
Software Specialists now - and throughout 1978.**

General Dynamics Data Systems Services introduces the Career Registry.

We have created this new registration service for DP professionals who are too busy to actively search for important opportunities. It will enable us to notify you of our *immediate openings* in your specialty, and also keep you informed of appropriate *future openings* throughout the year. Qualifications must include a professional degree in Computer Science, Math, Physics, Engineering or Business with a minimum of 2 years experience.

Here's How It Works:

We have listed our principal areas of DP involvement—hardware, software, applications programming and, of course, our widespread geographical locations. All you need to do is to use the scale provided to mark the spaces that best match your qualifications. We, in turn, will notify you of our present and future openings that fit your Career Registry profile.

A PROFILE OF DSS

Data Systems Services is a recently formed organization of General Dynamics providing scientific/engineering and business data processing services to corporate operating divisions. These services are performed at three major regional Data Systems Centers and at numerous nationwide locations.

Because computers and microprocessors are an integral part of many General Dynamics products, we are continually at the leading edge of DP technology. We are involved in projects ranging from Trident submarines, cruise missiles and the new F-16 fighter, to LNG tankers and digital telephone switching systems.

This diversity of challenge, combined with our rapid growth, has created an uncommonly professional and fast-paced organization.

CAREER REGISTRY ENTRY

Instructions:

Use the rating scale to indicate your current level of knowledge and write that number in the appropriate spaces. Complete your Career Registry Entry form and send it, together with earnings history, to:

Mr. M.R. Barlow, Corporate Director
General Dynamics Data Systems Services
Pierre Laclède Center
St. Louis, MO 63105

RATING SCALE

Basic Knowledge 1 Perform Independently 3
Perform Under Direction 2 Teach/Consult 4

LANGUAGES

___ COBOL
___ FORTRAN
___ PL/I
___ JOVIAL
___ MARK IV
___ APL
___ BASIC
___ ACL/BAL
___ CSSL
___ SIMSCRIPT
___ CSMP
___ GPSS
___ Other _____

SYSTEMS

___ IBM 370/168-MP (MVS/JES3)
___ CDC CYBER (NOS/BE)
___ UNIVAC 1100 (EXEC 8)
___ Minicomputer Systems
___ Microprocessor Systems
___ Military Computers
___ Other _____

GEOGRAPHIC PREFERENCE(S) (Simply Check)

☐ San Diego, California
☐ Sanford, Florida
☐ St. Louis, Missouri
☐ Pomona, California
☐ Norwich, Connecticut
☐ Quincy, Massachusetts
☐ Ft. Worth, Texas
☐ Quonset Pt., Rhode Island

APPLICATIONS AREAS

___ Guidance & Control Systems
___ Telemetry Data Reduction
___ Avionics
___ High-Technology Applications
___ Micro Processor Applications
___ Real-Time/Time-Critical
___ CAD/CAM/CMS
___ Structural Analysis
___ Electronics Design

___ Information Management Systems
___ Computer Performance Measures
___ Data Communications
___ Data Base
___ Semi-Conductor Technology
___ Hybrid Simulations
___ Computer Modeling
___ Operating Systems
___ Computer Design
___ Other _____

Name: _____
Current Position Title: _____
Home Address: _____
City: _____
State: _____ Zip: _____ Home Phone No: _____
Degree: _____ Years Experience: _____

GENERAL DYNAMICS
Data Systems Services

U.S. Citizenship required. An equal opportunity employer, M/F.

position announcements

position announcements

position announcements

position announcements

position announcements

West

Los Angeles Area

San Francisco Bay Area

Seattle

Denver

Kansas City

Minneapolis/St. Paul

Chicago

St. Louis

Shreveport

San Antonio

Houston

Dallas

El Paso

Milwaukee

There could be a Tektronix career in your backyard.

Or, maybe you want a Tektronix career and a new backyard.

Whichever, you have a choice. Stay where you are and advance your career with us, or move to another Tektronix area.

Our expansion is making it possible for even more professionals to join our winning ranks. As the undisputed leader in computer graphic terminals and computer graphic systems, Tektronix not only manufactures, sells and services the best line in the industry, we know how to care for our people.

If it's been a long, long time since you got a promotion, or a raise AND a pat on the back, or even recognized by the office receptionist, then you're ready for Tektronix. Match your career goals, interest and area of choice with what we have listed here. Then give us a call. Let's get together and YOU decide for a change just what it is you want, and where it is you want to live. It really can be that easy.

**District Sales Managers
OEM Sales Engineers
Sales Engineers**

Let's get together.

(800) 227-8340 Outside California
(800) 638-1915 Inside California

If you are ready for a Tektronix career, whether it be your present backyard, or one of our other openings, let's hear from you. Forward your resume or summary sheet or call one of the above TOLL FREE numbers, listing your area of preference. Address your inquiry to M.D. Westhoff, TEKTRONIX, INC., 3200 Coronado Drive, Santa Clara, California 95051. An equal opportunity employer m/f/h.

Tektronix
COMMITTED TO EXCELLENCE

East

Rochester, N.Y.

Syracuse, N.Y.

Philadelphia

Charleston, W.Va.

Richmond, Va.

Baltimore

Washington, D.C.

Detroit

Boston

Rhode Island

Springfield, N.Y.

New York, N.Y.

Cleveland

Atlanta

Orlando

Memphis

Louisville

Columbia, S.C.

Birmingham

COLLEGE of the VIRGIN ISLANDS COMPUTER CENTER

DIRECTOR

The College is seeking a director for its computer center equipped with an IBM System 3/Model 10. The appointee will be responsible for the operation of the computer center and for the design and implementation of computer applications for both administrative and academic departments of the College. Applicants must have a college degree and extensive computer experience. Knowledge of RPG is required. Knowledge of FORTRAN, COBOL AND BASIC and experience in an academic computer facility are desirable. Salary range is from \$16,000 to \$19,000 plus benefits and relocation expenses. Send resume to Mr. William DeLone, Assistant to the President, College of the Virgin Islands, St. Thomas, USVI 00801. An Equal Opportunity Affirmative Action Employer

PROGRAMMER ANALYST

HUTCHINSON INDUSTRIAL CORPORATION, a technological leader in the manufacture of chemically etched and milled parts for applications in medical and computer markets, actively seeks a Programmer Analyst for a challenging range of project assignments. This position requires systems design and development skills and capability to plan and meet commitments. Requirements are 2 to 4 years RPG programming experience with manufacturing systems and IBM, IPICS and BOMP. Experience in CCP and operations of IBM systems 3, model 15 is highly preferred. Excellent earnings and benefits package accompany this opportunity for rapid career growth and professional recognition in one of Minnesota's most scenic areas. Forward resume in confidence with salary history to:

Verne Meyer
Hutchinson Industrial Corp.
40 W. Highland Park
Hutchinson, MN 55350
An Equal Opportunity Employer

DATA PROCESSING DIRECTOR

Responsible for development, implementation and management of comprehensive data processing system for large school district. Extensive knowledge of state-of-the-art hardware; both instructional and administrative software required. Managerial experience and programming and systems design prerequisites.

Salary: \$23,377-\$31,045
Apply: Personnel Department,
City School District, 13 South
Fitzhugh St., Rochester, N.Y.
14614.
An Equal Opportunity Employer

Immediate Career Opportunities

Morrison Incorporated in Mobile, Alabama is growing rapidly and needs the following career EDP positions filled as soon as possible:

Systems Engineer — 3 to 5 years functioning as a systems engineer/programmer with knowledge of DOS/power/VS INTERNALS, CICS INTERNALS, Telecommunications and 370 Assembler Language.

Senior Systems Analyst — 3 to 5 years functioning as a systems analyst with experience including DOS/power/VS; ANS COBOL; DATA COMMUNICATIONS/DATA BASE (CICS). Requirements definition and systems design of financial and merchandising applications.

Programmer Analyst — 2 years functioning as a programmer writing program specs and designing COBOL programs. Specific experience should include DOS/POWER/VS, ANS COBOL, CICS and developing programs for financial, merchandising and inventory control applications.

Competitive starting salaries, excellent benefits program and opportunities for career growth.

Call now or send resume to:

MORRISON INCORPORATED



Human Resources Department
First National Bank Building
P.O. Box 2608
Mobile, Alabama 36625
205/432-9711 Extension 283

FIELD SERVICE

SYSTEMS 370/360, H-200
XDS, Univac, CDC
All Large & Medium
CPU's
MINI's PDP, NDVA, G.A.
HP, etc. All Mini
Systems

I/O STC, TELEX, CDC
ITEL, CALCOMP,
etc. All peripheral Ex-
perience

MTTR

(312) 344-8750

MTTR ASSOCIATES
1107 Mannheim Road \$12-30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

DATA COMMUNICATIONS COORDINATOR FLORIDA

Salary \$10-14K

Large data center in Jacksonville needs person for responsible technical work in coordinating the field operations of systems throughout the state. Individual must have experience in electronic test equipment.

Requirements: College degree + 2 yrs professional experience. Experience as required may be substituted on a year-for-year basis for the required college training.

Send Resumes To: R.H. Hall, Acting Computer Services Admin., Dept. of Health & Rehabilitative Services, Office of Management Systems, P.O. Box 2016, Jacksonville, Fl. 32203.

Programmers...
A career move up, to a bright
new future, begins with a...

collect
If you have at least one year of work experience call Steve Weber, collect, person-to-person at (203) 549-4240. He'll give you the inside info that leads to career success.



National Computer Associates

DALLAS
DataPro Personnel Consultants
4255 L.B.J. Freeway
Suite 182
Dallas, Texas 75234

DETROIT
Electronic Systems Personnel
Prudential Town Center
3000 Town Center, Suite 2580
Southfield, Michigan 48075

FLORIDA
Data Sciences Personnel, Inc.
Suite 205, 15490 N.W. 7th Ave
Miami, Florida 33189

HARTFORD
Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Constellation Enterprises
Suite 900, 3250 Wilshire Blvd
Los Angeles, California 90010

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
801 Nicollet Mall, Suite 1718
Minneapolis, Minnesota 55402

NEW JERSEY
Systems Search II
75 South Orange Avenue
South Orange, N.J. 07079

NEW YORK
Batal Associates, Inc.
405 Lexington Avenue
New York, New York 10017

NORTH CAROLINA
TaskForce, Inc.
1048 E. Wendover Ave.
P.O. Box 6888
Greensboro, N.C. 27405

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa. 19086

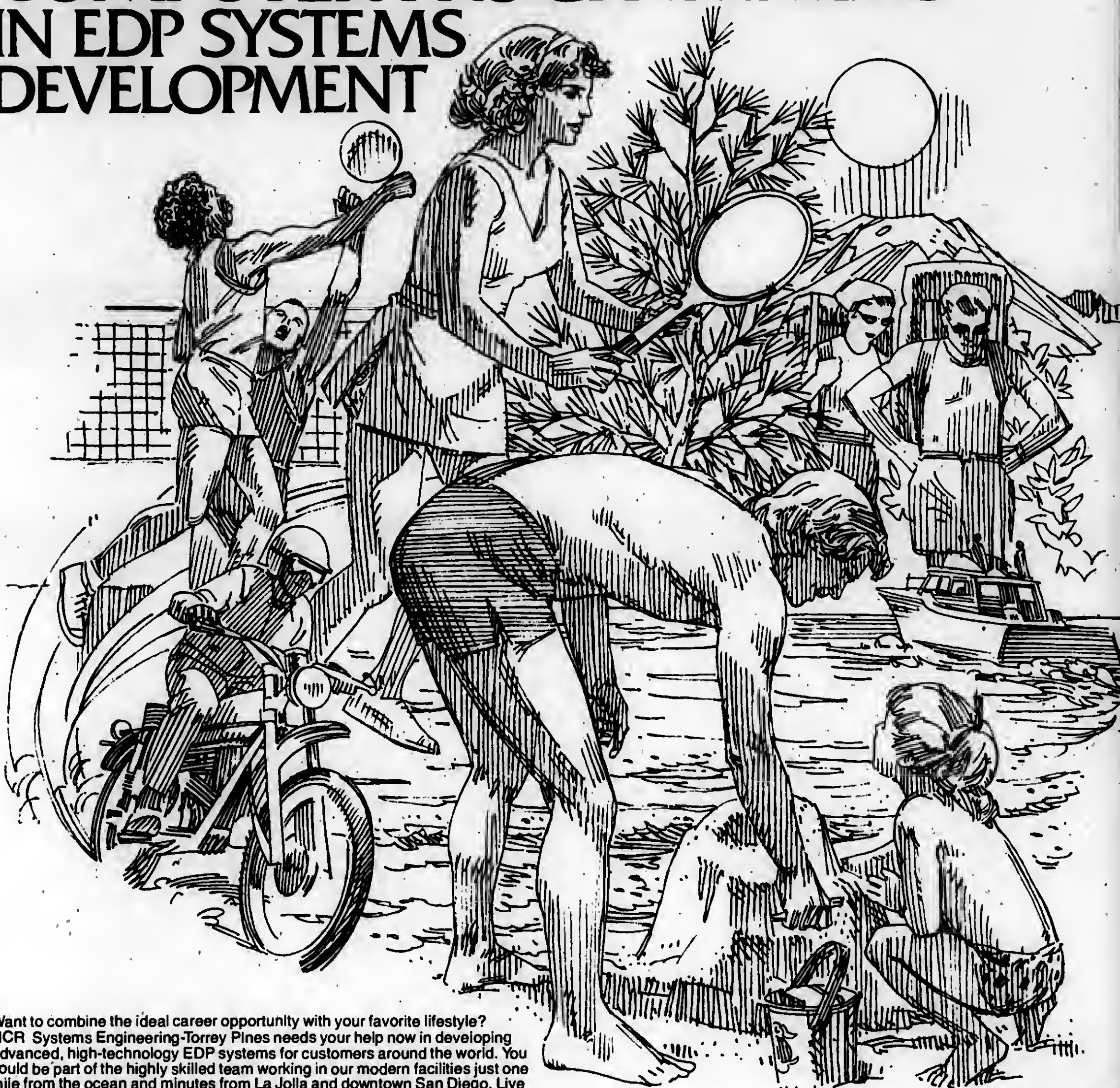
PITTSBURGH
Electronic Systems Personnel
106 Lawyers Building
426 Forbes Avenue
Pittsburgh, Pennsylvania 15219

SAN FRANCISCO
The Computer Resources Group
Agency, Inc.
303 Sacramento Street
San Francisco, California 94111

SYRACUSE
CFA Associates Personnel, Inc.
(Agency)
2530 James Street
Syracuse, New York 13206

WASHINGTON, D.C.
ESP Systems Corporation
Suite 210
1211 Connecticut Avenue N.W.
Washington, D.C. 20036

San Diego Openings for COMPUTER PROGRAMMERS IN EDP SYSTEMS DEVELOPMENT



Want to combine the ideal career opportunity with your favorite lifestyle? NCR Systems Engineering-Torrey Pines needs your help now in developing advanced, high-technology EDP systems for customers around the world. You could be part of the highly skilled team working in our modern facilities just one mile from the ocean and minutes from La Jolla and downtown San Diego. Live in the setting of your choice—beach, valley, mountain, country, small-town or urban—and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too—from mild coast to dry desert. San Diego is a place of extraordinary choices—and right now the choice is yours.

Systems Engineering has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- | | |
|---|----------------------|
| ■ TELECOMMUNICATIONS SOFTWARE | ■ OPERATING SYSTEMS |
| ■ FILE PROCESSING | ■ COBOL APPLICATIONS |
| ■ NETWORK DEVELOPMENT | ■ ASSEMBLY LANGUAGE |
| ■ LARGE MAINFRAME, MINI and MICRO PROCESSOR | |

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems, both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.

Thom Harris, Employment Specialist

NCR

SYSTEMS ENGINEERING-TORREY PINES

4046 Sorrento Valley Blvd., San Diego, Calif. 92121

We are an equal opportunity employer

position announcements

position announcements

position announcements

position announcements

position announcements

JOIN OUR SUCCESS!!!

SALES SUPPORT & MARKETING SUPPORT OPPORTUNITIES IN THE SUNBELT

with the Commercial Division of University Computing Company, an internationally recognized leader in proprietary system software packages for the IBM marketplace. Over 1,800 customers around the world (and over half the OS installations in the US) operate with the assistance of UCC's advanced software. In 1977, four of the divisions' seven products were NUMBER ONE in their markets.

The divisions' packages include:

UCC ONE:

(TAPE MANAGEMENT SYSTEM, listed on the Data Pro Honor Roll in 1974, 1975, 1976, & 1977 and recipient of the ICP Five Million Dollar Award)

UCC TWO:

(DOS UNDER OS, listed on the Data Pro Honor Roll twice and recipient of the ICP Ten Million Dollar Award in 1978)

UCC THREE:

(DISK MANAGEMENT SYSTEM)

UCC SIX:

(PDS SPACE MANAGEMENT SYSTEM)

UCC SEVEN:

(PRODUCTION CONTROL SYSTEM, first introduced in 1977)

UCC TEN:

(The standard IMS DATA DICTIONARY, which has received Honorable Mention from Data Pro and the Two Million Dollar ICP Award)

UCC FIFTEEN:

(RESTART/RECOVERY MANAGEMENT SYSTEM, which will receive the ICP One Million Dollar Award in 1978)

Due to a 24% increase in sales during 1977, we are currently accepting applications for the following positions:

SALES SUPPORT REPS:

(UCC 1, 2, 3, 6 and 15) Will assume the roles of technical sales support and customer and sales rep training for this product group. Advancement potential into direct sales from this position is excellent.

MARKETING SPECIALISTS:

(UCC 3 & 6) Will assume responsibility for establishing product direction & enhancements, major marketing programs, and the development of sales aids (brochures, slides, etc.)

ASSISTANT PRODUCT MANAGERS:

(UCC 1 & 15 and 2) Will serve as a team leader for a group of Marketing Specialists and will be responsible for the implementation of marketing activities for these products.

These positions, which are all permanently located in Dallas, Texas, involve moderate travel in the US and Canada. Salaries, benefits, and advancement potential are excellent.

To receive consideration, you must have a knowledge of IBM 360/370, OS/VS, ALC, and excellent interpersonal skills. Previous support experience and DOS/VS preferred, but not required.

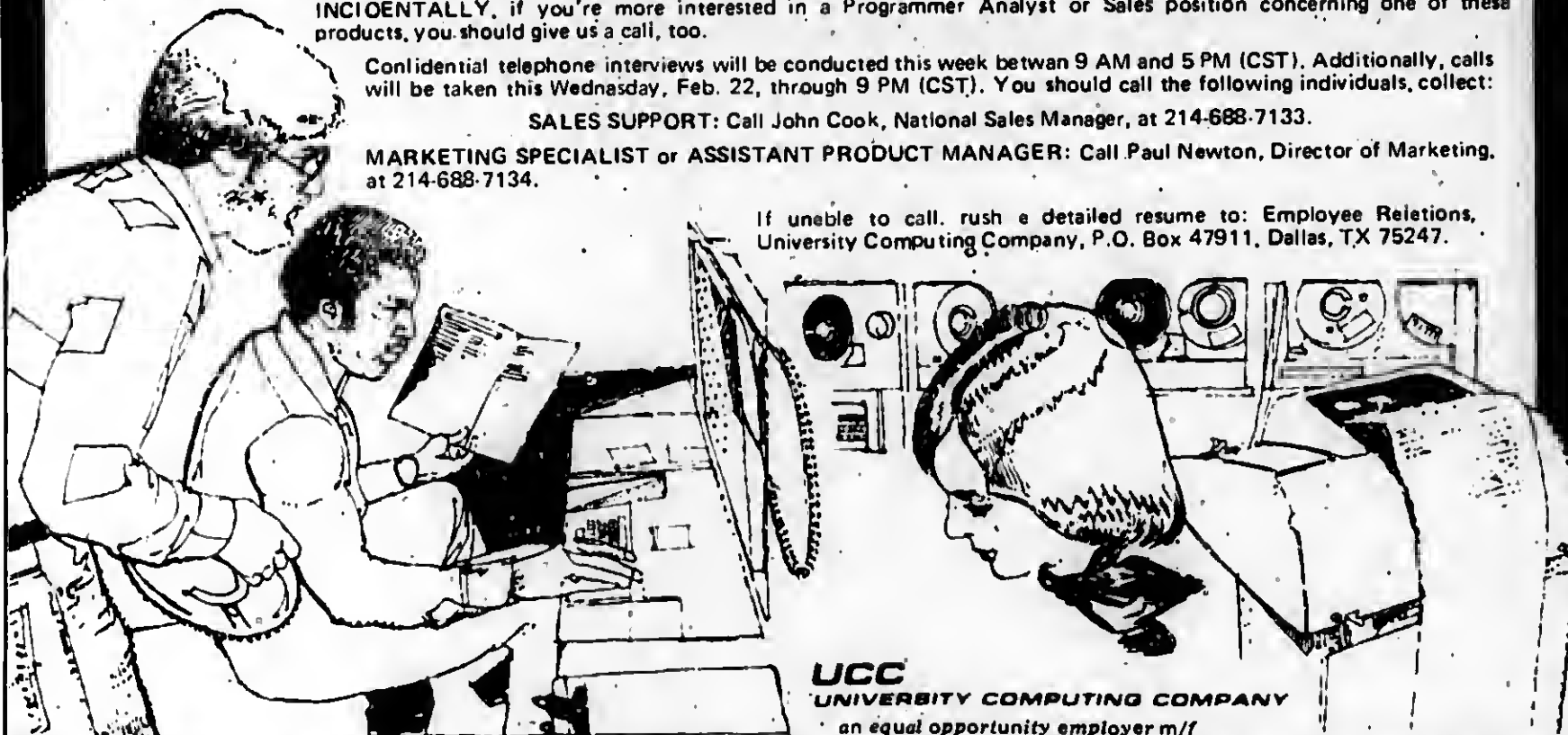
INCIDENTALLY, if you're more interested in a Programmer Analyst or Sales position concerning one of these products, you should give us a call, too.

Confidential telephone interviews will be conducted this week between 9 AM and 5 PM (CST). Additionally, calls will be taken this Wednesday, Feb. 22, through 9 PM (CST). You should call the following individuals, collect:

SALES SUPPORT: Call John Cook, National Sales Manager, at 214-688-7133.

MARKETING SPECIALIST or ASSISTANT PRODUCT MANAGER: Call Paul Newton, Director of Marketing, at 214-688-7134.

If unable to call, rush a detailed resume to: Employee Relations, University Computing Company, P.O. Box 47911, Dallas, TX 75247.



UCC
UNIVERSITY COMPUTING COMPANY
an equal opportunity employer m/f

SYSTEMS COORDINATOR

Assists faculty and students in effective use of university computer resources. Manages Systems Analyst team to provide technical expertise and consulting projects. Responsible for technical seminars, user publications, implementation, maintenance and documentation of statistical systems on 370/165-II. Knowledge of Fortran, SPSS, SAS, JCL, interactive systems, research methods and analytical techniques essential. Salary upper teens. Requires Master's in appropriate discipline plus extensive computing background in university environment, ability to work with variety of users and proven management experience.

ASSISTANT DIRECTOR UNIVERSITY COMPUTER SYSTEMS

Responsible for management of Center resources to provide administrative, instructional and research systems development and operation in large state university, 23,000 students. Assists Director in all aspects of University computer services administration. Manages Systems Coordinator/Analyst project teams. Recommends future software and equipment development, staff assignments, operating policies, service improvements. Current environment MVT/CICS moving to MVS/CICS-VS. Salary in twenties. Requires M.S. plus strong technical background and substantial experience at management level providing computing services in educational institution.

Application deadline both positions March 10, 1978.

Affirmative Action Equal Opportunity Employer

UNIVERSITY OF
SOUTH FLORIDA
Central Florida
Regional Data Center
Tampa, Florida 33620

SYSTEMS PROGRAMMER San Francisco Peninsula

Challenging career opportunity available for experienced Systems Programmer. Will be responsible for support and documentation of Burroughs 7700 Systems software including MCP, compilers, NDL, CANOE, OMS 11 and will assist in solving user problems.

Successful candidate should have degree in Computer Science or Math plus min. 8 years Burroughs 6700 or 7700 recently related work experience.

There has never been a better time to join AMI... our new leadership, expanding product lines and exceptional benefits make this an opportunity you must consider.

Please send your resume to Professional Employment, Dept. H-16, AMI, 3800 Homestead Road, Santa Clara, CA 95051. We are an equal opportunity employer M/F/H.

AMI
AMERICAN MICROSYSTEMS, INC.

COM SYSTEMS ENGINEER

NEW OPENINGS IN SEVERAL MAJOR CITIES

Due to our expansion Bell & Howell COM Products has immediate requirements for qualified Systems Engineers to provide technical support to our Computer Output Microfilm marketing effort.

Experience should include successful systems design, commercial application programming, oral and written communications, and direct customer interface. COM and minicomputer software experience is preferred, but not required. Responsibilities will include pre-sales marketing support, customer training, software installation, and application analysis. Some travel required.

For immediate consideration, please send your resume including salary history (resumes without salary history will not be considered) to Glenn Brock.

COM PRODUCTS DIVISION

1451 Quail Street, Newport Beach, California 92660



BELL & HOWELL

SYSTEMS PROGRAMMER

PHILA AREA FORTUNE 100 Mfr has asked us to identify that unique, one of a kind EOP pro. Bkgd must include knlkg VM, INTERNALS, TELEPROCESSING SYS, TEMS, CICS MAINTENANCE & SYSGEN, COBOL, ALC & BTAM exp nec. Co. has duplex 168, SVS/VM & MVS under VM configuration. Salary to \$29,000

For confidential attention, please call or send resume to:

ROBERT HALF
PERSONNEL AGENCIES, INC.

2 Penn Center, Suite 706
Philadelphia, Pa. 19102
(215) 568-4580

SAN DIEGO

PRG-II Programmers

Rapidly growing San Diego medical software firm is looking for bright, assertive programmers with good RPG-II experience and A/R billing background. Must be free to travel nationally. Salary commensurate with ability and experience. Benefits plus very generous profit sharing. Send resume in strictest confidence to: NATIONAL MEDICAL COMPUTER SERVICES, INC., 6640 CONVOY COURT, SAN DIEGO, CALIFORNIA 92111.

DATA PROCESSING MANAGER

We are a large financial institution searching for a goal-oriented individual to assume the position of Data Processing Manager. This is a career opportunity for the individual with a fair and direct approach to management. The ability to communicate well, both orally and in writing, is essential. Your background should include in-depth knowledge of IBM hardware and software. An advanced degree is required, an MBA preferred.

You should have 12 years of data processing and systems experience including a minimum of 2 years in systems applications. Management experience of 2 years in data processing operations and 2 years with a large unit (IBM 370/168 or larger configuration with 100 or more employees) is required.

This position offers exceptional advancement opportunity to Director of Data Processing Operations within 6 to 12 months. If you have the qualities we are looking for and are interested in relocating to the Southwest, write to:

CW box 1448
797 Washington St.
Newton, Mass. 02160

an equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

OPM LEASING SERVICES INCORPORATED

HAS RECENTLY OPENED BRANCH OFFICES IN THE FOLLOWING CITIES:

**LOS ANGELES
SAN FRANCISCO
CHICAGO
DALLAS**

We are expanding our operations throughout the United States, Canada and Europe and we're looking for dynamic marketing representatives with experience in system/370 leverage leasing combined with knowledge in the remarketing of data processing equipment. Minimum two years experience.

**EXCELLENT SALARY TOP BENEFITS PROVIDED
FOR PERSONAL INTERVIEW WRITE:**

OPM

Mr. Michael C. Iracondo, National Sales Director

O.P.M. Leasing Services, Inc.

9601 Wilshire Blvd., Beverly Hills, CA 90210

Tel: (213) 278-4117

THE CUSTOM LEASING PEOPLE

position announcements

position announcements

position announcements

position announcements

position announcements

Engineers and Programmers

NCR's Engineering & Manufacturing Division in Millsboro, Delaware is a leader in the design and manufacture of ECR/POS intelligent terminals. Ground floor opportunities exist in the design and development of our new C-2140 multi-microprocessor retail system.



REAL-TIME PROGRAMMERS

- Microprocessor software (Assembly Level)
- Operating Systems Design
- I/O Drivers
- Diagnostics
- Communication Protocols (SDLC)

Other requirements include Component-Reliability Engineers and Quality Engineers. All positions require a BS in EE, CS or a related discipline.

In addition to excellent career opportunities with NCR, our Millsboro location is right in the heart of the Delmarva Peninsula, better known as the "land of Pleasant Living". We're just minutes from marine recreational areas, wildlife preserves and the nation's finest beaches, and within a 3-hour drive of such major cities as Philadelphia, Baltimore and Washington.

Please send resume with salary requirements or call:

collect, (302) 934-8111

Ron Tull, Dept. CW-213
Engineering & Manufacturing-Millsboro
NCR Corporation
P.O. Box 607
Millsboro, Delaware 19966

DEVELOPMENT ENGINEERS

- State-of-the-art mass memory devices and technology such as PMOS, NMOS, CMOS, MSI and LSI
- 8080 Based microprocessor design
- Multiprocessor systems architecture
- I/O devices, (wand readers, cassettes, CRTS)

NCR
Complete Computer Systems

An Equal Opportunity Employer

M.I.S. PROFESSIONALS

Relocate to the SUN-BELT in South Florida. Miami-based insurance company is searching for career-oriented data processing individuals to fill responsible positions. Our Data Center is ideally located in Miami and contains dual 370/148 Systems utilizing CICS/VS.

NEEEO:

Systems Analysts with 6-8 years experience with solid analysis/design background on IBM 370 hardware.
Programmer Analysts with 2-5 years experience utilizing COBOL and/or Assembler on IBM 370 hardware.
CICS/VS and, Property/Casualty or Life, insurance experience are plus factors.

OFFERED:

New facilities; excellent working environment; in-house training programs; career development assistance; excellent starting salary; outstanding benefits; and a warm climate!

Please forward your resume, including salary history and requirements, to:

ADMINISTRATIVE SERVICE MANAGER (W)
I.S.D. - KOGER
AMERICAN BANKERS LIFE INSURANCE CO.
600 Brickell Avenue
Miami, Florida 33131

UNIVERSITY OF NEW HAMPSHIRE DEC system 10

The University of New Hampshire (conveniently located near mountains, lakes, seashore, and Boston) has immediate openings for experienced computer professionals. The Office of Computer Services, with its centrally located dual-KL DECsystem10, provides both batch and timesharing services to the entire University System network (comprising 5 remote stations and over 150 interactive terminals) for administrative, instructional, and research applications.

SYSTEMS PROGRAMMER

Challenging projects currently underway include: design and implementation of mini-based distributed network; investigation and feasibility studies of array and floating-point processors. Responsibilities include: monitor generation and maintenance, performance analysis, and operation system modification.

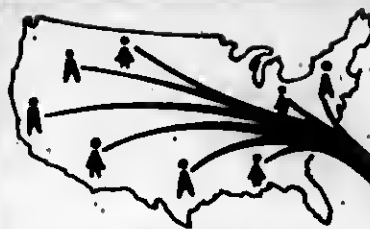
Minimum qualifications — Computer Specialist II: Bachelor's degree or equivalent experience plus 1 year experience on large-scale timesharing systems. Salary range: \$11,616 to \$18,048.

Resumes should be submitted no later than March 3, 1978 to:

Mr. Bill Vasilou, Director
University of New Hampshire
Computer Services, Kingsbury Hall
Durham, N.H. 03824

An Affirmative Action/Equal Opportunity Employer

COMPU SEARCH



specializes
in careers
for you...

See us in your city

Since 1968, CompuSearch has sought out exceptional individuals with data processing related skills for large and small companies throughout the United States. We also have been very successful in locating challenging new positions for thousands of people who have requested our assistance. If you are a talented achiever interested in learning about situations that will best meet your goals, contact our office nearest you in complete confidence. We keep a close watch for the best available opportunities locally and nationally.

Appleton, WISC	(414) 731-5221
Arlington, VA	(703) 841-1700
Boston, MASS	(617) 262-5050
Braintree, MASS	(617) 848-1666
Cincinnati, OH	(513) 651-5500
Cleveland, OH	(216) 623-1037
Dearborn, MICH	(313) 336-6650
Indianapolis, IND	(317) 257-4261
Jacksonville, FL	(904) 358-8513
Los Angeles, CA	(213) 830-1313
Louisville, KY	(502) 456-4330
Milwaukee, WISC	(414) 273-4430
Omaha, NEA	(402) 397-8115
Pittsburgh, PA	(412) 343-7410
Rochester, NY	(716) 325-1660
Rockford, ILL	(815) 968-1552
San Francisco, CA	(415) 362-0811
Southfield, MICH	(313) 598-2626
Stamford, CONN	(203) 324-2232
Troy, MICH	(313) 585-4200
Tulsa, OKLA	(918) 822-6632

COMPU SEARCH
Division of
Management Recruiters

COMIN' ON STRONG!

Display Data Corporation, America's largest supplier of in-house computer systems for auto dealers, has doubled in size every year since 1973. We will triple in 1978!

WHY?

- Because **INSIGHT** has become the nation's benchmark in-house mini-computer for auto dealers—in ease of operation, flexibility and customer satisfaction...
- Because our people who sell, install and service **INSIGHT** are well trained, highly motivated and totally professional—a winning team...

Our extraordinary growth has created numerous new career opportunities nationwide in:

- BRANCH MANAGEMENT
- SYSTEMS SALES
- FORMS SALES
- CUSTOMER ENGINEERING
- INSTALLATION SUPPORT
- SYSTEMS PROGRAMMING
- NEW SYSTEMS DEVELOPMENT

If you are looking for an environment that can offer you personal and professional growth limited only by your desire and ability, isn't it time you looked to Display Data?

Call or write today. All inquiries held in strictest confidence.

W. T. Myers
Display Data Corporation
Executive Plaza IV
Hunt Valley, Maryland 21031
301/667-9211 or 800/638-8665

insight
DISPLAY DATA CORPORATION

position announcements

position announcements

position announcements

position announcements

position announcements

LIVE WORK & PLAY IN

NEW HAMPSHIRE

Are you tired of high taxes and a congested highway? Then you should consider the numerous critical positions that we have here in NH for SYSTEMS ANALYSTS and PROGRAMMER ANALYSTS with either insurance or manufacturing applications experience. All positions with dynamic growth oriented firms. Salaries from low teens to twenties. Contact: David J. Osgood, CDC, Vice President.

ABILITY

Personnel Consultants

160 S. River Rd., Bedford, N.H. 03102
603/669-4440

An Exclusively Employer Paid Service

**OVERSEAS OPPORTUNITY
D.P. SUPERVISOR
(Systems & Operations)**

We are a world-wide leader in the marine engineering and construction industry and presently expanding our mid-east operations in Dubai, U.A.E.

Candidates should have a minimum of 6 years DP experience, at least 4 years directly involved in a medium to large size DOS installation 370/135 or larger. Must possess the ability to organize and control operations function, data control, data entry and systems programming. Some application language knowledge desirable (Assembler, RPG, COBOL, PL1 or Fortran).

Position offers excellent salary, family status, overseas premiums and fringe benefits. Please submit resume including salary history in confidence to: W.J. Buckley.

OCEANIC CONTRACTORS, INC.

Subsidiary of
J. Ray McDermott & Co. Inc.
P.O. Box 61961
New Orleans, LA 70161

Equal Opportunity Employer M/F

• PROGRAMMERS • SYSTEMS ANALYSTS • SOFTWARE SPECIALISTS
• IBM • HONEYWELL • DEC • COBOL • ASSEMBLERS • RPG • COMMUNICATIONS

Let Your Future Find You!

at the 1978 CAREER ADVANCEMENT CONFERENCE MARCH 3-4

sponsored by **CONTROL DATA CYBERSEARCH**
a private employment agency
CONTROL DATA CORPORATION



Those out-of-town candidates who are invited by Cybersearch will be reimbursed for reasonable transportation expenses.

Major U.S. companies will be in Chicago to interview qualified candidates for HUNDREDS OF POSITIONS in the \$15,000 to \$30,000+ salary range. These key positions will be filled by invited candidates attending the CAREER ADVANCEMENT CONFERENCE.

If you are degreed and/or have solid industry experience, you won't want to miss this outstanding career opportunity. Find the job that's right for you, at the salary you want. All at ONE location. NO COST. NO CONTRACT. NO OBLIGATION to you now or upon hire.

In order to participate, you MUST register. Call Cybersearch TODAY, SUNDAY, 11 A.M. to 4 P.M., or any weekday 9 A.M. to 7:30 P.M. Out-of-town callers collect or rush resume now for interviews. For reasons of confidentiality, if your current employer is an attending company, we will notify you immediately.

Conference Coordinator

214 N. Michigan Avenue, Chicago, Illinois 60601

PHONE: (312) 454-8490**SYSTEM
SOFTWARE SPECIALISTS**

Sanders Corporate Systems Software Group has several positions available in the areas of operating system and user support.

**• SYSTEMS PROGRAMMER
(DEC-10 and S/370)**

In this position you will generate, modify, debug, and install operating systems and system extensions. Proven ability to perform independently is required, as well as a degree in physical or computer science and six years of experience in software manipulation. A background that also includes applications programming is preferred.

**• SOFTWARE SUPPORT
SPECIALIST (DEC-10)**

In this position you will provide technical consultation to our DEC-10 user community and conduct periodic training courses. You will also monitor and report on the utilization of hardware resources and maintain a catalog of available software. A degree in Computer Science or comparable experience is required. Language proficiency should include FORTRAN and MACRO-10.

**• SOFTWARE SUPPORT
SPECIALIST (S/370)**

In this position you will recommend, evaluate and install a variety of vendor supplied software packages. You will also monitor and analyze computer hardware utilization and software performance and perform periodic programming tasks. A degree in Mathematics or Computer/Physical Sciences is desirable coupled with BAL background and 2-3 years experience in an IBM processing environment.

Sanders Associates, Inc. is located in southern New Hampshire within easy commuting distance of Boston and a variety of recreation/vacation areas. Sanders Computer Sciences Division utilizes a wide range of advanced computer facilities and techniques in support of Company business functions and product lines.

For prompt response, send your resume and salary history to A.O. Whitworth, Sanders Corporate Headquarters, Daniel Webster Highway South, Nashua, New Hampshire 03061.

SA**SANDERS
ASSOCIATES, INC.**An Equal Opportunity/
Affirmation Action Employer**MARKET
DEV. SPEC.**

New Eng. Industrial seeks indiv. to provide marketing plan in terminal systems for insurance and fin'l industries. Excellent Sr. Staff position with occasional travel. Salary to \$23,000. (Fee Paid). Contact Stan Durbas.

**ROBERT HALF
PERSONNEL AGENCIES**
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

**CONSULTANTS
San Francisco**

Decimus Corporation, innovative leaders in supplying Data Processing services to the Financial Industry, has created several consultant positions, and seeks growth-oriented individuals with programming/analyst backgrounds.

Alone and as a project team member, you will be involved with the design and implementation of a variety of applications, including Communication Network Design, Systems Simulation, Database Systems, Check Processing (MICR) and others.

You should have at least 3 years recent experience in COBOL, OS, JCL Systems Application Development (IBM large-scale systems), and a solid grasp of structured design techniques. Effective communication skills as well as appreciating the need to be a programmer first are a must. Knowledge of Banking/Financial Systems would be helpful.

Work in a State-of-the-Art environment with 370/155, 160, 195, SYS 3 (Mod 15), SYS 32, and various minicomputers, under DS, MVS, DOS, IMS, CMS-VM. Decimus offers salaries commensurate with your expertise/contribution and outstanding benefits.

Send your resume with salary history/requirements in confidence to: D.B. Michaels, Suite 320, 1700 Montgomery St., San Francisco, CA 94133, or call (415) 622-2030. EDE, M/F/H.

Join The
Proud People At
DECIMUS

A Bank America Company



Engineering

**Software
Pioneers
Wanted****on the San Francisco Peninsula**

There's a whole new pathway of discovery today. It's called outer space. Since 1957, Ford Aerospace & Communications Corporation has been blazing trails through the universe with our sophisticated communication satellites and ground terminals. Now we're the fastest growing software company on the San Francisco Peninsula, and we'd like to invite you to become involved in our quest for new technology. If you are looking for a wide range of opportunities, why not join us and become a software pioneer yourself?

- Environmental Systems
- Communication Systems
- Data Management Systems
- Experimental Systems

We are looking for experience in the following areas: *computer networking; *mission analysis and operations; *resource management and configuration; *image enhancement; *signal processing; *microprocessor programming; *real-time operating; *hardware control; *mini-computer distribution networks; *satellite compatible communication links.

A career with Ford Aerospace & Communications Corporation will bring you an excellent salary and benefits package, along with one of the most desirable locations anywhere. To apply, please send your resume and salary history to Professional Employment, Dept. PF-14.

**Ford Aerospace &
Communications Corporation**

Western Development Laboratories Division
3039 Fabian Way, Palo Alto, California 94303

An Equal Opportunity Employer M/F.

position announcements

position announcements

position announcements

position announcements

position announcements

Software Professionals looking ahead to new challenges

Northrop's enviable position as the foremost leader in the design, development and manufacture of airborne computers, electronic countermeasures, and other sophisticated electronic systems is the result of an environment of top priority software professionals dedicated to the solution of critical problems.

To meet our ever expanding needs, challenging assignments offering professional stimulation and career mobility are available in the following professional areas:

ENGINEERS ANALYSTS PROGRAMMERS

These positions require degree in electrical engineering, computer science or related fields.

Involvement will be in one of three specific areas requiring experience in Data General NOVA/ECLIPSE or HP 2100 at the assembly language level. Digital or analog experience helpful.

NOVA— to involve the writing of process control and real-time control programs.

HP 2100— working on operating systems, assemblers and loaders.

HP TODS BASIC— will involve working on automated acceptance and manufacturing test procedures for production hardware.

If your career concentration has been in any of the above areas, and you seek a climate that will exercise your talents and independence, we invite you to consider Northrop Defense Systems Division. Address your resume with salary specifics, in confidence to:

Manager, Employment
NORTHROP CORPORATION
Defense Systems Division, Dept. CF
600 Hicks Road, Rolling Meadows, IL 60008
An equal opportunity employer m/f

NORTHROP

SYSTEMS ANALYST

San Francisco Bay Area

The Lawrence Livermore Laboratory, an applied science R&D facility operated by the University of California for the U.S. Department of Energy, is located in a rural suburb 45 miles east of San Francisco. Our Supply and Distribution Department has a position for a systems analyst to assist with all facets of the operation involving analysis, design and implementation of manual and data processing systems to improve stock control, inventory procedures, issuance of material, receiving, shipping and warehousing.

Applicant should be familiar with large and mini computer applications, including devising of models or simulations. Working knowledge of EOQ formula applications desired. Must be capable of working closely with user groups and maintaining liaison between users and data processing programming personnel. Will be expected to prepare proposals and specifications and make presentations to management.

Starting salary commensurate with education, experience and ability. Please send resume, including academic background, salary history and salary requirements to: Sue Porter, Employment Division, LAWRENCE LIVERMORE LABORATORY, P.O. Box 808, Dept. KCM-028, Livermore, CA 94550. U.S. Citizenship Required.



**LAWRENCE
LIVERMORE
LABORATORY**

An equal opportunity
employer M/F

FOX-MORRIS PRINCETON

A nationally recognized leader in the placement of EDP professionals, is currently recruiting for the following positions:

- Ast Mgr-OP Prog \$25,000
- Prestige NJ Insurance corp
- Ops Mgr-370 Data Ctr \$25,000
- Leading mfr of personal care prod
- Systems Specialist-Gan'l \$25,000
- Consumer prod corp reqs mfg exp
- Systems Programmer \$25,000
- NJ corp hqs req mfg exp
- 5 Real Time Programmers \$25,000
- Leader in process control expanding
- COBOL Prog/Analyst \$25,000
- Sr. Applications Prog \$21,500
- Computer hardware mfr expanding
- Project Leader 370 \$20,000
- Florida's leading bank will relocate. All employment costs paid by client cos. Conf resumes, including present salary & reqmts to Robert Davis, (609) 452-6135

FOX-MORRIS
PERSONNEL CONSULTANTS
3490 U.S. Route 1
Princeton, NJ 05540

FLORIDA

Our client is experiencing a major expansion. They need IMS-Cobol. Any mfg or Data Base big plus 12-20K. In addition, they are looking for Sys Prog with TSO-TCAM-MVS or MVT-JES2. Will design network communications salary range 18-22K. Intv. exp. fees & relocation pd. mail resume today to Stan Allan.

ROBERT HALF
PERSONNEL AGENCIES, INC.
1311 N. Westshore Blvd
Suite 309
P.O. Box 22651
Tampa, FL 33622

EXCITING JOB OPPORTUNITIES BANK APPLICATIONS AND SERVICES

Does your present job offer all the opportunity you want?

Does working for the nation's leading supplier of financial software interest you?

Are you free to be creative?

Does being a part of a fast growing, on-line oriented bank servicing data center excite you?

Would you like professional technical writers to prepare your documentation?

Would you like to live and work in Central Florida?

FLORIDA SOFTWARE SERVICES PROVIDES APPLICATION PACKAGES AND BANK SERVICES FOR OVER 1000 BANKS THROUGHOUT THE NATION. COMPENSATION PACKAGE INCLUDES:

- Top Salary And Benefits
- Major Medical Health Insurance Including Dependent Coverage
- Life Insurance
- Excellent Working Conditions.

OPPORTUNITIES AVAILABLE:

OPERATIONS MANAGEMENT

Must be experienced in Management. Requires knowledge and ability to develop and manage systems and data flow. Will be involved in planning and controls. IBM 370 and Burroughs Hardware.

APPLICATION PROGRAMMER/ANALYSTS

Must be experienced. Cobol programmers. Familiar with bank applications. On-line experience helpful. IBM 370/Burroughs systems.

If you are qualified, we have the perfect opportunity for you. We offer unlimited possibilities for growth and advancement.

Send your resume today in strict confidence to:



Personnel Director

FLORIDA SOFTWARE SERVICES

P. O. Box 2269 • Orlando, Florida 32802

Data Processing Professionals

Here's how we can help the job you're looking for find you.

If you're looking to explore career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS • SOFTWARE SPECIALISTS and SALES REPRESENTATIVES for companies nationwide, at no cost to the applicant.

Here's how our service works. After we receive your resume, we (1) can make it instantaneously available, via computer, to our network of CYBERSEARCH® placement offices in major cities across the country. (2) Trained placement consultants at each office can then refer your resume to companies seeking EDP professionals with your qualifications. So instead of one office and one consultant, you can have all the offices of CYBERSEARCH searching the data processing job market for you. To protect your identity, your name and present employer's name are not included in the computer file.

When interest is expressed, your personal CYBERSEARCH® consultant will contact you and arrange an interview. This service is available without cost to you now, or upon hire. All fees are paid by the employer. To put your resume into circulation fast, call or write the EDP Dept. at the CYBERSEARCH office nearest you.

CONTROL DATA CYBERSEARCH INC.

CHICAGO, IL
214 North Michigan
60601
312-454-8490

DALLAS, TX
8585 Stemmons Freeway
75247
214-688-5810

HOUSTON, TX
2000 West Loop South
77027
713-965-5666

IRVINE, CA
17744 Sky Park Boulevard
92714
714-754-7701

LOS ANGELES, CA
8616 La Tijera Boulevard
90045
213-642-2462

MINNEAPOLIS, MN
6800 France Ave. South
55435
612-830-6650

PHILADELPHIA, PA
Two Balacynwyd Plaza
19004
215-667-2400

SAN JOSE, CA
2025 Gateway Place
95110
408-866-3186

position announcements

position announcements

position announcements

position announcements

position announcements

EDP Professional

We are seeking an EDP professional looking to advance your career opportunities. This position on our expanding EDP audit staff will offer the following challenges:

- Preinstallation system reviews
- Postinstallation system reviews
- Design and implementation of computer assisted audit techniques
- Support internal audit staff

You should have a college degree and a minimum of 3-4 years' systems/programming experience in a sophisticated computer environment. You will be trained in EDP auditing techniques, and good written and oral communications skills are essential. Familiarity with accounting and insurance concepts is desirable.

Salary range is mid to upper teens. We offer a comprehensive employee benefits package. Please send resume and salary history in strict confidence to: Director of Personnel.



Mutual Benefit Life

520 Broad St., New York, N.Y. 07101
Equal Opportunity Employer M/F

SOFTWARE

**JOIN COMPUTER ASSOCIATES
PHENOMENAL GROWTH
IN 1978.**

Computer Associates is seeking career-minded individuals for various positions in our software group.

• SOFTWARE DEVELOPMENT

Candidates should have experience with DOS or OS internals. Strong Assembler programming a must. Our development center is located in beautiful suburban Danbury, Connecticut.

• TECHNICAL SUPPORT

Candidates should have experience with system utility type packages for DOS and/or DOS/VS. Must enjoy dealing with people. Location in various parts of the country.

• MARKETING REPRESENTATIVE

Candidates should have solid data-processing background. Prior experience in selling system utility type packages is a plus. Location in various parts of the country.

CA offers excellent benefits and an attractive compensation package. Send your resume in complete confidence to:

MR. CHARLES B. WANG
COMPUTER ASSOCIATES
655 MADISON AVENUE
NEW YORK, NY 10021

WANTED: COMPUTER SALES PROFESSIONALS

High caliber sales professionals who have the desire and motivation will find they have the opportunity to move quickly into sales management.

CALL OUR CORPORATE SALES MANAGERS,
MONDAY OR TUESDAY 6 PM - 9 PM (EST) at

800-225-9228 or 800-225-9229*

REWARDS:

- Financial growth through career development
- Opportunity to use your industry expertise to the fullest
- The opportunity to a future in sales management, marketing, sales training, product development and other areas
- A company that provides excellent account management as well as the ability to develop new business
- An environment where the intent is to assist your fellow salesperson
- Excellent product complete with pre and post sales support
- Comprehensive benefits package including a dental plan

TERRITORY: Continental U.S.

MARKETS:

- Industrial
- Commercial
- Laboratory
- Telecommunications
- Graphic Arts
- OEM
- Large Computers
- Banking, Backlogs
- Insurance
- Terminals
- Education
- Micro Products

If unable to reach us at this time, call Bob Nephew, at *800-225-9228, Monday-Friday 9-5 (est) or send your resume to him at NORAM Central Employment, Digital Equipment Corporation, 129 Parker Street, Dept. H0130 3807 Maynard, Mass. 01754. We are an equal opportunity employer, m/f.

digital

MODLINE modular online systems the "Un-hardware" Company

MODULAR ONLINE SYSTEMS, COMPANY (MODLINE) is an organization of dedicated computer programming professionals successfully pursuing projects covering the entire spectrum of computer technology: micro-processors, mini-computers, communications processors, business systems, data base applications, and time sharing. We are presently seeking experienced career oriented

BUSINESS ANALYST/ PROGRAMMERS

responsible for analysis, design and programming utilizing RPGII, COBOL, and BASIC Languages.

Our modern facilities are located in the heart of the beautiful Pacific Northwest. We offer an excellent working environment and employee benefits package.

Be a PROFESSIONAL in your chosen field. Join one of the fastest growing computer software corporations.

Please reply with resume including desired salary requirements to: MODLINE, 3836 N. Bellest, Portland, OR 97217.

PROGRAMMER

Expanding firm requires experience in Basic using IRIS and RDOS with Fortran IV desirable. Salary open with generous benefit package in modern office with opportunity for professional advancement. Send confidential reply to Personnel Director, Snell Environmental Group, 1120 May Street, Lansing, Michigan 48906, E.O.E.

MINI-COMPUTER SYSTEMS SUPERVISOR

Applicant must have experience with real time mini-computer system implementation including budgeting, preparation of feasibility and system studies, preparation of specifications, and evaluation of vendor proposals from DGC, DEC, HP and similar vendors. Must interface with technical, plant operations, project, and administrative personnel in the implementation of mini-computer systems for applications including analytical chemistry instrumentation and nuclear fuel reprocessing plant process data acquisition and control. Will supervise and participate in the above activities and will coordinate activities of other groups supplying technical input to new and existing computer applications.

PROGRAMMER/ANALYST

Experienced Programmer/Analyst needed to satisfy current requirements including application of contemporary mini-computer systems to data acquisition and display of chemical process and instrumentation data. Typical systems are disc based with graphics capabilities and programs prepared in Fortran. Individual will be responsible for: feasibility studies, systems studies, specifications, cost estimates, schedules and program development. Experience with Data General MODCOMP, and Hewlett-Packard is desirable.

Jobs require 5 years of experience with 3 years' applicable mini-computer system experience.

If interested and qualified, please submit your resume in confidence to:

550 Second Street, Idaho Falls, Idaho 83401

**Allied
Chemical**

Idaho Chemical Programs Office

We are an equal employment opportunity employer M/F/H

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS DESIGNERS.

Because of a vast expansion program now under way, Aramco, the world's largest oil producing company, has a number of excellent career openings for Systems Designers in Saudi Arabia. If you are qualified, you will receive top-notch financial benefits. As an example, your net, take-home pay in Saudi Arabia will be approximately equal to your gross pay in the U.S. Advancement opportunities are excellent.

The job.

These positions require you to have knowledge of materials supply systems, policies and procedures concerning methods of inventory, investment control, determination of requirements, receiving, storing, issuing, reclamation, disposal of obsolete materials, utilization of surplus materials, physical inventory, control documentation and recordkeeping.

You would assist in the preparation of plans and proposals for EDP application and work with the EDP Data Processing Division developing controls and schedules for EDP input and output data.

You would be involved in developing studies and procedures to maintain effective management of over \$300 million in materials

inventory for over 120 thousand items.

The requirements.

You must have a B.S. or B.A. degree in Economics, Business Administration or Engineering and dependent on responsibility, from 2 to 20 years' experience in materials supply management.

Why work for Aramco?

Besides the challenge and career opportunities of your job, working for Aramco overseas offers several excellent advantages. You'll receive a good salary and savings plan, plus a generous tax-protected expatriate premium.

And you can travel the world if you wish, because on the average of every 12½ months you receive 40 fully paid vacation days, as well as round trip vacation travel fare to the U.S. Add to this an average of 12 paid holidays each year. In addition, medical care for you and your family is furnished at no charge by the company while you are in Saudi Arabia.

Send us your resume.

If your resume shows that you are qualified, we will send you an application and more information.

ARAMCO

SERVICES COMPANY

WRITE DEPT. CW0220A, 1100 MILAM BUILDING, HOUSTON, TEXAS 77002

PACIFIC NORTHWEST

Our client, a leading manufacturer has several opportunities for computer professionals with a strong business orientation. PROJECT MANAGERS act as internal consultants involving planning and implementation of business and manufacturing systems. Positions require five-seven years broad systems development experience. An MBA is preferred. SYSTEMS ANALYSTS and PROGRAMMER ANALYSTS support the projects and will have three-five years implementing large-scale systems in COBOL/FORTRAN. Some previous user contact and BS/BA degree desired. We are primarily seeking people with strong applications in the Manufacturing or Distribution Industries. Compensation and benefits are excellent.

Call in confidence or send resume, including salary history, and position desired to:

Al Friedman, Data Processing Division, Executive Resources, Inc., 310-108th Ave. NE, Bellevue, WA 98004 (206) 455-8300.

FLORIDA

Corporate Technical Planning and Administration

This position is at a Corporate level, high exposure covering multi-division MIS functions, and reports to the Vice President of Corporate Systems. Responsible for the consolidation of complex MIS and communications 5-year technical plans, budget projections, overall project management, contract negotiations, RFP preparation, proposal assessment, etc. Division installations include from mini-computers to the largest IBM equipment.

Ryder is a highly-profitable, growing industry leader and is international in scope.

Requirements: Degree in a basic business discipline and a Master's in business or computer science is preferred. Minimum 7 years of above-average MIS accomplishments, with an overall technical understanding of data processing and exceptional personnel, verbal, and narrative skills.

Send resume and salary requirements to: Personnel Development, Ryder System, Inc., P.O. Box 520816, Miami, Florida 33152.

Honeywell 6000 Programmers

We are assisting one of our suburban Boston area clients in locating qualified Honeywell 6000 programmers. This is an opportunity for you to learn first hand about an unusual opportunity without becoming directly involved with a potential employer. Clip and mail the enclosed coupon. I'll contact you at your convenience and answer any questions you may have about this or other opportunities.

Name _____ Date _____
Address _____
Phone _____
Best Time to Call _____ years
Honeywell 6000 experience _____
Other Data Processing Experience _____

Timothy D. Crowe, Jr.
Personnel Consultant
Box 6
Chelmsford, Mass. 01824
An equal opportunity employer, M/F.

Smart & Dumb Data Terminals

Are our Business. We continue to grow and need.

SALESMEN/w

in six locations nationally

SR. SOFTWARE

Systems Designers

A Computer Scientists Dream

ENGINEERS

PRODUCT ENGR'S & APPLICATIONS ENGR'S

New Product Development

For Detailed Information

Write or Call Personnel

800-631-7050

data services
WESTERN UNION

70 McKee Drive
Mahwah, N.J. 07430

Equal Opportunity Employer M/F

INTERGLOBAL is...

a subsidiary of a NYSE listed company, with an EDP service bureau placing Consultants throughout the United States and foreign countries.

To take advantage of our nearby and worldwide EDP opportunities, please submit your resume for inclusion in our worldwide computerized retrieval system, to our corporate headquarters in New York City.

Ralph Young
INTERGLOBAL
TECHNICAL SERVICES, INC.
56 W. 35 St. NY, NY 10001
(212) 695-7773

Equal Opportunity Employer M/F

SR. PROGRAMMER/ANALYST

National manufacturer of mining equipment, based in southern West Virginia, seeks an experienced Programmer/Analyst for its rapidly expanding operations. Individual sought should be degreed and possess 3-5 years' experience working with manufacturing - type applications. Hardware is a PDP-11, under RSTS/E, with on-line teleprocessing capabilities. Language used is BASIC PLUS. We offer an excellent salary, above average benefits including profit sharing, plus opportunities for advancement. Please forward resume and complete salary history to:

J.L. Robertson

FAIRCHILD, INC.

P.O. Box 890

Beckley, W. Va. 25801

An Equal Opportunity Employer M/F

SENIOR SYSTEMS PROGRAMMER NEWPORT, RHODE ISLAND

Analyze state-of-the-art software systems technologies to determine the feasibility of implementing new software techniques in developing operating systems for the ANUK-7 military computer facility.

Knowledge of high order language compiler algorithms is desirable. Detailed knowledge of FORTRAN compilers and their libraries is essential.

A strong background in computer science training (BS & MS) with 5-8 years' experience will qualify you for this most challenging position.

All positions are located in Newport, RI, a unique resort community. We offer attractive salaries, fringe benefits and challenging assignments.

Please send your resume to

Corinne Bradley
Newport Division

SYSTEMS CONSULTANTS INC.

10 John Clarke Road
Middletown, RI 02840

SYSTEMS CONSULTANTS INC.

An equal opportunity employer

position announcements

position announcements

position announcements

position announcements

position announcements

DATA BASE TECHNICAL MANAGER

Saxon Business Products, Inc., a major Miami headquartered leader in the expanding photocopier industry, is currently seeking an experienced professional to develop a data base group to support the MIS Department's conversion to an on-line system. Accountability includes data system development, implementation and management; systems generation; defining programming techniques and the establishment and implementation of data processing standards and efficiency measurement.

In addition to expertise in the above areas, candidates should have experience on Honeywell equipment and systems utilizing IDS I or II.

Excellent starting salary, complete company paid benefits including relocation to a highly desirable area. Submit resume (salary history must for consideration) in confidence to:

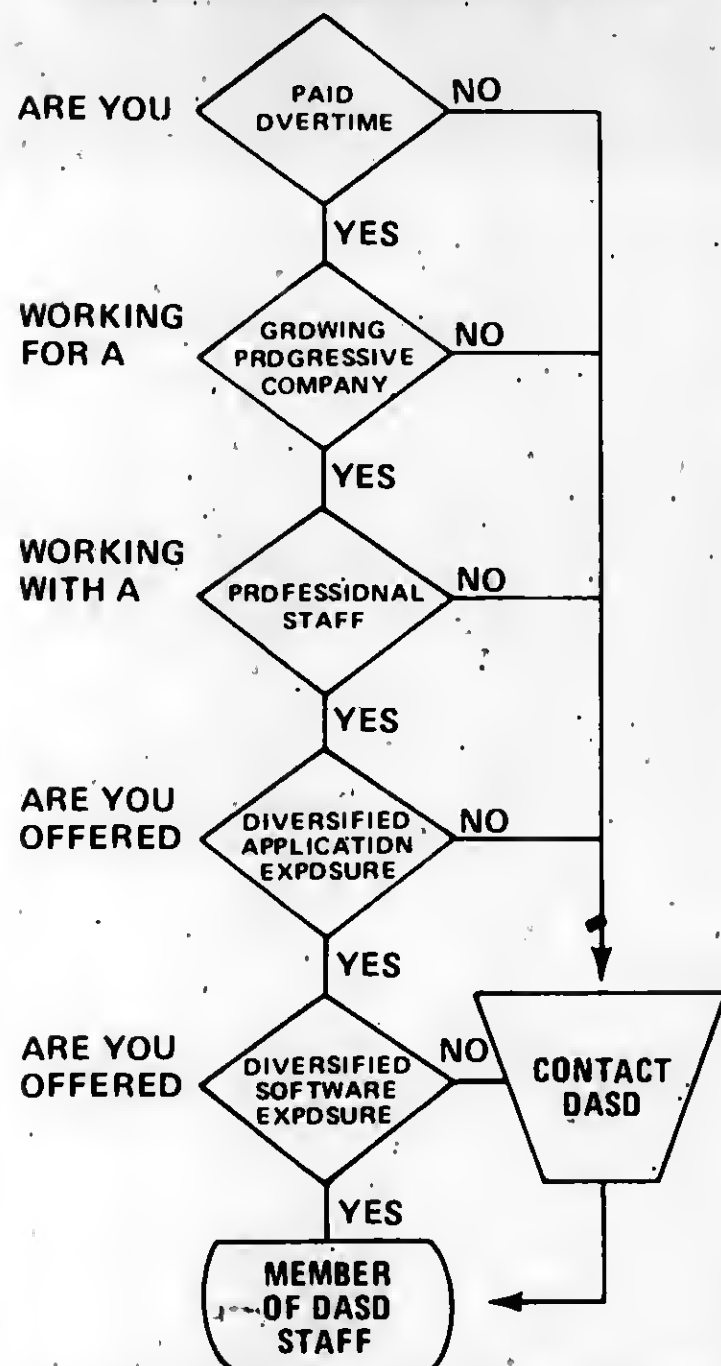
Ronald Victor
Personnel Manager
Saxon Business Products, Inc.
13900 N.W. 57th Ct.
Miami Lakes, Fla. 33014

An Equal Opportunity Employer M/F

saxon



DATA PROCESSING PROFESSIONALS



DASD CORPORATION, a national consulting firm, is seeking to expand its staff with career oriented professionals who are looking for all of the above advantages.

Job openings in Los Angeles, Chicago, Houston, Philadelphia, Minneapolis, Des Moines, San Francisco, Dallas, Omaha, Detroit, Seattle, Atlanta and Milwaukee. Immediate future expansion plans will create openings in all other major metropolitan areas.

If you are ready to make a move that will broaden your experience and further your career, send your resume to DASD, the company that can help you.

DASD

DASD CORPORATION

8705 N. Port Washington Rd.
Suite 301
Milwaukee, Wis. 53217

PROMOTE YOURSELF

Move up to increased pay and promotional opportunities and the life style of your choice

**SAN FRANCISCO
MALIBU
NEW ORLEANS
TEXAS &
SOUTHWEST
WASHINGTON
FLORIDA
ATLANTA
MASSACHUSETTS
CHICAGO
PHILA. AREA
TWIN CITIES
NEW YORK**

Dir Telecom
VP Data Proc
Fin Designer
DOS Syst Progr
Syst Progrs
DB Adminstr
Anlyst/Progrs
Mini Progrs
Syst Designers
Anlyst/Progrs
Progr/Anlyst
Programmers

Urgent Openings

	To
Full P&L resp. Voice/Data/Text/Image. Top service company	\$50M
Must have ins. exp.	\$45M
Univsty Syst exp reqd	\$34M
Internals a must. Calif.	\$30M
370/VS, VM or H6000	\$27M
IMS DB/DC. Calif.	\$27M
Top consult firm. Deg.	\$26M
Fortran. Proc control	\$25M
Banking, lge scale. Calif.	\$25M
Student & fin. applications. University environment.	\$24M
H6000, COBOL. Easy Coder	\$24M
Learn IMS, TOTAL. Deg.	\$20M

No fees or contracts. Our client companies pay all expenses. Career consultation prior to any action. Over 700 EDP positions represented.

Send your current resume (or an old one with pencil update) together with salary history in complete confidence to our suburban Philadelphia headquarters:

Systems Personnel, Inc.
Suite A 4
207 Fox Lane
Wallingford, PA 19086
215-565-2920

Systems Personnel

A NATIONWIDE CAREER SERVICE

APPLICATIONS PROGRAMMER

The Purdue University administrative data processing center has openings for experienced applications programmers. The computer facility is an IBM 370-148 with OS/VS1, CICS/VS, Roscoe, and Rami.

Required qualifications: business applications programming experience, ANS Cobol, OS/VS JCL.

Excellent benefit program in the environment of a large university. Please submit resume with references salary, and work experience to: Mr. T.L. Haworth, Personnel Services Adms, Purdue University, West Lafayette, IN 47907 (317) 749-6256. An equal access/equal opportunity employer.

PROGRAMMERS CHECK THESE JOB ADVANTAGES...

Leading Southeast Insurance company located in Dallas, Texas, has openings on its programming staff. Our shop is large enough to be advanced yet small enough to offer all around experience. We operate 370-OS-VS -CICS-SPM-Data Base Management Systems. If you are looking for a personal growth situation, mail your resume to:

EMPLOYERS INSURANCE OF TEXAS

P.O. Box 2759
Dallas, TX 75221

Equal opportunity employer M/F

data processing

SR. PROGRAMMER

The American Bar Association, one of the largest organizations representing members of the legal profession, seeks data processing talent for broad responsibilities in its modern installation. Requires a minimum of three years computer programming experience with demonstrated proficiency in BAL and COBOL Programming languages in an IBM S/360 or S/370 computer environment. (DOS or DOS/VS). Application experience should include formal education or work-related training and Data Processing, Accounting, and Business Administration.

The successful candidate will apply logical skills and complex programming techniques toward new program development and maintenance of existing production programs. Data Base and on-line programming experience will be a definite plus as we are using TOTAL and ENVIRON/I software packages to perform on-line inquiry on a S/370/135.

Minority and women candidates are encouraged to respond. If you feel you have the necessary qualifications for this position, please submit your resume including salary requirements (consideration will be given only to those who furnish salary history).

Ms. Chris Bardwell
Dir. of Employment & Compensation
or contact Jay Ammerman
(312) 947-4114

AMERICAN BAR ASSOCIATION

1155 E. 60th Street
Chicago, IL 60637

An Equal Opportunity Affirmative Action Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Computer Scientists

Major facilities expansion creates new opportunities at Argonne National Laboratory

We plan to double our computer capacity to accommodate the intensified activities in our multifaceted R & D programs—focusing on energy, the environment, and other vital areas.

We are currently operating interconnected IBM 370/195 and 360/75 running under OS/MVT, with ASP3 and batch on 195 and TSO and WYLBUR on 75. Future use of VM or MVS and JES3 is anticipated. Sophisticated network and graphics equipment are included in this system, largely devoted to advanced scientific applications.

If you're a talented computer professional who'd like to participate in our facilities expansion and make significant contributions to our laboratory research and development programs, we'd like to hear from you. We'll provide a commensurate salary, fine benefits and ample opportunity for achievement and growth. Requirements include a Masters-level degree in Computer, Information, or Administrative Science and expertise in one of the following areas:

Operating Systems

Will perform systems programming for ASP and OS generation, tuning, and maintenance with future MVS and JES3 involvement.

Administrative & Management Applications

Will analyze administrative and technical requirements for new information systems. Openings exist in projects utilizing mini-computers and a centralized data base environment.

Data Management Systems

Responsibilities include enhancements, maintenance, new systems evaluation and integration for effective use of disk and tape resources.

Mini/Microcomputers

Will perform systems engineering design and develop systems and applications software for mini/microcomputer-based data acquisition and control systems.

Time-Sharing Systems

Responsibilities include enhancements, tuning, maintenance, new systems evaluation, and integration of offerings under MVS and JES3.

DOE information Center Systems

Will develop computer systems to automate information center functions including data base management, information storage and retrieval, and network communication facilities. Member of group responsible for center's IBM 360/30 system.

To apply, see us at the **ACM Computer Science Conference** at the Detroit Plaza, in Detroit, Michigan.

Call Rosalie Bollino, on February 21, 22 & 23 at (313) 259-1416 to arrange a convenient appointment.

Or, send complete resume to Ms. Bollino, Dept. AMD, Argonne National Laboratory, 9700 So. Cass Avenue, Argonne, Illinois 60439.



ARGONNE NATIONAL LABORATORY

An equal opportunity employer, M/F HDBCP

SYSTEMS ANALYST

An Outstanding Key Opportunity In Computer Development for an Individual With a BS in Chemistry or Chemical Engineering and Computer Sciences.

The Research and Development group of the Fiber Glass Division of PPG Industries has a very important and very rewarding opportunity for an individual with experience in software development and a strong background in product problem-solving.

The successful applicant will be a key individual in the development of systems to change the methodology of Research and Development based on the most up-to-date computer technology. Responsibilities will include but not limited to:

- Challenge to use abstract thinking skills in software development to evaluate complex interactions, identify the economic factors related to the development of software and programming of technical projects.
- Keep abreast of computer technology and serve as a liaison between our Corporate computer personnel and equipment and direct proper installation of terminals at our Fiber Glass Technical Center.
- Leadership role in training technical personnel in the use of computers.

In return for your abilities and experience, we offer an excellent salary, outstanding benefits and an atmosphere of professional growth and appreciation.

For confidential consideration, please submit a detailed resume including salary requirements to:

Earle Phillips, Jr.
Administrative Specialist
PPG INDUSTRIES, INC.
Fiber Glass Division
P.O. Box 2844
Pittsburgh, PA 15230



An Equal Opportunity Employer M/F



WHY EDP SEARCH?

Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

COMPUTER SCIENCE

Faculty Position

The Department of Computer Science at East Texas State University in Commerce invites applications for positions at the rank of Assistant or Associate Professor for appointment August 28, 1978. Applicants must possess the Ph.D. in computer science or an equivalent. Salary and rank will be commensurate with education and experience. Primary teaching duties will involve graduate courses in information structures, teleprocessing, operating systems, computer languages, and research.

Applicants are requested to submit: (1) a personal resume, including research interests; (2) transcripts of all college work; (3) a list of courses previously taught; and (4) three letters of reference. Applications should be submitted no later than April 15, 1978 to:

Dr. Alton Goddard, Head
Dept. of Computer Science
E. Texas State University
Commerce, Texas 75426
ETSU is an EE/AAO

COMPUTER PROFESSIONALS

Project Directors

Proven experience in the management of multiple projects in the area of materials, inventory, purchasing, payroll, personnel, accounting and customer information systems in a large scale 370/OS-VS environment.

PROJECT MANAGERS

Proven experience in the management of large scale EDP projects in the areas of material, requirement planning purchasing, accounts payable.

ANALYST/PROGRAMMER

Experience in the design, development, and implementation of materials, inventory, and payroll and personnel systems in a large scale 370-OS-VS environment.

SYSTEMS REP

Solid experience writing in Cobol for 360-370-OS or VS systems IMS or CICS would be a plus.

IMS SPECIALIST

Experience in DBD PSE IMS Gen's OS/VS internals.

We are industry leader and can offer a challenging professional environment with upward mobility based on merit. We have a complete benefits program and above average compensations.

Please call or forward resumes to Cliff Teylor (214) 233-4341

TRES COMPUTER SYSTEMS

4255 LBJ Freeway, Suite 229
Dallas, Texas 75234
EOE M/F



Beautiful Colorado has something for everyone. And Dynalectron at the Transportation Test Center creates the opportunity to enjoy it all.

SCIENTIFIC PROGRAMMER

We are looking for an individual with data processing background to reduce test data acquired at the TTC. This data will be processed using minicomputers and large scale computers via remote entry terminals. Prepares ADP support specifications, program and document application software using assembly languages and FORTRAN. Knowledge of real time operations is desirable. Requires 4 years experience with a minimum of 2 years assembly language and a degree in an engineering discipline.

BUSINESS PROGRAMMER

Requires broad experience in programming IBM and CDC systems for business applications, such as payroll, cost accounting, logistics, supply, etc. Requires 5 years experience in COBOL. College degree highly desirable.

SCIENTIFIC PROGRAMMER/ANALYST

Positions available for individuals to develop, document, and maintain data based systems using COBOL, FORTRAN, File Management, and DBMS Software. Systems will be developed and installed on medium and large scale computers using remote batch/time sharing terminals. Systems will support test data acquisition, quality assurance, retrieval, and analysis. Degree in scientific or engineering field required with combination of 4 years COBOL/FORTRAN programming. Time sharing experience desirable.

DYNAMICIST

Provide dynamic analysis of rail vehicles to be tested. Will perform analytic studies, define instrumentation requirements, analyze and report on test data. Four years experience plus a 4 year college degree required. Knowledge of FORTRAN programming desirable.

Dynalectron performs testing of railroad systems for the United States Government as the operations and maintenance contractor for the Federal Railroad Administration at the Transportation Test Center at Pueblo, Colorado.

And you'll enjoy living and working in Pueblo. Drive 30 minutes north and you're in beautiful Colorado Springs at the foot of Pikes Peak. One hour north of Colorado Springs and you're in mile-high Denver. Just 30 minutes west of Pueblo and you'll be able to enjoy the magnificent Rocky Mountains. In Colorado, there's something for everyone!

If you're interested in an outstanding career opportunity reply in confidence with your resume and salary history to:

Mr. Glenn Williamson,
DYNALECTRON CORPORATION,
Transportation Test Center,
P.O. Box 11008, Dept. CW,
Pueblo, Colorado 81001



An Equal Opportunity Employer M/F Transportation Services Division

position announcements

position announcements

position announcements

position announcements

position announcements

SENIOR SYSTEMS ANALYST

Major Chicago based Fortune 500 company has an outstanding opportunity for a person with a minimum of five years experience in business systems design and analysis. The successful candidate will have knowledge in the programming field and a successful progression of increasingly responsible assignments through programming end systems. A special emphasis in this position is strong user interface and a desire to later move into project management.

We offer an excellent compensation and benefits package which includes full life, health and dental insurance, savings plan and several optional benefits. For consideration please send resume including salary history in confidence to:

CW Box 1444
797 Washington St.
Newton, MA 02150
Equal Opportunity Employer M/F

DATA BASE ANALYSTS PROGRAMMER ANALYSTS SYSTEMS ANALYSTS

BCS Richland, Inc., Richland, Washington (a subsidiary of Boeing Computer Services), is actively engaged in converting from a Batch to an On-Line "state of the art" environment covering technical and administrative systems.

Several positions in the following areas are open immediately:

• Data Base Analysts

Duties include analysis, design and development of Data Bases for on-line applications utilizing a Data Base Management System. Other duties consist of training, consultation, performance measurement and optimization of Data Base design.

Qualifications include 5 years applicable experience, preferably 2 of the 5 years experience with DMS1100 or S2000.

• On-Line Programmer Analyst

Duties include analyzing requirements, designing and developing on-line applications utilizing low and medium speed terminals, transaction processors and DBMS software.

Qualifications include 3 years analysis or programming experience with on-line systems utilizing S2000 or UNIVAC products such as TIP, QLP and DMS1100.

• Telecommunications Specialist

Duties include analysis of on-line computing requirements to provide optimum solution recommending terminals, lines, modems, network characteristics and configuration.

Qualifications include three years communications experience working with on-line real time applications. Experience with UNIVAC 1100 and compatible hardware is highly desirable.

• Business/Scientific Programmers and Analysts

Personnel needed to assist in a major conversion effort from a CYBER-74 to a UNIVAC 1100/40.

All positions require a degree in Computer Science, Math, Engineering, Business or the equivalent experience.

BCS Richland, Inc. provides vital support services to the U.S. Department of Energy, Hanford Complex.

The Tri-Cities, Richland, Pasco and Kennewick, are well-known for a temperate climate, numerous recreational facilities, superb educational systems and excellent living conditions.

Submit your resume to: Don Boyd, (509) 942-7784, BCS Richland, Inc., Room 149, P.O. Box 300-B3, Richland, WA 99352.

An equal opportunity employer.

BCS BCS RICHLAND, INC.

Hewlett-Packard needs computer systems engineers and sales representatives.

■ If you want to be part of a team that last year boosted sales of technical and commercial computers and terminals more than 50%...

■ If you have a technical degree and would rather be out with people than in the lab all day...

■ Or if you have a background in computer sales or applications...
Get in touch with us right away.

Why is moving to Hewlett-Packard a move in the right direction? Well, think about this:

You'll be working with a line of leadership products, with a reputation for quality and innovation.

You'll have a choice of good places to work. Right now, we need people in Chicago, Atlanta, Los Angeles, Washington, D.C., Boston and other major metropolitan areas.

You'll have a long-term opportunity for growth. (A cliché at most companies, but at Hewlett-Packard it's an everyday reality. We promote from within rather than hiring people over your head.)

You'll have a real sense of security. (Another well-worn promise, so here's a fact to back it up. We haven't had a layoff in our entire 35 years.)

You'll get a good salary and benefits. (At HP, a percentage of profits is distributed to all employees every six months. The last semi-annual bonus exceeded \$18 million.)

You'll receive first-rate support and service for your customers, both from the factory and engineers in the field.

You'll also be working for one of the leading small-computer companies. Hewlett-Packard is a diversified manufacturer of electronic and computational products, with 40 divisions worldwide, offices in 65 countries and annual shipments of \$1.36 billion. And *Dun's Review* has called HP one of the five best-managed companies in the country.

There's plenty of challenge and satisfaction working at Hewlett-Packard. If that's what you're looking for, write to us today.

We are an equal opportunity employer dedicated to affirmative action.

John Sundry, Regional Sales Mgr., 4 Choke Cherry Road, Rockville MD 20850

Bob Stringer, Regional Sales Mgr., 5201 Tottview Dr., Rolling Meadows IL 60008

Russ Stewart, Regional Sales Mgr., P.O. Box 105005, Atlanta GA 30348

Bob Sudkamp, Regional Sales Mgr., 23855 Research Drive, Farmington Hills MI 48024

Mike Leavell, Regional Sales Mgr., 3939 Lankershim Blvd., North Hollywood CA 91604

Mike Naggjar, Regional Sales Mgr., 6877 Goreway Drive, Mississauga, Ontario, Canada L4V 1M8

HEWLETT  PACKARD

IDMS SYSTEM PROGRAMMER

Here is a top level position with a major software firm in NYC to work with clients in problem solving and consultation on a specialized database system. Unlous optv. \$30,000 FEE PAID

ROBERT HALF
PERSONNEL AGENCIES, INC.

522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

SYSTEMS PROGRAMMER

The School Board of Bravard County, Florida, has an immediate opening for Systems Programmer. Applicants should have a working knowledge of IBM 360/40 MFT, using OS and HASP. Requires a combination of seven years training and experience in Data Processing, including two years in Systems Programming. Salary 16-24K, with good benefits in a good working environment. Send resume to:

Director
Data Processing Dept.
3205 S. Washington Ave.
Titusville, Fla. 32780

INFORMATION SYSTEMS SYSTEMS ANALYST

Position now available for a Systems Analyst with COBOL programming experience.

A BS degree with 2 years of Systems Analysis and at least 2 years of COBOL programming is required. Background in on-line manufacturing control applications such as BOMP, MRP and financial systems a definite plus. Data base design will be helpful.

The Microelectronics Division of NCR is one of the leaders in MOS/LSI technology. If you are a self-motivated professional and believe you qualify, send your resume to:

NCR
Complete Computer Systems

Mr. T.F. Wade, Manager
Personnel Resources
Microelectronics - Miamisburg
NCR Corporation
8181 Byers Road
Miamisburg, Ohio 45342

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

SR. SYSTEMS ANALYSTS SR. PROGRAMMERS PROJECT LEADERS

JOIN BOURNS IN RIVERSIDE, CALIFORNIA
FOR MORE ADVANTAGES!

*BENEFITS

Cash bonus profit sharing plus
extensive hospital and dental
plans.

*LOCATION

Ideal area, one hour from Los
Angeles, with excellent
educational facilities, better
housing values, nearby
recreation (skiing, ocean
swimming, fishing etc.)

*SALARY

For these positions, the salary
range is from the high teens to
mid twenties.

BOURNS, a worldwide diversified manufacturing company is now beginning development of a distributed processing information network. This will include the installation of multiple HP-3000 mini-computers and application software throughout the company's divisions and subsidiaries. In preparing for this long-term project, Corporate MIS is seeking qualified candidates with expertise in the following disciplines:

PROJECT LEADERS

Individuals with substantial project management experience. Must possess application software knowledge in manufacturing and accounting systems, and skill in customer/client relationships. These candidates will be accountable for full implementation activities as well as cost and schedule performance.

SR. SYSTEMS ANALYSTS

These individuals will be responsible for application software implementation at division and subsidiary locations. Heavy manufacturing/accounting knowledge is required. Prior experience in software installation is desired.

SR. PROGRAMMERS

Minimum of four years COBOL programming experience preferably in order entry and/or standard cost applications. These individuals will be assigned to major developmental work, and subsequently assist in installation of the systems throughout the company.

Find out more about these positions and the other advantages of working at BOURNS by sending a resume with salary history and requirements to:

Jim Conchelos



1200 Columbia Ave.
Riverside, Ca. 92507

An Equal Opportunity Employer M/F

MANAGEMENT CONSULTANTS

Opportunities for Expt
EDP Professionals

To \$36,000 To Start

If you are ready for career growth based on performance and are looking for challenging & diversified work, we want to meet you. We are the foremost management consulting firm specializing in the profitable use of computers/communications in business.

The senior level permanent positions in our New York office offer a stimulating performance oriented environment. You will work with major corporations and apply your knowledge & experience to formulate innovative solutions to business problems using computer/communications technology.

Qualified candidates will have as a minimum: Masters degree; 6 years experience in systems design, some as project manager; the ability to evaluate computer hardware & software performance; the desire to work in a challenging & unstructured environment; and excellent oral & written communications skills.

To be considered, forward resume with salary history in confidence to CW Box 1439, 797 Washington St., Newton, Mass. 02160.

an equal opportunity employer

SYSTEMS PROGRAMMER

An environment in which
sophistication starts
where others leave off

Broadly diversified energy systems company, COMBUSTION ENGINEERING runs one of the most advanced state-of-the-art data processing and communications networks currently in operation. You will be heavily involved in modification and maintenance of IBM systems control programs, as well as major sub-systems and access methods.

The successful candidate will have experience with the internal structure of TCAM and at least one of the following major IBM systems control programs or sub-systems: ASP Version 3, JES 3, SVS or MVS.

Located at our Windsor, Connecticut Data Center, this position offers an excellent starting salary and a full range of benefits. For prompt, confidential consideration, forward your resume, including salary history and requirements, to: Harold R. Kein, COMBUSTION ENGINEERING, 100 Lambert Road, Windsor, Connecticut 06095

**COMBUSTION
ENGINEERING**

The Energy Systems Company
An equal opportunity employer M/F

PROGRAMMER/ANALYST

Cattle Development Corporation, an expanding company located in the Texas Panhandle area has an opening for an experienced programmer/analyst. Applicants should have a minimum of four years system/programming experience. Advantageous if candidate also has experience with cattle feeding operations, RPG-III, COBOL, and teleprocessing applications. Successful candidate will be involved in all aspects of project development. We offer an excellent benefit program with starting salary commensurate with experience. Send resume indicating salary history and experience to: Corporate Personnel Manager, Keystone Foods Corp., 600 Kaiser Drive, Folcroft, PA 19032.

data processing

PROGRAMMERS

Key Positions with Our Winning Computer Consulting Team in Springfield, IL., Indianapolis and Chicago.

If you're skilled in COBOL, ALC and/or PL-1 and have at least a 2 year success record of accomplishment with large scale IBM systems under IMS... we have the programming and system challenges to match your expertise. These positions require high productivity.

As a member of our professional staff, you'll be rewarded with an excellent salary and benefits. For details call Don Breitfelder collect, from 10AM to 5PM et (312) 786-0220.



INDECON, INC.
300 South Wacker Drive
Chicago, IL 60606
since 1966
An Equal Opportunity Employer M/F

INFORMATION SYSTEMS CONSULTING

DENVER, COLORADO

Expanding management consulting division of national public accounting firm is seeking experienced professionals for its Denver office. Candidates should have the following qualifications: 2 years' experience in business systems analysis development and implementation; Bachelor's degree, MBA preferred; good oral and written communication skills.

In addition to exciting challenges as an entry-level consultant, you can expect an attractive compensation and benefits package plus significant potential for advancement.

Qualified candidates should send their resumes and salary history in confidence to:

CW Box 1441
797 Washington St.
Newton, MA 02160

SYSTEMS PROGRAMMING PROFESSIONALS

Control Data Corporation has career growth opportunities, in pre-sale, post-sale and consulting, located throughout the United States. Applicants should have experience in maintaining, modifying or extending any one of the following operating systems.

- CYBER 17X, or 7 X or 6000 with NOS, NOS/BE, SCOPE or KRONOS
- System 370/360 with DQS, VS or VS1, SVS, MVS
- CYBER 18 with 1700MSOS, RCOS or ITOS
- PDP11 with RSX-11M (These positions are in San Francisco Bay area)
- Intel 8080 or other microprocessors (These positions are located in the Philadelphia area)

Or have extensive assembly language experience on any of the above computers.

For immediate consideration, please send resume, salary history and geographical preference to:

John N. Powers

**CD CONTROL DATA
CORPORATION**

60 Hickory Drive, Weltham, Mass. 02154
OR CALL COLLECT: (617) 890-4600, ext. 245

An Affirmative Action Employer M/F



position announcements

position announcements

position announcements

position announcements

position announcements

Systems Development Manager

This is an excellent career opportunity for an individual with a strong management background, detailed knowledge of IBM software and general knowledge of data processing operations. You must have an advanced degree, preferably not in a scientific discipline. Your experience should include management of projects, budgets and personnel. Fifteen years experience in data processing and systems, six years of which were in management of projects of \$1 million or more, are required.

Excellent opportunity for advancement into a System Development Director within two years with this position.

If you would like to work for a large, State-of-the-Art organization located in an ideal climate, forward an inquiry to:

CW Box 1449
797 Washington St.
Newton, Mass. 02160

COMPUTER SYSTEMS ANALYST OS INTERNALS

OPPORTUNITY:

- Responsible for systems support in a 360/50 installation.
- Develop ADP applications for on-line data base management system.

REQUIREMENTS:

- Bachelor's or advanced degree in computer science or related field.
- OS, HASP, and data base management experience essential.
- NIPS experience desirable.

The University of California's Los Alamos Scientific Laboratory offers excellent working conditions and fringe benefits, including 24 days annual vacation, ample sick leave, and progressive retirement plan. Located high in the mountains of Northern New Mexico, the living is uncrowded, casual; the environment is pollution free; the climate is superb - cool summers and mild winters; recreational opportunities abound.

Please send complete resume or request application from:

James Trout - Employment Representative
Division - 78-EE
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545

los alamos
SCIENTIFIC LABORATORY

An Affirmative Action/Equal Opportunity Employer
U.S. Citizenship Required
Women, Minorities, Veterans, Handicapped, Urged to Apply

Systems Development/Programming

Booz Allen & Hamilton is a world leader in providing industry and government with consulting services in the areas of Technology, General Management and Market Research. Our rapid expansion has created openings in our recently established Corporate Systems Group, ideally located in North Central New Jersey, for professionals interested in assisting the firm in the development of corporate and distributive systems capabilities.

Senior Systems Analyst

The ideal candidate should have 5 plus years of systems analysis experience applicable to the development of data processing applications and the associated systems design including involvement with mini computers and vendor support. In addition, a financial systems orientation will be considered a major plus.

Programmer/Analyst

Qualifications will include: 3-5 years practical experience utilizing COBOL, preferably with a mini computer system; Business application background; Real Time application exposure; DEC 11/34, 11/70 background; Real Time application exposure; DEC 11/34, 11/70 background preferred.

These positions are designed to facilitate your maximum professional contribution to process concepts and implementation.

Please forward your resume in confidence to: R.W. Apple.



BOOZ ALLEN & HAMILTON INC.

66 Hanover Road Florham Park, New Jersey 07932
An Equal Opportunity Employer, Male/Female



MVS/JES 3

OR
DOS/VS

Many of our clients are seeking software experience. CT., Mass., N.Y. are but a few of the areas urgently in need. All fees paid - confidential. \$20,000 - \$30,000. Call or write - now.

ROMAC & ASSOCIATES
342 North Main Street
West Hartford, CT 06117
(203) 232-4811

DATA PROCESSING MANAGER-CONSULTING

Big 8 CPA firm with office in large U.S. Central City. College graduate with prior consulting either public or private to work with small medium and large client installations to evaluate and improve utilization of computer facilities. \$40,000. FEE PAID

ROBERT HALF PERSONNEL AGENCIES, INC.

522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

B6800 SPECIALIST

The Plastics, Paint & Vinyl Division has the following immediate openings:

• B6800 TECHNICAL SPECIALIST

Bachelor's degree combined with 3-4 years experience with on-line data base environment (DMS11, RJE, MCP, MDL, CANDE, WFL) preferred, graduate degree a plus.

• PROGRAMMER/ANALYST

Bachelor's degree preferred with 2-3 years programming experience. Burroughs experience a plus.

• B6800 OPERATOR

Bachelor's degree preferred with 2 years experience on Burroughs large systems.

We offer an excellent starting salary, a comprehensive benefit package and outstanding growth potential. Please send resume and complete salary history to:



Plastics, Paint & Vinyl Division

Attn: Mr. Jack Valentine
Salaried Personnel
P.O. Box 850
Wixom, Michigan 48096

An Equal Opportunity Employer

Systems Analysts/Programmers

G. D. Searle & Co., an International leader known for quality and innovation in the Health Care Industry, is seeking experienced DP professionals in the Systems and Programming areas at Corporate Headquarters located in Skokie. Positions currently available include:

LEAD ANALYST-SYSTEMS ANALYSTS

These positions will deal with the development of large-scale management information and retrieval systems, including problem definition, systems design, technical writing, and user interfacing associated with pharmaceutical research. Three to five years DP experience and systems analysis design, programming, timesharing and pharmaceutical research with COBOL and/or FORTRAN as well as a Bachelor's degree or the equivalent are required.

PROGRAMMERS

These positions will support the development and maintenance of information systems for scientific evaluation. Functions include programming and user interfacing for modification/maintenance of existing systems. A minimum of two years programming experience in FORTRAN, file management, and timesharing experience required. A Bachelor's degree in Math or Computer Science, or equivalent work experience, is preferred.

We offer an excellent salary and benefits program in a growing and stimulating atmosphere. Send comprehensive resume with salary history, in confidence, or call:

Darlene Brill
312/982-7513

SEARLE

G. D. Searle & Co.
P.O. Box 1045
Skokie, IL 60076

An Equal Opportunity Employer M/F/H



Strategic Marketing Professional For Computer Systems

Mostek Corporation, the recognized leader in MOS/LSI technology, is expanding its microcomputer operations and has an immediate opening for a technical marketing specialist.

This person will be responsible for new product definitions, marketing strategies, competitive analysis and business planning for new computer system products, including systems architectures - hardware and software. Ability to make suitable presentations to management essential.

A BS/MSEE or computer science degree is required along with significant experience in Strategic Marketing, preferably in the microcomputer or microcomputer industry.

If you meet these qualifications and desire a challenging and rewarding career, send resume with salary history to:

Mr. Bob Masie
Professional Staffing Manager
Mostek Corporation
1215 West Crosby Road
Carrollton, Texas 75006

MOSTEK
An equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

Mobil IMS TASK LEADERS SR. PROGRAMMER/ANALYSTS for DALLAS, TEXAS

Planned growth in our information systems activities requires some permanent additions to our systems development staff. The initial assignments will be with a project team in New York, designing the applications systems and special security software for a modern, on-line Human Resources Information System (HURIS) using IMS.

Upon completion of the business systems and computer systems design for HURIS — early 1979, the team will be relocated to Dallas, Texas for program development and systems implementation. Subsequent assignments, which would be in Dallas, would involve either major extensions to HURIS or senior-level participation in other major business information systems now being planned in other Mobil units.

Since these are long-term career positions, we are seeking people with project leadership potential, demonstrated IMS experience and a college degree.

Please send resume indicating experience, educational accomplishments and salary history to: Mr. P.J. Harbaugh, Jr., Manager, Professional Recruitment and Placement, Dept. 4105, MOBIL OIL CORPORATION, 150 East 42nd St., New York, N.Y. 10017.

an equal opportunity employer m/f

SYSTEMS PROGRAMMERS

Continued growth has created additional, career opportunities for career individuals with solid OS/VS1, RES and 3704 EP background and experience with large scale DB/DC systems degree preferred.

Responsibility includes generation and maintenance of systems software, application of vendor supplied software and evaluation of both software packages and hardware.

We offer excellent working conditions in a large IBM Network Data Center serving multi-plant activities. Send resume with salary history and requirements to:

Edgar L. Epperson
Corporate Employment Manager

ITT NORTH ELECTRIC COMPANY

Subsidiary of United Telecommunications, Inc.

P.O. Box 688
Galion, Ohio 44833

We Are An Equal Opportunity Employer M/F

MINI-SYSTEMS

Carat Corporation has a limited number of positions available for experienced people who consider themselves in the top 10% of their profession.

Experience in development of real time applications on mini/micro systems using assembler or high level languages.

Carat is one of Chicago's most respected consulting firms, working primarily with Fortune 500 accounts in the Chicago area. We offer top salaries and excellent fringe benefits including: Hospitalization, Disability and Life Insurance, Overtime Compensation, Paid Vacations, Profit Sharing.

If you think you meet our high standards and would like to know more about our unique client and personnel philosophy, call



Jack Meenan
Director of Mini Systems
(312) 654-2405

Suite 121 1010 Jorie Blvd. Oak Brook, IL 60521
An Equal Opportunity Employer

Tele-Communications Programmer/Analyst

Well established 200 million dollar firm has need for a person with extensive experience with mini-computers used in a communications/front-end environment. Individual would play a key part in developing and maintaining a large communications network. Individual must have a minimum of 5 years experience in telecommunications applications with good hardware and software knowledge.

Excellent compensation and fringe benefits. Send salary requirements and resume to:

CW Box 1434
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer, M/F

PROGRAMMERS/ANALYSTS

CCP/RPG II/COBOL

What do you want from your career?

- Independent work - like being in business for yourself?
- An opportunity to learn and progress with a group of professionals dedicated to the solution of all types of computer problems?
- Full account management responsibility?
- A high salary plus bonus and excellent fringe benefits program?

If these are your career objectives, and you have at least 3 years experience in the above disciplines, contact ISS today.

For interview appointment call (213) 484-0450

ISS: The Human Equation
International Systems Services, Inc.

1545 Wilshire Blvd., Los Angeles, CA 90017
An equal opportunity employer.

DATA PROCESSING CAREERS

Morrison-Knudsen Co., Inc. is a worldwide engineering construction and development company headquartered in Boise, Idaho. We have immediate requirements for the following qualified individuals:

- **SYSTEMS ANALYSTS**
3 years systems analysis experience. Commercial and construction applications.
- **PROGRAMMER ANALYSTS**
2-3 years programming experience. Commercial and construction applications. OS, CICS, DL1, BASIC, COBOL.
- **TIME-SHARE PROGRAMMER ANALYST**
1 year experience in time-sharing. Prefer CMS or TSO, experience in training and user support helpful.
- **SYSTEMS PROGRAMMER**
2-4 years experience in VM/OS/VS1 operating systems generation, knowledge of CICS and IMS helpful.

These positions offer competitive salaries and fringe benefits combined with career growth potential and are located in our Corporate Office facilities in Boise, Idaho. Boise is located in the heart of a major Rocky Mountain recreational area.

Qualified individuals may call or forward a resume including salary history to:



Contractors • Engineers
• Developers

MORRISON KNUDSEN

Box 7808, Boise, Idaho 83729
Attn: Bob Bakar
(800) 835-7825

M/K is an equal opportunity employer M/F

Don't just look for a new job... CYBERSEARCH

EDP CAREERS

Present client needs have created a multitude of challenging positions for data processing people. Here are some of them:

- | | |
|---------------------------|----------|
| • SYSTEMS SOFTWARE (+2) | \$19-22K |
| • 370/OS/OOS | |
| • SYSTEMS ANALYST (4) | \$23-25K |
| • 360/370 OS/OOS | |
| • SR. PROG. ANALYST (2) | \$18-22K |
| • 370/OS/OOS-BAL, COBOL | |
| • SR. PROG. ANALYST (7) | \$18-23K |
| • 370/OS-BAL, COBOL, CICS | |
| • SENIOR PROGRAMMER (6) | \$18-21K |
| • 370/OS-BAL, CICS | |
| • PROGRAMMER (11) | \$16-22K |
| • 370/OS-BAL, COBOL, CICS | |
| • COMM. ANALYST | To \$29K |
| • Mini computers | |
| • TECH SUPPORT SPECIALIST | \$18-21K |
| • 370/DOS-BAL, CICS | |

Please forward resume, or call collect (312) 454-8490. See our career conference ad in this issue.

CONTROL DATA CYBERSEARCH

AN EMPLOYMENT AGENCY OF
CONTROL DATA CORPORATION

214 N. Michigan Avenue, Chicago, Illinois 60601

position announcements

position announcements

position announcements

position announcements

position announcements

Sales Support Analysts

Join the team that's setting growth records again this year!

If you're looking for:

- Challenge
- Responsibility
- Diversity
- A professional environment that encourages and rewards individual performance

And you have:

- Computer Science degree or equivalent
- Experience in FORTRAN and some Assembly language
- Good communications skills
- The ability to work comfortably with customer personnel at all levels

We can offer you:

- Competitive salaries
- Good benefits
- The full support of an organization committed to excellence: training, office services, products, and state-of-the-art technology.

Tektronix is the leader in interactive computer graphics, one of the fastest growing segments of the computer industry. In just the last year, we grew 50%. We offer tremendous potential to success-oriented individuals who join our team now. For more information call collect or write: Mr. Lou Gennaro, Tektronix, Inc., 2 Research Court, Rockville, Maryland 20850. 301/948-7151.

An Equal Opportunity Employer M/F.

Tektronix
COMMITTED TO EXCELLENCE

FEDERAL EXPRESS

America's Airline for Packages

Our rapidly expanding and developing Communications Department will very shortly have openings for the following additional personnel:

MANAGER OF COMMUNICATIONS OPERATIONS

Minimum 5 years experience in communications operations and supervising technical personnel. Must be knowledgeable of sophisticated voice and data communications equipment and computer center operations. Specific knowledge of Burroughs, IBM, Data-point, Collins ACD, Dimension 2000 equipment preferred. Excellent human relations skills a must.

DATA COMMUNICATIONS SUPERVISOR

Responsible for installation, maintenance and operation of data communications equipment and supervision of technicians. Knowledge of Burroughs and IBM communications protocols and thorough familiarity with Bell System standards and modern data communications techniques required. Knowledge of communication front-end processors desirable.

We offer excellent compensation, benefits package and opportunity to the creative professional who enjoys working in a challenging environment.

Interested individuals possessing the qualifications indicated should immediately send a confidential resume including salary requirements directly to:

Kay Coop, Sr. Personnel Representative

FEDERAL EXPRESS CORPORATION

AMF Box 30167

Memphis, Tenn. 38130

An Equal Opportunity Employer M/F.

PROGRAMMERS, ANALYSTS, ETC....

IF YOU'RE LOOKING FOR

1st JOB —	Which is difficult to find	CALL →		→ offering	Training in all phases
2nd JOB —	To increase Salary	CALL →		→ offering	Excellent Salaries Good Benefits
3rd JOB —	To escape Boredom	CALL →		→ offering	CHALLENGES
4th JOB —	To find Your Future	CALL →		→ offering	Advancement Security

STOP PLAYING GAMES!

aci HAS IMMEDIATE POSITIONS AVAILABLE ... WHATEVER YOUR LEVEL-TRAINEE, PROGRAMMER, PROGRAMMER/ANALYST, SENIOR ANALYST OR SPECIALIST - aci OFFERS THE CHALLENGE, MONEY, ADVANCEMENT.

WE'RE A GROUP OF PROFESSIONAL PEOPLE DEDICATED TO SOLVING DATA PROCESSING PROBLEMS ... A CONSULTING FIRM PROVIDING THE BEST AND WE WANT TO TALK TO YOU!

CALL COLLECT: 513-278-4861



automation consultants, inc.

1700 Needmore Road, Dayton, Ohio 45414

an equal opportunity employer m/f

SYSTEMS PROGRAMMER

The Computer Software Company is expanding, and is accepting applications for the position of system programmer. Candidates must have a minimum of five years experience using the Assembler Language for the IBM 360/370 series of computers, and should have substantial knowledge of and experience with OOS/VS internals. Candidates will be expected to be able to meet the public, and to relocate to our corporate office in Richmond, Va. The position to be filled will be involved with both maintenance and development of enhancements for our products EDOS, EOOS/VS and POMS. Excellent salary and benefits. EOE. Please direct resumes to: Jack East

THE COMPUTER SOFTWARE COMPANY



6517 Everglades Drive
Richmond, Va. 23225

DATA PROCESSING OPPORTUNITY IN SUN BELT

A growth-oriented consumer products and specialty chemicals manufacturer in the Southeast U.S. has two openings in its System/3 Model 15 computer installation.

ANALYST/PROGRAMMER

We are looking for an individual to make a significant contribution in new systems development/programming. Successful candidate will have a 3+ years record of achievement in D.P. with at least one year's experience in design. This person will deal directly with users of D.P. services and be versed in all the advanced aspects of RPGII.

D.P. OPERATIONS SUPERVISOR

This is a responsible position for individual capable of directing an efficient computer/order-entry operation. This position requires a thorough knowledge of RPGII, ability to supervise, and ability to deal directly with users of D.P. services.

Call: Charles Wilson

Chattem Drug & Chemical Company

1715 West 38th St.
Chattanooga, TN 37409
(615) 821-4571



SOFTWARE ENGINEERS

EMI Medical Inc., one of the EMI companies, manufacturers, markets and services computerized tomographic brain and body scanners for all of North America. We are committed to continuing our dominance in the field of imaging instrumentation and computerized tomography. As a result, we are currently looking for qualified professionals who can interface our software with our CT scanners. This requires:

- Operating systems for instrument control
- Machine-level programming of micro-computer inner loops
- Modular architecture to permit future feature additions
- Working with designers of hardware array processors
- Algorithms for image processing
- High speed communication between peripherals
- Control of intelligent displays
- Software testing and distribution to field sites

Our tools include multi user UNIX and AOS. Prefer a BS engineering or computer science degree with a minimum of 2 years experience in the areas described above. Knowledge of file management, data base management and data general equipment is helpful.

We offer rich potential for pioneering a new and exciting field, an excellent income, and participation in an outstanding benefit program.

For confidential consideration, please send your detailed resume including work and salary history to Steve Callisher.

EMI MEDICAL INC

3645 Woodhead Drive
Northbrook, Illinois 60062
an equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

San Diego opportunity in SOFTWARE SYSTEMS DEVELOPMENT

Want to combine the ideal career opportunity with your favorite lifestyle? NCR Systems Engineering/Torrey Pines needs your help now in developing advanced, high-technology, EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, La Jolla and downtown San Diego. You can live in the setting of your choice — beach, valley, mountain, country, small-town or urban — and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too — from mild coast to dry desert. San Diego is a place of extraordinary choices — and right now the choice is yours.

COMPUTER PROGRAMMERS

The Systems Engineering/Torrey Pines Division has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- Telecommunications Software
- File Processing
- Network Development
- Large Mainframe, Mini and Micro Processor
- Operating Systems
- COBOL Applications
- Assembly Language

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems; both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.

NCR

Thom Harris, Employment Specialist
SYSTEMS ENGINEERING/TORREY PINES
4046 Sorrento Valley Blvd., San Diego, CA. 92121
An Equal Opportunity Employer

REAL-TIME PROGRAMMERS

AVIS has an immediate need for outstanding individuals to work in its Garden City, New York headquarters. Successful candidates must have 3-5 years PARS application programming experience. Knowledge and experience in 360/370 BAL.

We offer excellent starting salaries, fully commensurate with your experience, plus comprehensive benefits. For immediate, confidential consideration, please forward your resume including salary history and requirement to: Joan Shingles, Personnel.

AVIS RENT A CAR SYSTEM, INC.

North American Headquarters

900 Old Country Road

Garden City, N.Y. 11530

An equal opportunity employer M/F

AVIS

The Software Documentation people we're looking for probably aren't looking for a job.

We're the Digital Software Documentation Group, a proud collection of Writers and Editors. We like being part of this organization, not just because Digital is an important computer company, but because we're important to Digital.

We are on an equal footing with the Software Development organization, not a step below it. This is reflected in our salaries, our autonomy, our enthusiasm, and our corporate clout. We're not used to getting a lot of empty promises. What we do get is the necessary funding for our projects and enough freedom to produce the kind of documentation end-users can really sink their teeth into.

We have some of the best software documentation people in the business. And now we want the rest of the best because we are determined to produce nothing but the highest quality work. We have openings in Massachusetts and New Hampshire for great Writers, Editors, and Programmers with a flair for writing; people doing fine where they are but who would thrive in an organization that provides a great challenge to grow.

What Do We Offer You?

An opportunity to work for a company that recognizes the importance of software documentation; to be an integral part of the development team.

An opportunity to work with a highly autonomous, highly charged group where quality, not volume, is the objective.

An opportunity to experience real freedom, to take what has to be done and put your personal stamp on it.

An opportunity to have real impact on the support group, Digital, and the industry as a whole.

An opportunity to be catapulted forward in your career and choose your own directions to move in. You can follow either the administrative or technical path of our dual career program. Either way there will be personal satisfaction and, of course, compensation.

If this is the kind of involvement you're looking for — or if you'd like to learn more about us — let's talk.

Please forward your resume, including salary history to Theresa Buckley, Digital Equipment Corporation, Dept. B213 3807, 146 Main Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.

digital

A BETTER
WAY OF LIFE



APPLICATIONS

Systems Analysts to \$23K
Systems Development Staff of major mfr. co's with multi IBM, 370 OS/MVS; DOS/VS; IMS or TOTAL.

Systems Analyst to \$20K
Design & implementation of mfr Data Base systems: H.P. 3000/IBM 370/168. IMAGE or TOTAL.

Analyst/Prog to \$20K
Major Data Center (IBM 370 OS/VS/IMS) COBOL; OS-JCL; JCL; Mfr. Fin. Personnel or Sales & Mkt. Systems.

Prog Proj Leader to \$20K
4 yrs. COBOL; OS-JCL; CICS for multi 370/158 Data Center.

Sr. Programmer to \$20K
2 yrs. BAL; DOS or OS; CICS.

Sr. Programmer to \$18K
2 yrs. COBOL; DOS or OS; CICS.

Staff Programmer to \$18K
2 yrs. COBOL or PL1; OS-JCL.

Programmer to \$16K
1 yr. COBOL; DOS or OS-JCL.

TECHNICAL
Mgr. HOW/Software to \$32K
Long & short range planning and mgt. for Multi 370 OS/MVS/IMS Data Center.

Proj Mgr HDW to \$30K
Long range planning for Corp. O.P.C. & RJE Network. (Multi IBM-370's)

Software Proj Mgr to \$30K
Imp. & Maint. of operating systems; IBM 370 OS/MVS/IMS.

Software Proj Mgr to \$26K
Sysns & Utilities; OS/VS/IMS Virtual Operating Sys.

IN THE SUNNY SOUTH OUR CLIENTS

are the leading NATIONAL and INTERNATIONAL corporations with major DATA PROCESSING CENTERS in N.C., S.C., S. VA., N. GA. They offer "state of the art" TECHNOLOGY, excellent WORKING CONDITIONS, outstanding FRINGE BENEFITS and nationally COMPETITIVE SALARIES.

WE ARE PERSONNEL CONSULTANTS

There is no contract to sign. Our clients assure responsibility for your interview and relocation expenses and our fees. Your referral to a potential employer is personal and confidential. We do no mass mailing of resumes.

Software Proj Mgr to \$24K
Prime resp. for IMS/VS, PTF's vendor liaison; Multi 370 DPC.

Systems Prog to \$22K
Sysns; Conversions; Migrations; Multi 370's; OS/VS; CICS; TOTAL.

Systems Prog to \$22K
Generation & Maint. of MVS.

Systems Prog to \$28K
Min. 1 yr.; OS; BAL; Sysns.

MINI-COMPUTER
Software Proj Mgr to \$28K
Generation & Maint. of sensor based software & interface with 370; OS/MVS/IMS.

P.C. Systems Eng to \$24K
Design prog & instrumentation interface of chemical process control systems.

P.C. Systems Eng to \$23K
Design & prog of P.C. Applications in Textile Industry.

Prog/Analyst to \$22K
Real-Time or Interactive Systems in Distributed or Hierarchical environment.

Prog/Analyst to \$20K
Real-Time sys. exp. Assembler or Fortran; PDP-11; RSX 11M or D.

Programmer to \$15K
Fortran or Assembler; IBM Sys 7 Series 1; PDP-11 or NOVA exp.

Positions Available Nationwide

Call Toll Free

800-426-0342

Assured Confidentiality
and Employer Retained:

MAINT. ENGRS 15-18K
Experience in disk and printer repair.

PROGRAMMERS 16-20K
Several openings from coast to coast.

PROGRAMMERS 18-22K
With mini-computer experience.
Prefer E.E. degree.

SYS. PROGS 18-23K
OS/VS and OS (need several).

PARKER PAGE ASSOC.

P.O. Box 12308

Seattle, WA 98111

Offices in Wash. D.C.,

Chicago, Atlanta, Portland, Or.

PROGRAMMER/ANALYST

NORTHWESTERN ARKANSAS food manufacturer has opening in expanding data processing center. Requirements include BS in Computer Science or related field and minimum of 2 years business application experience using COBOL, Teleprocessing and assembler knowledge helpful. This is an excellent opportunity for the right person. Good company benefits and starting salary are featured. Interested candidates are invited to submit resume and salary history to:

Tyson Foods, Inc., Box E, Springdale, AR 72764. Attn: Randy Matthews. Call toll free (800) 643-3410. In Arkansas call toll free (800) 632-0003.

Computer Operations Supervisor

Black Hawk College has an immediate opening for a Computer Operations Supervisor. The applicant must have 3-5 years or medium to large scale computer operations experience and must have demonstrated supervisory potential in previous employment. The successful candidate will be responsible for the operation of a large, time-sharing and multi-programming batch computer system, including remote job entry and telecommunications.

Send resume, including previous experience, salary history and salary requirements, to Mr. Aclie B. Earl, Director of Personnel, 6600 34th Ave., Moline, IL 61265.

We are an EOE.

TO DETERMINE WHETHER YOU QUALIFY

call or write (please include salary history & objectives, relocation restrictions & career objectives).

Sto Fox CEC (919) 378-9884.



PERSONNEL CONSULTANT box 6788 • greensboro nc • 27405

Detach here, measure and seal you close securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

a new subscription

new address

new title

new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



**797 Washington Street
Newton MA 02160**

position announcements

position announcements

position announcements

position announcements

position announcements



**work
and
play...**
... in one of
the most
attractive
areas in the
midwest

DATA PROCESSING MANAGER

The perfect combination — management challenges and a relaxed lifestyle. Our location puts you within easy reach of beautiful lakes, skiing, snowmobiling areas and a variety of educational and cultural facilities. But this opportunity is more than a chance to enjoy a lower cost of living and a country lifestyle. You'll have full charge responsibility for all data processing activities of a progressive service organization that includes the development of major on-line applications.

To qualify you'll need a minimum of 8 years experience in data processing that outlines at least 3 years in a management position and an in depth knowledge of system design. College degree desirable. IBM experience would be preferred. Meet our qualifications and you'll be rewarded with an excellent salary, liberal benefits and a recognized place in our growth plans. We'll be in your area to conduct local interviews. To arrange a local interview send your resume to:

CW Box 1436
797 Washington Street
Newton, MA 02160

Equal Opportunity Employer M/F/H

SYSTEMS PROGRAMMERS

Come to the heart of the sunny southwest where you can: Ski in the morning — golf in the afternoon — and in the evening enjoy a breath-taking view at 10,400 feet of the jewel-like Albuquerque, from the Sandia Tram — longest tram-way in the United States. Albuquerque also offers you a tri-culture — a melting of Indian, Spanish and Anglos history, where you can walk the street, turn a corner and be transported back to the exciting days of both the conquistadores and pioneers.

Where else in the country will you find the clean air, mild climate, abundant sunshine — all combined harmoniously to allow the development of solar power at Sandia Labs in Albuquerque and at the Los Alamos Scientific Laboratories.

The University of New Mexico has openings for experienced Systems Programmers. Configuration: IBM S/360 Model 67 (2048K), IBM S/360 Model 65 (2048K), running OS/MVT with HASP in Shared-Mod, Time-Sharing Systems: CALL-OS and INTERCOM. Major job responsibilities: Generate, Maintain, Modify, Document, and Consult on Systems Software. Requirements: Bachelor's Degree, one to three years experience (one year of which consists of working as an OS Systems Programmer), knowledge of 360 Architecture, Assembler Language, and two high level languages. Particularly interested in persons with experience in Time-Sharing Systems, Mini-Computers or OS HASP. Starting salary to \$18,928 pending upon experience. Send resume and salary requirements to:

**DIRECTOR, COMPUTER CENTER
UNIVERSITY OF NEW MEXICO**
Albuquerque, N.M. 87131

An Equal Opportunity Employer

VIPSTM Regional Sales Managers

We're staffing a national sales team to market our new Variable Impression Printing Systems (VIPSTM) — and it could be the opportunity you've been waiting for.

VIPSTM is a revolutionary matrix printing system for tags, tickets, labels and specialty forms. It allows manufacturers to identify products with alpha-numeric, bar-code, OCR-A or graphic imprinting — from production control right through to the shipping of finished goods.

As one of our regional sales managers you'll start up and develop your own territory, working with an unusual degree of independence. It's a results-oriented job, requiring a talented, organized and experienced sales professional with the demonstrated ability to sell high technology products (such as computer peripherals), to manufacturers in diverse industries.

As a Dennison Sales Manager you will be paid on excellent salary plus commission, receive a company car and all Dennison employee benefits.

Local interviews will be held in the near future in each of the following cities: **Chicago, Philadelphia, Cincinnati, Atlanta, Pittsburgh, St. Louis, Buffalo and Dallas.**

To set up an interview appointment in a city near you, send your resume to Joy Corbett, Dennison Manufacturing Company, 300 Howard Street, Framingham, MA 01701.

An equal opportunity employer M/F.

Dennison



data processing

Software Engineers Systems Analysts Programmer Analysts

Well known leader in public policy research & experimentation has multiple openings at all levels of systems design and implementation including SOFTWARE ENGINEERS, SYSTEMS ANALYSTS & PROGRAMMER ANALYSTS.

Project assignments & desirable qualifications cover a broad range of computer science & systems application experience. Positions require ability to apply computer technology to design & implementation of data processing & computer system support within inter-disciplinary projects. Projects include large scale innovations in administrative automation for public welfare programs in several states.

We are looking for people who can make creative contributions & will respond to, and grow with, challenging opportunities. Range of desirable qualifications:

- broad background in computer technology, including hardware analysis, operating systems, communications, on-line environments.
- experience in systems development, including design of processing flows, file management & file design
- experience with minicomputer hardware, operating systems & programming languages; experience with UNIX/C language desirable
- solid analytical experience with commonly used high level programming languages
- computer science or other relevant degree desirable

Candidates can expect salaries, assignments & growth dependent on their contribution & qualifications. Competitive benefits. Positions available in Princeton, New Jersey, Denver, Colorado, and Montpelier, Vermont.

Please supply resume, salary history and locational preference to Ms. Carol Szul at:



**MATHEMATICA
POLICY RESEARCH**

P.O. Box 2393
Princeton, N.J. 08540

equal opportunity/affirmative action employer m/f

MIAMI UNIVERSITY FACULTY POSITION

The Department of Systems Analysis has a one-year position as a visiting Assistant Professor (with a possibility of the position becoming a tenured track position after one year). Teaching assignments will be primarily at the undergraduate level and include some programming languages. Ph.D. and practical industrial experience preferred. Send your application to:

Amit K. Jain, Chairman
Systems Analysis Dept.
Miami University
Oxford, Ohio 45056
MIAMI UNIVERSITY IS AN
EQUAL OPPORTUNITY
AFFIRMATIVE ACTION
EMPLOYER

SYSTEMS ANALYST UNIVERSITY OF TENNESSEE, KNOXVILLE

Responsible for development and maintenance of information systems in the administrative support areas of UTK. Direct programmers and analysts in the development/maintenance of application systems in some of the following areas: Student Administration Processes, Physical Plant, Finance, Bookstore, Purchasing, Telephone Services, Food Services, and Libraries. Must be skilled at preparation of specifications for programmers and user offices, be able to perform method and procedures analysis, estimate resource requirements, and participate in the development of plans and schedules. Technical experience with OS JCL, COBOL, MARK IV, and PANVALET preferred. Education - Bachelor's degree.

Submit resume to U.T. Employment Center, 1818 Terrace Ave., Knoxville, TN 37916 (deadline - March 1, 1978).

UTK is an EEO/Affirmative Action/Title IX/Section 504 Employer

SOFTWARE PROGRAMMER

ZIMPRO, INC. (Subsidiary of Sterling Drug, Inc.) a leader in waste water treatment and resource recovery offers an exciting opportunity for the qualified professional. Need a 4 yr. degree in real-time engineering, mathematics, or in computer science. Desirable to have Assembly Language capabilities and experience with Digital Equipment Corporation Computers: PDP-11 family line. Duties involve programming for real-time product line. This will entail task development software documentation, executive design and implementation, systems testing, hardware/software diagnostics, and software installation.

We offer competitive salary, comprehensive benefits, interesting employment and a great place to live.

Please send resume and salary requirements in hard copy enclosed to:

Mr. Ted Stehly
ZIMPRO, INC.
Rothschild, WI 54474
Equal Opportunity Employer M/F

DATA PROCESSING POSITIONS IN FLORIDA

LOOKING FOR A CHANGE? Excellent salary — benefits — challenge? Nationwide data processing company with headquarters in Florida has positions from Programmer Analyst through Senior Technical Analyst.

Positions require experience on H6000 series hardware utilizing FORTRAN, T/S and IOS. Data base specialists needed with CICS/IMS and networking experience. Other vacancies require COBOL, FORTRAN and IBM 370 background. Mini-computer (HP300, HIS L6 or equivalent) experience desired. Degree preferred for all positions.

Interested? Send resume to (Ms.) Nancy Fitzpatrick, Personnel Department, GTE Data Services, Inc., First Florida Tower, P. O. Box 1548 — Tampa, Florida 33601.

"AN EQUAL OPPORTUNITY EMPLOYER M/F"
GTE DATA SERVICES
INCORPORATED

PROGRAMMER/ANALYST

Expansion of our on-line, progressive data processing department created a need for another experienced, dynamic programmer/analyst to help our staff to continue to develop and improve corporate systems in all functional areas.

Successful candidate should have at least 2 years of programming experience and 1 year of systems analysis in a manufacturing environment. Outstanding company benefits include 100% tuition refund. Company located in Northwest suburb of Chicago. Reply in confidence giving complete salary history and requirement to:

CW Box 1433
797 Washington St.
Newton, Mass. 02160
an equal opportunity employer

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER ANALYST

Telephone Interviews

Are you an experienced programmer with exceptional career motivation and an interest in expanding into the systems area?

If you are challenged by the opportunity to contribute to the development of an integrated data base management system, if you possess several years business applications programming experience (billing, order processing and other on-line systems application ideal), if you have some exposure to systems development, if you are competent in DOS and able to write CHROM for an IBM 360/370, and if you interact well with management and possess excellent communication skills, you should investigate this opportunity to be recognized for individual achievement.

Our nationwide trade organization offers a competitive salary and employee benefits program, modern offices and a genuine opportunity for professional growth.

PLEASE CALL COLLECT
MONDAY THRU FRIDAY
(312) 644-3100 Ext. 470

If unable to call, send your resume to:

Personnel Dept.
U.S. FLIGHT OF SAVINGS ASSOCIATIONS
1111 Wacker Dr.
Chicago, IL 60601

An Equal Opportunity Employer M/F

Programmer/Analyst \$14,500-\$17,650 Annually

Opportunity for an experienced programmer/analyst to develop data base municipal systems. Analyst will be working on a HP-3000 minicomputer using Image DBMS with Query, Cobol, and Basic. Requirements include an accounting, business or math major with a minimum of one year EOP systems experience. Mountain View is near Stanford University in the San Francisco Bay Area. Final filling date is February 28, 1978. Send resume to City of Mountain View, Personnel Office, P.O. Box 10, Mountain View, CA 94042 (415) 967-7211, Extension 255.

SENIOR SYSTEMS ANALYST \$34,000

Expanding Co. has several openings for individuals with 6-8 yrs exp w/min comp (Data Gen Eclipse a +) realtime network distributive processing operations in foreground/background mode. Structured FORTRAN format, dealing w/signal processing, data base, mgmt., command and control systems.

Sr. Intermediate ANAL/PROG exp w/ Op Sys (Data General), Network Comp Sys, OBM, Hi Speed Signal Processing, Msg Switching, Software Integration and Maintenance Salary \$20,000-\$34,000.

Professional Search Personnel
MIS-EOP Dept
4900 Leesburg Pike, Suite 311
Alexandria, VA 22302
(703) 671-0010
No Contracts,
No Fees to You

TOLL FREE

800/633-6644

In Alabama Call Collect
205/328-2931

24 Hr. Telephone Service

SUNBELT SERVICE

PROJ MGR/370	28K
EDP AUDITOR	25K
P/A UTILITY,	24K
370	
SYSTEMS CONS	24K
ANAL, BKNG	23K
INS, 370, ANAL	22K
SYS PROG MGR	22K
PL/I PROG/	21K
ANALYST	
MIS ENGINEER	20K
UNIVAC, P/A	20K
ANALYST, 370,	20K
MFG	
S/3 PROG	18K
P/A, DEC EQUIP	18K
SYS PROGR	18K
MGR, HONEY,	18K
COBOL PROG	18K
P/A, BURR,	17K
IBM 370,	17K
MFG, P/A	
S/3, MFG, P/A	16K
BAL PROG	16K
PL/I PROG	15K
ASSEMB PROG	15K
RPG II PROG	14K

Representative listing of current southern opportunities. Additional positions available in south and nationwide. All fees paid. Call Ole Olson or mail resume for fast, confidential service.

GENERAL PERSONNEL CORPORATION
Brown Marx Bldg
Birmingham, Ala 35203

SYSTEMS PROGRAMMER

1-3 yrs. experience
Queens Location

Bulova America's leading manufacturer and marketer of fine quality watches has an excellent learning opportunity for an Assistant Systems Programmer. Our installation utilizes 370/145 OOS/VS hardware, with CICS teleprocessing. Your background should include maintaining various software packages such as ASAP, EPAT, OBOMP and PANVALET, combined with understanding of BAL and COBOL.

For prompt consideration please send letter or resume including current earnings in confidence to:

Ms. Jeanne McLaughlin
BULOVA WATCH CO.
Bulova Park
Flushing, N.Y. 11370

Computer Performance Measurement Career Opportunities for Management Consultants

We are a prestigious, well established rapidly expanding computer services firm headquartered in midtown N.Y.C. Our growth has created outstanding opportunities for EDP professionals who want to grow with us.

Our client base is extensive and varied-manufacturing, banking, retail, insurance, government, etc. Our immediate needs are for well qualified Computer Performance Evaluation Professionals who can assume challenging consulting responsibilities in one or more of the following areas:

- **COMPUTER COST ACCOUNTING** - Evaluation, design and implementation of sophisticated cost accountingsystems which report to client management profit center costs for EDP services (hardware, software, personnel, other).
- **COMPUTER PERFORMANCE REPORTING SYSTEMS** - Evaluation, design and implementation of systems which report the service level and resource utilization of MIS/EDP environments to its own and executive management in client companies.
- **COMPUTER SYSTEMS MEASUREMENT** - The measurement of computer systems internal performance and productivity in order to size hardware/operating systems utilization for client processing support requirements and to improve the integrating end mix of hardware/systems software for operational improvement. Knowledge of hardware monitors and software measurement tools desirable.
- **COMPUTER SYSTEMS TUNING** - Evaluation, design and implementation of procedures, systems, schedules and resource modifications to improve productivity of EDP hardware/operating systems, application systems, data base management (software) systems, computer production schedules, systems development support and processing integrity.

We offer a climate conducive to personal and professional growth, including partnership potential. Your compensation will be determined individually-commensurate with your experience and background. A willingness to travel is required.

Our staff is aware of these openings. If you would like to learn more about the opportunity we offer, please submit your resume, including salary history, in complete confidence to:

Box 819, 420 Madison Ave., New York, N.Y. 10017
An equal opportunity employer M/F

IMS or COMTEN

Our clients are nationwide and represent a full spectrum of industries... manufacturing, banking and insurance. We have more openings with quality firms than we can find experienced people for. Our clients pay all fees, interviews and relocation costs. IF YOU ARE EVEN THINKING of a change, please call us to discuss these opportunities.

LARGE SCALE SYSTEMS

COMTEN Specialist	\$24-30K
Sys Prog IMS/VS Internals Expert	\$24-28K
Data Base Anal, IMS PSB DB's	\$22-26K
Data Base Adminis. IMS	\$22-28K
Proj Leader IMS/VS COBOL or PL-I	\$21-25K
Prog/Anal IMS/VS COBOL or PL-I	\$18-24K
Prog/Anal OS/DOS COBOL	\$15-19K
COMTEN Analyst	\$18-22K

Partial List Only
CONTACT BILL DENNY, V.P.

CALL TOLL FREE 24 HRS./DAY
1-800-821-2270 EXT. 605

(In. Mo. 1-800-892-7655)

Jim King and Associates

438 Gulf Life Tower/Jacksonville, Florida 32207
19041 398 7371

SR. SYSTEMS ANALYSTS (FINANCIAL)

Amtrak is seeking individuals qualified to supervise the design, development and implementation of financial reporting systems projects.

The successful candidates will be degreed with 5 or more years experience in any area of Accounting, Budgeting, Financial Planning, Auditing and Computer System design. Will define problems of user groups and devise solutions for our Financial Department.

Must have designed, developed and implemented at least one major reporting system.

We offer excellent salary, benefits and growth opportunity in a challenging environment. Send resume, INCLUDING SALARY HISTORY, in confidence to: J.R. Brune, Personnel, Amtrak, Dept. 2, 400 N. Capitol St., NW, Washington, DC 20001.

An Equal Opportunity Employer M/F



DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

COMPUTER PROGRAMMERS

Candidates should have a college degree or equivalent, and a minimum of 1 year experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and knowledge of JCL for OS/MVT is desirable.

COMPUTER SYSTEMS ADVANCED PLANNING SPECIALIST

Will perform feasibility and systems design, procurement justification and evaluation of automatic data processing equipment. Also involves performance monitoring and analysis for improving present computer systems, a CDC CYBER 70/Model 76, and CYBER 170/Model 173 computer systems. BS or equivalent in Electrical Engineering, Computer Science or related field, with 8-10 years of applicable experience.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If interested and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C
EG&G Idaho, Inc.
Box 1625, Idaho Falls, Idaho 83401

U.S. Citizenship Required
We are an equal opportunity employer M/F H



position announcements

position announcements

position announcements

position announcements

position announcements

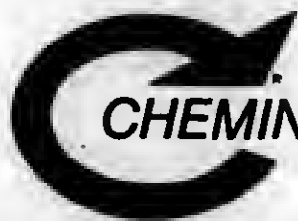
SENIOR PROGRAMMER/ANALYST

An expanded range of business and manufacturing applications coupled with the progressive technical environment of an innovative leader in the chemical processing industry makes this an outstanding opportunity for the Programmer/Analyst seeking to step up to Senior level responsibilities.

Working within the frame work of our digital equipment PDP-11 RSTS/E systems, you'll participate in systems analysis, program design, coding and other programming tasks; BS in computer science or math and an exposure to interactive on-line applications would be considered essential for success.

Competitive salary, full benefits and extensive opportunities for career advancement accompany this position with our dynamic team DP professionals. For confidential consideration, forward resume with earnings history to:

William Stephan
Staff Personnel Administrator
P.O. Box 1123
Dayton, Ohio 45401



CHEMINEER, INC.

We are an Equal Opportunity Employer M/F

EDP AUDITOR CONSULTANTS

Expansion within our young EDP Audit Department has created excellent opportunities for professionals with a unique blend of talents and skills. The right people will possess a full range of current EDP experience, be adept at applying this knowledge in an audit context, and have programming experience in all major languages.

Work assignments will include management review of major systems projects in all business areas, particularly manufacturing, participation in decisions to acquire hardware and software, operational audits of control and security procedures and development of corporate guidelines for selection and management of systems projects.

The successful candidates will have an undergraduate degree in a systems or business discipline and extensive experience, probably as a consultant or EDP Auditor.

We offer an attractive salary and working environment as well as high visibility and quick identification of potential. Travel will be moderate, occasionally international. The position is located at our corporate headquarters in north suburban Chicago. Submit comprehensive resume, including salary history, in confidence to:

Richard E. Pochowicz
G. D. Searle & Co.
P.O. Box 1045
Skokie, IL 60076

Equal Opportunity Employer M/F ... A Practice
Not Just a Policy

MARKETING & SALES MANAGER TIME-SHARING DIVISION

If you are looking for a chance to be innovative and to quickly establish a good track record for yourself...

We are looking for a take-charge marketing/sales executive, who will report to our consulting client's Time-Sharing Division Manager.

Your immediate task will be to effect a major sales increase while achieving profit goals in the next twelve months. You will therefore require:

- A record of successful sales force management;
- A working understanding of time-sharing and its potential;
- Experience in time-sharing-based product design and marketing;
- An ability to move people to secure desired results.

Our client is a diversified, well-established, and profitable computer services company, with a demonstrated willingness to appropriately reward outstanding performance.

Interested? Send us a letter outlining why you believe you qualify, and include your resume with compensation history. Your reply will be held in strict confidence.

CW Box 1443
797 Washington St.
Newton, Mass. 02160



DATA PROCESSING PROFESSIONALS be with the best, be with BECHTEL

We're one of the international world leaders in the field of engineering and construction management. If you're looking for an innovative and active professional career in data processing, we offer outstanding opportunities. If you have a minimum of two years experience in the following areas we'd like to talk to you:

- SENIOR SYSTEMS ANALYSTS
- BUSINESS PROGRAMMER/ANALYSTS
- ENGINEERING PROGRAMMER/ANALYSTS
- SENIOR SYSTEMS PROGRAMMERS

Write or call in confidence:
Mr. K. David Bates (415)
768-5942 collect. Bechtel
Corporation, Employment
Dept. 8-68-8, P.O. Box 3965,
San Francisco, CA 94119.



An Equal Opportunity Employer M/F

FLORIDA URGENT!

SYS/PROG-OS/VS, HASP/JES2,
SYS/GEN (1, 7, 9, 3), IMS,
3704em des TO 23K
SYS/PROG- CICS Ints, min 1 yr.
BAL, OS/VS sysgen des TO
18K
OB/ANAL-IMS, util, Cobol, OS/
JCL, OB design TO 23K
SYS/PLAN- Bank, apps, OS/VS+
TO 22K
APPLICATIONS PROG/ANAL,
COBOL, read RPG, 370/DOS TO
18K, BAL, CICS apps, DOS TO
17K, PL/I, OS/JCL, degree 18K,
COBOL, IMS, OS/JCL TO 17K
OTHER SUNBELT
SYS/PROG-VS1/VS2 sysgen req.
CICS, VTAM, NCP/VS des. TO
25K
SYS/ANAL- Network design,
SNA OS/VS, CICS/IMS apps.
To 25K
APPLICATIONS PROG/ANAL,
PL/I, BAL, CICS apps. To 21K,
PL/I, OS/JCL To 19K, Many
COBOL, OS/DOS TO 18K
Len Payden
(305) 735-0110
Frank Leonard Personnel
2331 N. State Rd. 7, Ste. 124
Ft. Lauderdale, FL 33313

PROGRAMMER Colorado Opportunity

Take advantage of Colorado's wide variety of winter and summer recreational activities. Excellent opportunity for individual interested in conducting feasibility studies and developing systems designs. Primary responsibilities include programming, testing, documentation and implementation. Must have B.S. degree and 2 yrs Burroughs Programming experience, including Cobol. Please contact Patty Anderson, Personnel Dept., St. Joseph Hospital, 1895 Franklin St., Denver, Colo 80218 (303) 837-7970.

Reach for
the Stars!



We offer a GALAXY of exciting opportunities for PROGRAMMERS & ANALYSTS

including:

- Excellent Salaries including:
- Per Diem Allowance (for relocation & misc. expenses)
- Company paid major medical insurance
- Life insurance for you and your family
- Paid Overtime
- Special welcome back financial consideration, for previous employees

Call our Toll Free Number Monday thru Saturday and ask about our numerous DP job openings in 5 national offices.

1-800 543-7583

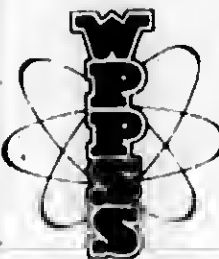
ALLEN SERVICES CORP
DAYTON AIRPORT OFFICE

212 West National Road
Vandalia, Ohio 45377
In Ohio call collect (513) 890-1200
An Equal Opportunity Employer M/F

SYSTEMS ANALYST

We have immediate openings for Systems Analysts with business or scientific applications experience. Responsibilities include preparation of requirements, specifications, and detailed designs (programmable) associated with the implementation of application systems.

The successful candidates will possess a degree, plus a minimum of three years of directly related professional experience.



We are a major Pacific Northwest utility agency with work in progress on five nuclear power plants. We are located in an inland Pacific Northwest community of approximately 90,000. Comprehensive fringe benefit package, including relocation assistance. Send resume, salary history and salary requirement, in confidence to:

Ms. J.M. HAROING
Dept. GK-14
Washington Public Power
Supply System
P.O. Box 944
Richland, WA 99352
an affirmative action employer

PROGRAMMER/ ANALYSTS

We'd like to be your employer

Ford Motor Company - Sales Operations
has career opportunities in
the Detroit area related to:

• BUSINESS APPLICATIONS SYSTEMS

CDBL programming experience in a large-scale disk end/or tape environment essential. Experience with data base systems, structured programming concepts, and IBM 370 hardware utilizing DS/VS operating systems desirable.

• COMMUNICATIONS SYSTEMS

Proficiency in IBM Assembly Language plus synchronous bisynchronous communications protocol required. Experience with video display in an on-line interactive environment and programmable front-end processors an asset.

• MINI-COMPUTER SYSTEMS

Programming experience in either MINI/MICRO Systems or programmable terminals essential. Knowledge and experience in developing operating systems, source data entry systems, inquiry-response systems or distributive processing systems a plus.

Qualifications - 2-7 years full-time experience in any of the above areas; college degree (MS/MBA preferred) and a demonstrated record of accomplishment. Reply to: (Include salary requirements).

SALES OPERATIONS

Attn: Administrative Manager
P.O. Box 1548
17101 Rotunda Drive
Dearborn, Michigan 48121

An Equal Opportunity Employer M/F



position announcements

position announcements

position announcements

position announcements

position announcements

MIS Director

Food products company in central Pennsylvania seeks a Director for our Integrated Management Information System. Present MIS consists primarily of a data base and communications oriented computer system. Exposure to several mainframe manufacturers, systems analysis and strong training skills are essential.

We require excellent planning and communications skills along with a progressive career track record. This position will be attractive to the candidate whose present base earnings are in the low to mid \$20's and offers future professional and personal growth.

We offer an excellent compensation package including a bonus program. If you desire to join a progressive management team with a rapidly expanding company, please forward resume and salary history to: CW Box 1447 757 Washington St. Newton, MA 02160

An Equal Opportunity Employer M/F

RAYTHEON

Santa Barbara, California ENGINEERS

Raytheon Electromagnetic Systems Division, located in the beautiful Santa Barbara, California area, has immediate openings in the following areas:

SOFTWARE/SYSTEMS

SOFTWARE — Define NTDS/EW interface requirements and design and develop associated software. Design and develop diagnostic software for a large scale military EW system. Requires BSEE or Computer Science degree with experience in real time development and FORTRAN programming.

SYSTEM ENGINEERS — To perform subsystem design and analysis of computer controlled ESM/ECM system. Will be responsible for development of system error budgets and analysis of system performance. Requires coordination with design groups.

PROJECT ENGINEER

Engineers with systems background in electronic warfare or radar are needed to coordinate effort in providing state-of-the-art improvement in a major electronic warfare system. Work involves conceptual definition, project or proposal coordination and customer interface. BSEE required with 3 to 5 years experience, including 1 year in radar systems.

Please send resume with salary history to: Employment Office, Dept. CW.

RAYTHEON

Electromagnetic Systems Division

6380 Hollister Ave. Goleta, CA 93017.
Equal Opportunity Employer M/F
U.S. Citizenship Required

IMMEDIATE REQUIREMENT for SERVICE BUREAU PERSONNEL in SAUDI ARABIA

SALES MANAGER — Full responsibility for sales of Service Bureau in Alkhobar, Saudi Arabia. Commercial and scientific applications are supported under Time Sharing and Batch. Service Bureau sales experience required. Excellent compensation package including salary, incentive, and bonus plans, including expatriot premium. A two year contract with completion bonus is included. Ground floor opportunity for qualified individual. Reply in confidence to CW Box 1450, 797 Washington St., Newton, Mass. 02160.

Programmer

SYSTEMS PROGRAMMER

The National Academy of Sciences is seeking a systems generation software maintenance programmer using an IBM 370-135 system. DOS/VS experience with CICS and terminal experience essential. Duties include systems generation and maintenance including CICS, ATMS, application program maintenance and technical assistance to other programmers. A background in statistics, accounting or computer science is desirable. Position requires 5 years experience using IBM assembly language. Starting salary \$19,000-\$23,250, depending on qualifications. Interested candidates should submit resume to Mr. J.H. Leach, Manager, Data Processing Center, NATIONAL ACADEMY OF SCIENCES, 2101 Constitution Ave., N.W., Washington, D.C. 20418.
An Equal Opportunity Employer

SUNBELT OPPORTUNITIES Fees Paid By Client/Firms

LEAD PROGRAMMER/ANALYST — \$20,000 Range Negotiable. Dynamic, expanding Memphis based corporation offers ground floor opportunity for career progression in development and implementation of new and advanced systems. Should be proficient in one or more languages, have experience in systems modification/implementation and a burning desire to advance on a planned career course.

PROJECT MANAGER

TD \$25,000 Range. Billion dollar corporation located in Mid-South Metro Area needs D.P. pro for new systems development. Ground floor opportunity in development of on-line data base systems utilizing large IBM mainframes, mini-computers and terminals for corporate wide applications. Prefer related experience with qualities of leadership and desire.

EXECUTIVE PERSONNEL CONSULTANTS

5050 Poplar Suite 1601 Memphis, TN 38157
(901) 761-4560
RECRUITING IN THE SUNBELT FOR 32 YEARS

DATA PROCESSING SOFTWARE SPECIALIST

Generate and maintain operating system. Provide technical help to telecommunications specialist, data base specialist, and Operations Department. Write special subroutines and optimize operating system. Should be familiar with DS-MVT or OS-VS maintenance and generation. Requires 1 to 2 years experience as system programmer. Call (503) 225-5272 for appointment, or send resume to Blue Cross of Oregon, 100 S.W. Market St., Portland, Oregon 97201.

BLUE CROSS OF OREGON

An Equal Opportunity Employer

COMPUTER SYSTEMS

Project Leader

The Toledo Edison Company is seeking Project Leaders to manage CIS and General Systems. 370/145 equipment operating in the DS-MVT environment. Degree desirable, 2-5 years experience required. Cobol and Assembly languages necessary. Please submit resume and salary requirements in confidence to: The Toledo Edison Co., 300 Madison Ave., Toledo, Ohio 43652 Attn: Mrs. M.J. Conway. An Equal Opportunity Employer.

PROGRAMMER/ ANALYST

280 store retail chain based in North Carolina and listed on AMEX, is looking for an aggressive individual to join our Data Processing team. 2 years experience with RPG-II required and CCP experience helpful. Excellent benefit package. Send resume, salary history and requirements to: Alex Von Plinsky, 111 P.O. Box 25800 Charlotte, NC 28212 EOE M/F

DECsystem10/PDP/ Network Development

Wilson Synchrotron Laboratory
Cornell University
Laboratory of Nuclear Studies
Ithaca, NY 14853

Immediate opening for someone with experience developing system software to participate in design and development of data acquisition and control systems using 11/34s (RSX11M), a K118 (TDPS-10) and to be selected additional large timesharing system(s).

BS in computer science, or a combination of related education and experience, plus good systems programming background. TDPS10 and/or RSX11M experience is the most desirable, but candidates with other systems programming experience will also be considered.

Salary will depend on experience. Many educational, employment, and recreational benefits. Staff is encouraged to keep up with the state-of-the-art through professional activities and Cornell's excellent computer sciences department.

CALL TODAY to discuss how you might work and grow in this pleasant and exciting scientific research environment!

Ray Helmke or Erich Knöbl
(607) 256-4882
Equal Opportunity Employer M/F

PROGRAMMERS IRAN

RCA Global Communications, Inc. has immediate openings in Iran for programmers with a minimum of 5 years experience in real-time minicomputer hardware/software interface and problem solving. Large computer background is an asset.

Responsibilities will include operational support of on-line Telex circuit switching communications systems at our main sites in Teheran and Shiraz and 9 other peripheral sites. Tour of duty will be for approximately 2 years.

We offer an outstanding compensation package including excellent starting salary, plus 25% completion bonus, plus overtime, relocation assistance, living allowance and cost of living adjustments.

For immediate consideration, please reply in confidence, to: Ms. Shirley Krepf, RCA Global Communications, Inc., Box 11-IR, 60 Broad Street, New York, NY 10004.

We are an equal opportunity employer F/M.



INTERNATIONAL INTERNAL AUDITORS

Rapidly expanding worldwide engineering and construction company (Fortune 500 & NYSE) seeks highly motivated professionals for the following:

EDP AUDIT SUPERVISOR

Assist in development of a new EDP audit function. 7 years EDP audit experience (2 years supervisory) with a large internal audit department.

EDP SENIOR AUDITOR

Participate in EDP system design and operational audits, 5 years EDP audit (2 years as senior) with a large internal audit department.

These positions offer unusual opportunity, high visibility and long-term growth. Superior communications skills are essential, requires undergraduate degree (accounting desirable) MBA, CPA, CIA preferred. Approximately 40% domestic and international travel. Excellent salary, benefits and relocation programs. Submit resume (in confidence) including salary and requirements, identifying desired position to:

M.W. AVERETT, DEPARTMENT CO

J. Ray McDermott & Co., Inc.

P.O. Box 60035, New Orleans, LA 70160
An Equal Opportunity Employer M/F

Analysts Want Western Living? NCR

Has an opening for you if you possess the following qualifications:

1. At least 3 years programming and system on Century hardware
2. Proficient in use of Neat/3 Level II
3. On-line experience

We are looking for a few key people in DENVER, TOPEKA AND BILLINGS. Position involves project type work on large customer sites involving on line networks. Send detailed resume and/or contact J. Morin, NCR, 2000 S. Colorado Blvd., Denver, Colo. 80222. (303) 758-6273

NCR is An Equal Opportunity Employer M/F

MANAGER COMPUTER OPERATIONS BURROUGHS

ON-LINE BANKING
Management of supervisory and support personnel for Burroughs 84700. Demonstrate ability to develop procedures and organization. Work for midwestern bank service center. Send resume with salary history to:

Champaign National Bank
Attention H. Primmer
P.O. Box 250
Champaign, Ill. 61820
Telephone (217) 351-2761
an equal opportunity employer

Analyst Programmers

The Rockwell Way Of Life Is More Than A Career

Rockwell International's Automotive Operations, which is a Billion dollar-plus supplier to the transportation industry, has an immediate opening for Analyst Programmers.

The successful candidates must be degreed, and have 3 years programming experience with manufacturing end/or engineering systems on an IBM 158/168/OS System with IMS/DL1, BOMP and DBOMP.

Rockwell International can offer you personal growth through interaction with experts in your discipline, and sincere management interest in your career development. We provide top financial remuneration for top performance, and a benefits portfolio comparable to any.

Please submit your resume, including salary history to:

Mark Toth
ROCKWELL INTERNATIONAL
Automotive Operations
2135 W. Maple Road
Troy, Michigan 48064



**Rockwell
International**

Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SAN FRANCISCO Computer Expo '78....

Whether your "bag" is skilling (Would you believe a twenty-five foot base at one of our resorts?), or attending COMPUTER EXPO '78 during Easter Week in the Bay Area — we'll arrange job interviews for you in your spare time.

SOFTWARE PROGRAMMERS
Our clients are seeking IBM 370/OS and 370/DOS types from junior/intermediate to Project Ldr. levels.

QUALITY ASSURANCE P/A's
Sr. COBOL P/A's to develop new systems testing spec's, Sys. Dvlpmt. procedures, disaster recovery, documentation.

COBOL PROGRAMMERS
Multiple openings with prestige Bay Area firms for programmers with one yr. or more COBOL. Exclnt. opportunity to join 370/IMS tele-com's environment.



ROBERT HALF
PERSONNEL AGENCY
111 Pine, San Francisco, CA 94111
(415) 434-1900

EDP**PROFESSIONALS**

Ortho Pharmaceutical Corporation, a member of the Johnson & Johnson family of companies, seeks candidates for an expanding data processing organization utilizing an IBM 370/135 DOS/VF CICS. The successful candidate will have a Bachelor's degree and a minimum of 5 years Programming and/or Systems experience.

SENIOR PROGRAMMER

Individuals must have a knowledge of COBOL and commercial programming applications. Duties include overall directions of programming projects, planning systems flow, generation of test data and programming critical and complex modules.

SR PROGRAMMER ANALYSTS

Duties include program design, program development and implementation for computer systems supporting research. A thorough knowledge of batch processing time sharing and mini processing is necessary. A knowledge of FORTRAN, COBOL or BASIC is important.

Ortho is located in central New Jersey and offers a competitive salary and benefits package coupled with a growth environment that provides realistic opportunities for advancement and personal development.

Qualified individuals should forward their resume in confidence to Ronald H. Darden, Senior Personnel Administrator



ORTHO
PHARMACEUTICAL
CORPORATION

Route 202, Raritan, New Jersey 08869

(A Johnson-Johnson Company)

an equal opportunity employer M/F

COMPUTER PROFESSIONALS**READY FOR A CHALLENGING CAREER POSITION?**

Sperry Vickers, located in Jackson, Mississippi, is the world's leading manufacturer of hydraulic systems and components. The MIS Department has positions available at various experience levels to participate in the development of a comprehensive Business/Manufacturing Data Base System which is to be supported by Shop Floor Data Collection. Applicants must have a minimum of two years experience in developing business information systems utilizing COBOL and a strong background in at least one of the following areas:

- * Univac 1100 series computers
- * Manufacturing system applications
- * On-line, real time applications
- * Computer supported Data Collection
- * Data Base Systems

Please submit your resume, including salary history and current requirements to:

Mr. B.J. Shelton

SPEERRY VICKERS

P.O. Box 10177, Jackson, Mississippi 39206
An Equal Opportunity Employer M/F

COMPUTER CAREERS

Control Data CYBERSEARCH is a full service, private employment agency of Control Data Corporation. To augment the individualized effectiveness of our experienced counselors and to speed and simplify the search process, CYBERSEARCH utilizes the CDC nationwide computer network for job match. If you do not find the position of your choice listed below, please call with your specific requirements.

IBM DOS PROGRAMMER/ANALYSTS

	To
COBOL, CICS, Senior, O.E. fin.	21K
COBOL, BAL, some CICS, fin.	21K
COBOL, CICS, OL-1, ord. proc.	23K
COBOL, CICS, COMP, mfg.	22K
COBOL, Senior fin.	18K
COBOL, BAL, Sr. Anal.	22K
BAL, batch, banking	18K
BAL, on-line banking	20K
PL-1, CICS, mfg.	16K
PL-1, CICS, OL-1, mfg.	23K

IBM OS PROGRAMMER ANALYSTS

COBOL, CICS, new conversion	20K
COBOL, Sr. heavy JCL	19K
COBOL, CICS, IMS, analyst	19K
COBOL, fin. banking	19K
BAL, CICS, fin.	18K
BAL, batch, ord. proc.	18K
BAL, on-line, fin.	18K
BAL, CICS, insurance	20K

TECH SUPPORT

Sys Specialist, OOS/VF, PL-1	21K
Tech Support, OOS/VF, CICS, POWER	20K
Sr. Tech, 145/155, OOS/OS, CICS	20K
On-line software, 370/155 OS	25K
IMS Internals, 165 OS	24K
vs 1 & 2 Communications	29K
All Fees Are Employer Paid	
Please forward resume, or call collect	
(312) 454-8490	
Please see our career conference ad this issue	

CONTROL DATA CYBERSEARCH

214 N. Michigan Avenue
Chicago, ILL 60611

EDP**SOUTHEAST**

Prog: OS, Cobol	\$18K
Sr. Prog: CICS	\$20K
Software: OOS	\$22K
Software: OS	\$24K
Sys Anal: Mfg.	\$25K

Several positions open in the above categories with leading Southeastern companies. Mail confidential resume or call Joe Sawyer, the EDP Personnel Specialist, (803) 233-2546.

EXCEL PERSONNEL

1421 Laurens Road, Suite 200A
Greenville, SC 29607

FACULTY POSITION

In Computer Science available August 1978 in new undergraduate four-year program in Colorado. Must have at least M.S. degree (Ph.D. preferred) and strong interest in teaching at all undergraduate levels. Recent industrial experience desirable. Tenure track. Apply by March 15, 1978, to William Putnam, Dean, School of Natural Sciences and Mathematics, Mesa College, Grand Junction, CO 81501. Telephone (303) 248-1354. Affirmative action, equal opportunity employer.

MANAGER PRODUCT PLANNING**MDS...The Most Intelligent Choice For A Dynamic Career**

The success of MDS is well known worldwide. From our modest beginning, we have grown to a \$160 million, multi-national corporation in 14 short years.

And the bulk of the credit for our achievements must go to our people. Highly intelligent, highly motivated, dynamic professionals who have not only helped make us what we are today, but in the process have also carved out exciting and rewarding careers for themselves.

Due to current expansion, we have an immediate career opportunity in our product planning organization at our Los Gatos, California facility.

If you have experience in product or market planning for data entry equipment, intelligent terminals, data communications systems, or small distributed processors, you may qualify for a key position on our product planning team. Candidates should have previous experience in assessing trends and user requirements in the data entry, intelligent terminal and data communications segments of the data processing industry. You should also be skilled in converting requirements to functional specifications assessing hardware & software implementation of those specifications, and releasing completed products to a worldwide marketing organization. Creativity, attention and ability to interface with the technical community, the marketing organization, and end users are musts for product planning.

In addition to excellent compensation and fringe benefit programs, we offer the opportunity to grow with us as we continue to introduce significant new systems. For immediate, confidential consideration, please send resume including present compensation to:

MR. D.P. MCCONNELL
Director, Corporate Personnel

Mohawk Data Sciences

955 University Ave, Los Angeles, CA 95030
An Equal Opportunity Employer M/F

**SALES & MARKETING**

Our client, a nationally known leader in software package RJE sales has commissioned us to find numerous sales, marketing and account executive personnel to fill expanded needs across the country. They seek experienced (Jr. or Sr.) personnel familiar with these products. Experience with manufacturing accounts a plus. All costs are paid by our employer. Company has excellent benefit package and incentive program. Here is a sample of current needs:

Sr. Marketing Consultant	\$30-45K+
Lead Marketing Representative	\$30-35K+
Sales Reps (SR.)	\$24-30K+
Sales Reps (JR.)	\$20-24K+

CALL TOLL FREE 24 HRS./DAY

1-800-821-2270 EXT. 605

(In Mo 1-800-892-7655)

Jim King and Associates

438 Gulf Life Tower Jacksonville, Florida 32207

DATA PROCESSING CONSULTANT

The Kansas City management services department of a Big-Eight Accounting firm is currently seeking a qualified individual to join our expanding data processing consulting group at a systems design and project management level. The qualified candidate will have:

- 3 to 5 years' experience in the design of computerized manufacturing systems in such areas as:
 - Bill of Materials explosion
 - Material requirements planning
 - Plant and machine loading
 - Automated inventory control
- Above average communications skills
- A college degree

We offer an excellent starting salary and benefits package with unlimited future growth opportunities. If interested, send resume with complete work experience and salary history to CW Box 1440, 797 Washington St., Newton, MA 02160. All resumes submitted will be handled on a completely confidential basis. An equal opportunity employer.

position announcements

position announcements

position announcements

position announcements

position announcements

FOUR-PHASE SYSTEMS, pace setters in display-oriented transaction processing systems and business end commercial applications has immediate openings in the offices of LOS ANGELES and SAN DIEGO.

Computer Sales

This is an exceptional opportunity to participate in the booming distributed processing market with a company that has grown from \$6 to \$88 million in the last 3 years. These positions are available both in Los Angeles and San Diego.

As a Four-Phase Systems Marketing Representative you'll have personal responsibility for selling and installing our advanced family of distributed processing systems in major business, financial and government organizations. Your background in mainframe sales, data communications and data entry will be complemented by extensive training at our new headquarters in Cupertino, California.

Systems Engineer

Our San Diego Office is currently seeking a Systems Engineer. This Systems Engineering position offers a unique blend of technical and marketing support activities.

Duties include presentations, systems design and analysis, network analysis and others while maintaining a high degree of technical competence. Training is provided at our all new Cupertino, California headquarters.

Interested candidates should submit resume, including salary history, to J. Gollhofer, Branch Manager, FOUR-PHASE SYSTEMS, 101 Continental Blvd., Suite 1100, El Segundo, CA 90245, or call (213) 640-1438. Equal employment opportunity is our pledge & practice.

Four-Phase Systems
Advanced Technology for Distributed Processing

PROGRAMMER/ANALYST

Texas based Manufacturing Division of Multi-national Fortune 500 Company has outstanding opportunities for two aggressive individuals.

Must have college degree and/or minimum of 5 years experience with 2-3 years experience in systems analysis.

Manufacturing and accounting applications will be developed in IBM S/3 in COBOL and RPG II.

Send Resume in Strictest Confidence to:

Personnel Department

Stemco Inc.

P.O. Box 1989, Longview, Texas 75601

An equal opportunity employer M/F

SYSTEMS SOFTWARE and APPLICATIONS SOFTWARE SPECIALISTS

These are unique opportunities to join a multi-billion dollar multi-national computer and communications company in key positions.

We need a couple of self-starters who have in-depth experience with small business computers. Key elements of background should include knowledge of and experience working with interactive operating systems, data base management systems and communications.

SYSTEMS SOFTWARE SPECIALIST

Key areas of responsibility will include recommending, developing and implementing enhancements to the operating system of our small business computer system.

APPLICATIONS SOFTWARE SPECIALIST

This person will be key in applications development and will make a substantial contribution to NECIS in providing the most advanced application capability in the small business system area.

If you are interested in either of these truly outstanding growth opportunities, please send resume to:

NEC

INFORMATION SYSTEMS INC.

5 Militia Drive, Lexington, MA 02173

an equal opportunity employer

The Pros of working and living in Houston



- Dynamic Business Community
- Attractive Cost of Living
- Warm Climate

Our client is currently scheduling expense paid interview for qualified applicants during the next several months.

If you are degreed and have expertise in each of the following:

- Programmers/Systems Analysts/Project Leaders
- Business or Scientific Applications
- COBOL, PL-1, or FORTRAN
- 370/OS

Send us your resume, or call us collect (station-to-station) at (713) 621-9811 and we will appraise your chances.

Scientific Placement, Inc.

EMPLOYMENT SERVICE: 2700 SOUTH POST OAK ROAD Dept. 52 HOUSTON TEX 77056 713-621-9811

Data Processing

OUR NEW HOME ATLANTA

We are a new division of a major corporation establishing our Southeastern data center in Atlanta. From Feb. 15 through March 30, we will be seeking qualified programming and systems personnel for all levels including management. Our immediate needs are as follows:

- Systems Analysts
- Tech Support
- Programmer/Analysts
- Programmers
- Programmers (Entry Degree)

Equipment to be utilized is large scale state of the art hardware with communications capabilities. If you are interested, send a complete resume with salary history to:

Mgr. of Information Services
P.O. Box 45133
Atlanta, GA 30362

Equal Opportunity Employer M/F

As the largest, non-franchised fast-food restaurant company in the West, Carl's Jr. is continuing its search for qualified professionals for our Administrative Headquarters located in Orange County, California. Our state-of-the-art Data Processing Department has opportunities for:

CCP Programmer

We are seeking a CCP Programmer with 2-4 years programming experience, including a familiarity with RPG II, System 3, Modal 15 (OCL and sorts). Background should also include 1-2 years experience in CCP.

POS Assembler/ Programmer

The individual we seek will have experience in assembly language, mini-computers or microprocessor software development, and telecommunication software. Areas of responsibility will include maintenance of existing software for HLX POS systems, development of mini-floppy programs and overall systems, and writing documentation.

We offer an excellent salary and a comprehensive benefits package. Direct your resume to the address below, or write to us for an application. Or, you may call 714/774-5796 for more information.

Carl's Jr.

P.O. Box 4349
Anaheim, California 92803
Attention: Personnel Manager

Grow With Alaska!

The dynamic growth of our state has created new opportunities with data processing with the National Bank of Alaska, Alaska's largest financial institution.

PROGRAMMER ANALYST

We are seeking an individual with 2-4 years' experience as a programmer, proficient in Assembler Language Coding having a working knowledge of COBOL. Knowledge of MICR systems and banking or financial institution DP is highly desirable.

SYSTEMS ANALYST

The selected applicant must have substantial programming experience combined with demonstrated problem solving abilities. Two or more years of systems analyst experience is required, preferably in a commercial bank system, such as DDA and/or MICR. Data Base experience is a definite plus.

Send resume, including salary history, in confidence to: L.S. Rhodes, Employment Manager, Box 600, Anchorage, Alaska 99510. An equal opportunity employer M/F.

**National Bank
of Alaska**



Software Engineers

for Advanced Software
Systems Development

Lockheed Missiles & Space Company has challenging career positions available AT ALL LEVELS for talented individuals ready to become involved on an advanced aerospace program requiring a complex real-time computer-based command and control system. This is primarily an ANSI X3.9 Fortran system development, requiring specific programming experience in one or more of the following areas:

- RADAR SIGNAL PROCESSING
- WEAPON GUIDANCE AND NAVIGATION
- MISSION PLANNING AND CONTROL
- INTERACTIVE GRAPHICS
- SOFTWARE SUBCONTRACTOR INTERFACES
- ENVIRONMENT & SYSTEM SIMULATION
- SOFTWARE SYSTEM TEST

Structured programming experience is highly desirable. These positions are based on the SAN FRANCISCO PENINSULA, with some travel involved.

In addition to exciting challenges and a variety of responsibilities, you can expect a good salary and a comprehensive benefits package. For immediate consideration, please send your resume to Professional Employment, Dept. CW-220, P.O. Box 504, Sunnyvale, CA 94086. We are an equal opportunity affirmative action employer.

LOCKHEED
MISSILES & SPACE COMPANY

SCIENTIST /ENGINEER

The Lawrence Berkeley Laboratory, University of California, has an opening for an individual with a science/engineering background and expertise in computer programming to participate in the application, testing, and development of Cal-ERDA, LBL's new public-domain computer program for energy analysis of buildings. Duties include engineering design of new algorithms to simulate thermal loads in buildings, and simulate heating, ventilation, and air-conditioning systems; assisting in systematic testing of existing programs; assisting users; and using Cal-ERDA to study the thermal performance of conventional and innovative residential and commercial buildings. The Cal-ERDA project is part of the large LBL research program on Energy Efficient Buildings. Please submit resumes to: Florence J. Flint, Personnel Department, One Cyclotron Rd., Berkeley, CA 94720. An Equal Opportunity/Affirmative Action Employer M/F.

position announcements

position announcements

position announcements

position announcements

position announcements

Programming Manager

Worldwide leader in container leasing seeks a Programming Manager for the development of new applications software and maintenance of existing programs.

The ideal candidate should have a minimum of 8 years of progressive experience with at least the last 2 years spent managing the programming function. On-line application from specifications thru implementation is a must, as is experience with structured programming techniques including development of appropriate programming standards and control mechanisms for their enforcement. Technical background must include DOS/VS, CICS/VS, COBOL (ANS) and usage of DBMS and on-line program development (CMS or TSO). Familiarity with decision table translator a plus.

The position is located in Westchester County and provides an excellent benefit package. Salary open. Please submit detailed work history and current salary to:

CW Box 1432
787 Washington St.
Newton, MA 02160
An equal opportunity employer, M/F

SENIOR EDP SYSTEMS CONSULTANT

Our CPA Firm (non-big eight) is a large worldwide organization providing management consulting services to a widely diversified industry base.

We are searching for two highly skilled EDP professionals to join our NY practice. The successful candidates will have:

- A bachelors degree; masters degree desirable
- Industry experience in small or medium size companies
- Prior consulting experience
- Familiarity with mini to medium scale hardware and software
- In-depth applications experience in retail, apparel, manufacturing or general business operations
- Ability to apply technical skills in a top level business environment

To confidentially explore this opportunity, send a resume or letter describing your employment and salary history to:

P.O. Box 277
FDR Station
NY, NY 10022

We are an equal opportunity employer M/F

Computer Editor

Major NYC professional publisher requires individual with EE degree and experience in computer industry. Position requires organized thinker, self starter, able to meet deadlines in reporting, researching, writing and editing for international publication IEEE SPECTRUM.

We offer salary commensurate with experience along with an outstanding benefits program. Please send resume including salary requirements to:

Mr. E.G. Logan, Personnel Manager

THE INSTITUTE OF
ELECTRICAL AND
ELECTRONICS
ENGINEERS, INC.
345 E. 47th Street
New York, N.Y. 10017

Equal Opportunity Employer M/F

PDP REQUIREMENTS

Amtrak has immediate requirement within its Systems Support Staff for Communications oriented Programmers and Programmer Analysts. The specific project involves the re-design and upgrade of our reservations' system front-end. This system will be implemented on a DEC PDP 11/55 under RSX11-M and support a nationwide network of 3000 terminals. It will also interface a CDC-3500 (ARTS) System and an IBM 370/158 (ACP) System. All communications will be supported via DV11 multiplexers.

All positions require a thorough knowledge of PDP 11's and MACRO-11. IBM ALC experience will be a definite plus.

We offer excellent salary, benefits and growth opportunity in a challenging environment. Send resume, INCLUDING SALARY HISTORY, in confidence to: J.R. Brune, Personnel, Amtrak, Dept. 3, 400 N. Capitol St., NW, Washington, D.C. 20001.

An Equal Opportunity Employer M/F

Amtrak

PORTLAND, OREGON SENIOR ANALYST/ PROJECT LEADER

We are a major forest products company seeking a Senior Analyst who has experience as a Project Leader for the design and implementation of an on-line order entry/inventory system. Minimum requirements include a college degree, programming experience, and four years of systems analysis. An advanced degree, experience in the forest products industry, and knowledge of on-line, data base, and distributed processing concepts would be beneficial.

This is a career opportunity for a hard working articulate individual. For consideration, please send resume and salary requirement.

PERSONNEL MANAGER
P.O. Box 3815
Portland, Oregon 97208
An Equal Opportunity Employer

CCP Programmer/ Analyst

The City of Wilmington, N.C. is seeking an individual with three years' experience in disc processing systems, to include teleprocessing using RPG II and COBOL. Desire IBM Systems 3/15D experience and knowledge of municipal applications. Send resume and salary history to: Andre Mallette, Recruiting Office, Box 1810, Wilmington, N.C. 28402.

Equal Opportunity Employer M/F

PROGRAMMER/ ANALYST

Georgetown Steel Corp., a Division of Korf Industries, Inc. has an immediate opening for an aggressive, self-starting, Programmer/Analyst with 1-3 years experience in a commercial or manufacturing environment.

The successful applicant will have an Administrative or Computer Science degree or equivalent and a thorough knowledge of COBOL and DOS/VS. Selection of project assignments is offered between administrative/financial applications and manufacturing applications. GSC is a growth-oriented steel mill located on the Grand Strand of coastal South Carolina. We offer promotional opportunities and an excellent salary and fringe benefits package. Interested applicants should send their resume, salary history and requirements to:

Director of Industrial Relations
GEORGETOWN STEEL CORP.
P.O. Box 619
Georgetown, S.C. 29440
Equal Opportunity Employer M/F

PROGRAMMER ANALYST

Maine based mfr. seeks sharp COBOL prog./Analyst for fin'l. & mfg. applications. Must know DOS, RPG II a plus. Relocation paid. \$17-\$19,000 (Fee Paid). Contact Jim Staunton.

ROBERT HALF
PERSONNEL AGENCIES
140 Federal St.
Boston, Mass. 02210
(617) 423-6440

PROGRAMMER- SYSTEM ANALYST

B.S. in Computer Science or equivalent experience required. 3 years experience preferred. Familiarity with the Univac computer system, using telecommunications. Must be knowledgeable with COBOL and RPGII computer language. Police systems preferred. Salary negotiable. Send resume to Personnel Office, Civic Center Complex, Greeley, Colorado 80631. An Equal Opportunity Employer.

DATA BASE MANAGER

\$24,000-\$28,000
Exeter Associates
Executive Recruiters

Bruce A. Montville
P.O. Box 623
Computer Park
Hampton, N.H. 03842
(603) 926-6712

COMPUTER SYSTEMS DESIGNER/ANALYST

Opportunity in rapidly growing, privately owned company with newly formed decision control-oriented systems design department. Work entails identifying system needs of users as well as detailed specification of what computer-based systems would fill these needs. This person will interface with the data processing department in programming as well as implementation and follow-up on programs.

Qualified candidate must have a minimum of a 4 year degree in computer science or data processing. Coursework in statistics and applied mathematics a must. Psychology, social sciences, accounting and finance a plus. Two year minimum work experience must include programming/applications in an IBM 370/ DOS on-line environment and knowledge of COBOL, APL, and FORTRAN.

Benefits include comprehensive insurance, profit-based bonus and opportunity to purchase company stock. Send resume to:

Ms. Mary Hunter
Corporate Recruitment & Selection Manager
% L.D. Schreiber Chassis Co., Inc.
P.O. Box 610
Green Bay, WI 54305

DATA PROCESSING PROGRAMMER - ANALYST POSITIONS

Expanding computer applications in rapid growth company has created several additional openings in our Data Processing Division.

-Career Positions
-Professional Work Environment
-Individual Growth and Development

Current application areas include On-line Order Processing for 135 Member Companies. Development of a Distributed Processing System for grain elevators using a Honeywell Level 6 Mini-computer. Expansion of the On-line General Ledger System and redevelopment of the Sales Accounting Systems for the 135 Member Companies. Utilization of Mohawk Terminals for Petroleum Distribution tied into the Order Control System.

Two to six years experience in Systems and/or Programming is necessary. H-600/6000/66, CDBL, IDS, TDS & GMAP desirable but not mandatory. Experience in Teleprocessing and On-line Data Base applications would be an asset. A four year college degree is preferred. Excellent salary structure with salary history in confidence to Personnel Manager.

FS SERVICES, INC.
1701 Towanda Avenue
Bloomington, IL 61701

An Equal Opportunity Employer

ANALYSTS & PROGRAMMERS

Fortune 1000 Manufacturing firm seeks qualified individuals to join our Data Processing Department. You will have the opportunity to be a part of a development team that is expanding to meet the needs of a growth oriented corporation.

Systems Analysts

5 years experience in an industrial environment working knowledge of CDBOL

Programmers

3 years experience
skilled in COBOL
communications experience desirable

This is an opportunity to join a leader in the office furniture field who offers a stable environment, fine benefits and salaries, including profit sharing. You will find Muscatine to be a very desirable location.

Send resume in confidence to:

Mary Ann Strange
Manager, Personnel Administration
414 E. 3rd Street
Muscatine, Iowa 52761

COMPUTER SYSTEMS ENGINEERS

A rewarding and stimulating career opportunity offering the professional and personal recognition you seek is available now at the new Earth Resources Observation Systems (EROS) Data Center. This facility is the national center for the processing and dissemination of spacecraft acquired imagery and electronic data of the Earth's resources.

To qualify, individuals should be degree in Electrical Engineering, Computer Science, or a related field and have 3 or more years of experience in development of digital image processing equipment or techniques. A knowledge of mini/micro computer systems, I/O controllers, array processing, and large disc management is essential.

Excellent income, comprehensive benefits, relocation assistance, and the advantages of our midwestern lifestyle await you. Join Technicolor Graphic Services, Inc., a wholly-owned subsidiary of Technicolor, Inc., Hollywood, California, for an exciting career opportunity at the EROS Data Center.

FOR PROMPT AND CONFIDENTIAL CONSIDERATION, OR ADDITIONAL INFORMATION, SEND RESUME TO:

Mr. J.C. Pfliger
TECHNICOLOR GRAPHIC SERVICES, INC.
P.O. Box 1242
Sioux Falls, S. Dakota 57101
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SENIOR SYSTEMS PROGRAMMER IMS SYSTEMS PROGRAMMER

Expanding and changing requirements of the company have created the need to develop a national Customer Order Service System, using the IMS Data Base Management System. This new development activity provides several line positions in our Technical Div. Section of the Computer Systems Division.

Both positions require college level background (Math, Statistics, Computer Science) plus 3 to 4 years programming coupled with experience in file structures and design, data base design management, data communications design concepts, advanced coding techniques and hardware systems architecture.

We have an excellent comprehensive benefits package, highly competitive salary opportunities, and challenging personal growth capabilities for qualified professionals.

Please call Edward Weiler, Corporate Manager Selection/Placement, 242-0600, or forward resume to Employment Department.

H.P. HOOD INC.

500 Rutherford Drive

Boston, MA 02129

An equal opportunity employer M/F

INSURANCE SYSTEMS

Growing client base includes many excellent career opportunities in development, consulting and package installation. Individuals with well developed technical skills, solid analytical capabilities and a "big picture" orientation will be given the opportunity to play an important role in a variety of environments.

Current openings include:

NEW ENGLAND

ALC or COBOL 15-23K

LIFE or CASUALTY

MIDDLE ATLANTIC

ALC or COBOL 18-22K

LIFE INSURANCE

MIDWEST

ALC or COBOL 18-23K

LIFE INSURANCE

SOUTHEAST

ALC or COBOL 17-26K

CREDIT, CASUALTY,

PENSIONS, LIFE

SOUTHWEST

ALC, LIFE 18-25K

INSURANCE

Exceptional individuals at all levels are invited to explore these opportunities with Jack Edwards.

Jack is an FLMI and deals exclusively with insurance clients.

Jack Edwards Associates

Suite 600

8150 Leesburg Pike

Vienna, Virginia 22180

(703) 821-0688

Insurance Personnel

SUNBELT OPPORTUNITIES!

Banking \$13-\$20K
Numerous openings, from Programmers to OP Manager.

Manufacturing \$15-\$30K
Manufacturing backgrounds are currently in great demand. Openings with major companies from Coast to Coast.

Programmers \$15K Plus
If you're earning less than \$15,000, contact us now.

For these and many other OP openings, in the Sunbelt and nationwide, send summary of experience including current salary or phone Mike Ashby, (512) 458-5271.

OUNHILL

Personnel Service
314 Highland Mall Blvd.
Suite 406
Austin, Texas 78752

Programmer Analyst Senior

Attractive, challenging position at large southern California community college in Newport Beach area. Need Systems Analysis & Computer operation background for modern Business Information Systems facility. Salary range \$1647 - \$2006/mo. plus attractive fringe benefits. Written applications must be received prior to 5:00 P.M. Pacific Time on Friday, 3/3/78. Submit to:

Coast Community College
District Personnel
1370 Adams Avenue
Costa Mesa, CA 92626
To request application telephone: (714) 556-5947
M/F Equal Opportunity Employer

PROGRAMMER ANALYST

Opportunity to work as a member of a team developing on-line and data base applications for administrative educational processing. COBOL programmer with knowledge of BAL or FORTRAN. 370/145 DOS/VS, POWER, IDMS, TASK/MASTER experience highly desirable.

Send resume: Santa Clara County Superintendent of Schools, 100 Skyport Drive, San Jose, CA 95110, (408) 299-3701.
Equal Opportunity Employer

MEDICAL INFORMATION SYSTEM DEVELOPMENT PROGRAMMER/ANALYST

A Research Institute at the Indiana University Medical Center (Indianapolis) is seeking a bright and dedicated Programmer/Analyst to join in the development of a medical information system with national significance. Work involves networking, transaction processing and the development of an in-house data base system and an automated medical decision-making system. Applications extend to the clinical lab, the pharmacy, the medical record and the operation of the medicine clinics. Opportunity for strong interaction with users and responsibility for major application systems from design through implementation.

Position requires B.S. in Computer Science or equivalent technical degree and one to three years of employment as a Programmer/Analyst. Experience in the development of data management systems and/or PDP 11 RSTS, BASIC PLUS and/or RSX 11-M desirable. Experience with medical applications not needed.

Salary depends upon qualifications and experience. Please send resume (if possible, transcript) to Mrs. Joanne Lepper, 1001 West 10th St., Indianapolis, Indiana 46202.

An equal opportunity employer M/F

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

SYSTEMS PROGRAMMERS

WORD & INFORMATION PROCESSING

A unique IBM 360/370 based distributed logic word processing system with powerful front end micro-processor based dedicated consoles and IBM compatible transmission controllers has been developed for a large scale penetration of the rapidly developing word processing industry. We are a NYSE Company located in Westchester County, NY.

We seek systems programmers with knowledge of:

- IBM 360/370 Systems
- Ability to work with IBM/OS, HASP, RJE, Assembler, EXCP, PL/1
- Design of I/O Routines
- Duties will include systems generation and installation, maintenance and updating of software, etc.
- Experience with micro-processor software helpful.

This is an outstanding opportunity to be where the action will be in data processing during the 80's. "INFORMATION PROCESSING". Please send resume with salary requirements to:

CW Box 1419
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer

PROGRAMMER/ANALYSTS PROGRAMMERS

Outstanding state of the art opportunities exist for qualified professionals to participate in development of Integrated, on-line Factory Management System for this Information Services Company. Twenty major financial and manufacturing subsystems will be implemented on dual H66/40's using Honeywell's recently announced DM-IV Software (I-D-S II, COBOL-74, TDS, Data Query).

Successful Candidates:

- Must have 1-4 years solid COBOL programming/analysis experience on large scale equipment; Honeywell 6000/86 preferred.
- Must have manufacturing or financial backgrounds.

Salary commensurate with experience. Mail resume in confidence to:

CW Box 1438
797 Washington St.
Newton, Mass. 02160

"An Equal Opportunity Employer"

Software Salesperson

To open another midwestern office (Chicago) Due to the unprecedented demand for our Project Management and Cost Control System—Project Control/70 and our Systems Development Methodology—SOM/70, we are expanding our midwest operations. Excellent financial and growth opportunity. Write, telling me why you think you're the "Right Person"

Dick Thatcher, President
Atlantic Software Inc.
5th & Chestnut Sts., Phila., Pa. 19106
215-922-7500

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM II, Assembler and COBOL. Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:

W.M. Jones

Harper-Grace
Hospitals

Human Resources Department

3990 John R.

Detroit, MI 48201

(313) 494-8082

An Equal Opportunity Employer M/F

CAREER PATH

Does your current job fit your career goals? If not, you should call us. We are professionals serving you, the data processing professional. We specialize in commercial operating systems, scientific and minicomputer personnel placement. We can help you make the right move.

- MIS Director for Southwest mfg. co. Need take-charge individual for network environment with good user interface. 370 experience a plus.
- Multiple positions - programmers, programmer/analysts, senior P/As - with major oil company. Must have 370 OS experience. IMS preferred.
- Small coastal community in California needs programmer/analysts with 2 years COBOL. Any DEC-10, On-Line or Data Base experiences are pluses. Company pays relocation.

N.Y. 535-5th Avenue, NYC 10017

(212) 867-2650

N.J. 349 E. Northfield Rd, Livingston 07039

(201) 954-3773

CALIF. 11222 So. La Cienega Blvd, Inglewood 90304

(213) 670-7353

the jarvis walker group

CHURCH'S FRIED CHICKEN, INC.

P.O. BOX BH001 SAN ANTONIO, TEXAS 78284

Has Openings for

Project-Leader Data Base

3-5 Years Experience

Programmer Analyst

2-4 Years Experience

Programmer

1-2 Years Experience

All candidates should have college degree or equivalent and experience in the development and implementation of Accounting or related systems. Job requires thorough knowledge of OS-VS1, ANS COBOL, JCL, OS Utilities and CICS-IMS Data Base.

Church's offers attractive benefits package and opportunities for advancement. Salary commensurate with experience.

Please send resume and salary requirements to: Mrs. Alder, Box BH001, San Antonio, TX 78284

position announcements

position announcements

position announcements

position announcements

position announcements

CAREER OPPORTUNITIES

With Caterpillar Tractor Co.
Located in East Peoria, IL

PROCESS CONTROL ENGINEER

- Bachelor's in electrical, electronic or mechanical engineering required.
- Experience/knowledge in electro-mechanical devices/sensors. Computer experience attractive, but will provide computer training.
- Projects in computer controlled storage systems, product testing and manufacturing applications.

SYSTEMS ANALYST/DESIGNER

- Bachelor's in business administration desirable, will consider equivalent business experience.
- Minimum 3 years experience in IBM IMS/DL-1 batch/TP data base environment. Batch required, TP preferred.
- Work with marketing systems applications in Triplexed IBM 168 with MVS/JES-3 environment.

MANAGEMENT SCIENCE

- Masters in computer or management science, operations research, or applied mathematics with cross emphasis between these fields.
- Experience in modeling, such as GPSS simulation, linear programming and other mathematical techniques.

Positions located in our new Central Data Processing Center. We offer liberal compensation and fringe benefits.

Send resume in confidence to Patricia D. Lee, Employment Representative, CATERPILLAR TRACTOR CO., 100 N.E. Adams St., Peoria, IL 61629.

CATERPILLAR

An Equal Opportunity
Employer M/F

SYSTEMS PROGRAMMERS

Clemson University is seeking Systems Programmers to work in a growing environment of large scale TP and batch applications in an IBM environment. Salary range \$15,766 - \$22,441. Excellent fringe benefits. Desirable background includes a Bachelor's degree and four years experience with COBOL and Assembler on IBM operating systems such as SVS, MVS, VM. Please submit resume to:

Clemson University
GO1 Sikes Hall
Personnel Division
Clemson, S.C. 29631
Phone 656-2426

Equal Opportunity Employer

computer hardware



and software candidates RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

COMPUTER CAREERS INC.
Specialists - Data Processing
4720 Montgomery Lane, #503
Bethesda, Md. 20814
(301) 654-9225

CHETNEY & ASSOC.
754 Hanna Building
Cleveland, Ohio 44115
(216) 771-2141

O. BROWN & ASSOC.
Dorothy Spiegel OP Specialist
610 S.W. Alder, Suite 711
Portland, Oregon 97205
(503) 224-6860

ANDERSON-TAYLOR
P.O. Box 21
Exton, Pa. 19341
(215) 363-1600

members of

National
Personnel
Associates
Specializing in DP

DATA PROCESSING

in the great Northwest

Opportunities galore! Our clients have asked us to pull out all the stops in a make it or break it effort to locate the best OP talent available for the following positions:

MIS Director	to 35K
Sys & Prog Mgr.	to 28K
Proj Lead(s)	to 28K
Consultant(s)	to 28K
EDP Auditor	to 24K
Logic Design	to 25K
Sys Anal(s)	to 23K
Prog/Anal(s)	to 21K
IMS/DBM	to 30K
Sys Engin(s)	to 24K
Field Engin(s)	to 20K
TSO Coord.	to 24K

The above represent a small sampling of the quality career opportunities available to the upwardly mobile DP professional. Please contact us for a confidential review of your potential. Employer retained exclusively. Hamilton Associates, 2050 112th NE, Suite 230, Bellevue, WA 98044 (206) 455-2155.

Hamilton ASSOCIATES

EQUIP. PLANNER

New Eng. Corp. formalizing new function. Indiv. with extensive exp. in evaluating, cost justifying large scale and "mini" for central and remote sites. Indiv. has opty. to dev. own staff. Starting salary to \$30,000. (Fee Paid). Contact Stan Durbas.

ROBERT HALF
PERSONNEL AGENCIES
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

SYSTEMS PROGRAMMER

Software Professional

Work with a first-rate team of computer professionals in the Computer Center of a multi-divisional N.Y.S.E. corporation headquartered in north New Jersey. Primary responsibility for overall operating systems or complex subsystems such as sophisticated file management routines, large telecommunication networks or advanced mathematical/scientific software packages. Define logic, perform coding, test and debug programs. Delegate and direct as required. We seek a software specialist familiar with 370/145, DOS VS, CICS. Data base experience an asset. Excellent salary and benefits package. Wide latitude for innovative decision-making and technique development. Send resume including salary history to:

CW Box 1429
797 Washington St.
Newton, MA 02160

PROGRAMMER/ANALYST SENIOR

Experienced project leader in financial and accounting systems needed for business systems group - minimum 5 years exp. Background in COBOL, on line systems, design & analysis, DS. Must be able to communicate with all levels of management. Bachelor's degree preferred. Competitive salary and fringe benefits. Submit resume & salary history to Personnel Department.

PROGRAMMER/ANALYST TECHNICAL

Challenging position for person possessing BSEE degree & 2 years experience with the IBM 370 system & an operating knowledge of FORTRAN. Prior power system analysis programming exp. preferred. Career opportunities. Competitive salary & fringe benefits. Submit detailed resume including salary history to Personnel Department.

DILMARVA POWER

800 King Street
Wilmington, De. 19899
Equal Opportunity Employer M/F

OPPORTUNITIES FOR COMPUTER PROFESSIONALS IN BUSINESS COMPUTER APPLICATIONS:

ANALYST PROGRAMMERS

We have openings for experienced individuals who have a proven track record in large applications systems using advanced IBM 370 hardware and software technology. If you desire to help us ready for the 1980's, if you produce quality systems on time, within budget, within specifications, you may like the challenges.

SENIOR ANALYST PROGRAMMER

Northeast Utilities needs you if you can help form our medium and long range EDP plans with emphasis on systems solutions to Utility business problems. You should have extensive experience in large scale (IBM-MVS-TP) integrated business systems. We also expect you to be current on data base, distributed processing, word processing, text processing and retrieval techniques. Obviously, all your work should be based on rigorous cost benefit analysis methods.

Please apply in writing with educational, employment and salary history to:

Mrs. Linda Heldenis

NORTHEAST UTILITIES

P.O. Box 270, Hartford, Conn. 06101



an affirmative action, equal opportunity employer m/f

The Connecticut Light and Power Co.
The Hartford Electric Light Co.
Western Massachusetts Electric Co.
Holyoke Water Power Co.
Northeast Utilities Service Co.
Northeast Nuclear Energy Co.

Programmer Analyst

Let's talk systems.

We're Becton Dickinson Medical Systems, a leader in the field of medical electronics, with a newly developed opening on our EDP staff.

The Programmer Analyst we're seeking will report directly to the Manager of Data Processing, and should have at least 2 to 3 years experience. We require a solid background using IBM System 3, Model 15, in a COBOL or RPG II environment.

You assignments will focus on designing and developing programs for financial, manufacturing and marketing applications. Previous experience in one of these areas would be a plus, but is not required.

If your background matches our requirements, we'd like to hear from you. Call John McCain at (617) 828-9080, or write to him at Becton Dickinson Medical Systems, Rt. 1, Sherron, Mass. 02067.

BECTON DICKINSON

Becton Dickinson
Medical Systems

An equal opportunity employer, m/f

position announcements

position announcements

position announcements

position announcements

position announcements

Programmer Analysts

Pick Up The Option

On Your Future!

Rockwell International's Automotive Operations, which is a Billion dollar-plus supplier to the transportation industry, has immediate openings for Programmer Analysts at our headquarters facility in Troy, Michigan.

Qualified candidates will possess a degree, or equivalent experience, and have 2-5 years COBOL programming experience with manufacturing applications in an IBM/370/OS environment (IMS experience would be a plus).

Rockwell International can offer you personal growth through interaction with experts in your discipline, and sincere management interest in your career development. We provide top financial remuneration for top performance, and a benefits portfolio comparable to any.

Please submit your resume, including salary history, to:

**Professional Staffing Administrator
ROCKWELL INTERNATIONAL**

Automotive Operations
2135 W. Maple Road
Troy, Michigan 48064



**Rockwell
International**

Equal Opportunity Employer M/F

The ROMAC DIFFERENCE

A Local Call Goes A Long Distance

Call or visit the Romac office nearest you, and make contact with our expert personnel consultants. Experienced executives constantly in touch with key executives and top management in EDP, Accounting and Banking.

Your local call gives you access to Romac offices in 12 major eastern cities. You're not restricted to searching your immediate area. You have access to the best openings, in your industry as well as the best professionals available. All that for just a local call. That's the Romac Difference.



ROMAC

& ASSOCIATES/
Personnel Consultants

Contact Romac & Associates, A. L. Temay, President, 2 Sun Life Executive Park, Wellesley Hills, MA 02181 for transmission to our Partners in Atlanta, Boston, Buffalo, Charlotte, Hartford, New Haven, New York, Philadelphia, Portland, Rhode Island, Rochester/Syracuse, Stamford.

PROGRAMMER/ ANALYST II

For Eastern Michigan University's Department of University Computing. Successful completion of computer science courses and one to three years computer programming experience necessary. Languages used, PL-I and COBOL under 360-50 DOS/VS.

Salary range - \$12,209 - \$16,778. For application contact:

Eastern Michigan University
Personnel Office
112 Welch Hall
Ypsilanti, MI 48197
(313) 487-3430

**AFFIRMATIVE ACTION/
EQUAL OPPORTUNITY EM-
PLOYER AND EDUCATIONAL
INSTITUTION**

FLORIDA DP OPPORTUNITIES

1978 will be the best year ever of data sciences professionals in Florida and the Southeast. Some of our clients current requirements include:

Technical Support, Systems Software, IMS, TSD, other to \$30K
Mini-Computer, Real Time, Assembly, Fortran to \$28K
M.B.A.'s for Corporate Audit Staff, EDP, Mfg., Financial to \$22K
Banking Applications, Analysis, and Programmers to \$25K
Communications Analysts and Designers, Data and Voice to \$27K
COBOL, BAL Programmers to \$20K
Data Base Administrator, IDMS, TOTAL to \$25K

If you are planning a trip to Florida, please contact us about 2 weeks in advance. Otherwise, send a resume or call:

Ms. Louise Resnick
DATA SCIENCES
PERSONNEL, INC.
15490 N.W. 7 Ave.
Miami, FL 33169
(305) 685-7891

DATSUN INFORMATION SYSTEMS 1978

Due to the tremendous growth of Datsun in the U.S.A., our National Information Systems Department has just moved into a new two-story data center building. This has opened up several new expansion positions to support our growth. We have an IBM 370/158 under OS VSI with a nationwide CICS on-line system using 3270 terminals. On-line and batch applications all COBOL VS, Database and MVS. Continued growth is in our immediate future.

PROGRAMMER/ ANALYSTS

Minimum 2 years COBOL experience in an IBM 370 OS environment (JCL, Utilities, Debugging, etc).

SENIOR BUSINESS SYSTEMS ANALYST

Minimum 5 years experience analyzing the information requirements of requesting organizations to determine cost and feasibility.

TELEPROCESSING COORDINATOR

Requires 1-2 years experience in Data Processing plus technical knowledge of teleprocessing/telephone equipment. Duties include monitoring and insuring the performance of teleprocessing and IBM equipment. Will act as technical advisor and troubleshooter in telephone related areas.

SYSTEMS PROGRAMMER

Minimum 1 year experience in maintenance installation, and generation of IBM software.

DOCUMENTATION EDITOR

Minimum 1 year experience creating and maintaining narrative procedures and documentation from system design specifications. Requires excellent communications skills.

PROCEDURES ANALYST

Minimum 2 years experience required. Responsibilities include analyzing and evaluating operations, reporting systems and procedures requirements, as well as a working knowledge of EDP.

For consideration, please forward your resume in confidence with salary history to:

National Employee Relations-CS

**NISSAN MOTOR
CORPORATION**

P.O. Box 191
Gardena, CA 90247

Equal Opportunity Employer M/F

SENIOR PROGRAMMER/ANALYST

The Andersons, a dynamic Midwest company with sales in excess of \$600 million, a history of steady growth in the agribusiness field, and with a philosophy emphasizing concern for its responsibilities to customers, community and employees, has a challenging career opportunity available.

You will be responsible for designing, programming, and implementing computer applications that meet company and department goals. Individuals should have experience in systems design and feasibility studies, project control and cost estimating, systems implementation, data base, and communications programming. Applicants should have a BA or BS degree with 4 years COBOL programming, and 2 years of systems experience.

The Andersons, located in Maumee, Ohio, a suburb of Toledo, offers an excellent compensation program, a comprehensive company-paid benefits program that includes a liberal profit sharing plan, plus growth potential. For immediate action, please direct your resume and salary requirements, in confidence, to:

**The
Andersons**

An Equal Opportunity Employer

Mr. Charles Gallagher
Personnel Manager
P.O. Box 119
Maumee, Ohio 43537
(419) 893-5050

TORIN CORPORATION

Seeks

Technical Professionals
These career opportunities are as a result of planned growth in the company's domestic and international activities:

Project Engineer Information Systems

BSEE or equivalent plus 3 years design and application engineering with fractional and sub induction motors essential. Fan and blower experience a plus.

Sales Information Systems

Expansion requires a sales professional with electro-mechanical orientation. Applicants must be open to relocation to the Northeast, East or West Coast. Definitely a stepping stone to a management career.

Sales Supervisor Information Systems

Engineering academics with one plus years experience in application engineering and/or inside/outside sales small qualify applicants for basic training in Connecticut up to 12 months. This position leads to a sales engineering assignment. Interested? Send resume to include salary history and requirement in complete confidence to:

Gonzalo Casares
TORIN CORPORATION
Kennedy Drive
Torrington, CT. 06790
An Equal Opportunity Employer

R.P.I.

COORDINATOR OF APPLICATIONS SOFTWARE

RPI seeking individual to coordinate the installation and maintenance of academic applications packages, support academic database management applications and consult with users on package use. Requires experience in using and maintaining academic packages such as SPSS, IMSL, BMDP; familiarity with database concepts especially as related to research and instructional applications; and user services experience in an academic environment. Send resume and salary requirements to: Recruitment Manager, Rensselaer Polytechnic Institute, Troy, N.Y. 12181. An equal opportunity/affirmative action employer.

PROGRAMMER

Min. 1 yr. PLI programming exp. required for IBM 370/158 installation. Western N.Y. mfg. co. has opening for versatile savvy programmer to join dynamic team. Degree. \$15,000. (Fee Paid).

**ROBERT HALF
PERSONNEL AGENCIES**

1310 Liberty Bank Building
Buffalo, N.Y. 14202
716-842-0801

COULD YOU BE A DATA PROCESSING RECRUITER

We are a well established national recruiting firm seeking the right person to join our existing EDP placement division in our Boston office. The person we seek is a bright, pleasantly aggressive, outgoing, sales oriented type who is well-versed in the EDP field and may now be a marketing rep. for a large vendor or consultant with a prominent consulting firm. We offer substantial earnings growth, excellent fringe benefits and incentive. Salary commensurate with experience. Send resume to President.

CW Box 1451, 797 Washington St., Newton, MA 02160

COMPUTER SALESPERSON

For inside sales position with N.J. microcomputer systems house. Familiarity with computer software and hardware mandatory. Minimum 2 yrs. experience. Salary commensurate with qualifications. Call Personnel Director at (609) 921-0321.

DATA PROCESSING PROFESSIONALS

Atlantic States is a national recruiting firm searching for Programmer/Analysts, Systems Analysts and other EDP specialists at all experience levels. Many openings nationwide, salaries ranging to \$30,000. Fees paid. For selective handling, WITHOUT PRESURE, mail your resume to: ATLANTIC STATES PERSONNEL, P.O. Box 9928, Savannah, GA. 31402.

PROGRAMMERS/SYSTEMS ANALYSTS

LAUNCH A SYSTEM

Join a progressive team developing a new real time mini-computer based system utilizing new microprocessor controlled terminals. Experience is a must. Knowledge of M6800 microcode or a high level procedure-oriented language is a plus. We are an international company in a growth industry located in Delaware. If you would like a challenge, call Fay Dobbs between 9 and 5 on weekdays at (800) 441-9222 or (302) 737-4300.

EQUAL OPPORTUNITY EMPLOYER

position announcements

position announcements

buy sell swap

buy sell swap

buy sell swap

EDP PROFESSIONALS San Francisco/Bay Area

If you are a: PROGRAMMER, SYSTEMS ANALYST, SYSTEMS PROGRAMMER with a minimum of 2 years experience with commercial, financial, manufacturing, scientific systems; we would like to talk with you about career opportunities available in the San Francisco Bay Area.

PERSONAL LOCAL INTERVIEWS

will be conducted the week of Feb. 19 through 24 in Chicago. For an appointment or more information, please call Mr. Lou Ritz at (312) 944-4119, Sunday thru Friday.

or write:

LOGICAL OPTIONS INC.

233 SANSOME ST. SUITE 1300
SAN FRANCISCO, CA. 94105
415/777-3900

BUY SELL SWAP

IBM 3330/001

Available March 11, 1978
- Sale Price - \$20,500 each
- 3 Year lease - \$618/Mo.
- 2 Year lease - \$818/Mo.
- Certified for IBM Maintenance

TELEX Tape-To-Print Units

(3) 5403/1 Printers
(3) 5416/1 Print Trains
(3) 4889/1 Tape Drives
(1) 5848/1 Control
(1) 5848/2 Control

Available April 1, 1978
Certified for IBM Maintenance
Call

**FORSYTHE
McARTHUR**

(312) 943-3770

Dealer &
Lessor In IBM
Computers

FORSYTHE/McARTHUR ASSOCIATES, INC.
919 North Michigan Ave. Chicago, IL 60611

Member Computer Dealers Association

FOR SALE/LEASE

DEC LSI 11[®]
PDP 11V03 SYSTEMS
LA 36 DECwriters
LA 180 * VT 52
In Stock For
IMMEDIATE DELIVERY

UNITRONIX CORP.
1081 U.S. Hwy 22
P.O. Box 6515
Bridgewater, N.J. 08807
(201) 725-2560

PLANNING A NEW COMPUTER SYSTEM?

HAVING PROBLEMS
WITH AN
EXISTING SYSTEM?

Project Systems, Inc.

Specialist In general purpose com-
puter systems with emphasis on

IBM System 3 and System 32

We'll evaluate your needs and
present you with the solution

For Further Information Contact:

Project Systems, Inc.
1156 Ave. of the Americas
New York, N.Y. 10036
(212) 869-3875

SALE

or short or long-term

LEASE

IBM 3271s, 3272s, 3277s

write or call

METROPLEX COMPUTER COMPANY, INC.
Suite 1206 Honeywell Bldg.
1111 W. Mockingbird Lane
Dallas, Texas 75247 TWX 910-861-4171
(214) 634-2750

BUY • SELL • LEASE

026 - \$ 850	085 - \$ 750
029 - 1850	088 - 2500
059 - 1375	129 - 3350
082 - 800	514 - 800
083 - 1800	548 - 1500
084 - 2500	552 - 900
	557 - 2800

MOHAWK-6401-6403 NCR-738

Want to buy IBM 029 s. 129's, 3741 s. 3742's

COMPLETE LINE BUSTERS, SHREDDERS
DECOLLATORS AND BINDERS
ECONOMICAL LEASE PURCHASE PLANS

DP SERVICE INC.

STANFELDOV NATALE REYES

312-774-2556

5505 N. MENARD AVENUE, CHICAGO, IL 60630

CMI BUY LINES

BUY-SELL-LEASE-TRADE

3031/3032/3033

(Lease Only)

John Mills
(313) 642-8000

3420 3803

3333 3830

3330 3340

Darryl Hastings
(313) 642-8000

360

30/40/50/65

Gary Smith
(313) 642-8000

370/165 370/168

Bob Van Hellemont
(313) 642-8000

370/158

Ron Baker
(313) 642-8000

370/155

Gary Smith
(313) 642-8000

370
148/145/138/135

Pam Hoban
(313) 642-8000

1403 2821

2501 1442

1443

If you rent any of these and
are returning them to IBM call
me. I'll show you how to
make money using your rental
credits. We buy and sell all of
these units.

Kathy Housey
(313) 642-8000

370/115/125

Bob Southwell
(313) 642-8000

3270 CRT's

Printers/Controllers
Jim Carleton
(313) 642-8000

129-029-059-026

System/3

Model 15
Jerry Roberts
(313) 642-8000

3742

3741

5496

Jerry Sharon
(313) 642-8000

360/20

1130

Jim Carleton
(313) 642-8000

CMI
CORPORATION

The IBM Specialists

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000

Member
Computer Dealers
Association

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115
370/125

ECONOCOM

MEMBER COMPUTER DEALERS ASSOCIATION

ECONOCOM
1255 LYNNFIELD ROAD
P.O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

THREE AND FOUR YEAR WALK-AWAY LEASES

1. ATTACHED PROCESSOR FOR 3158

2. 3158 - 3 MEG WITH APU FEATURE

SPRING AVAILABILITY

3. 3158 - 3 MEG MOD 3

SUMMER AVAILABILITY

THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle - (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman - (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Huntington Station, New York 11746

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap



INDEPENDENT

**WE BUY - SELL -
INSTALL & REPAIR**
AT REASONABLE PRICES

**HONEYWELL USED
SERIES 200 EQUIPMENT**
COMPUTER SYSTEMS
PARTS - PERIPHERALS

Now in stock

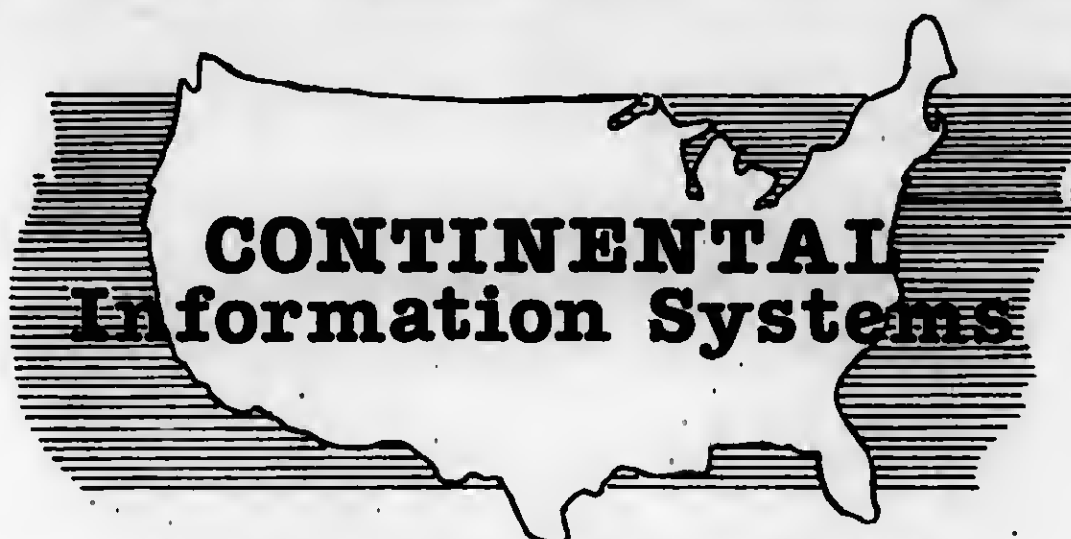
2040-64K M7-32K M9
120-1250 - TAPE DRIVES
READERS, PRINTERS, PUNCHES
3200-131K Avail. 6/78

CALL NOW

Wilson Grubill (513) 874-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati, Ohio 45246



BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

AVAILABLE

Feb 78 155-II
165-II
158-new, ITC qualifying
168-new, ITC qualifying

Apr 78 145-II
155-II
165-II
158-new, ITC qualifying
168-new, ITC qualifying

Mar 78 165-II
158-new, ITC qualifying
168-new, ITC qualifying

May 78 158, pre-owned
158-new, ITC qualifying
168-new, ITC qualifying

Several 370 systems available beyond May, 1978

We will also take your currently installed IBM equipment in trade on a new system.

Peripherals and I/O

All 360/370 Disk, Tape
Printers, Readers, and T/P

Gene Chappell

Call Us!



CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900

CIS is very interested in
buying pre-owned
IBM 370 systems. -
If you are thinking
about selling, let us
make you an offer.

BUY SELL LEASE

370, 380, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340'sIBM UNIT RECORD
EQUIPMENT026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557

029-059-129

Call us for all your needs, we buy
rent and sell all types of IBM unit
record equipment. Over 12 years
of serving commercial and govern-
ment requirements. Contact ACS
for proposal.

7126 Mullins
Houston TX 77081
(713) 666-2122
TWX 910 881 1526

EQUIPMENT CORP.

WANTED

NCR 299 - 399 - 499
270-279-775BURROUGHS
All L Series
TC Series - TD700IBM 360-370;
3270; 029; 129DEC
PDP 8 And 11 CPU's
Peripherals

FOR SALE OR LEASE

360/168's

(MODELS 1, 3 or A)

AVAILABLE JUNE '78

Call Bob VanHellemonst - (313) 642-8400

CMI CORPORATION

DEC
HARDWARE
PDP 11 PDP 8Peripherals Processors
Memories

VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

BUY-SELL-SWAP

PDP 11's & NOVA's

Systems and Peripherals at very
attractive prices

New and Used

ICS

Computer Equipment Sales

408-735 7360

PAUL PEREZ

408 735 7361

FOR SALE OR LEASE

Immediately Available

IBM 3330/001's

IBM 3330/011's

IBM 3333/011's

with features #8150

Contact: Harry Blair 713-524-8249

370/158

Serial Number 23566

Available May, 1978

Contact: Ann Rhame

Commonwealth Computer
Advisers, Inc.

707 East Main St. Suite 1650
Richmond, Virginia 23219

(804) 643-9123

BUY

Surplus DEC And
Data General
Hardware

PHIL THOMAS

(305) 272-8753

Thomas Business Systems, Inc.

efm computer
leasing, inc.

3000 mercus avenue
lake success, ny 11040
(516) 485-7878

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40

360/65

360/50

370/135

BUY SELL LEASE

SYSTEM/3

Models 15, 10, 8, 6

Systems 32 & 34

All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298

Memphis, Tn. 38128

Phone 901/372-2622

Member CDA

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3

AND PERIPHERALS

WE BUY • SELL • LEASE • TRADE



P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
BUY SELL LEASE BROKERAGE COMPUTER INTERNATIONAL LTD. 1111 W. Mockingbird Lane Suite 1206 Honeywell Bldg. Dallas, Texas 75247 TWX 910-881-4171 (214) 634-2750	SALE/LEASE DATA GENERAL ECLIPSE Available Immediately 8600 160 KB Core 6060 90 MB Disc 6021 800 BPI Mag Tape 5776 900 LPM Printer 4251 Communication Chassis 4016D 285 CPM Card Reader 6042 Dasher Send/Receive Terminal Contact: Mr. Tom Mason ETC P.O. Box 728, Newburgh, N.Y. 12550 (914) 564-6000	360/20 Sub-5 SALE OR LEASE • 1403 Mod 2 Printer • 2560 with 6 lines print • 2 2311 Disk Drives write or call METROPLEX COMPUTER COMPANY, INC. Suite 1206 Honeywell Bldg. 1111 W. Mockingbird Lane Dallas, Texas 75247 TWX 910-881-4171 (214) 634-2750	CONNECTICUT PRIME COMPUTER TIME IBM 370/158 OS/SVS IBM 360/50 DOS REMOTE JOB ENTRY BATCH PROCESSING COMPETITIVE PRICES Computeristics, Inc. Benson Rd. Middlebury, CT 06749 CALL COLLECT Richard Wood: (203) 573-2222	

3803-1/3420-7AVAILABLE FOR
SALE OR LEASE

IPS can supply 3420-7 systems of any size from inventory. Controllers with or without switching features. Attractive sale or lease terms available. CALL ED JOSEPH for an immediate quote.

IPS COMPUTER MARKETING
 2480 Lemoine Ave.
 Fort Lee, N.J.
 (201) 947-4200

BUYING • SELLING • LEASING • TRADING

call... **the Matchmakers**

1-800-654-9179

TOLL FREE!

COMPUTER SALES INTERNATIONAL, INC.

SALE

ALL IBM Unit Record Equipment

129 & 029's

East Coast
(717) 564-8870
West Coast
(415) 332-6265

Unit Record Leasing Company
 110 Hivista Road
 Sausalito, Calif.

LEASE

For Sale or Lease

370/168with attached
processor
July, 1978Call
R. Van Hellemont
(313) 642-8000**CMI Corporation**

DIRECT FROM FACTORY • TESTED • WARRANTED

MODEMS

Used ICC Modems at Significant Savings

Now you can buy or lease dependable ICC modems at a special low cost. We have a stock of modems, largely from customers who upgraded their data communications networks with our latest modems. These modems have been factory tested, are under warranty, and are backed by Racal-Milgo's nationwide service/support organization. Quantities are limited. Prompt action can assure you of these substantial savings.

**Conditions of Sale**

- 1) Orders must be postmarked prior to March 31, 1978 with delivery scheduled no later than June 1, 1978.
- 2) Offer subject to availability of products.
- 3) All prices are F.O.B., Miami, Florida and do not include installation.
- 4) Based on ICC Terms and Conditions.

March Special

Save 43%
over original price on a
2000 bps modem

Save even more on this Bell 201A compatible modem. Modem 20LSI, originally \$1,585, is available during March only at a special low price of \$895, or \$42/month for a 30-month lease. This is \$155 under our normal Special Offer Division price of \$1,050. Modem 20LSI operates in full and half duplex mode over two-wire or four-wire dial or unconditioned leased lines.

Offer expires March 31, 1978

Typical Savings.

		Original Price	Special Price
2400 bps	MODEM 2200/24 Half or full duplex operation over dial or dedicated facilities.	\$1780 \$60/mo.*	\$725 \$29/mo.*
3600 bps	MODEM 3300/36 Dial or dedicated operation with reverse channel. Built-in auto-answer on dial-up.	\$3620 \$85/mo.*	\$950 \$38/mo.*
4800 bps	MODEM 4500/48 Automatic equalization unconditioned dedicated dial lines. Optional dual 2400 bps operation on dedicated lines.	\$4980 \$100/mo.*	\$1795 \$72/mo.*
7200 bps	MODEM 4800/72 Dedicated line with optional multipoint operation for up to three 2400 bps channels.	\$6900 \$165/mo.*	\$1995 \$80/mo.*
9600 bps	MODEM 5500/96 Dedicated line with optional multipoint operation for up to four 2400 bps channels.	\$7990 \$185/mo.*	\$2995 \$120/mo.*

Prices apply to sale or lease in U.S. only *Based on 30 month lease.

Racal-Milgo Special Offer Division, 8600 N.W. 41st St., Miami, FL 33166

Reserve now. Phone collect (305) 591-5335 or send this form.

Racal-Milgo

— the new name for ICC

I want more information about
your Special Offer Division
products.

- ☐ Yes, I am interested in the March special. Please send order form and data sheet
- ☐ Purchase ☐ Lease Quantity _____
- ☐ I'm interested in the following modems:

Modem No.	Quantity

☐ Purchase ☐ Lease

Name _____

Company _____

Street _____

City _____

State _____

Zip _____

Phone No. _____

☐ Please place me on your mailing list for future specials.

A

RANDOLPH NEEDS:
3340-A2 DISKS
3420-3, 4 & 8
MODEL TAPE DRIVES
CALL: MIKE SEEKINGS
TOLL FREE
800-243-5308

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR LEASE — ANY TERM

370/158 U35 AVAILABLE MARCH 8, 1978

1433, 1434, 1435, 7840 & 3213

370/158 U? (ANY MODEL) AVAILABLE MARCH 18, 1978

1433, 1434, 1435, 2150, 2151, 4650, 6111, 7840 & 3213

370/168 U34 AVAILABLE MARCH 7, 1978

3855, 4525, 3066-11, 3067-111, (2) 2880-2, 2870-1, 2860-2

370/168 U34 AVAILABLE JUNE 1978

3855, 4525, 3066-11, 3067-111, (3) 2880-2, 2870-1, 2860-2

**AMDAHL V6-2 AVAILABLE 3RD QUARTER 1978
FOR LEASE ONLY**

Contact:

George Prussin or Dave Wygoda

OPM

O.P.M. Leasing Services, Inc.

99 Wall Street New York, New York 10005

(212) 747-0220

out of state call (800) 221-2674

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE OR LEASE

3330-1

3333-1

3330-11

3333-11

3340-A2F

3344-B2

3344-B2F

3350-A2F

3350-B2F

3350-C2F

3276-2

3278-2

3287-2

3803-2 DD (8) 3420-6 DD

NEW ITC QUALIFIED

3350 ALL MODELS

MADRIDS FOR 370/158 2150, 2151, 6111

2880-2

2870-1

3830-2

3830-3

INTERDATA

8/32C PROCESSORS 524K.

M46-512 TAPE DRIVES 9 TRACK 1600 BPI,

M46-500 TAPE DRIVES 8 TRACK 800 BPI,

MSM-80 DISK DRIVES 67 mb & CONTROLLERS,

LINE PRINTERS 1200 LPM, TERMINALS

Contact:

George Prussin or Dave Wygoda



O.P.M. Leasing Services, Inc.

99 Wall Street New York, New York 10005

(212) 747-0220

out of state call (800) 221-2674

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE OR LEASE
Control Units (2)
3277-2 Display Stations (Many)
Immediate Delivery
 Call Collect or Write:
 Data/3 Computer Corporation
 114 Central Avenue
 PO Box 266
 Buffalo, Minnesota 55313
 Contact:
 Mr. Bob Johnson
 (612) 682-4884

For Sale
 NCR Century 100 32K
 4-665 Spindles
 450 LPM Printer
 20-665 Disk packs
 2-Disk file
 W/Cobol, Fortran, Nest/3
 /RPM Compilers
 W/CRT Interface
 Under NCR Service Agreement
 June 30, 1978 delivery
 Incl multi-divisional G/L Accounting
 w/budget comparisons
 A/R, A/P, and payroll (multi-state
 systems, all interfaced to G/LI
 \$25,000
 HOUGH BROS., INC.
 9875 Grand Ledge Hwy.
 Sunfield, MI 48890
 Contact: David Hough
 (517) 566-8041

BUY-SELL-LEASE-TRADE

PURCHASE LEASEBACK / RENTAL CREDITS

Write or call collect today
 to these representatives!

SYSTEM / 3
 All Peripherals
 call Ted Arbuckle

370's
 All Peripherals
 call Don Norris

SYSTEM 32's, 34's
 3270 CRT's
 call Marilyn Morris

360's
 All Peripherals
 call Duke Crumpton

EAM EQUIPMENT
 Refurbished, eligible for
 IBM M/A
 call Don Norris
 or Duke Crumpton

MCC

(214) 634-2750
 TWX 910-861-471

METROPLEX COMPUTER COMPANY, INC.
 Suite 1208 Honeywell Bldg.
 1111 W. Mockingbird Lane Dallas, Texas 75247

Industry's Fastest Growing Computer Dealer



WILLIAM MARION COMPANY, INC.
 P.O. BOX 309 • HACKENSACK, N.J. 07602

N.C.R.
 270-299-399-775
 31, 32, 41, 42 etc.
 BURROUGHS
 "L" TC 500, TC 700
 I.B.M.
 029-Systems 32/34

BUYING
SELLING

029's & 059's
 immediate delivery
 Also: 026 - 056 - 082 - 083
 084 - 085 - 088 - 402 - 403
 407 - 514 - 519 - 548 - 552
 557 - Eligible For IBM M/A

FOR MORE INFORMATION CALL - (201) 343-4554

"WANTED"

029's
 129's
 3277's
 3741's

Rental Credit Machines Acceptable
 Thomas Computer Corp.
 600 N. McClurg Ct.
 Chicago, ILL 60611
 (312) 944-1401

WANTED

BURROUGHS 'L' Series
 DEC & DATA GENERAL
 Minis & Peripherals
 NCR: 399 & 299

Boynton Business Systems
 87 Route 208
 Wallkill, N.Y. 12584
 914-895-2007

914-723-3800 The End User Connection

Available for Sale or Lease:

Powerful IBM 165 DAT, Processor Speedup, 4 MEGS.

We Need: 168 ASAP

Your Best Option - Data Options Corp.

Station Plaza
 Hartsdale, N.Y. 10530

Wanted To Buy
3672-Memorex storage control unit
3673-Memorex disc controller
3670-Memorex disc module
3675-Memorex disc module
 Contact:
 Harry Blair 713-524-1401

FOR SALE

NCR Century 200
 32K, Dual Spindle
 657 Drive
 1500/3000 LPM Printer
 \$70,000

Available for Shipment
 Phone Mr. Bullock
 (803) 723-9411

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.
026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.
029	\$1800	\$55/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.
046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.
056	\$260	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.
059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.
077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.			

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202
 Chicago, Illinois 60611
 (312) 944-1401
 115 Harbor Island Rd.
 Newport Beach, CA 92660
 (714) 675-2810

WANT TO BUY

IBM 3271-2
 IBM 3272-2

FOR SALE

024	084	419	552	*2402
026	085	514	557	*2403
029	088	519	602	*2405
056	089	521	604	*2406
077	402	523	824	7330
082	403	526	826	
083	407	548	867	

(* Potter)

Call Warner Rivera
 at (212) 557-3712

GENESIS ONE
 COMPUTER CORPORATION
 an MAI company
 300 East 44th St., New York, NY 10017

ALL NEW EQUIPMENT

DS332-FA DEC Data
 System 11/34
 64KB
 dual RX11,
 VT32
 RX11 Controller and
 RK05 Disk Drive
 Dual RX11 Floppy Disk
 & Controller
 M511-JP DEC
 32KB MOS Memory
 M7850 Parity Control
 VT32-AE CRT
 (2) - LP11-VA 300 LPM Printers
 and interface for PDPS or PDPT1
 (your choice)
 900 LPM Printer and interface for
 PDPT1
 USED
 Dual RX11 Floppy Disk & Con-
 troller for PDPS
SYSTEMS MANAGEMENT CORP.
 NGNB Plaza Tower
 P.O. Box 982
 Charlotte, N.C. 28231
 (704) 373-0875

BUY-SELL TRADE

For Computer
 Call Action Write

CAC

404 458-4425 P.O. Box 80572
 Atlanta, Ga 30366

LEASE

3031-3032
 3033

SHORT **ATTRACTIVE**
AND LONG **RATES**
TERMS 360/ 30,40,50,65
 CPU 138,148,158,168/

370/ 125,135,
 145,155

**DISK-
TAPES**

BUY

SELL

National Computer Rental
 415 Madison Avenue
 New York, New York 10017
 Tel. No. (212) 532-1500

Member of Tiger Leasing Group Member of Computer Lessors Assoc.

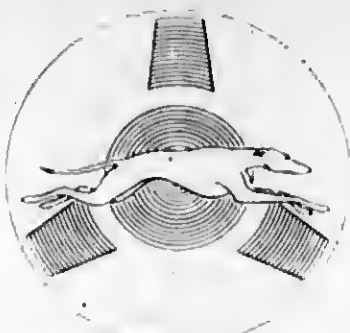
buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

**GO GREYHOUND**

When you plan to
Buy or Sell your
Computer Equipment

For complete information
call the Greyhound Repre-
sentative in your area.

FOR SALE

3145-HD
360/65J

WANT TO BUY

3340-A2 & 3340-B2
3135 w/4656, 6981, 6982,
7865, 7861

U.S.

Home Office
New York
Chicago
Dallas
San Francisco

T.A. Tekash
Dick Ventola
Pete Ahern
M.W. "Bill" Tucker
Henry Paulson

602-248-6037
914-949-1515
312-298-3910
214-233-1818
415-283-8980

INTERNATIONAL

Canada
U.K./Europe
Mexico
Austro-Asia
Eurasia

Don Meunder
Joe Gold
Andres Contreras
John Hallmark
Don Haworth

416-366-1613
022-61-27-54
905-543-6860
214-233-1818
214-233-1818

NON IBM

Dallas

John Hallmark

214-233-1818

**WANTED TO BUY**

168, 158, 165, 155's
All 370 Peripherals
145-12 and 135-H
360/65

**FOR SALE
165-KII**

DATed, up to 4. mega-
byte. For Sale or Lease.

158-K

Available in March with
or w/o ISC.

155-J

available now with or
without new DAT

145-12

available now with ISC.

3420-7

available now with
switching features

158 Memory

J to KJ available
March 1.

**FOR LEASE
145-10**

available immediately for
sale or short term lease.

125's

We will purchase and
leaseback your 125 sys-
tem. Save rent starting
today. Call for a quote.

**IBM RENTAL
CREDITS**

We will pay for your
rental credits on FTP,
ETP, and MAC machines.
Call us before sending
your machine back to
IBM.

**IPB**

Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

We are buying, selling, & leasing!

Buying: 3830, 3420

Selling: 360/65, 360/40

Leasing: 370/155, 360/65

Please contact:

Linda Vaughn / (415) 955-0220

Tommy Talbot / (415) 955-0238

**ITEL
CORPORATION**

**BEFORE YOU BUY, SELL, OR LEASE,
TAKE A 'SECOND' LOOK!**

FOR SALE

3505-B1 and 3525 P3
3135-GF -- Fully Loaded
3155-J with Dat Box

WANT TO BUY

370/145 IBM Mem. I2-J2

370/135 IBM Mem. GF-H

3-1403 N 1

1442 N 1

3420-5 Single Density



**COMPUTER
INDUSTRIES
INC.**

3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO 312 298 5650
WASHINGTON 703 525 3074
LOS ANGELES 213 370 4844

FOR IMMEDIATE SALE**NEW
DATA GENERAL
NOVA**

3/12 64KB
DUAL FLDPPIS
HIGH PERFORMANCE
FLODATING POINT
Contact Roger Hughes
SMITHCO Engr. Inc.
(918) 446-4406
Tulsa, Ok. 74105

**MODEM CABLES
RS232 CABLES
CINCH CABLES**

25 Pin Extension Cables
Production and Custom Cables
Cables installed on-site
in San Francisco Bay Area
Contact Bob Vasconcellos

WHERE ENDS MEET

5926 Whitney St.
Oakland, CA 94609
(415) 652-7748

**FOR SALE
IMMEDIATELY**

SYSTEM 3 MOD 10
5410-A14 Processing Unit 16K
with 5203-2, 5224-A1, 6378-002,
5424-A1 5444-002

Under IBM maint.
Also 60 5440 Disk Packs Avail.

Contact

Jack Boates
(617) 344-1111

FRANKLIN SPORTS
P.O. Box 508
Stoughton, Ma. 02072

WANTED TO BUY

3803-3, 145 I2
with ISC

135 Core GF-DH

1/2 Meg 145 Core

Call Datronic-

WILL FOSS

312/992-0760

370 158-168

**OPERATING LEASES
AVAILABLE**

AMERICAN COMPUTER
SALES & LEASING
440 Park Ave. South
New York, N.Y.

Call:

V. Incandela
(212) 689-7051

**FOR SALE OR LEASE
COMPUTERS**

B6700 Complete System

April 1, 1978

B4700 Complete System

April 1, 1978

B3700 CPU Only

\$175,000.00

B1728 Complete System

March 1, 1978

B700's - Several Systems

PERIPHERALS

B500-B4700 Tape Drives; Disk
TERMINALS
TC732/735 Teller Terminals
TD700's w/Expanded Memory
(303) 922-8331
2480 W. Alameda Ave.
Denver, CO 80223
Lawrence G. Lyon

**FOR SALE
DEC PDP 11/70
SYSTEM**

Including IAS Operating Software

512 KB Memory

(2) RP04 Disk Drives & Controller

(1) TU-16 Tape Drive

(1) LP-11 Line Printer

(1) DH-11 16-Line Multiplexor

(1) DU-11 Bi-Sync Interface

(1) Selector Channel Simulator

System in Excellent Condition

CW Box 1446
797 Washington St.
Newton, Mass. 02160

Short or Long Term Leases From RANDOLPH

370/138

370/148

370/135

370/145

... and all other IBM systems ...
from S/3's and 115's ... to 168's
and all 303X CPU's or full systems.
Up to 8-year leases available.

CALL THE 370 HOTLINE

800-243-5307



Randolph Computer Company
357 Steamboat Rd., Greenwich, CT 06830
(203) 651-6888

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

DEC 2040 / \$8,952 Mo.**4 YEAR LEASE * AVAILABLE NOW**

Central Processor, LA36-C Console, 64K Words Memory, RP06-B Disk System, TU45 Tape System, Eight Asynchronous Lines, Tops-20 Operating System Plus:

2	MA20-E	32K Add-On Memory
1	MA20-A	32K Basic Memory Module
1	RP06-AA	Add-On Disk Drive
1	OC20-AA	Basic Eight Line Group
1	OC20-OA	Eight Line Expansion Group
1	LP20-AA	300 LPM, 64 Character Printer
1	OT001-AP	Fortran-20
1	OT003	Cobol-20
1	OT007-AP	Sort-20
1	OT012-AP	APL-20/SF
1	OT008-AP	OBMS-20
1	OT016-AP	IOL-20 Extended for OBMS

Equipment is under OEC Maintenance. Direct inquiry to present user:

SUMMA CORPORATION
MANAGEMENT INFORMATION SERVICES
P.O. Box 14000
Las Vegas, Nevada 89156
(702) 361-1300 (Bill Janett)
* NOT LIMITED TO PRINCIPALS *

**WANTED-
USED COMPUTER**

Varian 620-L100
Complete With Memory
Contact Andy Isner
Or Doug Miller
604 980-0311

128 W. 8th St.
N. Vancouver, B.C.
Canada

**DEC-10 TAPE
SUBSYSTEM**

800-1600-6250 BPI

contact: JIM HUOSON
(303) 666-6581
ext. 2454

for sale

for sale

**ATTENTION
IBM 360/370 USERS**

DATA AUTOMATION COMPANY, INC.

buy • sell • lease • trade

370 3410/3411 3330/3333 3211/3811
3420/3803 3340/A2, B2 3272/3277

Peripherals

360

CPUs and Peripherals

Peripherals

Lowest Price

We'll Buy

Any 360 CPU

Today

360/20

LEASE or SALE

2020 C1

w/2203 120pp

2560

w/2 line printer

2401-5

2402-2

2403-1

2403-4

W/DD

360/40-50-65's Available

Sys/3 WANT TO BUY FOR SALE

CPUs and

Peripherals

3741's 3277's

5421 Control Unit

Any System/3

features as listed

3901 - for Sys - 3-10

4140 - for Sys - 3-10

2074 - for Sys - 3-10

5410-A14 Processing Unit, 16K

3971 5203-2 Attachment

4100 5424-A1 Attachment

6378 2nd Disk Attachment

5424-A1 Multi-Function Card Unit

5203-2 Printer, 200 lpm

5560 36 Add'l Print. Pos

5444-2 Disk Storage Drive

544402 Disk Storage Drive

We'll Buy

5415's All Models

IBM Rental Credits OK



DATA AUTOMATION COMPANY, INC. 8488 CASH ROAD DALLAS, TEXAS 75247 MAC 214 637-6570

dataserv

buy • sell • lease • trade

370
115/125/135
Steve Locny
800-328-2406

For Sale or Lease
Any 115/125 configuration
Sending 115/125
Back to IBM

Call us! We'll show
you how to make money
using your rental credits.

370
138 THROUGH 168
Dove Miller
616-637-8481

For Sale or Lease
138 - 145 - 155
CPUs — Peripherals —
Memory
370/145-H

7855
8810
6982
6983
3215 Console
3047 Power Units

370
Peripherals
800-328-2406

Avail. Now WTB
3203-02 3272, 3271
3340-B2 3277, 3420
3410/3411 3803, 3830
3505/3525
STOP! Before you send
any of the above machines
back to IBM call us. We'll
show you how to make
money.

360
CPUs and Peripherals
Neal Johnson
800-328-2406
Tom Anderson

For Sale or Lease
360/30 - 40 - 50 - 65s
CPU — Peripherals —
Memory
We'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory

Sys/3
CPUs and Peripherals
800-328-2406
SYS-132's

For Sale or Lease
5406 - 5410 - 5412 - 5415
CPUs — Peripherals —
Memory
We'll Buy
Your 5406/5410
5415 — Rental credit
machines
Peripherals — Memory

**WANTED TO BUY
IBM S370/145 12**

Delivery Date Open
Send CPU Configuration
And Date Available
To
CW Box 1437
797 Washington St.
Newton, MA 02160

370
138/148's
AVAILABLE NOW
call
Bill Gannon
(703) 790-0970



FINALCO, INC.

WANTED 360/30

65k, 5 tape/3 disk system
with full I/O set. Will con-
sider individual units. State
model # Feature #, serial #,
price and date available. Must
be acceptable for IBM maint.

CW Box 1442
797 Washington St.
Newton, MA 02160

2314-A1

- 8 or 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

COMDISCO
312-698-3000

**IBM 158
Attached Processor
AVAILABLE
APRIL 7**

Contact: Jerry Borisy
JBI ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, CO 80228
(303) 988-0820

GREYHOUND COMPUTER CORPORATION
For Sale or Lease

Univac 494 CPU with 131K Memory
Full I/O CRT Console

Univac FH1782 Drums-Type 6015-00
Direct Drive Hard Surface

Call:

John Hallmark

or

Don Haworth

(214)233-1818

**Data Systems Marketing
Delivery from Stock****Microcomputer Systems**

Digital PDP 11/03 Family with Both Floppy and Hard Disks.

VT-78 Micro 8, Word Station 78

Data General Micronova Family

Printer Terminals

Digital LA-36, LA-35, LA-180, LS-120

Teletype Model 43

Data General Dasher 30 and 60 CPS

Diablo Hytem 1620 and 1610

Lear Siegler Hydra Series 200 180 CPS

Texas Instruments 743, 745, 810

Video Terminals

Lear Siegler ADM-3A, ADM-2, ADM-2B, ADM-1A, VDP-400

User Programmable

ADD5 Regent 100 and 200

Digital VT-52

Data General Dasher 60S3 and 60S2

Data Communications and Accessories

DSM Acoustic Couplers, 103F, 113A, 113B

General Data Comm. 1138 Direct Connect, Frequency Division

Multiplex Equipment

Sykes Single and Dual Drive RS-232 Floppy Disk, IBM S100

Compatible Floppy Disk

Techtran 815, 8410, 8400, 8420, 8421 Single and Dual Cassette

Systems

Software

General Purpose Disk Operating System, Fortran and Business

Basic for PDP 11/03 and Micronova Families

Distributed Processing, Remote Job Entry, Asynchronous and

Bisync Communication for PDP 11/03 and Micronova

Families

Business: Public Accountant Client Write Up and Complete Set

of Business Accounting Packages for PDP 11/03

Call 714-560-9222, 800-532-3717 (California)

or 800-854-2684 for DSM Showroom Nearest You

Call Toll Free 800-328-2406
or 612-544-0335

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
P.O. Box 9485, Minneapolis, MN 55440

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WANTED TO BUY SYSTEM/3 MODEL 15

- Any configuration.
- Rental Credit Machines O.K.
- Highest prices and commission paid.

Call or Write

data3

computer corporation 114 central avenue, box 266, buffalo, minn 55313 (612) 682-4884

FOR RENT

Computer Terminals

- Teletype's® new Model 43 Teleprinter 30 CPS throughput - KSR.
- LA36 DECwriter II with numeric LED Display.
- LS120 DECwriter III 1,200 BPS - 132 column print line.

Data Communications Equipment

- TELEX & TWX optional LA36 TWX/DDO.

Customer options include:
lease, lease/purchase or
outright purchase plans.

tel-tex

3203 Audley Street • Houston, Texas 77098
TEXAS (713) 526-8326
WATS 800-231-6120
TWX 910-881-5757
TELEX 77-5613

**US
LEASING**

FOR SALE

NCS-OpScan DM100 Optical Mark Reader. Scanner and 9 trk, 800 bpi tape unit (upgradable to 1600 bpi) and manuals. off line. Purchaser will be responsible for shipping from Kenosha. Offers will be accepted through February 28, 1978.

For more information call:
John C. Bernard
(414) 658-2371

SALE OR LEASE

370/145

Serial Number 11192
Available March 1, 1978

Contact: Anne Rhame

Commonwealth Computer
Advisors, Inc.

707 East Main St. Suite 1650
Richmond, Virginia 23219

(804) 643-9123

WANTED

Data Processing Equipment
We can buy most surplus
computers/terminals/peripherals

OR

find what items you need
Give us a try - its FREE

Call John Pinzone

(214) 296-1981

U.S. BROKERS
P.O. Box 311
Duncanville, TX 75116

(1x8) 3330-1

Telex or Itel

Wanted to Buy

From End User

412.823.3445

WANTED TO ACQUIRE SERVICE BUREAU

If you are ON-LINE service bureau, we have an interest in a merger with or acquisition of your company. Let's pursue this possibility. All inquiries held in strict confidence.

CW Box 1409
797 Washington St.
Newton, Mass. 02160

LEASES

3138

March 24, 1978
April 21, 1978

3148

March 31, 1978
April 14, 1978
May 19, 1978

3158

Six to 24 Month Leases (or longer) on your Rented or Owned System. Upgrades to 303X Available.

3168


Computer
Capital
Corporation

1351 Washington Boulevard
Stamford, Connecticut 06902
Tel 203 357 9663



dearborn giveth:

370's: 370-145J (mod 2 & ISC avail.);

3420-7 single.

dearborn taketh:

370-145's; 370-135's; 3420's; 3330's; 3340's.

Call Tom Millunchick: 312/827-9200
or any dearborn office.



dearborn
computer company

dealer-IBM computers
systems software
leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788

FOR SALE

Calcomp 114 Disk Drives

28 Megabyte for use with all types
of mini computers.

Available Immediately

Contact: Gene Wendt

CompuMart Inc.

6622 Black Swan Drive
Shawnee Mission, KS 66216
913-631-2992

digital

Factory Refurbished Equipment

All quality tested and warranted
by the people who made them.

- Complete systems
- Processors
- Peripherals
- Accessories
- Complete Documentation

Digital Equipment Corporation
Traditional Products
125 Northeastern Boulevard
Nashua, New Hampshire 03060

☐ Please send your complete product listing.

☐ Please call, I'm specifically interested in: _____

Name _____

Address _____

City _____

State _____

ZIP _____

Phone _____

CW2138

DEC PROCESSORS PERIPHERALS & MODULES BUY — SELL — LEASE — RENT \$1, 000,000

NEW & USED DEC INVENTORY

DEC CPU'S

11/04 • 11/05 • 11/10 • 11/35 • 11/40 • 11/45 • 11/60 •
11/34 • 11/70 • PDP8E • DEC 310

DEC DISKS & CONTROLLERS

RK05 • RX11 • RK11D • RP02 • RP03 • RP04 • RP06

DEC TAPES

TU10 • TJU16 • TJE16

DEC TERMINALS

VT52 • VT50 • VT05 • VT20 • LA36 • LA180 • LA120

DEC PERIPHERALS

DH11 • DZ11 • DL11's • LP11 PRINTERS

MISC. BOARDS & MEMORY

M7260 • M7261 • MM11DP • MM11L • DPH1D • KW11L
MM11U • MS11BM • M792 • DUI1DA • MS11JP •
MF11L • MM11F • MF11U

Hundreds of Miscellaneous Modules & Cables Available
CALL FOR OTHER COMPONENTS IN STOCK

SAVE 33%

NEW 11T34 CONFIGURATION

***** \$23,333.33 *****

For Fast Delivery & Substantial Savings
Call the DATALEASE Digital HOTLINE

800-854-0350
DATALEASE

780 North Valley Street, Anaheim, CA 92801
(714) 843-3020 • TELEX 682439

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE OR LEASE

5421	Printer Control	5/1
1231	Optical Reader	7/1
370/125 GF2		
3705-A1	Comm. Control	\$35,000
1401-B4 w/1402,	1406	Best Offer
3505-B1	Cd. Reader	4/1
3410/3411-3	Tapes 1x4	2/1
		Now
	\$44,600	

WANTED TO BUY

3420's	3277's	129-3's
3272's	3340-A2	029's
3271's	3333-11	3330-11

DIMENSIONAL DATA INC.
1400 Renaissance Drive
Perk Ridge, Ill. 60088
(312) 297-7210

155's

BUY-SELL-LEASE

CMi CORPORATION

GARY SMITH — 313-642-8000

303X Leasing

Large industrial corporation wishes to purchase and lease back to substantial corporations IBM 303X Systems. We will only deal with end users and equipment must be scheduled for delivery in 1978.

CW Box 1410
797 Washington St.
Newton, Mass. 02160

BUY • SELL TELETYPE MODELS

43 • 33 • 32

NATIONAL
TELETYPEWRITER CORP.
207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444

FOR LEASE 3032 (4 MEG)

JUNE 78

CONTACT:
BOB RUSSELL

SYSTEMS MARKETING, INC.
200 E. Thomas Road
Phoenix, AZ 85012
(602) 264-5600 TLX 667-334

WANTED TO BUY

IBM 370/155

with or without DAT

Contact: Harry Blair

(713) 524-8249

MINICOMPUTERS & SYSTEMS

Don't waste company time or money. Check with us before you buy or sell.

New DEC Equipment
Immediate Delivery

RK11-RK05 Disk Systems -
\$8500
PDP 11/04s and 11/34s - 20% off list
DZ 11
DEC Station 78

New DG Equipment
Immediate Delivery

DG 10 Mbyte Disk Systems from
\$7500
DASHERS - 15% to 25% off list
Nova 3/12 or 3D - 20% off list

Immediate delivery for MOS!

Inventory Clearance

call us for free brochure

MINICOMPUTER EXCHANGE

(408) 733-4400
TWX 910-339-9272

SOFTWARE WANTED

WANTED

FULL accounting software for Nova 3 or CS-40. Desire on-line, interactive packages with multi-user capability. Should include accounts payable, payroll, general ledger, in-house inventory with costing, sort and utilities.

Contact

Manager of Data Processing
Post Office Box 754
Springfield, Missouri 65801
(417) 881-1204

SOFTWARE FOR SALE

STRUCTURED PROGRAMMING

You appreciate the many advantages of structured programming but lack of acceptance by customer or manager or industry is a continuing problem for you. POL is a programmer oriented language, enables you to make a smooth transition from Fortran to structured programming and still keep everyone fairly happy.

Inquire on your company letterhead to
POL
139 West Center Street
Logan, Utah 84321
(801) 753-1739 ask for Mike Harris

WHY DEVELOP SOFTWARE WHEN YOU CAN BUY SOFTWARE?

We've got the software you need. Now.

PAYROLL/PERSONNEL
ACCOUNTS PAYABLE
TAXBREAK/TAXCOST

(Payroll Tax
Calculation Modules)

Call us. (415) 845-7991



argonaut
Systems, Inc.
2140 Shattuck Ave.
Berkeley, CA 94704

PDP 11/45

FOR SALE

2-RP03 2-TU10
Full Memory Cache
1800 LPM Printer
RF/RS RSTS

FINANCIAL SOFTWARE

It the Performance of an
11/70 and the price of an
11/34 appeal to you ...

Contact: Michael Niernberg
EDI COMPUTER SERVICES
13693 E. Cliff Ave.
(303) 756-4619

WE BUY AND SELL AND INSTALL

NEW AND USED COMPUTER ROOM FLOORING

Raised Floor Installation, Inc.
19 Sebago St.
Clifton, N.J. 07013
Telex (201) 778-2444 in New Jersey
(212) 594-4039 in New York
(415) 946-9466 in Calif.

FOR SALE DEC PDP 11/40 RSTS/E TIMESHARING SYSTEM

- 11/40 CPU with 256K bytes memory
- Hardware floating point
- 2048 byte cache buffer
- 15M bytes on-line storage
- Swapping disk
- Tape drive
- Dual DECTAPE
- LA30 system console
- RSTS/E Software & license

\$39,900

CALL

PLANSMITH CORP.
(312) 359-4045

FOR SALE BY OWNER PDP 11/70 DA AVAILABLE IMMEDIATELY

- | | |
|------------|----------------------|
| 1 FP 11-C | Floating Point |
| 1 RWP04-AA | Disk Drive |
| 1 TNU1G-EA | Tape Drive & Control |
| 1 LP11-VA | Printer & Control |
| 6 DL11-E | Modems |
| 2 LA36 | DEC Terminals |
| 1 AR11-KT | Analog Sub-system |

(All Under Continuous
DEC Maintenance)

PRINCIPALS ONLY

For Full Particulars

Respond to

CW Box 1445

797 Washington St.

Newton, Mass. 02160

MAGNETIC TAPE SALE

Slightly used, Money-Back Guarantee
U.S. Government Archives
Manufactured to G.S.A. Specs!
2400' 1600'bpi/3200fci
w/Hanging Seal \$4.50 ea.

Freight prepaid on orders over 200
Tapes. Shipped within 48 Hrs.

CALL or WRITE:

Computer Tape Mart

31 Sprague Ave., Amityville, NY 11701

(516) 691-2309

(Brokers Inquiries Welcomed)

BROKER IN DEC COMPUTER SYSTEMS AND COMPONENTS

C.D. SMITH

730 N. Post Oak Road

301

Houston, Texas 77024

(713) 686-9405

THE TOTAL SYSTEM

IBM 370-125 FOR SALE OR LEASE

- Mach Model 3125-Q 256K.
- 1403 Print Attach
- 3410 Tape Attach
- 3330 Disk Attach
- MPLX Channel
- ICA Med Speed BSC (4)
- 1403-7 Printer 600 LPM
- 3333-1 Disk & Control 200 MB
- 3411-1 Tape Drive & Control 20 KB
- 3410-1 Tape Drive 20 KB

Vincent

Contact
MR. GREENE
Bress & Aluminum Co.

(812) 378-1131
TOLL FREE
(NATION) 800-328-7772
(MN) 800-552-1202

FOR SALE/LEASE

(2) 135 Immediately
Available
\$3,500 per month
3803-02

(2) 3420-04 with 6250/1600
2314-A1 (1 x 9)

Call Datronic - Will Foss

312/992-0760

FOR SALE

IBM 2314 Compatible
Calcomp 1x6 Double
Density Disk System.
One 1015-A Controller
Three 215 Drives equal
to twelve spindles of
2314.

CALL:

MR. FILLEY
ELKAY MFG. CO.
(312) 681-1880

INTERACTIVE INFORMATION SYSTEMS

HAZELTINE CRT TERMINALS Interested? Contact
1500 - \$1100 Brenda Baughman
1510 - \$1300 1-800-543-4613
513-761-0132
5% cash disc. P.O. Box 37403
IMMEDIATE DELIVERY Cincinnati, OH 45222

370/125's

For Sale* Lease* Purchase
*Purchase Leaseback

Specialists in 125 Systems
3410's and 3411's Also Available



CORPORATE COMPUTERS, INC.

(203) 661-1500

115 Mason St., Greenwich, CT 06830

For Sale Or Lease System 3/15 Complete Systems

Any configuration from B 19 to D 24

30 to 90 days delivery depending

upon your requirements.

Also complete inventory tapes — disks.

Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

software for sale

software for sale

software for sale

time & services

time & services

SAVE**RPG/RPG II TO COBOL TRANSLATOR**

This package accepts all types of RPG and produces ANS COBOL while approaching 100% error free conversion. The resulting COBOL program is modular in design and easy to read and maintain. Several client service options are available: Perpetual Lease, Conversion only, Clean Compile and full implementation including production JCL, test and installation. Over 100 satisfied customers.

For Prompt Reply
Write or Call Us Today



Park Ridge, Illinois 60068, Suite 315
1480 Renaissance Dr., (312) 299-5005

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCOOPER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCOOPER (7070) to COBOL
- COBOL to COBOL
- AUTOCOOPER/SPS to COBOL

For more information on our translators, write or call today.

Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

COMPUTER TIME

RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 15511
360/30

- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

REMOTE JOB ENTRY**PHOENIX-HECHT**

- IBM 370/158-3
- Nationwide Incoming Watts lines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, NASP, INTERCOMM, ROSCOE
- Complete data security including off-site storage

For information
call Walter Czerniak
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

ACCOUNTING SOFTWARE FOR DEC RSTS/E OR CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Completely on-line, interactive systems available for ACCOUNTS-PAYABLE, GENERAL LEDGER, FINANCIAL-REPORTING, ACCOUNTS-RECEIVABLE and PAYROLL applications.

These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

If you are installing or have installed a Digital Equipment Corporation RSTS/E or CTS-500 system, contact us for cost-effective solutions to your core accounting problems.

Plycom services, Inc.

(219) 936-2163
P.O. Box 160
Plymouth, IN 46563

ACCOUNTS PAYABLE

Many system features including:

- Auto. discount calculation
- Cost center reporting
- G/L interface tape
- Check reconciliation
- Written in COBOL
- Single data base
- Audit trail & file control
- 3 manuals & 3 yr. warranty
- Batch mini or main frame
- Low purchase price or rent.

Write or call for more information

LEGLER SYSTEMS COMPANY

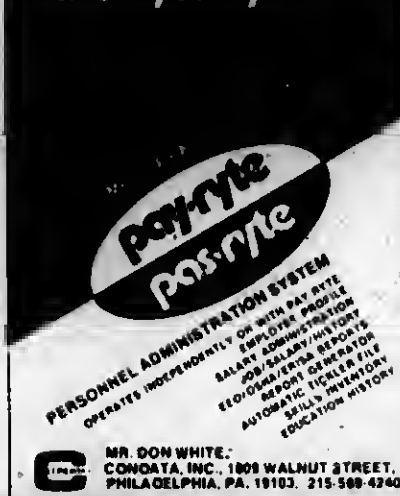
23 Charles Hill Road
Orinda, CA 94563
(Est. 1972) (415) 254-1264

PAYROLL PERSONNEL

SUPER/PAY
ONLY \$960
ANS COBOL
60+ USERS

Users on IBM, Burroughs, Univac and minis such as NCR, OG, & Four Phase

Easy to Use 30 Day Trial
Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

the ryle systems

MR. DON WHITE:
CONDATA, INC., 1809 WALNUT STREET,
PHILADELPHIA, PA. 19103, 215-588-4240

TIME & SERVICES**I.B.M. 360-40**

All Shifts 128K, 4-2401
MOD-2, 9-2314, 1403-N1,
2540, 1401 Compatibility.

From \$35/Hour

• Restaurant Associates, Inc.,
1540 Broadway
New York, N.Y. 10036

Contact:
Al Palmo (212) 974-4966
Charles Leigey (212) 974-4967

CHICAGO
370 - 145
DOS/VS - GRASP
TIME/SERVICE
Computime of
Chicago
(Loop)
(312) 922-6624

DECsystem - 1090**TIMESHARING**

¼ - 1¢ / KCS (KL10 - fast!)
\$4 - 10. / Hr. (Tymnat Cities)
3 - 12¢ / Block/Mo. (Online)

**CONNECTICUT**

Corporate Data Center

OS VS 1

370/158

3330 3330-11 3340

LONG TERM
RJE USER
DESIRED

RTAM EP/3705 VTAM
NCP/3704, SDLC for Distributed
Processing. Excellent Technical
Support. Very Reasonable Rates.
CALL (203) 579-8158 For Details

WE ARE BROKERS OF COMPUTER TIME

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

TEXT DATA BASE BUILDING

Fantastic Rates!

Fantastic Service!

ComCom inputs fifty million characters per week with a maximum error rate of one in 20,000 characters—double-keyed and electronically proofread.

Rates begin at \$1.25/M characters.

Specialty—converting, updating and CRT typesetting existing data bases.

Interested? Contact

Mr. David Zaliner
ComCom, Inc.
834 N. 12th St.-Box 2
Allentown, Pa. 18102
215-437-9656

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Oer Craft, Oer General, COC, OEC, EMM, Febri Tak, Honeywell, GAI, HP, Interdate, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Varian, XOS.

Any Manufacturer's Memory

THREE DELTA CORP

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

COMPUTER TIME

- ALL SHIFTS AVAILABLE
- DOS/VS AND GRASP ENVIRONMENT
- COMPLETE DATA PROCESSING SERVICES PROVIDED
- REASONABLE RATES

370/145-256K

PERIPHERAL DEVICES INCLUDE:

- (6) 2314 DISK DRIVES
- (6) 200/400 KB DUAL DENSITY 8 TRACK TAPE DRIVES
- (2) 1403 III 1100 LPM PRINTERS
- (1) 1442 CARD PUNCH
- (1) 2501 CARD READER
- (1) 2671 PAPER TAPE READER
- (1) 3215 CONSOLE PRINTER

CONTACT JIM GREEN OR LARRY YOUNG
MASS. TEL. (617) 583-8800

BUSINESS OPPORTUNITIES

Established U.K. Co.
Marketing Computer Equipment With Full U.K. Maintenance New products to market in the U.K. and Europe. Maintenance agreements. Managing director will visit U.S.A. end Feb. to discuss possibilities. Please contact by Telax U.K. 916832 ... Phone U.K. 01 828 2355 or write CW Box 1435, 797 Washington St., Newton, MA 02160.

RPG II SYSTEMS

- A/R OPEN ITEM OR B/F
- ACCOUNTS PAYABLE
- GENERAL LEDGER
- PAYROLL AND LABOR DIST.
- INVENTORY
- CREDIT UNION MAILING, ETC.

Extensive Documentation Provided

Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

MU Basic RT-11 Proven Programs DEC PDP 1103, 1104 and 1134 Complete General Ledger Program Complete Payroll Program

DATAPAK

(505) 266-4207

416 Fontana Pl., N.E.
Albuquerque, N.M. 87108

GENERAL LEDGER \$400 FULL PRICE

- Check Register • Journal Register
- General Ledger • Trial Balance
- Balance Sheet • Income Statement

Complete bookkeeping system for any medium to small company. Over 500 customers processed during the last ten years. Modular parameter design can be adapted to any small computer. Written in low level IBM Cobol. Price of \$400.00 includes Source programs, sample JCL with test data, and complete operating procedures.

FREE SAMPLES & DOCUMENTATION

GENE SUMRALL
4211 S.W. Freeway
Suite 106
Houston, Texas 77027

TONE 3

The only

TSO for VS1

Redesigned to eliminate TCAM and the staggering overhead of user swapping

ISP

(Intersystem Spool) Processor

System-to-System Communication for VS1

(Write or phone for details)

TONE
Software Corp.

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

CHARGE!

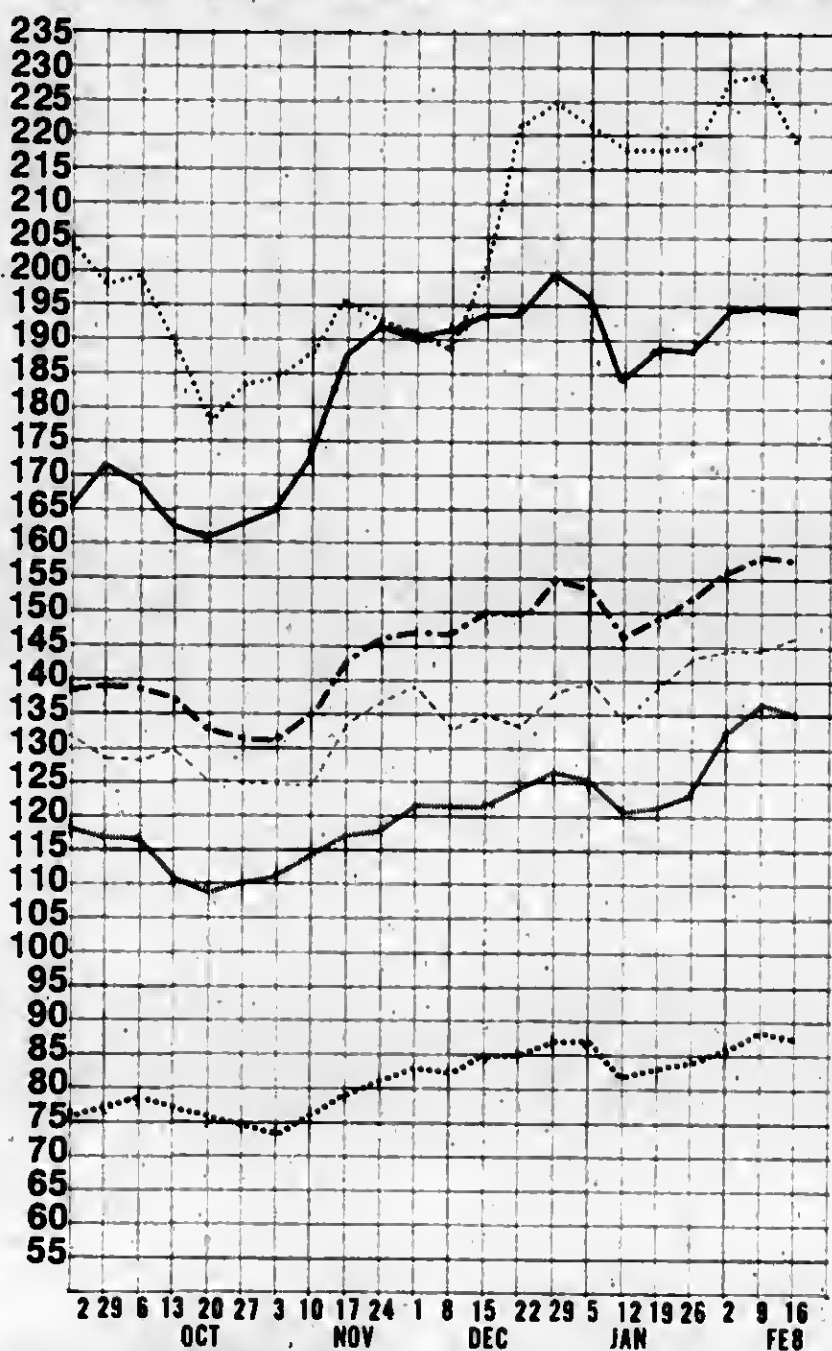
Put yourself on top of the list! Take out your Amex, Visa or Master Charge card and *CHARGE* your own subscription. It costs only 35¢ a week to win the war.



11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mkt. Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other:

COMPUTERWORLD Computer Stocks Trading Indexes

— Computer Systems — Software & EDP Services
 - - - - - Peripherals & Subsystems - - - - - Leasing Companies
 - - - - - Supplies & Accessories - - - - - CW Composite Index



Earnings Reports

SPERRY RAND Three Months Ended Dec. 31

	1977	1978
Shr Earnings	\$1.04	\$1.96
Revenue	908,101	806,704
Earnings	50,845	38,888
6 Mo Shr	5.01	2.88
Revenue	2,578,512	2,572,012
Earnings	117,036	109,016

DATA GENERAL Three Months Ended Dec. 17

	1977	1978
Shr Earnings	\$0.82	\$0.58
Revenue	78,250,000	61,067,000
Earnings	6,166,000	5,715,000

s-Restated to reflect acquisition of Digital Computer Controls, Inc. on pooling-of-interests basis.

DATAPOINT Three Months Ended Oct. 31

	1977	1978
Shr Earnings	\$0.85	\$0.80
Revenue	10,014,000	12,846,000
Earnings	2,840,000	1,086,000

COMPUTER AUTOMATION Three Months Ended Jan. 1

	1977	1978
Shr Earnings	\$0.77	\$0.59
Revenue	14,561,000	10,076,000
Earnings	1,530,000	1,145,000
6 Mo Shr	1.43	.96
Revenue	26,525,000	17,930,000
Earnings	2,846,000	1,869,000

CONTROL DATA Year Ended Dec. 31

	1977	1978
Shr Earnings	\$0.65	\$0.55
Revenue	1,512,675	1,366,259
Earnings	583	1,070
6 Mo Shr	62,995	44,240
Revenue	432,545	387,477
Earnings	14,721	10,708

s-Results of Commercial Credit Co. and subsidiaries restated using purchase method of accounting to reflect consolidation of Gulf Insurance Co.

Computerworld Sales Offices

Vice-President/Marketing
 Roy Einreinhofer
 Advertising Administrator
 Terry Williams
COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800
 Telex: USA-92-2529

Boston
 Robert Ziegel
 Northern Regional Manager
 Mike Burman
 Account Manager
COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800

New York
 Donald E. Fagan
 Eastern Regional Manager
 Frank Gallo
 Account Manager
COMPUTERWORLD
 2125 Center Avenue
 Fort Lee, N.J. 07024
 Phone: (201) 461-2575

San Francisco
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Donna Dezalan
 Account Coordinator
COMPUTERWORLD
 1212 Hearst Building
 San Francisco, Calif. 94103
 Phone: (415) 495-0990

Los Angeles
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Judy Milford
 Account Coordinator
COMPUTERWORLD
 1434 Westwood Boulevard
 Los Angeles, Calif. 90024
 Phone: (213) 475-8426

Japan
 Mr. Shigema Takahashi
 General Manager
DEMPA/COMPUTERWORLD
 1-11-15 Higashi Gotanda
 Shinagawa-ku, Tokyo 141
 Japan
 Phone: (03) 445-6101
 Telex: J2424461

United Kingdom
 Tony Vickers
IDG PUBLISHING LTD.
 140-146 Camden Street
 London NW1 9PF
 England
 Phone: (01) 267-1201
 Telex: UK-264737

West Germany
 Hans-Jürgen Ballnath
COMPUTERWORLD GmbH
 8000 Munich 40
 Tristramstrasse 11
 West Germany
 Phone: (089) 36-40-36
 Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 15, 1978

All statistics compiled,
 computed and formatted by
TRADE QUOTES, INC.
 Cambridge, Mass. 02139

E X C H	N	PRICE				E X C H	N	PRICE				E X C H	N	PRICE			
		1977-78 RANGE	CLOSE FEB 15 1978	WEEK NET CHNGE	WEEK PCT CHNGE			1977-78 RANGE	CLOSE FEB 15 1978	WEEK NET CHNGE	WEEK PCT CHNGE			1977-78 RANGE	CLOSE FEB 15 1978	WEEK NET CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS																	
A	ANDAM. CORP	22-35	41	-2	-4.0	O	ADVANCED COMP TECH	0-2	1 5/4	-1/8	-6.6	O	DATA ACCESS SYSTEMS	4-5	5 1/2	+1/4	+1.6
N	BURNBOUGHS CORP	35-91	61 3/8	-2 1/2	-5.9	O	AMACOMP INC	7-10	9	-5/4	-7.6	O	DATA 100	6-11	9 1/2	-1/4	-2.5
O	COMPUTER AUTOMATION	18-50	25 1/4	-1/4	-1.0	A	APPLIED DATA RES.	5-10	8 1/8	-1/8	-1.5	A	DATA PRODUCTS CORP	9-19	15 1/4	-1 1/2	-8.9
M	CONTROL DATA CORP	20-29	24	-1 5/8	-6.3	N	AUTOMATIC DATA PRDC	23-50	24 1/8	-1 7/8	-7.2	O	DATA TECHNOLOGY	3-4	4 1/4	0	0.0
O	CRAY RESEARCH INC	15-51	27 3/4	-1 1/2	-5.1	O	COLEMAN AMERICAN COS	2-2	1 5/4	0	0.0	O	DATUM INC	1-5	2 5/8	0	0.0
N	DATA GENERAL CORP	35-54	45 1/2	-1 1/2	-5.5	O	COMPU-SERV NETWORK	9-15	9 1/4	-1/2	-5.1	O	DECISION DATA COMPUT	2-5	2	+1/8	+6.6
N	DATAPoint CORP	18-41	31 7/8	-1 1/8	-2.8	O	COMP ELECTION SYSTEMS	6-10	9 1/8	+1/8	+1.5	O	DELTA DATA SYSTEMS	1-1	3/8	0	0.0
N	DIGITAL EQUIPMENT	57-55	39 1/8	-1 1/8	-2.7	O	COMPUTER HORIZONS	1-1	2 1/4	+1	+80.0	A	DOCUMENTATION INC	6-12	11 1/2	-1/4	-2.1
N	ELECTRONIC ASSOC.	2-3	2 7/8	+5/8	+27.1	O	COMPUTER NETWORK	6-11	9	+1/4	+2.8	O	DATARAM CORP	2-24	18	-1	-5.2
A	ELECTRONIC ENGINEER.	8-16	13 3/4	-1	-6.7	O	COMPUTER METHORR	6-11	9	+1/4	+2.8	O	ELECTRONIC M & M	4-5	4 1/4	+1/4	+6.2
O	FOUR-PHASE SYSTEMS	13-23	22 1/8	-1/2	-2.2	N	COMPUTER SCIENCES	7-10	9	0	0.0	O	PABRI-TER	1-2	1 1/8	0	0.0
M	FOXBORO	28-54	50 5/8	+3/8	+1.2	O	COMPUTER TASK GROUP	1-2	1 5/8	0	0.0	O	GENERAL COMPUTER SYS	0-2	1 1/2	0	0.0
O	GENERAL AUTOMATION	6-9	7 3/4	+1/4	+5.3	O	COMPUTER USAGE	1-5	1 5/8	+1/8	+8.3	N	HAZELTINE CORP	8-12	9 7/8	-1/4	-2.4
O	GRI COMPUTER CORP	1-1	1	+1/8	+14.2	O	CONSHANE	5-9	6 1/4	+1/4	+5.1	M	HARRIS CORP	28-41	41 7/8	-5/8	-1.4
N	HEWLETT-PACKARD CO	65-87	64 1/2	-1 5/8	-2.0	O	DATA DIMENSIONS INC	3-3	3	+1/4	+5.2	O	INFOTEK INC	4-8	7 1/2	+1 1/4	+20.0
R	MONEYWELL INC	45-33	45 5/8	-1	-2.2	O	DATATAB	1-2	1 1/4	0	0.0	O	INFORMATION INTL INC	8-14	8 1/2	-1/4	-2.8
M	IBM	245-284	257 1/4	-2 7/8	-1.1	N	ELECTRONIC DATA SYS.	14-20	17	-1/2	-2.8	O	INTEL CORP	58-37	40	-2 1/2	-5.8
O	MANAGEMENT ASSIST	5-11	11	+1/4	+2.3	O	INSYTE CORP	2-5	1 5/8	0	0.0	A	LUMOV ELECTRONICS	3-4	4 5/4	+1/4	+5.5
O	MICRODATA CORP	7-10	11 7/8	+5/8	+5.5	O	IPS COMPUTER MARKET.	1-2	2 1/4	+1/8	+5.8	O	MST DATA CORP	6-15	12 1/2	0	0.0
O	MINI-COMPUTER SYST	5-12	5 1/4	-1/2	-6.6	O	KEANE ASSOCIATES	3-4	4	+5/8	+16.5						
						O	KEYDATA CORP	1-5	1 5/8	0	0.0						
SOFTWARE & EDP SERVICES																	
O	MODULAR COMPUTER SYS	5-9	8 3/4	+1/8	+1.4	A	LOGICON	7-17	15 5/4	+1 7/8	+15.7	O	MEMOREX	23-54	26 3/4	-1 1/2	-1.8
M	NCR	52-47	40 5/8	-1/8	-0.3	A	MANAGEMENT DATA	1-2	1	0	0.0	N	NOMAD DATA SCI	5-8	7 3/8	+1/4	+5.5
O	PRIME COMPUTER INC	12-25	24 1/2	+1/4	+1.0	A	NATIONAL C55 INC	10-18	16 3/8	-1/2	-2.9	O	PENRIL CORP	2-4	5 1/4	+1/8	+2.4
N	PERRIN-ELMEN	17-22	18 5/8	-1/2	-2.6	O	NATIONAL DATA CORP	4-7	7 1/4	0	0.0	M	PENTEC CORP	7-11	9 7/8	-1/8	-1.2
N	MATTHEW CO	16-55	51 1/4	-1 1/2	-4.3	A	ON LINE SYSTEMS INC	16-25	20 1/2	+5/4	+5.7	A	POTTER INSTRUMENT	2-2	1 3/4	0	0.0
M	SPERRY RAND	50-42	53 5/8	-1/8	-2.5	N	PLANNING RESEARCH	3-4	4	-1/8	-5.0	O	PRECISION INST.	2-2	2	0	0.0
O	SYCON INC	8-21	20 1/4	+1/8	+0.6	O	PROGRAMMING & SYS	1-1	5/8	0	0.0	O	QUANTON CORP	3-5	3 7/8	-3/8	-13.8
A	SYSTEMS ENG. LABS	5-15	11 7/8	+3/8	+3.2	O	MAPDATA INC	2-3	3	+1/8	+4.3	O	RECOGNITION EQUIP	6-10	8 5/8	-1/8	-1.4
A	WANG LABS.	10-14	12 3/4	0	0.0	O	MEYNOLO & MEYNOLO	17-21	16 3/4	-1/2	-2.3	O	SCAN DATA	1-2	1 1/8	0	0.0
						O	SCIENTIFIC COMPUTERS	1-4	2 7/8	-1 1/4	-30.3	O	STORAGE TECHNOLOGY	10-25	25 1/8	+3/8	+2.7
						O	TYNSHARE INC	14-23	21	-1 1/8	-8.1	O	T & A INC	7-13	14 1/4	+1 1/8	+8.3
						A	URS SYSTEMS	4-6	5 1/2	+1/2	+10.0	O	TALLY CORP.	4-6	5 7/8	-3/8	-6.0
						N	WVLY CORP	1-2	1/2	-1/8	-20.0	A	TEC INC	7-10	6 3/8	-1/2	-7.0
LEASING COMPANIES																	
O	ALANTHUS CORP	3-4	3 3/8	0	0.0	M	ADDRESSOGRAPH-MULT	10-14	13 3/8	+3/4	+3.0	A	AMERICAN BUS PRODS	6-8	7 1/8	-1/4	-3.3
O	BOOTH COURIER COMP	6-14	14	-1/8	-0.7	O	ADVANCED MEMORY SYS	7-9	6 1/4	-3/4	-4.3	O	BALTIMORE BUS FORMS	1-4	1 7/8	0	0.0
O	COMISCO INC	10-16	9 3/4	-3 1/2	-36.0	N	AMEN CORP	8-12	11 1/4	-1	-8.1	O	BARRY WRIGHT	10-19	16 7/8	-1 1/8	-6.2
A	CONFERENCE GROUP CORP	1-3	3/4	0	0.0	O	ANDERSON JACOBSON	3-4	3	0	0.0	O	CYBERNETICS INC	1-1	7/8	0	0.0
A	COMPUTEN INVESTND GRP	1-2	3/4	0	0.0	N	APPLIED OIG DATA SYS	10-20	14	+1/4	+0.9	O	DUPLEX PRODUCTS INC	14-20	14 3/4	0	0.0
N	COTRONIC RENTAL	0-2	1 1/4	0	0.0	O	GEEMIVE INT'L	5-12	3 3/4	0	0.0	N	EMMIS BUS. FORMS	4-9	4 3/4	+1/8	+1.4
A	DCL INC	1-4	3 1/4	-1/4	-7.1	A	GOLY, GERAMEN & NEW	6-9	6 1/4	+1/8	+2.0	O	GRAPHIC CONTROLS	13-39	54 5/4	-1/8	-0.3
M	OFF INC	6-10	6 1/2	+1/6	+1.4	N	MUNER-NANO	8-13	11 3/4	+3/8	+3.2	N	SH COMPANY	45-54	44 3/8	-3/8	-1.3
N	ITEL	13-22	17 1/4	-3/8	-3.4	A	CALCOMP	3-3	3	0	0.0	O	MOORE CORP LTO	24-37	27	+1/8	+0.4
N	LEASCO CORP	19-27	24 1/2	+5/4	+1.4	O	CAMBRIDGE MEMORIES	1-4	2 7/8	-1/4	-6.1	N	NASHUA CORP	16-28	20 3/4	+1/4	+0.6
O	LEASPAC CORP	1-2	1 1/4	-1/4	-16.6	N	CENTRONICS DATA COMP	16-30	18 1/2	-1/2	-2.6	O	STANDARD REGISTER	18-23	21 3/4	0	0.0
A	PIONEER TEN CORP	5-11	3 7/8	+3/4	+6.6	O	COGNITRONICS	1-1	7/8	0	0.0	O	TAB PRODUCTS CO	8-19	7 7/8	-3/4	-7.3
N	U.S. LEASING	10-14	13 1/8	-1/4	-0.9	O	COMPUTEN COMMUN.	5-6	6 3/4	-1/4	-1.6	O	UAWCO	18-22	21	+1/4	+1.2
						O	COMPUTEN CONSOLES	4-7	4	-1/4	-5.6	A	WAGASH MAGNETICS	10-13	11 1/2	+1/4	+2.2
						A	COMPUTEN EQUIPMENT	2-4	4 1/8	0	0.0	N	WALLACE BUS FORMS	17-21	19 3/8	-1/4	-1.2
						O	COMPUTEN TRANSCIVER	1-1	1 1/4	0	0.0						
						O	CORTEN	9-13	12	+1/4	+1.0						
						N	CORRAC CORP	19-28	19 3/4	-2 1/4	-9.8						
SUPPLIES & ACCESSORIES																	
EXCISE: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH L=NATIONAL; M=MIDWEST; O=OYER-THE-COUNTRY O-T-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST BID 111) TO NEAREST DOLLAR																	

NOT LIGHT BEER, FRAN. GENERAL LEDGER.



FRAN TARKENTON, MINNESOTA VIKINGS' QUARTERBACK.

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices © 1978 by CW Communications/Inc.

February 27, 1978

75¢ a copy, \$18/year

Contu Approves its Base Copyrights

By Edith Holmes

CW Staff

WASHINGTON, D.C. — The National Commission on

New Technological Uses of Copyrighted Works (Contu) has decided to recommend to the President and Congress that computer data bases be protected by the new copyright law.

But commission members voted against providing software that same protection. At a recent meeting of the full commission in New York, Contu's members could not agree with the conclusion of its Subcommittee on Software that the copyright law, applying as it does to all forms of expression, should be broad enough to shelter the works of Nobel Laureates and computer programmers.

(Continued on Page 4)

Overall DP Spending in '78 To Top Last Year by 13.1%

By Jeffrey Beeler

CW Staff

CAMBRIDGE, Mass. — Overall DP spending in the U.S. will rise 13.1% during 1978, International Data Corp. (IDC) predicted in the user spending section of its annual computer industry market forecast.

Among large systems users, DP expenditures this year will grow 10.6%, spokesmen for the market research firm said at a management seminar here last week. That figure agrees exactly with the increase *Computerworld* predicted recently in an independent forecast of large systems spending [CW, Jan. 9].

Among small and medium systems users,

meanwhile, DP budgets will rise 14.5% and 13.2%, respectively, the market survey added.

Much of the anticipated growth in DP spending will result from increased hardware purchases, IDC said. Driven by the demand for improved throughput and computing productivity, about 62% of domestic users will acquire some kind of hardware during the coming months.

Heavy Demand Areas

Demand will prove particularly heavy for CPUs, terminals, and disk drive systems. About 36% of U.S. users, for example, plan to add or upgrade a major CPU this year, compared with 40% in 1977, IDC said.

As a result, spending for large mainframes will increase 10.8% during 1978, the study forecast. At the same time, expenditures for medium and small CPUs will rise 14.5% and 15.2%, respectively.

Forty percent of domestic users, meanwhile, expect to acquire disk drive systems, 42% terminals, and 32% other major equipment including minis, the survey found.

Because of these planned purchases, hardware spending among users will grow 15% this year to exceed \$15.1 billion, IDC added. During the previous

(Continued on Page 6)

For Distributed Processing DEC Links Incompatible Systems

By Ronald A. Frank

CW Staff

MAYNARD, Mass. — Digital Equipment Corp. has expanded its Decnet communications software with interface programs it said allow previously incompatible systems to interact in distributed networks.

The programs permit users to configure multipurpose distributed networks, interfacing previously incompatible applications to allow remote intersystem file access and similar functions, the company said.

Software interfaces were introduced for DEC processors operating under the RT-11, RSTS-E and VMS operating systems. Decnet RT-11 covers PDP-11 machines running under the RT-11 real-time operating system. Decnet E covers PDP-11-34 to PDP-11-70 processors operating under RSTS-E, and Decnet VAX works with the recently introduced VAX-11 running under the VMS operating sys-

tem.

Enhanced Decnet software was also introduced for the RSX-11D, RSX-11M and core-only RSX-11S and for the multifunction IAS operating system.

Although the amount of additional memory required for the Decnet software will depend on individual systems, major storage upgrades are

not required, a spokesman noted.

The firm made changes to the Network Service Protocol (NSP), Data Access Protocol (DAP) and Digital Data Communications Message Protocol (DDCMP) within DEC's Digital Network Architecture. DAP now has improved support for various file systems and NSP functions now handle

(Continued on Page 6)

Bill Would Fund Electronic Mail

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — Congress is considering a bill that would require the U.S. Postal Service to spend by 1980 at least 2% of its budget from the preceding year on research and development efforts that include electronic mail.

But the Carter Administration —

chiefly through the Justice Department — and the few computer and communications companies and associations aware of H.R. 7700 fear the proposal is another Bell Bill that would turn over electronic mail and electronic funds transfer to a regulated monopoly rather than allow this new technology to be offered competitively.

The Postal Service Act of 1977 calls for the post office to spend a minimum of \$300 million by 1980 and at least \$500 million by 1985 for R&D. The Postal Service budget for R&D during fiscal year 1978 is \$32 million, less than 2% of its expenditures, according to the House committee report on the bill.

While there are some stirrings of concern among staff members of the House Subcommittee on Communications, the vast majority of the House and Senate support the bill and expectations are that it could pass the Congress sometime this year.

Change of Heart

The Postal Service itself — which was reluctant to acknowledge the potential of electronic mail when the Commission on Postal Service warned it last April to consider the technology or die — now indicates it has plans to

experiment with it this year.

Former Postmaster General Benjamin F. Bailar said in a recent interview with the *New York Times* that a prototype electronic mail system will be established and offered in conjunction with a partner whose identity is as yet uncertain. The message service may be adapted to money orders, Bailar added. RCA Corp. is conducting a feasibility study for the post office on such a system.

A Jan. 9 article in *Barron's* quoted IBM Chairman Frank Cary as saying that Satellite Business Systems might

(Continued on Page 4)

Change in SSA Reporting Could Hurt Fraud Detection

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Social Security Administration's (SSA) move from quarterly to annual wage reporting could make a lot more difficult federal efforts to catch cheats by computerized matching of welfare rolls and the like with employment records.

SSA wage information used by the Department of Health, Education and Welfare (HEW) — and now by state and local welfare agencies — to detect fraud will be updated only once a year rather than four times, making the data increasingly stale as the calendar year wears on [CW, Jan. 23].

Data will be less current for the

federal government and the 13 states which rely on SSA for wage information, an HEW spokesman conceded. But he added, 37 states will continue to have comparable information available to them on a fresher basis because they still require employers to report wage data on a quarterly basis.

Certainly less current wage information will make matching projects more difficult because the employment information will require more checking, the spokesman said.

States and the federal government might have to delve into unemployment compensation records, for example. It private companies permit

(Continued on Page 6)

CW in D.C.

WASHINGTON, D.C. — *Computerworld* has formally opened an editorial bureau here. The news office is located at 821 National Press Building, 529 14th Street N.W., Washington, D.C. 20045.

The phone number is (202) 347-6718.

Washington news announcements may be addressed to correspondent Edith Holmes. All other news and all advertising inquiries should continue to be directed to CW's Newton, Mass., office.



EDITORIAL

Editor E. Drake Lundell Jr.
Deputy Editor Ronald A. Frank
Managing Editor Nancy French
Associate Editor Donald Leavitt
Associate Editor Esther Surden
Associate Editor Molly Upton
Assistant Editor Frank Vaughan
Washington Bureau Edith Holmes
Staff Writers Catherine Arnst
Jeffrey Beeler
Timothy J. Scannell
Brad Schultz
Chief Copy Editor Cheryl M. Gelb
Copy Editors Barbara T. VanScoyoc
Susan Gerrard
Photography Editor Ann Dooley
Editorial Assistant Denise Petski
Editorial Cartoonist Jim Orton

Bureaus:

London Roger Frampton
Munich Hans-Jürgen Ballnath
Asia Hidetsuna Sasaki

Contributors:

Education J. Daniel Couger
Legal Roy N. Freed
Taylor Reports Alan Taylor
Human Connection Jack Stone

SALES

Vice President/Marketing Roy Einreinhofer

Advertising

Administrator Terry Williams
Display Advertising Mary Anne Furlong
Classified Advertising Dunna Whalen
Recruitment Advertising Kathy Steinberg

Sales Promotion

Director Jack Edmonston
Market Research Kathryn V. Dinneen

CIRCULATION

Vice-President/Circulation Margaret Phelan
Circulation Manager Barbara Jeannetti
Customer Service Rep Peggy Kelly
Assistant Maureen Burke

PRODUCTION

Manager Lee Vidmer
Supervisor Henry Fling
Assistant Manager Peter Holm
Typesetting Supervisor Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone (617) 965-5800. Telex USA-92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone (01) 995-3352, Telex 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristramstrasse 11. Phone 36-40-36/37. Telex 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone (03) 445-6101. Telex J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy U.S. — \$18 a year, Canada and PUAS — \$28 a year, Europe and Middle East — \$50 a year, all other foreign — \$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld is indexed; write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/Publisher Patrick J. McGovern
President W. Walter Boyd
VP-Marketing Ruy Einreinhofer
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

By at Least Five Years

Frank Says SNA Behind the Times

By Ronald A. Frank
CW Staff

TUCSON, Ariz. — There is a huge gap today between what teleprocessing users need and what IBM's Systems Network Architecture (SNA) can do, according to Howard Frank, president of Network Analysis Corp.

IBM continues to be five years behind in providing telecommunications capabilities, Frank contended, predicting it will be the 1980s before SNA will provide the features today's users need.

Frank's opinions were presented at the recent National Conference on Information Systems Development at a session dealing with management perspectives on SNA. Presenting another viewpoint was N. D'Arcy Roche, manager of product marketing for communications systems at IBM, who said the architecture has gone a long way to improve the capabilities of communications users.

SNA has given users access to multiple applications from a single terminal; it has allowed CRTs, teleprinters and other devices to operate on the same line facilities; it has upgraded user networks from half-duplex to full-duplex transmission; and it has provided better CPU utilization of communications functions, Roche told at-

tendees.

Despite the improvements that have been made, IBM "still has a long way to go" with SNA, he said. The goal is to develop the architecture so it will support any user with any application running on any CPU from any terminal device, he added.

Frank called SNA a "reasonable paper statement of telecommunications policy that works in most environments. But," he said, we "must separate the architecture from the implementations."

The key question for the user is whether IBM could have done other things, Frank said, asserting the focus on central computing within IBM dictated an architecture that was different from what was being developed outside of IBM.

Mini Level Implementation

Both the Telenet and Arpa networks are implemented on a minicomputer level so a host has no influence on network operations. In this regard, SNA architecture could be imposed onto Arpa architecture, Frank explained.

But SNA includes a system services control point that will continue to reside in the host CPU for the foreseeable future. This continues the concepts of centralized DP control, he said.

If you believe in the concept of voice and data coming together, then having a host run the network cannot succeed, he believes.

Addressing the charge that SNA is expensive to implement, Roche said that "once you put the access method and [Network Control Program] in the host, you have paid your ticket for SNA. Users should not convert to SNA with an 'entire environment,' but look instead at its implications on an individual application basis, he advised.

Representing the user viewpoint on the panel was Richard Cambron, systems manager at Commercial Union Assurance Co. in Boston. Cambron described a "pilot" IBM 3790 network now operating at his company to process Massachusetts automobile insurance policies.

The company needed intelligence at remote offices but, at the same time, had to process policies as if they were operating on-line. The 3790/SNA network was selected as the solution, Cambron said.

Complete records of any customer can be called up on 3270-type CRT screens at any Commercial Union office connected to the system. Even though the system appears to be operating on-line, local transactions are stored at remote offices in a daily file, which is transmitted several times each day to the corporate DP center for file updating.

Cambron said the key point for SNA users to remember is that applications must be "properly insulated" so that a failure in one part of the system will not bring down the entire network.

Corrections

In the confusion caused by the recent blizzard here, Computerworld inadvertently omitted a key piece of information from the story "Bank Consortium to Ensure Emergency DP" [CW, Feb. 13]. The mysterious "Jacobson" in the story is Robert Jacobson, who is serving as director of the consortium project. Readers interested in more information about the project can contact Jacobson at (212) 398-3698.

In "Driver Finds NONE Worse Than Nothing" [CW, Feb. 6], the Department of Motor Vehicles should have been identified as being that of the City of Reno, not that of the State of Nevada.

Catamore, IBM Make Settlement

BOSTON — IBM and Catamore Enterprises, the jewelry firm, settled their suits out of court recently for an undisclosed amount. Neither firm would comment on the settlement.

Catamore won an award of \$11.4 million but lost it on appeal, when the case was remanded for a new trial. The new trial would have started next week.

On the Inside This Week

NEWS

Child Abuse Data Base Found Unconstitutional 4
IBM Europe Urges Limits on Privacy Rules 5
Antitrust Review Commission in State of Limbo 6
Michigan Keeping High-Risk Felons in Prison 7
NBS Eyes Standards Efforts, Asks Funds Boost 8
New Body Urged for Regulation of Data Flow 9
Warning Issued on 'Shell Game' 10
Vote for Burroughs Ends Knoxville Imbroglio 11
Indian-Owned Firm Prospering in Arizona 14
Mini Helps Landlords Screen Out 'Undesirables' 18

EDITORIAL

Editorial Sites for Sore Eyes 22
Human Connection: Power Motive Apparent 23
Taylor Report: Readers Document Rip-Offs 23

SOFTWARE & SERVICES

Late Software Delivery Hurts B80 User 27
Sierra Adds Support for Micros 28
Software for Wholesaler Uses Eclipse 30
Please, Read Between Lines in Ads for DBA 32

COMMUNICATIONS

Incoterm Has Virtual Storage Software 37
Insurer Sinks Its Teeth Into On-Line Processing 38
Service Designed to Reduce Oil Dealers' Costs 39
RCA Develops Optics Data Link 40
Atlantic Research Unwraps On-Line Monitor 41

SYSTEMS & PERIPHERALS

Function, Comlort Both Seen Important 45
John Deere Saves \$30,000/Year in Rental Fees 47
User Opts for 'Superior' Price/Performance 48
Memorex Unveils Disk Drives, Controllers 50
Interface Links CDC Printers, Decsystem-20 51
RAM Upgrades NCR Century 101 52

MINIWORLD

Business Micros Serve Concerned Public 53
Dynus Adds Disk Controller 54
Multiterminal System Bows 59
Quodata System Based on DEC PDP-8 62
Mini-Based Unit Eases Nurses' Job 63
Securities Trader Uses Dual CPUs 64

MICROCOMPUTING

IBM Warned: Beware of Personal DP 65
Signetics Reduces Price of ABC Kit 66

COMPUTER INDUSTRY

Adapso Urges Changes in Federal Policy 69
Some Mass DP Workers Poorer After Storm 69
Judge Suggests Jury Decide Memorex's Cause 71
Amdahl Expects Big Growth in Jobs, Production 72
Europeans Urged to Proceed Slowly With POS 73
Mainframers Post Strong Results in Earnings 75
Mini Makers Reach Record Earning Levels 76

CUSTOMER

**Migrating to MVS?
Have a safe trip.
Don't get ambushed
by the wrong sort!**

Call (201) 568-9700.

**SyncSort rescue
parties available
on short notice.**

1978? It's liable to be the *migratingest* year since the old Oregon Trail was closed down for lack of interest.

A lot of solid data-processing citizens -- you may be one of them -- are going to auction off the old system, pull up stakes and head out for the promised lands of MVS or VS1.

And IBM will be only too happy to help you get there! No doubt you've grown accustomed, these past few years, to the strident yells of their wagonmasters -- and mistresses -- "Head 'em up! Move 'em out!"

Well, great, we say. For the adventurous data processor with an itch for multi-programming, the streets of MVS and VS1 are paved with gold. Neither system is nearly as wild and woolly as it once was. Why, nowadays, even a sweet young programmer can walk down the streets without any problems at all!

All the same, there are some dangers to keep an eye peeled for in the new land. No. 1 on the list is software that doesn't perform as well out there on the Frontier as it did Back Home.

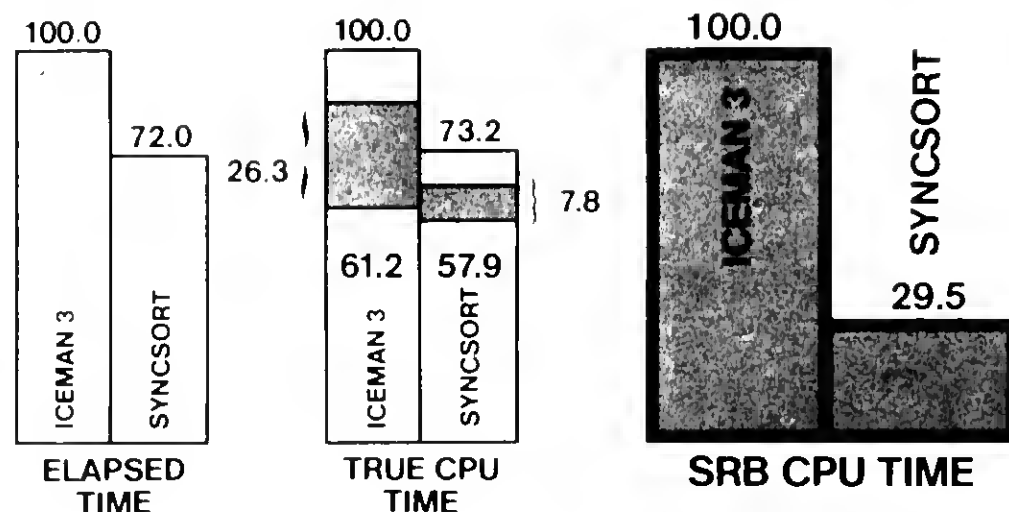
In some sort programs, for example, there's a sneaky little component called "locked-up True CPU Time" -- and it can be as paralyzing to a multi-programming system as a rattlesnake bite to a rabbit.

Like the mighty Sioux Nations, True CPU Time in MVS is divided into Systems Overhead and two other territories:

- TCB Time (Task Control Blocks), which is *interruptible*. If the CPU wants to switch signals, the message gets through and the cavalry arrives on time.
- SRB Time (Service Request Blocks), which is *non-interruptible*. The message doesn't get through and another one of those deplorable DP massacres occurs.

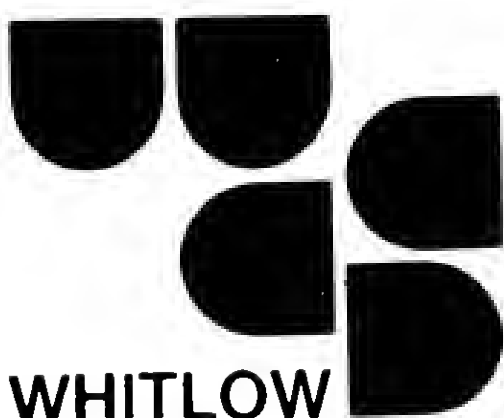
Take a squint at the charts below, particularly the two on the right. They compare SyncSort's overall performance with that of IBM's 5740-SM1, Release 3. SyncSort has 70% less of that venomous locked-up time:

COMPONENTS OF
TRUE CPU TIME



OVERSEAS REPRESENTATIVES -

Brussels: CAP/GEMINI Belgium
Düsseldorf: CAP/GEMINI GmbH
Geneva: CAP/GEMINI Switzerland
Hague: CAP/GEMINI PANDATA
Johannesburg: Computina Benefits Ltd.
London: GEMINI Ltd.
Melbourne: Shell Oil Co. of Australia
Miami: SYNTAX
Paris: CAP/GEMINI PRODUCTIONS
Stockholm: BRA
Tel Aviv: ADVANCED TECHNOLOGY Ltd.
Vienna: CAP/GEMINI GmbH



WHITLOW

COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

But don't take our word for it! Ask your friendly IBM rep. Chances are, he or she will look embarrassed and try to divert your attention to the shiny hardware goods laid out on the blanket.

If you keep probing, though, Old Straight Arrow will probably whisper, "If I was you pardner, I think I'd go with SyncSort."

And you wouldn't expect Old Straight Arrow to speak with forked tongue, would you?

By Federal Court in Texas

Child Abuse Data Base Found Unconstitutional

HOUSTON — A federal court here has ruled that the manner in which the State of Texas implemented and operated a data base of reported cases of child abuse or neglect is unconstitutional.

In *Sims vs. the State Department of Public Welfare*, a three-judge panel found that the Texas Child Abuse Neglect Report Inquiry System

(Canris) was an "unconstitutional infringement on the right to privacy and guarantees of due process."

Canris is an computerized system used to store confidential information collected by the state during a child abuse or neglect investigation. Each record is based on the conclusions of the social worker who investigated the case, not of a jury or judge.

The opinion, written by Judge John V. Singleton Jr., did not dispute the state's legal right to maintain investigative files and a clearinghouse of child abuse information. However, it found that to the extent that Canris purports to be a clearinghouse of child abuse information that has not actually been determined by a court of law, it is unconstitutional and in-

fringes on the right of the parents whose reputations could be ruined by the system.

The January issue of *Computer Law and Tax Report (CLTR)* published in Boston, Mass., by Warren, Gorham & Lamont, Inc., said this about the case:

"One of the major complaints against computerized record systems during the '60s and '70s was the ease with which abbreviated evaluations of individuals in situations could be entered into the file without review or an opportunity to contest the characterizations, and then come back to haunt the individual so labeled. People fear Garbage In, Gospel Out," CLTR said.

"The Sims case shows that Canris was exactly this kind of system. Organizations that establish a computerized data bank with personal information must make a special effort to insure that the system treats human beings fairly," the monthly newsletter concluded.

Bill Allots R&D Funds to Electronic Mail

(Continued from Page 1)

lease service to the Postal Service for electronic mail.

The Postmaster General resigned his office last week to become executive vice-president of U.S. Gypsum. Until his interview with the *Times*, Bailar had repeatedly stated he believed the post office should learn to deliver packages on time and without mangling them before venturing into electronic mail.

In addition to the Postal Commission, H.R. 7700 sponsors James M. Hanley (D-N.Y.) and Charles H. Wilson (D-Calif.), who head postal subcommittees in the House, have encouraged the post office to explore electronic mail.

Despite its opposition to the means by which H.R. 7700 would establish the subsidy due the post office from the federal government, the Carter Administration, too, agreed the impact of electronic communications technology on mail volume and services must be assessed and responded to by the Postal Service. W. Bowman Cutter, executive associate director for budget in the Office of Management and Budget, said during hearings on H.R. 7700.

Very little of the testimony before house subcommittees on H.R. 7700 dealt with electronic mail R&D. The president of the National Association of Letter Carriers, J. Joseph Vacca, expressed the union's support of electronic mail and electronic fund transfers (EFT) for the post office, contending that without these new technologies the Postal Service won't survive.

While it did not oppose an electronic mail operation, the American Retail

Federation, Inc. did denounce Postal Service development of EFT systems.

The federation opposes "the use of public financing to develop an electronic communications system which would compete with private [EFT] systems, especially where the Postal Service by deficit financing could secure a virtual monopoly over such communications, even outside the private express monopoly."

There is broad support for the notion that the postal service must understand the roles it can play in electronic mail, a congressional staff member said last week. Down the road are significant policy questions regarding the future of electronic mail and communications in the U.S. in general, and "these won't be solved or even addressed by H.R. 7700," he added.

The Real Issue

There is no question the Postal Service will get into electronic mail," a Justice Department spokesman asserted. But, he added, "electronic mail isn't the real issue."

The issue is the Private Express Statutes that assure the Postal Service a monopoly over "letter" carriage. These statutes permit the Postal Service to subsidize unprofitable rural and second-class mail services with such competitive offerings as first-class mail — and, potentially, electronic mail — and this is the real threat to competition in electronic communications technologies, the spokesman contended.

Under the Private Express Statutes, a "letter" is any message written on or in an object and intended for delivery to a

specific address, the Justice Department spokesman said. Only the Postal Service is permitted to handle letters.

Revisions to the criminal code now before the Senate would "drastically increase the penalties" for violators of these laws, he noted. Fines would be in the \$5,000 to \$100,000 range.

Customers at Risk

The Postal Service has a tradition of enforcing the Private Express Statutes through customers of alternative delivery services rather than through the deliverers themselves, according to the Justice Department.

A DP shop can send and receive source documents, for example, by some means other than the post office — as long as postage is paid for the package. If a postal inspector discovers postage hasn't been paid, the DP operation will be fined, he suggested.

While the Postal Service has stated it has no intention of expanding the Private Express Statutes to cover electronic mail, it has also engaged in "knock-down battles" with such prominent U.S. firms as AT&T over the shipment of toll tickets by Greyhound bus. The Justice Department doesn't believe the Postal Service on this score, the spokesman said.

CCIA Opposed

Like the Justice Department, A.G.W. (Jack) Biddle of the Computer & Communications Industry Association (CCIA) opposes H.R. 7700 but goes further, believing the fight against it should begin now rather than "down the road."

"There is no way the post office can spend \$300 million internally for R&D by 1980," Biddle contended. "This effort must be contracted out."

The Postal Service is not covered under any of the federal government's procurement rules that require competitive bidding for contract awards, however, he said. Biddle believes there is a good chance the Postal Service contract for the development of electronic mail could go to one contractor.



'Spurgeon, Your 1040 Caused the Whole Left Bank of Our Computer to Light Up.'

Contu Says Yes To Copyrights

(Continued from Page 1)

without causing any confusion about which is which."

The Subcommittee on Software will meet soon to determine what amendments should be made to its report to ensure the agreement of all Contu's commissioners. The full commission won't meet again to decide this question until late April.

The Contu Subcommittee on Data Bases never had such problems. In its report to the commission, it noted the agreement among its members that Congress intended the new copyright law to protect computer data bases as it would traditional hard-copy compilations [CW, July 4].

The Subcommittee on Software acknowledged early in its report that "certain commissioners are skeptical about the need for any form of protection for computer programs as well as the copyrightability of such works."

Eight months later, "There is still a good deal of controversy regarding the report of the subcommittee," according to Michael S. Keplinger, senior attorney and assistant director.

'Reserved Territory'

Among those leading the fight against providing copyright protection for computer programs has been well-known author John Hersey. The novelist advocates the creation of a new form of protection for computer programs and similar technologies — "a reserved territory," as Hersey describes it — something between a copyright and a patent that has aspects of both but is neither.

Hersey contends that computer programs are more mechanical devices than they are works of authorship. "The computer program is something strikingly new in our culture," he added in his original dissent from the Software Subcommittee report.

"There has been feeling all along that what Mr. Hersey has been saying has merit," Keplinger stated. "The problem facing the commissioners is how to deal with it."

NEW RESPONSE TIME MONITOR.



MONITORS RESPONSE TIME on asynchronous and bisynchronous multidrop terminal networks
DISPLAYS minimum, maximum, last transaction, number of transactions and maintains running average on 4-digit LED display
DATA RATES from 75 to 9600 baud.
TERMINAL CONNECTION via optical coupler or RS-232C bridge
RESOLUTION is 0.1 sec. with 9.999 sec. possible.

All packed into one self-contained, self-powered monitor, the

MODEL 300

Manufactured and serviced by:

QUESTRONICS, INC.

3565 South West Temple, #5
 Salt Lake City, Utah 84115
 (801) 262-9923

IBM Europe Urges Limits on Privacy Rules

Special to CW

BRUSSELS, Belgium — IBM Europe is promoting a "go slow" position on international privacy regulations. In a recent statement to the European Parliamentary Committee on Data Processing and the Rights of Individuals, IBM advanced a clear-cut position urging:

- That national privacy laws be limited to physical persons and not concern legal or corporate entities.

- Self-regulation under a framework of legal regulation and responsibility rather than the general licensing schemes adopted by Sweden and France.

- Avoidance of detailed security requirements that may be ill-suited to actual needs or inhibit development of new techniques providing improved safeguards.

- Caution on blanket regulation for either public or private registers of personal data, proposing instead a functional "sensitivity according to user" context.

- No official action by the European Community on transborder data flows until the Council of Europe and the Organization for Economic Cooperation and Development can act, to avoid risks of incompatibility and resulting uncertainty of compliance costs.

The IBM statement was in reply to a questionnaire prepared by the committee and presented at a public hearing on Feb. 6. Claiming no "particular expertise in such areas as human rights or international law," IBM concentrated on points "which are of interest to a manufacturer and a vendor of data processing equipment and services and to a business organization operating at an international level."

Supporting the concern of many in the U.S. DP community about the dangers of ignoring manual files, IBM Europe sees little justification for privacy legislation concentrating on DP alone. The firm contended that DP does not cause abuse of personal facts and suggested instead that "the source of actual harm should be the object of regulation."

Limit to Physical Persons

The IBM concern that protected data be limited to physical persons was recently demonstrated during the French parliamentary consideration of "data processing and freedom" legislation. The lobbying by leaders of IBM France is considered by some to be responsible for the deletion of legal persons from the French law.

IBM strongly favors applying privacy rights exclusively to individuals, noting the alternative definition "has wide implications for industry and commerce. Under the latter definition all files of data concerning suppliers, customers, prospective customers and competitors, including for example market research files, would fall within the ambit of the law."

"This would even be the case when all the data in question refers solely to business corporations and individuals are not affected by the data. All business entities would have to allow customers, prospective customers, suppliers and competitors rights of access to information held by the business entity," IBM said, adding this raises fundamental problems for competitive

business enterprises which have not so far been adequately addressed by either the legislators or the business community."

The statement also took note of the fact that draft privacy legislation pending in Austria, Belgium, Denmark, Norway and Luxembourg pertains to data concerning legal persons.

As to the issues of distorted competition being raised by the European Community in its support of a common policy on transborder data in the nine countries, IBM indicated it was not aware of any "concrete evidence" that DP laws have had a significant effect in distorting competition.

However, "the cost of meeting different data protection legislation and denial of data about a market to sup-

pliers" when legal persons are included under privacy laws could be harmful to multinationals.

Referring to the categorical principles of fair personal information practices that are often taken for granted in European legislation, IBM noted exceptions to several of these broad generalities:

- "There must be no secret data banks." This principle cannot apply in the sphere of state security.

- "Right of consent to collect personal data should be universal." This principle cannot apply without qualification in the sphere of criminal investigation. Some qualification is also necessary in connection with performance assessment in education and employment, IBM pointed out.

- "The right of access to stored personal data" and "right to correct stored personal data" cannot be absolutes. These principles cannot apply without qualifications to prevent the abusive exercise of these rights, IBM said.

- "The right to block usage of allegedly incorrect stored personal data" has limits. This principle should be subject to an onus of proof. Otherwise the principle is potentially subject to abuse, it noted.

The hearing before the parliamentary committee is intended to bring together government experts and legal, professional and commercial organization spokesmen who wish to submit their views on future European Community policy on data protection.

DOS/VS USERS COME IN FROM THE COLD

Altergo introduces SPACE/MANAGER, the ultimate Disk Space Management system that makes others look like basic starter products by comparison.

Major benefits include Reduced Disk Space Requirements, Simplified JCL — throw away EXTENT and ASSGN cards, Dynamic Disk Space Allocation, Fewer Job Reruns, Reduced Operator Involvement, Simplified Job Scheduling, Cross Partition File Protection, Reusable Files, Increased Throughput and many many more.

Add to this the benefits of local Altergo technical support, low price, reliability and good documentation, and you have an unbeatable combination of quality and value.

Get the facts behind these claims. Write or call now for a full description of SPACE/MANAGER and what it can do for your installation.

altergo

ALTERGO SOFTWARE, INC.
Wellesley Office Park
55 William Street
Wellesley, MA 02181
Phone: 617-237-6132

Antitrust Review Commission in State of Limbo

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — President Carter's three-month-old National Commission for the Review of Antitrust Laws and Procedures is in a state of limbo.

Signed into existence by Executive Order 12022 on Dec. 1 [CW, Dec. 12], the commission cannot begin its search for procedural and legal means to expedite large antitrust cases the size of U.S. vs. IBM and U.S. vs. AT&T until its members are named.

The President has made no formal appointments to the commission. To date, however, three members of the House of Representatives — Barbara Jordan (D-Texas), Robert McClory, (R-Ill.) and Peter Rodino Jr. (D-N.J.) — are believed to be slated for service on the commission, a Justice Department spokesman said.

No word has reached the Justice Department employees who are busy arranging administrative and clerical support for the antitrust commission on who the appointees from the Senate and the private sector will be or which federal district court judge will be asked by Carter to serve.

The commission, which will have a six-month life after the last of its members is appointed, will be aided by staff from the Department of Justice, the spokesman stated.

Among the antitrust commission's duties will be the creation of a roster of district court judges who are knowledgeable in antitrust law and the problems of large case and to whom such cases may be assigned.

The President's order also asks for recommendations that would narrow

as quickly and precisely as possible the scope of contested issues of fact and law in big cases and revise discovery practices to limit expensive and time-consuming inquiry into areas not important to disputed issues.

In addition, the commission will examine the option of giving judges faced with large antitrust cases the power to penalize parties who delay the formulation of issues or fail to cooperate with the court and their adversaries.

Simplified standards for establishing attempted monopolization of an industry under Section 2 of the Sherman Antitrust Act and structural relief and "nonjudicial alternatives for resolution of complex antitrust issues" will also be considered.

When the commission's members will be appointed and able to look into these areas is "anybody's guess," the Justice Department spokesman said. "We assumed things would move much more rapidly than they have."

DP Spending in '78 to Beat '77 by 13.1%

(Continued from Page 1)

year, the total user budget for hardware approached \$13.1 billion for a 13% annual growth.

Altogether, hardware expenditures will account for about 36% of the \$41.7 billion that IDC estimated users will spend this year for DP. Personnel, the largest single expense item, will account for another 45% of the total budget; communications, for 3%; software and services, for 6%; and supplies and overhead, for 5% each.

In the personnel area, the report estimated user spending this year will

near \$18.4 billion for a 13% increase, compared with nearly \$16.3 billion and a 10% growth last year. DP salaries will increase an average of 7.2% in 1978, and overall manpower will grow 2.3%.

By contrast, salaries and staffs increased 6.2% and 2.8%, respectively, during 1977, IDC noted.

Shift to Outside Software

Partly to ease the burden of rising personnel costs, users will increasingly shift their emphasis from in-house programming to outside software and services. By year's end, total spending in this area will top \$2.6 billion, a 27% jump over the previous year's expenditures of about \$2.1 billion, the study predicted.

As users rely increasingly on outside programming, spending for customized and off-the-shelf software will show especially marked growth.

Last year, budgets for these products grew 10.9%; this year, the increase will total 14%, the market report projected. User budgets for DP services, meanwhile, will decline 2.4% this year, compared with a 4.2% rise in 1977.

In the data communications sector of the DP budget, spending will also increase sharply, from about \$1 billion in 1977 to more than \$1.3 billion this year. IDC credited this projected 28% growth primarily to an almost universal user interest in applying data communications to new and existing applications.

On the other hand, Systems Network Architecture (SNA) has encountered unexpectedly stiff resistance from IBM users, and a similar fate has befallen other vendors' versions of SNA. Although 42% of domestic users plan to use SNA eventually, only 10% have adopted the technology thus far and 37% have rejected it altogether, the market forecast reported.

In other findings, IDC predicted 42% of U.S. users will add a major new application to their systems this year, and another 28% will upgrade existing applications. Among large and medium systems users, nearly all these new or improved jobs will be communications oriented, the survey said.

IDC also forecast that 20% of small systems users will add their first online application in 1978, while 30% of all domestic users plan no new applications this year.

DEC Software Backs Networks

(Continued from Page 1)

"diverse operating system" characteristics by doing such things as arbitrating different buffering features to prevent network overloads, the spokesman said.

Not covered in the announcement were Decnet upgrades for the PDP-8, Decsystem-10 and Decsystem-20.

Configuring Eased

The latest Decnet programs are said to simplify network configuration and generation. Dynamic reconfiguration is available in case of malfunction and lines can be switched without interruption of service, the company said.

The programs share full point-to-point interconnect capability for task-to-task communications by which programs running on separate network nodes can exchange data. The programs also allow the transfer of files from one node to another on user command, according to the spokesman.

Remote resource access allows users at one node to utilize peripherals at another node. Remote sequential I/O of files is also supported.

The software supports any Ascii sequential files, the firm said.

The software will be distributed for a license fee covering installation and support up to the network node level "in a stand-alone mode." The fee for each program includes one year of systems support.

License fees are \$1,500 for Decnet-RT and Decnet-S systems; \$2,700 for Decnet-M, Decnet-E and Decnet-VAX systems; and \$3,500 for Decnet-D and Decnet-IAS systems. Deliveries are scheduled to begin next month for all software except Decnet-VAX, which is slated for first installation in January 1979.

SSA Changes Seen Hindrance

(Continued from Page 1)

federal, state and local government officials to check their employment records, these agencies won't have to worry about the validity of SSA data, a Capitol Hill source said.

Government access to private records "seems to be the trend in some places," he added.

Government access to private records is also likely to be the subject of hearings and of new privacy laws this year, another Capitol Hill observer pointed out. Whether annual wage reporting to the SSA will cause the agency to be in violation of the Privacy Act of 1974, which requires that data in federal information systems be accurate and timely, is still another unanswered question, he said.



NEW WATER DETECTION ALARM

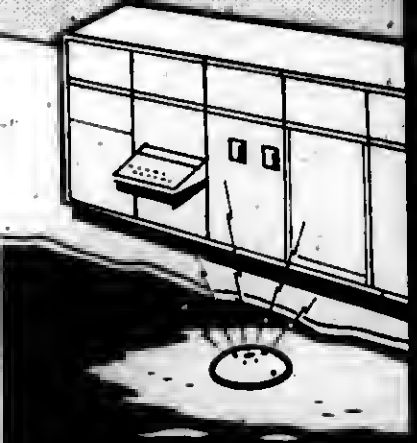
... FOR COMPUTER AREAS

Warns you of water leakage in sub-floor wiring areas.

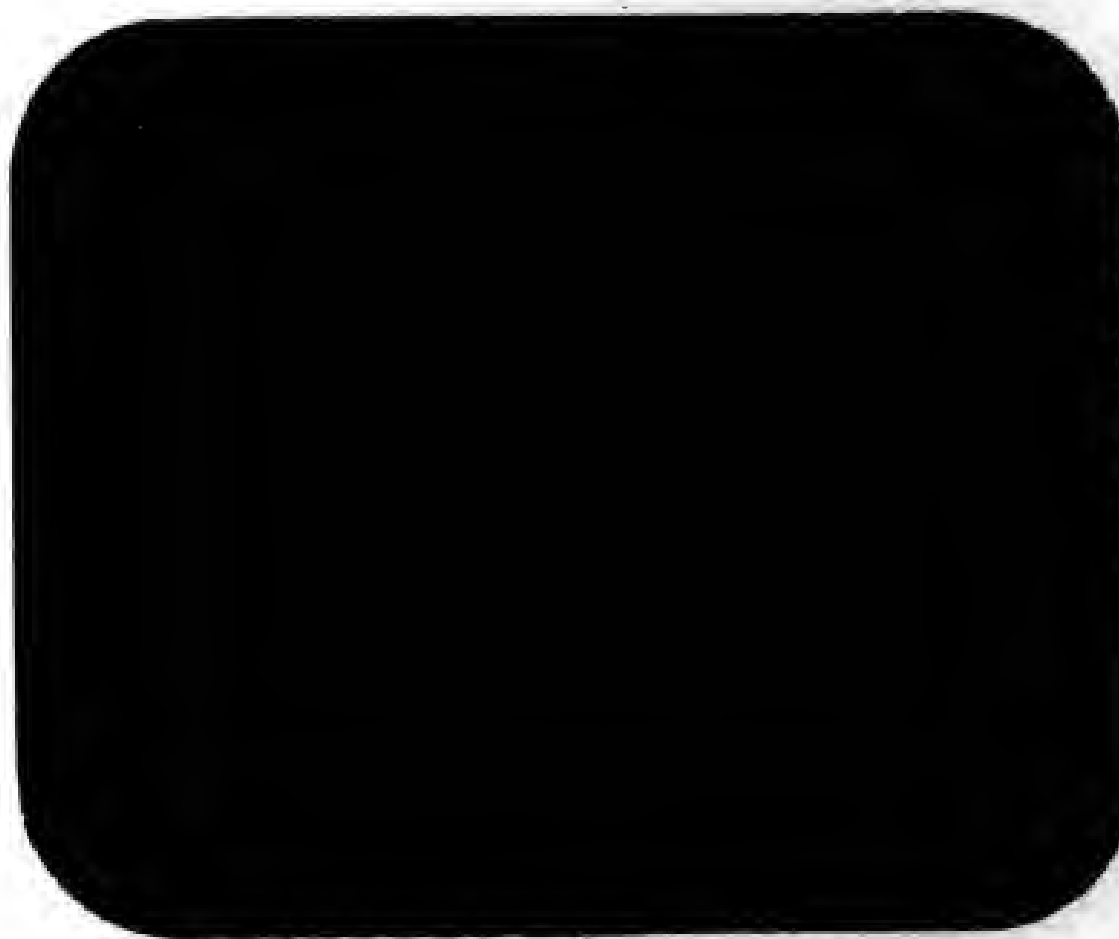
- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained... no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

From \$40 - \$70.

Ask about **WATER ALERT** today.



Dorlen Products
Division of E. C. Dorlen, Inc.
 7424 E. 12th Avenue, Denver, CO 80231
 Phone 414-282-7849



Tracking Study Showed How Michigan Keeping High-Risk Felons in Prison

By Jeffrey Beeler
CW Staff

LANSING, Mich. — A computer analysis of prison inmate case histories is helping penal authorities here keep dangerous criminals off the streets and, at the same time, relieve serious overcrowding in the state's prisons.

In a study of 2,000 convicts paroled in 1971, Michigan Corrections Department head Perry Johnson and his staff found prison inmates most likely to commit violent crimes when released from jail have the following background traits in common:

- A series of arrests beginning before age 15.
- A history of major misconduct while in prison.
- At least one conviction for a serious assault like rape or murder.

When an inmate of one of the state's prisons applies for parole, penal authorities review his arrest record and case history to estimate how much of a risk his release would pose to public safety. If the inmates' background indicates a high potential for violence, officials usually deny his request for parole and thus ensure that he serves a full prison sentence, according to William Kime, deputy director in charge of the Corrections Department's program bureau.

If the prisoner does not have a long history of assaults, however, authorities classify him as a low-risk individual and often approve his parole application quickly. This preferential system of granting paroles helps the state minimize the number of inmates in its jails by speeding the turnover of low-risk convicts, who constitute by far the largest percentage of the total prison population, Kime said.

"The whole purpose of the computer analysis is to find out which prisoners are violent and which aren't so we can hold the dangerous ones longer and release the less dangerous ones sooner," he explained.

Only Three Variables

Completed last January under the supervision of Project Director Doug Kinsey, the analysis drew most of its raw data from court and prison records like presentence report, which under law must be prepared for every convicted felon in state institutions. A typical presentence report summarizes a subject's arrest record and provides extensive information including a description of his early home life, size of his home town, employment history, educational background and marital history.

To a lesser extent, the study also depended on raw data from police files. Corrections Department officials par-

ticularly noted details like whether a parolee's activities had resulted in bodily harm to his victims and whether his offenses were committed with the help of accomplices.

When they had assembled all their data, Kinsey and his staff isolated — with the aid of psychiatrists, penologists, criminal literature and other information sources — some 350 variables they hoped might foretell an inmate's future capacity for violence.

After coding and cross-tabulating their data, they narrowed the field of possible indicators to just three variables — age of first arrest, behavior while in prison and nature of current conviction.

Using these variables, they then predicted each prisoner's chances of committing a violent crime while on parole and classified each subject into one of five risk groups — very high, high, medium, low and very low.

Almost Perfect Agreement

At this point, the Corrections Department officials arbitrarily split their study sample into two equal groups. For the first 1,000 subjects, they attempted to predict the frequency of violent crimes in each risk group and concluded that 40% of the very high risk inmates would commit serious assaults during parole, compared with an estimated 10% for the sample as a

whole and just .5% for the very low risk group.

For the other 1,000 inmates, they made no predictions. Instead, they observed the subjects after their release from prison and noted the frequency of violent crime in each of the five risk groups.

They then compared the theoretical predictions from the first half of the study sample with the experimental observations from the second half and found the two sets of data agreed almost perfectly, Kime said.

A recent follow-up study yielded similar results, he added. In a sample of 145 convicted felons, the Corrections Department

(Continued on Page 8)

CICS Users:

You've just written your last on-line data entry program.

KEY/MASTER is the CICS application development system you've been waiting for. With KEY/MASTER data entry applications are designed and tested right at the terminal. There's no coding, no compiling, and no delay.

Easy to use.

All you specify is the format of the data to be entered and the editing rules. KEY/MASTER does the rest. All the logic needed to accept data, edit it, and store it in KEY/MASTER's own on-line database is built in.

If you've wanted to bring your key-entry facilities on-line, now is the time. KEY/MASTER's features are superior to all known key-entry systems (whether keypunch, key-to-tape, or key-to-disk) and require no user programming.

Ready in minutes.

KEY/MASTER can be installed and ready for use in minutes. It works with both CICS and CICS/VS and runs under any operating system. All you need is 32K of virtual or real storage and one or more local or remote 3270 (or compatible) terminals.

No risk!

KEY/MASTER can be leased for \$295 per month or purchased for \$12,000. Each system comes with a 30-day no-risk guarantee. After 30 days, if you're not convinced that KEY/MASTER is the ideal system for developing on-line data entry applications, simply return the system for a full refund.

We'll be glad to tell you more, give you a demo, or sign you up for a 30-day trial. Just clip the coupon or call.



turnkey systems inc.
111 east avenue
norwalk, connecticut 06851
(203) 853-2884/telex 964351

tsi international, ltd.
19 bedford row
london WC1R 4EB, england
01-405-7304/telex 23302

839 mitten road
burlingame, california 94010
(415) 697-1833

additional
representation
worldwide



- ☐ We're interested. Send a brochure.
- ☐ We'd like a demo.
- ☐ Schedule us for a 30-day trial.

Name

Title

Company

Address

City State Zip

Phone

3330/33
DISK DRIVES

3330 Models I and II
immediately available
for sale or lease

COMDISCO
312-698-3000

NBS Eyes Standards Efforts, Asks Funds Boost

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The National Bureau of Standards (NBS) has trebled its fiscal year 1979 budget request for its Institute of Computer Sciences and Technology in hopes of significantly improving the development of Federal Information Processing Standards, according to the institute's acting director, Zane Thornton.

Appearing before the Senate Science, Technology and Space Subcommittee here recently, Thornton said NBS will ask Congress to boost the institute's 1978 appropriations of \$4.3 million to \$13.4 million in 1979. Seventy-five percent of the funds the institute

hopes to obtain for the coming year will be used to develop standards on software-related problems, he added.

The institute "will continue to exist as an entity in NBS" when the bureau's reorganization plan, already approved by the President's Reorganization Task Force, the Office of Management and Budget and the Secretary of Commerce, goes into effect on April 9, Dr. Ernest Ambler, NBS director, told the subcommittee.

Under the reorganization plan, the institute will share the NBS limelight with two new laboratories — the National Measurement Laboratory and the National Engineering Laboratory. The Computer Sciences and Technology organization has undergone

the least amount of change, according to the reorganization documents NBS provided the senators.

The institute will retain its Systems and Software Division, Computer Systems Engineering Division and Information Technology Division. Its "mission" will center on the standards-making and technical advisory functions given it under Public Law 89-306, the Brooks Act of 1965, Ambler said.

The reorganization documents further suggest the institute will continue to develop computer security standards in accordance with the Privacy Act of 1974.

to "a lack of resources in the institute and in NBS to carry the program out."

"If funded, the five-year plan should lead to the more timely development of standards by strengthening management control of the development process and reducing reliance on purely volunteer, part-time labor to staff standards development task forces," Thornton stated.

"Moreover," he added, "the plan and adequate funding will give the government the latitude to reduce dependence on voluntary commercial standardization activities whenever it becomes clear that those activities are not moving at a pace or in a direction that will

Ambler Gets the Job

WASHINGTON, D.C. — The U.S. Commerce Department's National Bureau of Standards (NBS) has its first "official" director in two and a half years. Dr. Ernest Ambler, who has been "acting" in that capacity, got the job.

Ambler joined NBS as a research physicist in 1953 and for the next two decades successively headed the agency's Cryogenics Physics Section, Inorganic Materials Division

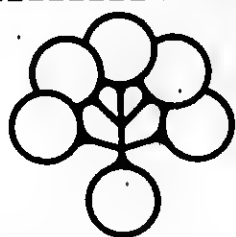
and Institute for Basic Standards. He became deputy director in 1973 and acting director two years later, NBS said.

The native Englishman and naturalized U.S. citizen has authored 51 publications, holds a patent for low temperature technology, is a fellow of the American Physical Society and a member of the American National Standards Institute Board of Directors.

Announcing RTP

The DOS/VS Resident Transient Program...

- ✓ Eliminates the Main DOS/VS Bottleneck
- ✓ Increases throughput 10 to 20%
- ✓ No changes to JCL
- ✓ No need to Re-IPL
- ✓ Not release dependent
- ✓ Runs without operator intervention
- ✓ Also runs under VM



Value Computing Inc. The Computer Operations Company

Please send me more information about RTP
— The Resident Transient Program

NAME _____ COMPANY _____
TITLE _____ PHONE _____
ADDRESS _____ CITY _____ STATE _____
ZIP _____ CPU _____ OPERATING SYSTEM _____

Mail to: VALUE COMPUTING INC.
300 VCI Building, W. Marlton Pike
Cherry Hill, New Jersey 08002

Or Call toll-free
800-257-8242

2078

PRINT DRUMS

•REPLACEMENT •SPECIAL SEQUENCES •CUSTOM CHARACTERS & ASSEMBLIES

Our custom-designed character print drums and print-drum assemblies can fill your requirements. Industrial Engraving Company, Inc., P.O. Box 311 Easton, Pennsylvania 18042. Phone (215)253-3541.

IE
INDUSTRIAL



NBS' request for more funds for computer and communications standards work stems from "a major effort in 1976 to strengthen the standards development program and achieve a more meaningful implementation of the Brooks Act," Thornton said. The result of this effort was a five-year plan centered on the standards development function, he explained.

"This plan, covering the fiscal years 1979-83, was the basis for the president's significantly expanded budget request for the [federal] Standards Program for fiscal year 1979," Thornton noted.

Reaction to GAO

Observers at the hearing also suggested a recent General Accounting Office (GAO) draft report on the standards work at the institute [CW, Jan. 30] might have prompted efforts to beef up the program.

The GAO draft accused the institute of "bureaucratic ineffectiveness" and an overreliance on the private sector with its own set of self-interests in the development of DP standards.

Asked about the GAO draft report, Thornton said it was "hard to say the GAO's criticisms aren't justified." He attributed the problems the institute faces in the promulgation of standards

satisfy essential federal goals and requirements.

The institute will continue to participate in voluntary commercial standards activities, Thornton said.

Software is the focus on the five-year plan chiefly because of the growing ratio of software to hardware costs in federal DP expenditures, the institute's acting director explained.

To judge the importance of the development of high-level programming, language standards and their potential impact on software conversion costs, one need only consider that estimates now indicate more than 80% or about 8,500 general management computers in the federal inventory will be replaced by 1985, Thornton said.

The institute would like to eliminate software conversion as an obstacle to the competitive procurement of computer systems in addition to reducing the costs of converting software from one set of equipment to another.

If the institute gets the full \$13.4 million it has requested for standards development, federal users will see a push to expedite the development of 10 families of standards — including those involving software quality control, performance assurance and computer system functional specifications, Thornton stated.

Study Eases Parole Choices

(Continued from Page 7)

tions Department found 43% of the very high risk group committed assaults during parole compared with 15% for the high risk inmates, 5% for the medium risk prisoners and none for either of the two lowest risk groups.

"Our predictions turned out to be much better than we had hoped for, and we don't expect to achieve that kind of accuracy again," Kime said.

Using the same study sample of 2,000 inmates, Kinsey and his col-

leagues also attempted to predict the parolees' chances of committing property crimes. But the predictions from that study proved much less accurate.

Using manual DP techniques, Corrections Department officials made the first preliminary results from their analysis available in June 1976, more than a year after the study began. They later reanalyzed their findings with a 98K-byte Control Data Corp. 6500 at nearby Michigan State University and made the resulting refinements part of their final conclusions.

'All Our Nations Intertied'

New Body Urged for Regulation of Data Flow

By Owen K. Darrath
Special to CW

BRUSSELS — An international regulatory body is needed to deal with the serious economic and legal problems associated with transnational data flow, according to John M. Eger, former head of the White House Office of Telecommunications Policy.

Speaking in Brussels recently before the Conference on Transnational Data Regulation, Eger said no existing body is capable of dealing effectively with the problems posed by data crossing national borders. The body he proposed must prevent nations from becoming isolated from each other.

"All our nations are intertwined and we are no longer free to act for ourselves; we have, indeed, responsibilities in a shrinking world to each other and, in

such laws [CW, Feb. 13]. "It is incumbent upon us to somehow make governments throughout the world aware of the composite effect of such legislation," he said.

"Under a new forum," Eger believes, "we can begin to address the problems that need to be dealt with: trade, technology transfer, privacy, proprietary and human rights."

Eger pointed to several obstacles to the free flow of information: misinformation and lack of information about technology on the part of governments; the fear of dependency on foreign data banks and data processors; and fears of a loss of national sovereignty.

It is vitally important to overcome these obstacles, he said, but "somehow the message simply has not gotten through because the regulatory rhetoric continues to grow."

"The old rhetoric persists while new barriers arise ... in the months ahead, more regulation can be expected," he predicted. "It can also be expected that once such regulation is passed, there can be little abatement, retraction or skillful rewriting of those laws."

The body he is proposing, Eger said, must surmount conventional nation-state negotiations "and construct a new agenda to preserve and strengthen our democracies."

In addition, planning for such a

forum must not be unduly weighed or influenced by a unilateral decision of any agency of any state, such as the U.S. Federal Communications Commission.

According to Eger, three objectives demonstrate a need for action by the new group: a review of all countries' laws and regulations to eliminate inconsistencies between nations; the need to keep regulation to a minimum; and the rapid development and adoption of new technology.

In particular, he said that tariffs should not be prohibitive, and should be based on volume and not the cost of leased lines.

Digest Planned

WASHINGTON, D.C. — The Commerce Department's Office of Telecommunications (OT) expects to complete a digest of foreign national privacy laws by the end of this month.

The countries whose laws will be included in the OT summaries and translations are Sweden, West Germany, Norway, Belgium, Luxembourg and Spain.

the economic sense, all our economies are already interdependent," he noted. The complexities of international business place a high premium on speed and accuracy, he added.

As an example of that interdependence, Eger cited the economies of scale which can result in the airlines of several countries being tied to a central computer in yet another country. Since the cost of replacing existing data services provided from another country with a domestic industry can be prohibitive, imposing stiff tariffs for use of such services may simply isolate a user and force him to drop out of an international data network.

In the forum he proposed, Eger noted, the ultimate beneficiary — the corporate or individual user — must have a clear and meaningful voice. Because the benefits brought by technology have tremendous economic importance to individual countries, cutting off the flow of data from one country to another will cause industries of all affected nations to suffer.

At the present time, 19 European nations have data protection laws already in force or in the making, and other countries are presently considering

Datamedia Video Terminals

working wonders

at thousands of user sites worldwide

Do our users know something you don't know?

Maybe so. For as users of our family of general-purpose alphanumeric display terminals, they've gained firsthand knowledge about Datamedia and our Elite video terminal family. ■ They know that Datamedia stands for performance-proven video terminals at a moderate price. ■ They know that in nearly 10 years of producing video terminals, we've established a new standard in terminal reliability. ■ And they know that we stand behind the thousands of video terminals shipped to users in industry, business services, government, education, medicine, and research around the world. ■ Datamedia Video Terminals. Nice to know.

Datamedia Corporation

7300 N. Crescent Boulevard
Pennsauken, NJ 08110
609-665-2382
TWX: 710-892-1693

Sold throughout North America and the world

Get in the know!

I'd like to know more about Datamedia video terminals.

- ☐ Please have a salesman call me to discuss my specific needs
☐ Please send me information on your complete product line

Name _____
Title _____
Company _____
Address _____
City _____ State _____ ZIP _____
Phone _____

165-II

With a DAT this is almost a 168! Machines available now. With tie-in leases to your 3033

COMDISCO
312-698-3000

In 158, 30 Series Market

Warning Issued on 'Shell Game'

By Brad Schultz
CW Staff

WINTER PARK, Fla. — Some computer vendors that deal in popular mainframe models have resorted to shell game tactics, effectively selling the same equipment more than once or selling equipment that does not exist, according to a recent *Computer Negotiations Report* (CNReport).

When user demand for a particular mainframe exceeds available supply, many users turn to the used market for needed equipment, the report noted, citing the current IBM

370/158 market as a case in point.

Despite the 1977 reduction in used 370/158 prices, user demand for these CPUs now exceeds supply and IBM is unable to provide them on delivery schedules acceptable to many users. Delivery dates for the 30 series are even further away, according to the January CNReport.

The heightened demand for 158s with the lengthened 30 series delivery times has inflated the prices for early 158 and 30 delivery positions despite IBM pledges to eliminate this "future market," the re-

port said, pointing out that a \$200,000 premium was recently paid for an early 3031 delivery spot.

Sizable premiums are now tossed at anyone even claiming to have a 370/158, tempting vendors to be "overly optimistic" about their ability to find a 158, the report continued.

Substitution Clauses

Although a wary user may compel a vendor to supply the serial number for a 158 under consideration and perhaps an invitation to visit its current installation, the vendor may insert — as inconspicuously as possible — right-of-substitution clauses in the agreement, enabling him to continue offering the 158 to the highest bidder while searching for a substitute machine to give the party at hand.

The agreement may not stipulate exact delivery dates; if it does, it may not specify penalties for vendor non-fulfillment.

A user may not realize "his" 158 has been given to another customer until it is too late to get a replacement from another source, the report added.

In addition, the user who desperately needs the equipment and feels irrevocably committed — having paid a substantial holding deposit months earlier — may be intimidated from challenging the vendor's nonfulfillment, the report asserted.

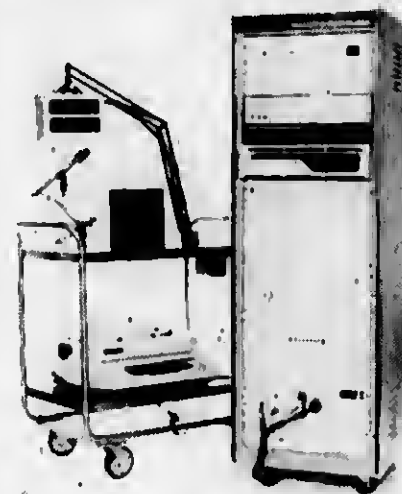
Safeguards Urged

As safeguards against being victimized by this ploy, users should identify equipment by serial number and current location and should compel the vendor firm to warrant that it presently owns or has all rights to the identified equipment, free of any liens unless clearly understood and accepted by the user, CNReport recommended.

In addition, the user should compel the vendor to guarantee that identified equipment is not and will not be under contract for sale, lease or supply to any other person or firm, the report suggested, and should ensure that all these conditions will not lapse prior to the user's acceptance of the merchandise.

Moreover, the vendor should agree that no equipment may be substituted for the identified equipment without the user's consent in writing, and that alternative inspection and acceptance standards should prevail in any such substitution.

Finally, the report recommended that "meaningful" delivery and performance dates be specified, as well as corresponding penalties for vendor nonfulfillment.

Voice-Command System
For Immobile Patients

Dialog 117

BELMONT, Mass. — Bed-ridden and paralyzed patients can now have voice control over their own bed motors, lights, telephones, televisions, typewriters and nurse calls with the help of a minicomputer-based hospital system developed by Dialog Systems, Inc.

The patient communicates with the Dialog 117 system by speaking into a microphone. The system has a vocabulary of 99 words and uses a CRT for verification of commands.

Based on a Digital Equipment Corp. PDP-11/04 minicomputer, the system converts sound waves into electrical signals which are amplified and converted into digital form the system's word processor can understand.

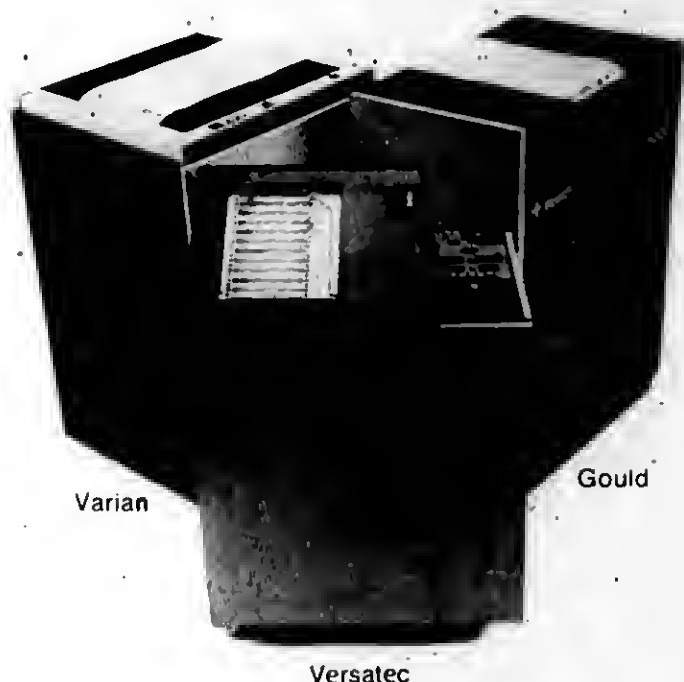
The Dialog 117 reportedly trains itself to the user's manner of speaking so it can respond to foreign accents and

dialects.

Patients can write letters by spelling out each word. The sounds picked up by the system are output on a printer.

With one channel servicing a single patient, the Dialog 117 costs \$57,600. For eight patients, it costs \$78,000. Dialog is at 32 Locust St., Belmont, Mass. 02178.

If you own one of these



get sensitive.

You pay plenty for electrostatic paper.
You should know about our new paper
that makes brighter images and costs less.
Try a roll free. Come with the
Sensitive Paper People.

GRAPHIC CONTROLS
COATED PRODUCTS DIVISION

sensitivity coupon

Send one free roll or fanfold to fit:
☐ Gould, ☐ Varian, ☐ Versatec

Annual Usage: _____ rolls Paper Number: _____

Name: _____ Phone: _____

Firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Mail to Coated Products Division, Graphic Controls Corporation,
P.O. Box 1309, Buffalo, NY 14240

Or call toll free 800-828-7978.
(In New York State, call 716-847-7500.)

CW-E-2

DG Eclipse
Unlimited Memory?

Not exactly, but the M-5 Virtual Memory System provides an effective program execution space of more than 2 Megabytes for the FORTRAN 5 user. M-5 runs on your existing DG hardware and requires no special programming. Eliminate your 64 KB constraints instantly.

Contact David N. Langley

FINNING

FINNING COMPUTER SERVICES LTD.

555 Great Northern Way, Vancouver, B.C., V5T 1E2, (604) 872-7474

DEC® Data System Owners
Need new reports within minutes?

DEC® OEM's
Having trouble speaking English?

SYMBOLIC SYSTEMS® INC.

(DEC's first and foremost business OEM)

PRINT IV™

a user-oriented, query type report writer

To print a report, simply:

- select data desired
- select order desired
- enter selection criteria and required totals
- watch report appear on printer

No programming skills required!
License price includes 1-yr. warranty
For free demo and further information
call, write or telex

FRANK J. PONZIO, JR.

SYMBOLIC® SYSTEMS
25 Chatham Road Summit, NJ 07901
(201) 277-8100/Telex No. 13-8478

And Vendor Drops Suit

Vote for Burroughs Ends Knoxville Imbroglia

By Jeffrey Beeler
CW Staff

KNOXVILLE, Tenn. — The long and sometimes bitter dispute over a proposed computer procurement ended here recently when the Knoxville city council voted 5-4 to approve a contract for a Burroughs Corp. B2810 system.

The vote took place in the early morning hours of Feb. 8, just six days after Burroughs dropped a lawsuit charging the city and 22 of its officials with violating an earlier agreement to acquire the system [CW, Jan. 30].

Mayor Randy Tyree cast the deciding ballot after a vote of the nine-member city council resulted in a 4-4 deadlock with one abstention. One day later, the city signed the contract for the Burroughs system, and Burroughs consummated the deal the following day.

Local officials expect to install the B2810 later this year

as a replacement for the community's existing General Electric (now Honeywell Information Systems, Inc.) 437, which City DP Manager James Ryan contends can no longer meet the area's expanded computing needs. Just hours before approving acquisition of the Burroughs system, the council had voted, again by a 5-4 margin, to scrap the city's four-year-old lease agreement with HIS, which Ryan said had neglected to supply 17 of 20 promised software packages.

For six months after becoming DP manager about a year ago, Ryan had tried to correct the software shortage through

negotiations with HIS. But when his efforts produced no results, he wrote 16 main-frame manufacturers early last September to request bids for an alternative system [CW, Dec. 19].

After evaluating 17 proposals from nine bidders, Ryan tentatively selected the B2810 in mid-October as the lowest "responsive" bid. He estimated the \$8,145/mo Burroughs system would cost the city about \$5,000/mo less to operate than the current HIS system.

Dramatic Reversal

The council's recent approval of the Burroughs pro-

posal marked a dramatic reversal in its attitude toward Ryan's hardware selection. Last Dec. 13, the council voted 6-2 to reject all previous bids and resume negotiations with HIS, after the chairman of the city's Computer Advisory Committee convinced the group the B2810 would in fact cost almost \$88,000 more than the 437. Ryan later disputed Chairman Tom Sudman's claims and presented figures that purportedly proved his cost estimates contained more than \$630,000 in errors.

The abrupt turnabout in the

council's attitude stemmed partly from a recent shakeup in the group's membership. Since the anti-Burroughs vote in December, three outgoing council members who opposed acquisition of the B2810 vacated their seats for three new members, all of whom favored procurement of the new system.

Whatever the reason for the change, the council's recent approval of the Burroughs contract helped vindicate Ryan's professional judgment during the procurement controversy.

Professional Development Set as NCC Seminar Topic

MONTVALE, N.J. — The 1978 National Computer Conference (NCC) will feature a

Professional Development Series of 12 seminars covering latest developments, applications and trends in specific areas of interest to computing professionals, the American Federation of Information Processing Societies (Afips) announced here.

Four of the tutorial, one-day seminars are expected to examine user-oriented management issues, series director Gopal Kapur said, noting that in general the seminars will address topics in systems development, structured methodology, software engineering, data base management and cost-effective computer usage.

Among specific topics under consideration are cryptography, security and fraud, managerial development, managerial opportunities for women, structured testing of large systems, structured programming and microprocessor technology as exemplified by the Intel Corp. 8080, Afips said.

The NCC will take place June 5-8 in Anaheim, Calif.: its main part at the Anaheim Convention Center; the NCC Personal Computing Festival at the nearby Disneyland Hotel; and the seminar series at the Inn at the Park, which is adjacent to the convention center.

The separate registration fee for each professional development is \$45 and includes complete course material plus access to the four-day exhibit program and the Personal Computing Festival. Attendance will be limited to 125 people per seminar.

Additional information on the Professional Development Series plus further details on NCC are available from Afips at 210 Summit Ave., Montvale, N.J. 07645; or by calling (201) 391-9810.

PROFESSIONALS WANTED

Our rapid success in implementing Data Terminal Management Programs at Fortune 500 companies necessitates additional personnel in our Boston, New York/New Jersey, Philadelphia and Washington offices.

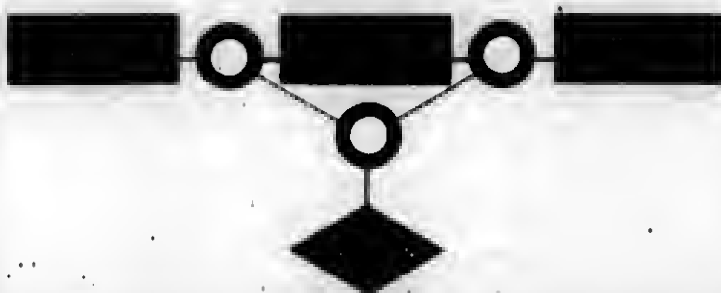
Eighty percent of our business is generated from our existing customer base and we need Area Managers, Account Managers, Sales Persons and Electronic Technicians. Qualified Computer Professionals are invited to join in our success — We double revenues every other year, and earn 10%+ profits. Contact Eric S. Taylor, Personnel Manager.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617) 246-1300
AN EQUAL OPPORTUNITY EMPLOYER M/F

FOCUS

DOS TO OS



\$10 PER COBOL PROGRAM

- I. FOCUS CONVERTS DOS COBOL SOURCE CODING TO OS
- II. FOCUS CONVERTS DOS JCL TO OS JCL
- III. FOCUS PRODUCES OPERATIONS DOCUMENTATION
- IV. FOCUS supports UCC-II.

EXPERIENCED, PROVEN, TESTED AND IMPLEMENTED
FULL SUPPORT: ON SITE INSTALLATION AND BRIEFING SESSIONS

ELIMINATE — COST OVER-RUNS
ADDED EXPENSE OF MAINTAINING
TWO OPERATING SYSTEMS
EXPENSIVE OUTSIDE SERVICES

FOCUS

INTERNATIONAL LTD.

P.O. BOX 162 AUBURNDALE, MA. 02156
(617) 965-2090

If you own a TI Silent 700®



get sensitive.

For what you pay for thermal paper, you should get consistent imaging and quick delivery. No maybes. We say you can. And pay less. Come to the Sensitive Paper People. Try our paper. Free.



GRAPHIC CONTROLS
COATED PRODUCTS DIVISION

Silent 700® is a trademark of Texas Instruments

sensitivity coupon

Send one free roll for Texas Instruments Silent 700®.

Annual Usage: _____ rolls Paper Number: _____

Name: _____ Phone: _____

Firm: _____

Address: _____

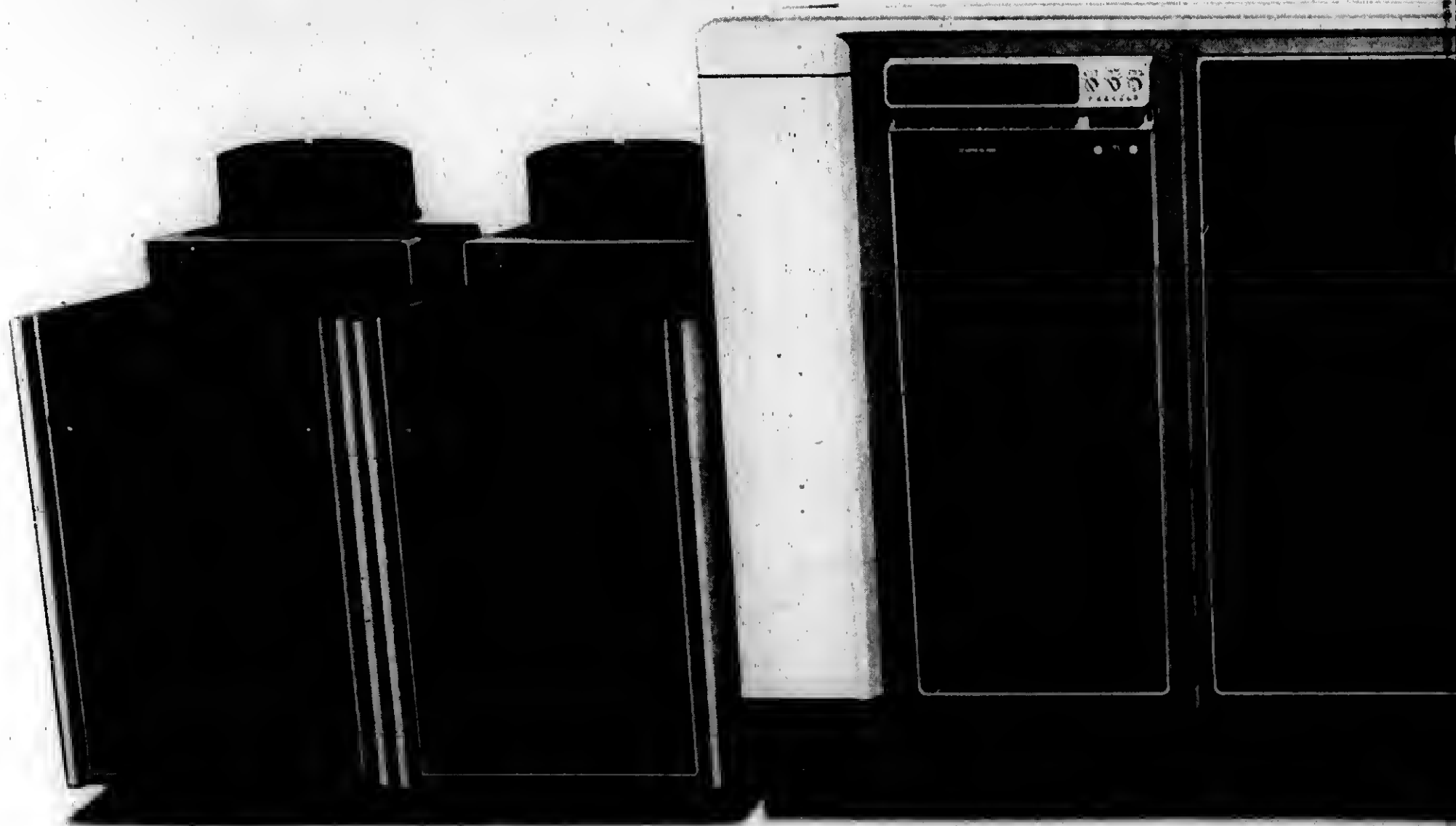
City: _____ State: _____ Zip: _____

Mail to Coated Products Division, Graphic Controls Corporation,
P.O. Box 1309, Buffalo, NY 14240

Or call toll free 800-828-7978.
(In New York State, call 716-847-7500.)

CW-TI-2

INTRODUCING THE MINI- MAINFRAME. \$195,000.



Data General Corporation, Westboro, MA 01581, (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61 rue de Courcelles, Paris, France, 766.51.78. Data

Until now, either you opted for the capability of a mainframe or you went with the flexibility and economy of a mini. Until now.

Introducing the Data General ECLIPSE M/600 computer system. It combines the workload capability of a mainframe with the traditional advantages of a mini, such as interactive computing, distributed processing and economy.

One thing that makes the ECLIPSE M/600 like no other existing computer is an incomparable three level I/O Management System, which prohibits I/O bottlenecks. Another is an incredibly efficient Demand-Paged Memory Management, which allows you to run more jobs faster. And its new Job Processor is unmatched for speed and flexibility. Then our supremely intelligent Advanced Operating System (AOS) keeps everything speeding along for a minimal terminal response time and a maximum concurrent batch stream throughput.

Once again Data General raises the world's expectations for computers, while lowering the cost. To find out more about what you can expect from the new ECLIPSE M/600, write for our brochure. Or call (617) 366-8911, Ext. 4735.



 **Data General**
We make computers that make sense.

Indian-Owned Firm Prospering in Arizona

By Brad Schultz
CW Staff

SACATON, Ariz. — Framed by desert that has changed little throughout the centuries of human existence, a contemporary American Indian reservation here is the site of the FM4 Gila River Corp., the only data processing firm known to be majority-owned by American Indians.

Located on the Pima-Maricopa Gila

River reservation about 15 miles from Phoenix, FM4 is providing a sharp contrast to the more typical modern-day situation of the New World's original inhabitants. The firm has reported record gross sales of \$600,000 and a net income of \$90,000 for 1977 while poverty, disease, lack of schooling and high unemployment continue to plague American Indians in general.

The firm prepares data for storage on



FM4 Gila River Corp.'s day shift gathers in front of firm's new building on Pima-Maricopa Indian Reservation near Phoenix.

Are Your DASD's Drowning ... in a Sea of Data?

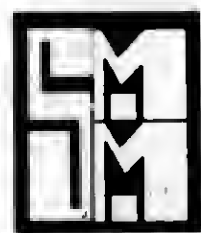


DMS/OS is the Wave of the Future in Data Management

In its first year, over 50 major banks, industries and government agencies have purchased DMS/OS. They are enjoying the benefits of having the most complete data management system available. Let us show you how they are controlling their DASD resources with DMS/OS.

Find out why DMS/OS is the wave of the future in data management. Just call or write for our free brochure or functional overview.

SOFTWARE MODULE MARKETING



Crocker Bank Building/Penthouse • 1007 7th Street •
Sacramento, CA 95814 • Telex SMMSAC 377-314 • IN
EUROPE: California Module Marketing, Ltd. • C/O
Country Formations Ltd., • 27 Kelsa Place, London W.8

computer tapes for Petroleum Information Corp. (PI) of Denver, a subsidiary of AC Nielson Co., compilers of technical data for oil and gas exploration and several other companies.

PI spokesman John L. Stout explained how FM4's encoding system works: "FM4 converts oil and gas well drilling history from scouting reports to computer tapes for us to include in our computer-controlled statistical reports. We send FM4 the reports on microfilm. It analyzes them, extracts the pertinent well history from each one and transcribes it to coding sheets for key entry."

"Then it does the key entry on its [communications mode control] key-to-disk-to-tape system and sends the tapes to us in Denver," Stout continued. "This requires that its personnel understand petroleum industry terminology so they can extract and process just those items of information we require."

"Selected FM4 operators learned encoding from our people in Denver and Houston swiftly and went back to train others. At the end of a 45-day trial period, the FM4 operators had surpassed all expectations," he said.

"This is important work, and the efficient expenditure of a great deal of money hinges on the accuracy with which it is done," Stout noted, adding the Well History Control System he manages for PI is now one of the largest existing industry computer files. It contains the histories of more than a million U.S. oil and gas wells

terprises that own the Mesbic Financial Corp. of Dallas, another FM4 stockholder.

Amoco Venture Capital Corp., a Standard Oil of Indiana subsidiary, is another Minority Enterprise Small



Ross Lyons (Pima-Papago) and Andrea Terry (Pima) encode oil and gas well histories for keying.

Business Investment Corporation (Mesbic) that owns FM4 stock.

"The Mesbics give us advice, loans and business," MacKenzie explained, adding that Standard Oil of Indiana executive Martin Stern is on FM4's board of directors.

MacKenzie forecast 1978 profits of \$120,000. His company has just moved into a new, 3,200 square-foot building in the reservation's Pima-Chandler Industrial Park.



Dorothy Eschief (Pima), Rosaline Thomas (Hopi), Janice Johns (Pima) and Lois Pablo (Pima) extract information from microfilm for key entry.

and provides up to 500 independent and distinct items of information for each well.

"Technical evaluation of well histories is one of the most important techniques for finding much needed new oil and gas," he said.

At present nearly 60% of FM4's common stock is owned by its employees and other American Indian interests, FM4 President Roger B. MacKenzie said. However, IBM, Texas Instruments, Inc. and Shell Oil Co. are among a group of Dallas-located en-

A former IBM systems analyst, MacKenzie attributed FM4's success to the dedication, intelligence and high morale of its employees. "The employees are very proud of their company, and three of them are on the board of directors," he said. "Wages are good and working conditions superior."

FM4 lost money through its first four years, broke into the black in 1975 with \$7,000 net income, upped this to \$57,000 in 1976 and to \$88,000 for the first nine months of 1977.

Call 1-800-321-0516 For The "Last Word" in Speedreading!



The Portable Telxon Wand



IMMEDIATE DELIVERY on Telxon 717 portable order entry terminal with wand – 32,000* character memory storage.

Check these outstanding features:

- Interchangeable Rechargeable Batteries
- Check Digit Verification, MOD 10, MOD 11
- Accumulator (Case Total)
- True Item and Field Search
- Built-in Diagnostics
- Interchangeable Program Formats that the operator can't inadvertently lose.
- 110, 200, 300, 600, 1200, Baud, even or odd parity

The Telxon 717 is compatible with all Telxon cassette terminals as well as other terminals in the marketplace that transmit the following formats:

1. Universal or Block format for most commercial data receivers
2. Teletype
3. 10 bit, 1200 Baud, even parity, bit sync
4. 10 bit, 1350 Baud, even parity, bit sync
5. 5 bit, 1200 Baud, odd parity, char sync
6. 5 bit, 1350 Baud, odd parity, char sync

TWO NEW PROGRAMMABLE DATA RECEIVERS:

Telxon 660/670: single/dual drive receiver – records data on IBM 3740 compatible diskette.

Telxon 970: 1 to 4 line mag tape receiver. An optional feature provides each line with universal auto discriminate capability which is able to receive data from almost any portable data terminal that has been marketed during the past nine years. Receives Telxon, MSI 2100/2001/100, Azurdata or Digitronics data on every line.

*2K, 4K, 8K, 12K, 16K also available.

Telxon puts a family of data terminals in the palm of your hand! Call 1-800-321-0516 toll free for a demonstration or more information. In Ohio call 1-(216)-666-6751 (collect)

Telxon
CORPORATION
Headquarters: Houston, Texas

SYSTEMS DIVISION
GHENT SQUARE
BATH, OHIO 44210

RETHINK.

The people who rethought the computer ask you to rethink your future.

There isn't anything that can't be improved.

A computer.

Or a career.

With that kind of spirit in mind, we set out to build large-scale computers that would not only be higher performing, more reliable and less expensive, but also would run on the most popular operating systems.

Our rethinking of the computer business worked.

In the short time since we introduced our first model two and one-half years ago, we've grown from under 400 to over 1800 employees. And now that we manufacture and market a family of advanced, large computers worldwide, our 1977 revenues have exceeded \$188 million.

Why have we grown like this?

Our trailblazing spirit is part of it. But from the outset, we've sought the kind of people who would flourish in a company that demanded creative thinking. Yes-men and yes-women could only hurt us. So we've looked for the most enthusiastic. The

brightest. The best.

And we offer the kinds of salaries and benefits that allow us to get them.

The result?

Amdahl is an exciting place to work.

And because we're the kind of company that is constantly rethinking computer science, we need people who are willing to rethink their future.

And we need a lot of those people. Because it looks like our workload is going to double again during 1978.

So we'd like to talk to you. Just visit our personnel lobby at 1210 East Arques Avenue in Sunnyvale, or send your letter or resume to Employment Department, Amdahl Corporation, P.O. Box 5070, Sunnyvale, CA 94086.

You see, a company like Amdahl needs to keep on attracting people who are willing to rethink and improve their future.

Because their future is our future, too.

ENGINEERING SOFTWARE

ENGINEERING SOFTWARE INTEGRATION MANAGER

You will be responsible for providing in-process QA for specifications and code, implementing final test/regression testing procedures, and coordinating the release of software, including diagnostic and small systems control programs to users. You have technical management experience in a large software project and will find it helpful to have hardware experience. Please indicate 4271-E on your response.

SMALL COMPUTER SYSTEMS PROGRAMMING MANAGER

You will be responsible for writing control programs for small computers that function as master controllers for Amdahl's CPUs and special test equipment. Your background should include machine and higher level languages, system software/control programs experience, and technical management experience in a large software project. Please indicate 4272-E on your response.

CPU DIAGNOSTICS DEVELOPMENT MANAGER

Your department will specify, review, and implement diagnostics for Amdahl's large CPUs. You will use Amdahl's unique diagnostic hardware and will operate in the environment provided by Amdahl's advanced diagnostics systems. Your background includes knowledge of large system hardware and technical management experience in a large software project. Please indicate 4273-E on your response.

DA PHYSICAL DESIGN MANAGER

You will be responsible for the physical implementation of complex bipolar LSI chips and multi-level PCBs. Your duties will include the evaluation of placement and wiring algorithms, implementation, and integration into a system. You should have technical experience in complex physical design and experience in the technical management of a large software project. Please indicate 4275-E on your response.

DA DESIGN ENTRY MANAGER

You will be responsible for developing new design methodology and entry languages working toward the development of a system to be used in the design of Amdahl's new high-performance CPUs. You have experience in the technical management of a large software project and an understanding of hardware logic design. Please indicate 4274-E on your response.

DA DATA BASE MANAGER

You will design and implement a data base containing the design requirements and physical implementation of Amdahl's high-performance computers. Your background includes knowledge of the MVS environment and experience in the technical management of a large software project. Hopefully, you have knowledge of hierarchical specifications systems such as bills of material. Please indicate 4276-E on your response.

SOFTWARE PROGRAMMER

You will be responsible for the development and maintenance of software programs for computer controlled test equipment. You are experienced in the programming of either the 1130, HPZIMX, or the NOVA computers. You have a BSEE or Computer Science degree and 5 years' experience with test equipment related software. Please indicate 6331-E on your response.

OPERATING SYSTEMS DEVELOPMENT

SYSTEMS PROGRAMMERS

You will participate in the design and development of current systems programming languages for current and future architectures. You have PL/1, PLS, PASCAL or C experience. Please indicate 4701-E on your response.

You will be working with an MVS SCP product under development and you will be responsible for the design of methods and the development of technologies to validate the product. You possess a working knowledge of the MVS SCP and are able to develop specialized mechanisms to exercise the MVS supervisor. Please indicate 4702-E on your response.

You will be working with MVS Source and will develop programs to produce systems programming languages from a variety of inputs. You have a working knowledge of MVS and support documentation and will find it helpful to have PL/1 experience. Please indicate 4703-E on your response.

You will work to define the software development process including documentation and programming standards and assist in developing project plans and provide continued monitoring of those plans. You should be highly knowledgeable with the development process and be able to assist with and conduct detailed planning. Please indicate 4704-E on your response.

APPLICATIONS PROGRAMMERS

You will design and develop an on-line system for use by both technical and management people involved in the development of software products. You have a working knowledge of the software development process and will find it helpful to have ADABAS exposure. Please indicate 4705-E on your response.

COMPUTER DEVELOPMENT

SYSTEM DESIGN ENGINEER

We seek system/logic design engineers to work in system organization, logic design and the development of new, large LSI computer systems. Hopefully, you are familiar with ECL technology, microprogramming, large computer architectures and higher level computer languages. You have a BSEE/MSEE with a minimum of 2 years' experience in systems or logic design. Please indicate 424-E on your response.

HARDWARE INSTRUCTOR

We seek instructors or field engineers with 5-10 years' experience maintaining 360/370 CPUs. You will be involved in course design including analysis, writing course objectives and lesson plans. You will be a course manager developing students by lecture and case study, using training simulators and state-of-the-art 470 systems as your laboratory equipment. Your other responsibilities will include guidance, counseling, and evaluation. Please indicate 881-E on your response.

PRODUCT PLANNING AND SYSTEMS ARCHITECTURE

PERFORMANCE MEASUREMENT AND EVALUATION SPECIALISTS

You will be a performance specialist on an architectural team as you develop performance measurement and evaluation methodologies and provide support for future product development. Immediate openings are available in the following areas: Computer Systems Performance Modeling and Evaluation, Software and Hardware Measurement, and Workload Characterization. Please indicate 492-E on your response.

COMPUTER SYSTEMS ARCHITECT

You will be a member of an architectural team developing future high-performance computer systems. You should have a solid educational background and broad knowledge of computer and operating system architecture and technology. We have immediate openings in the following areas: Computer System Organization, Operating Systems, Data Base Systems, Storage Systems and the Console System. Please indicate 491-E on your response.

PRODUCT PLANNERS

You should have a thorough knowledge of computer hardware, software and commercial applications, and extensive experience in computer systems planning, development and use. You should be capable of working effectively with management and professionals in Engineering, Manufacturing, Marketing and Finance, as well as with our customers. A combined education in computer science and business administration is desirable. Please indicate 490-E on your response.

QUALITY ENGINEERING

QUALITY ENGINEERING MANAGER

You will be responsible for the implementation, application, and maintenance of quality standards and quality control systems as applicable to the fabrication, production, and shipping of Amdahl products. You will develop operating procedures, instructions, audit programs and controls as well as plan and schedule special projects. You have 5 years of responsible quality control engineering experience including a minimum of 1 year in technical management. You possess a thorough working knowledge of manufacturing processes, inspection methods, and QC systems. BA in Engineering or the equivalent experience required. Please indicate 6805-E on your response.

QA ENGINEERS

You will perform special electrical tests of parts, materials and assemblies in support of QA test and evaluation requirements. You will also plan and schedule lab projects and prepare appropriate technical reports. You have a BSEE or the equivalent experience and 2-5 years' experience in special electrical bench and lab tests of parts, materials, and electronic hardware. Please indicate 6806-E on your response.

ELECTRICAL ENGINEER

You will develop techniques and procedures for performing non-standard incoming electrical tests and will assist MRB QAs in dispositioning rejected electronic hardware. You have a BSEE or the equivalent experience and 2-5 years' experience performing special electrical bench and lab tests of parts, materials, and electronic hardware. Please indicate 6806-E on your response.

COMPONENT QUALITY ASSURANCE ENGINEER

You will be responsible for establishing component quality assurance specifications and implementing appropriate incoming quality assurance screening programs. You will

generate appropriate control documentation, analyze data and prepare reports, establish environmental and test requirements, and evaluate commercial test facilities and equipment. You must have a BSEE plus 2-5 years of directly related experience. You possess demonstrable knowledge of IC failure mechanisms and corresponding screening-out techniques per MIL-STD-883 and other specifications. Please include salary history and indicate 6801-E on your response.

TECHNICAL SUPPORT ENGINEERS

Senior and intermediate openings exist for electronic engineers who will provide technical support for the quality assurance program. You will perform technical analyses and interpretation of failure data; evaluate quality, reliability and performance-related problems; identify test, test flow and test screening problems; prepare reports and initiate corrective action programs. You have a broad systems and component engineering background with a BSEE and 2-5 years' experience in analyzing component, circuit equipment design, test and applications problems. Hopefully, you have experience working with high-speed MSI/LSI components and digital systems. Please indicate 6802-E on your response.

QUALITY CONTROL ENGINEERS

You will be responsible for providing quality engineering support to manufacturing and inspection; generating inspection procedures; establishing quality workmanship standards; analyzing discrepancy and failure data to identify chronic manufacturing problems; initiating and monitoring corrective action programs; and analyzing quality capability of products and processes for complex electronic and electro-mechanical assemblies and components. Junior and senior openings exist for technically competent engineers in the following areas: Electro-Mechanical Assemblies; CRT/keyboard display, power supplies, minicomputer, disk drives, control panels, power panels; multi-layer PCB assemblies; and major sub-systems. We also have openings for QEs in design engineering. These positions require a BS degree with directly related experience in Quality or Manufacturing Engineering with a commercial manufacturer of complex electronic systems. Please include employment/salary history and indicate 6803-E on your response.

QUALITY ENGINEER—FAILURE REPORTING AND ANALYSIS

Your responsibilities will include failure reporting for in-process PCB and systems tests. You will perform gross analyses of failure data, identify chronic test problems and high fallout assemblies. You must have a sound electronics background and a BS degree plus at least 2 years' experience in failure reporting or assembly test. Please indicate 6804-D on your response.

MANUFACTURING ENGINEERING

DESIGN INTEGRITY ENGINEERS

You will be responsible for ensuring that designs are reliable, well specified, perform to spec, are cost-effective, have qualified, dual sources components/assemblies, and have a minimum number of different part types. You have a BSEE or BSME and several years of hardware design experience and/or experience relative to the goals stated above. Please indicate 411-D on your response.

SYSTEMS TEST ENGINEERS

Your background should include experience with final test or field maintenance of medium or large-scale computers or S/370 compatible peripheral controllers. College graduates with EE programs emphasizing digital logic design are encouraged to apply. Please indicate 627-E on your response.

TEST ENGINEERS

Your responsibilities will include the generation of test/troubleshooting procedures as well as supporting manufacturing test equipment problems. Your background should include either test, QA, or manufacturing engineering and a familiarity with ECL-MECL-RAM logics. You have a BSEE or the equivalent experience, and process NOVA minicomputer experience. Please indicate 6332-E on your response.

SENIOR RELIABILITY LAB ENGINEER

You will be involved in engineering and design work in support of various computer system products on materials testing and processes evaluations. Other duties will include the establishment of a departmental manual; development of a calibration, maintenance and service program; and development of a departmental job description manual. You have a solid practical and educational background (BSME, BSEE or the equivalent experience) and at least 10 years' experience in testing, engineering, production and documentation standards and standardization. Please indicate 681-E on your response.

JUNIOR & SENIOR MEMORY TEST ENGINEERS

You will plan and carry out evaluations of memory devices and boards using automated test equipment. Your activities will include memory board interface design and test package development, MOS bipolar device characterization, and the development of statistical tracking programs for production monitoring. You have experience in digital design, basic programming skills and an understanding of memory device characteristics. You possess a BSEE, MSEE or a CS degree. Please indicate 417-E on your response.

MANUFACTURING ENGINEERS

We have several openings for individuals who will be involved in technical line support for the production of state-of-the-art electronics. Your background includes at least 2 years' experience as a manufacturing engineer in the electronics industry and one position calls for some experience in tooling. You should have a BS in engineering; hopefully mechanical or manufacturing. Please indicate 651-E on your response.

PRODUCT ENGINEERS/ SEMICONDUCTOR EXPERIENCED

You will be working with Amdahl systems designers in the selection of components. You will write electrical performance, quality and reliability components specifications (including MOS and ECL RAMS), and will select and perform in-depth qualification of manufacturers' products. You have at least a BS in EE or Physics and a minimum of 2 years' components engineering experience. Please indicate 419-E on your response.

FIELD SYSTEMS PROGRAMMERS

You will be responsible for maintaining Amdahl's excellent reputation in providing software support to Amdahl installations. You are an experienced systems programmer with internals level knowledge of MVS, SVS, VS1, or VM. Your ability to perform system generation and maintenance is essential. Please indicate 805-E on your response.

HEADQUARTERS SYSTEMS ENGINEERS/INSTRUCTORS

You will be responsible for providing headquarters advisory and planning services to our customers, using your knowledge of MVS, SVS, VS1, or VM internals. Software opportunities are available in a variety of areas including Education, Field Support Center, and SCP Support Teams. Please indicate 852-E on your response.

We are an equal opportunity employer.

amdahl

Mini Helps Landlords Screen Out 'Undesirables'

By Tim Scannell
CW Staff

ARCADIA, Calif. — The task of screening out undesirable tenants has been simplified by an agency here that uses a minicomputer to help compile investigative reports on prospective renters for landlords.

The reports contain data on a person's credit history and employment as well as his "habits and patterns of behavior." Such "habits" include whether the prospective tenant is noisy, has pets, pays his rent on time, has children or does an excessive amount

of damage to the apartment he rents, a spokesman said.

Renter's Reference of America, Inc. (RRA), operated on a membership basis, is similar in many respects to credit reporting firms such as TRW Credit Data and the Chilton Corp. In this case, however, the service is geared to the needs of owners or managers of apartment buildings, the spokesman stated.

"Professional" Staff

Unlike most credit reporting services, RRA employs a full-time professional staff of investigators who gather infor-

mation on the rental histories of rental applicants for inclusion in its files, he explained.

Prospective tenants are given a standardized application form when they inquire about an apartment from a member landlord, according to Ronald Pecora, president of RRA's California branch. When a tenant signs this form, he does so "knowing that he will be investigated," Pecora said.

The application is then sent to the RRA office and checked against the computerfiles to see if there is any existing information on the tenant. If information does exist, it is passed on to the client landlord.

"If we do not have a file, we use the information from the application" to compile a report, Pecora said. "We do this by making phone calls and searching through other sources that we have."

Phone Checking

A number of avenues are explored in an investigation, both to check on the tenant's honesty and his financial standing, Pecora noted. "We usually check out their last three locations, their banks and their employers. Our people call the landlords where the person has been living" to verify what he has put on the form and "call the banks to see if he has a bank account."

Employers are called to ask "if the person has been working there as long as he said he was, if he is making what he

says he is" and if there is a possibility of his being fired in the immediate future, he stated.

In addition, landlords can submit positive or negative appraisals of previous tenants for addition to their files, he said.

The reports are processed and updated using an NCR Corp. 399 minicomputer with 14K of memory.

Files Open to Tenants

If a tenant is rejected, a landlord will tell him that the decision is based upon information supplied by Renter's Reference, Pecora said. The tenant can then go to RRA and review his file after giving sufficient proof of identification.

"We then go through the report and see what's derogatory about the person" and discuss "why the management company has turned him down," Pecora said.

"We do not make a judgment," he stressed. "That is the job of the manager or the landlord."

If a person feels something is wrong with the file in its presentation of facts, "he has to go to the complaining party, straighten the matter out and send a letter to RRA" stating he has corrected the situation, Pecora said.

Although he described the system as being "better than what most people use," a percentage of error does exist, Pecora pointed out. One particular problem involves landlords who exaggerate on tenant reports, overplaying a person's negative qualities.

"There is a tendency to do that with any type of reporting," Pecora observed. Unfortunately, "you really don't find out about it until six months down the road" because there is no way to im-

mediately discern if a landlord is fabricating a tenant's undesirable aspects.

"Most people, unless it's a small landlord who hasn't been in the business too long, know they are going to get themselves into trouble if they lie," he said.

An even more prevalent problem concerns landlords who give "glowing recommendations" to tenants whom they want to "get rid of," Pecora stated. "If one landlord submits an overly positive review and the others we receive are all decidedly negative, his will not be taken into consideration."

Reverse Use

"Editors" at Renter's Reference sift through the various reports and evaluations and isolate the ones that seem to be unfairly biased. Any reports claiming excessive damage or noise are investigated to establish their authenticity, Pecora said.

All in all, "the system works fairly well," he added. "We've had very few problems and we've never been sued or anything like that."

A few people have even used the service in reverse. "If a tenant is noisy, has too many kids or animals or did a lot of damage to his last apartment, he might ask [what landlords are] not contracting our services," Pecora explained.

The California office was established in 1977 and currently handles tenant traffic for 10,000 apartment units. Members are charged an annual \$100 fee plus \$5 for a basic "mini-report" and \$9 for a full-scale investigative survey.

The service is governed by laws set forth for investigative reports under the Fair Credit Reporting Act, the spokesman noted.

Discussion of Passwords Available on Paper, Fiche

WASHINGTON, D.C. — The National Bureau of Standards (NBS) has announced availability of "The Use of Passwords for Controlled Access to Computer Resources."

After describing the need for and uses of passwords, pass-

word schemes are categorized according to selection technique, lifetime, physical characteristics and information content, NBS said.

Password protection, in storage and transmission is discussed, as are current implementations and cost considerations.

Copies of the paper, SD. No. 003-003-01770-1, can be ordered for \$2 each from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Microfiche copies, cataloged as NTIS No. NBS-SP-500-9, are available for \$3 each from the National Technical Information Service, Springfield, Va. 22161.

Mom is one cheap mother.

MOM'S WAREHOUSE
WE MOTHER YOU BY MAIL

When You've Got It... Flaunt It!



JASPER JOB ACCOUNTING

FEATURING:

- WIZARD REPORT GENERATOR
- FREE CICS BILLING CAPABILITY
- RJE ACCOUNTING

NAME _____ CO. _____
 TITLE _____ TEL. _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP _____
 COMPUTER MODEL _____ OP. SYSTEM _____

DATACHRON CORPORATION
 174 FIFTH AVE.
 NEW YORK, N.Y. 10010 (212) 675-5333

155-II

Up to two megabytes with DAT.

Sale or Lease

MDISCO
312-698-3000

System Helps Ensure 'Correct' MVP Award

ATLANTA — Time is the culprit that may have contributed to selection of the "wrong" Most Valuable Player (MVP) in National Basketball Association (NBA) All-Star Games in years gone by. And it might have occurred again in the Feb. 5 All-Star Game if it hadn't been for computer processing.

Because of the time needed to collect and manually tabulate the ballots, the nearly 300 sportswriters and sportscasters who elect the MVP have had to cast their vote at the midpoint in the fourth quarter.

But this year, for the first time in NBA history, they were able to hold their ballots until the final buzzer — and it's a good thing. With only five minutes and 10 seconds remaining, the East All-Stars, having trailed for the entire game, took the lead and held it for a dramatic 133-to-125 win.

Less than one minute after the final buzzer, a Honeywell Information Systems, Inc. Level 66 computer proclaimed Randy Smith of the winning East team the MVP, and CBS Sports covered the presentation of the NBA's

MVP trophy and keys to a new Chevrolet.

Historically, the MVP has been a member of the winning team. If HIS had not computerized the tabulation of the votes, the ballots would have been collected while the West was still ahead — and a lot of sportswriters may have nominated a member of the team they would later see lose the game.

The system was set up with groups of terminals situated near the tables where the voting sportswriters and sportscasters were seated.

At the one-minute-remaining point and then at the final buzzer, volunteers from HIS collected the ballots and rushed them to the nearest terminals where others were ready to input the data.

Each terminal was connected by dial-up phone lines to a Level 66 at HIS's data center in Atlanta. (As a backup system, each terminal was also tied to the firm's data center in Phoenix.)

Entering the votes into the terminal took a little more than a minute, HIS said.

EPA Using Dial-Up System To Check Up on Witnesses

By Ann Dooley
CW Staff

DENVER — A computer is now being used to discredit expert witnesses whose testimony in environmental court cases and administrative actions can mean gains or losses in the millions of dollars.

Used by the U.S. Environmental Protection Agency (EPA), the computer system checks out the credentials, past experience and expert testimony of scientific witnesses opposing the EPA in various types of actions.

The system also helps prepare the testimony of the EPA's own expert witnesses.

Using a portable terminal and dial-up lines, members of the EPA's National Enforcement Investigation Center can access about 95% of the world's scientific and technical papers, according to John Lattimer, an EPA spokesman.

This includes articles in some 50,000 scientific journals published within the last 15 years and stored in commercial data bases, such as Lockheed's or in the world's network of libraries, government agencies, private research groups, Congressional records and the Science Citation Index, Lattimer said.

Some of the information gathered includes where witnesses on the opposing side have worked, what papers they have published, in what kinds of research they have specialized, whether they hold any patents and who gives them the grant or contract money to do their research. Also, past connections with the industry for which they're testifying sometimes come to light, according to Lattimer.

Contradictory Testimony

The system has another advantage, too. Previously, when a witness in a case made a statement that was misleading but not so inaccurate that it was obvious to attorneys, it was over-

looked. But now, with the help of the system, attorneys can identify testimony that contradicts that of another witness or even a statement made by the same witness in answer to previous questions, according to Dr. Douglas Seba, also of the EPA.

Time is a critical factor, according to Seba. In the past, it was impossible to gather enough evidence to refute statements from the opposition because there wasn't enough time for a complete search. But the computer has enabled the EPA to search for the data, gather it and validate it within 48 hours, according to Lattimer.

Previously, the most credible and believable witness would convince the judge in a hearing, but now there's a chance to break that testimony.

In one case, an opposing witness withdrew his testimony rather than face the computer system, Seba claimed.

In a sense, the system works for both sides, Seba said, because "all witnesses involved will strive for the highest credibility, knowing their expert opinion is truly open for inspection when under oath on the witness stand."

In addition to refuting the opposition's evidence, the system provides comprehensive background in preparing EPA enforcement actions. It is important to know everything about a chemical, for instance, before taking any action on its use, Lattimer said.

In a recent case, there were 17 days of petitioner cross-examination and 87 hours of on-line time charged by nine suppliers of data bases for the use of 62 technical files. More than 10,000 citations were reviewed and total on-line time cost about \$3,200.

These expenditures were less than 20% of the cost of manual searching and less than 10% of the cost of batch searching, and the results were more comprehensive, Seba noted.



Business Systems

DISTRIBUTOR OPPORTUNITY

Business Systems Products, Inc., manufacturers of the ADVISER® computer systems, is currently expanding its dealership program in selected marketing areas throughout the United States.

ADVISER systems are general business computers, developed by BSP to meet the needs of small to medium-sized companies, either as first time computer users, or to upgrade from outgrown mini-computers.

BSP is actively seeking distributorship candidates with prior successful experience in the business computer field.

Please submit your application to: George C. Erickson, Vice President, Marketing.

business systems products, inc.

2121 Campus Drive, Irvine, CA 92715
(714) 752-1799

Look Into Johnson Systems'

CICS/VS UTILIZATION MONITOR AND CHARGEBACK SYSTEM



"Now, a powerful data collection system that lets you accurately account for . . . and equitably bill for . . . all resources used by each user."

"The first feasible alternative to Performance Analyzer."

Send me your brochure about the new CICS/VS UTILIZATION MONITOR and CHARGEBACK SYSTEM.

Name

Title

Company

Address

City State

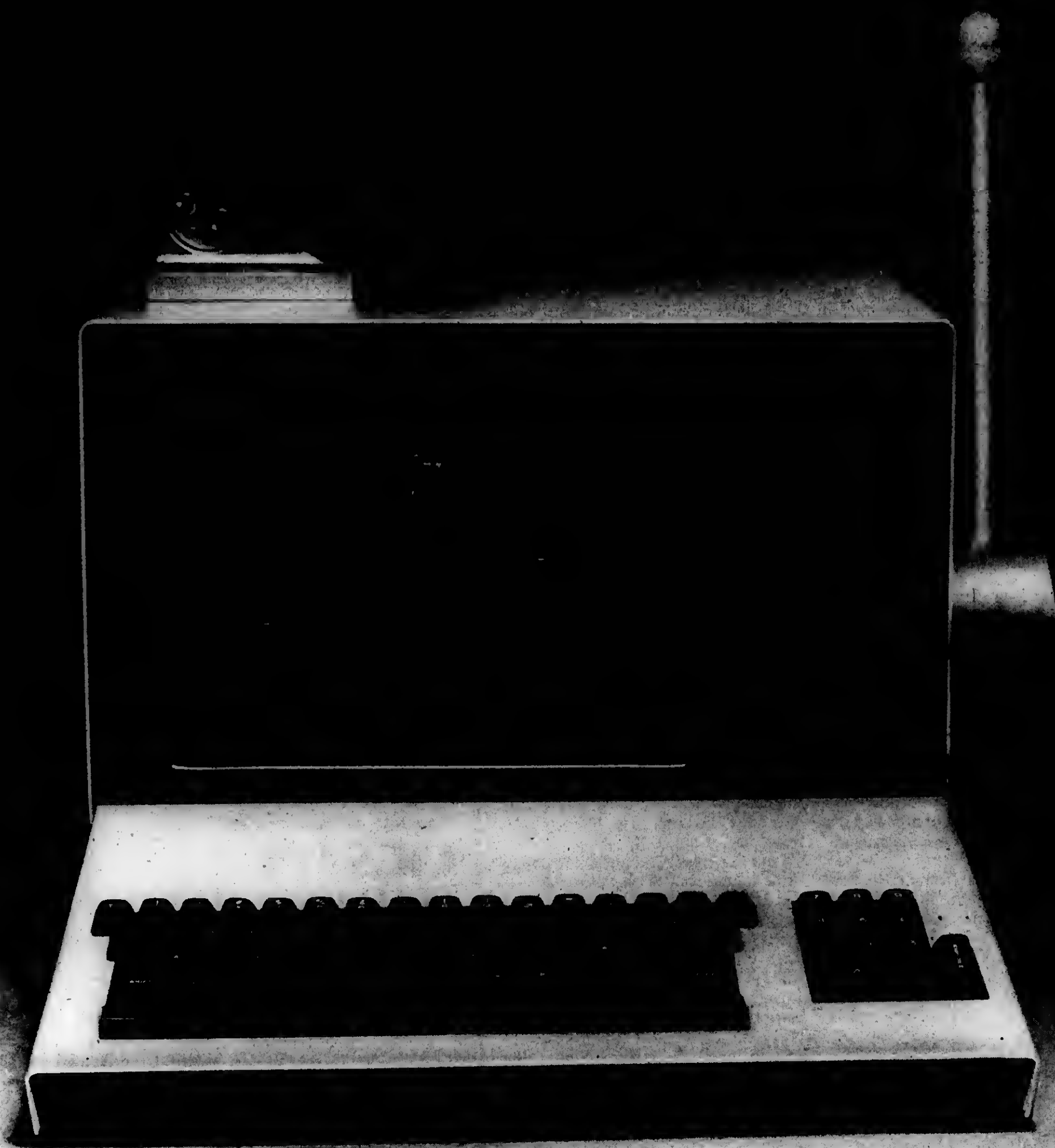
Zip Phone ()

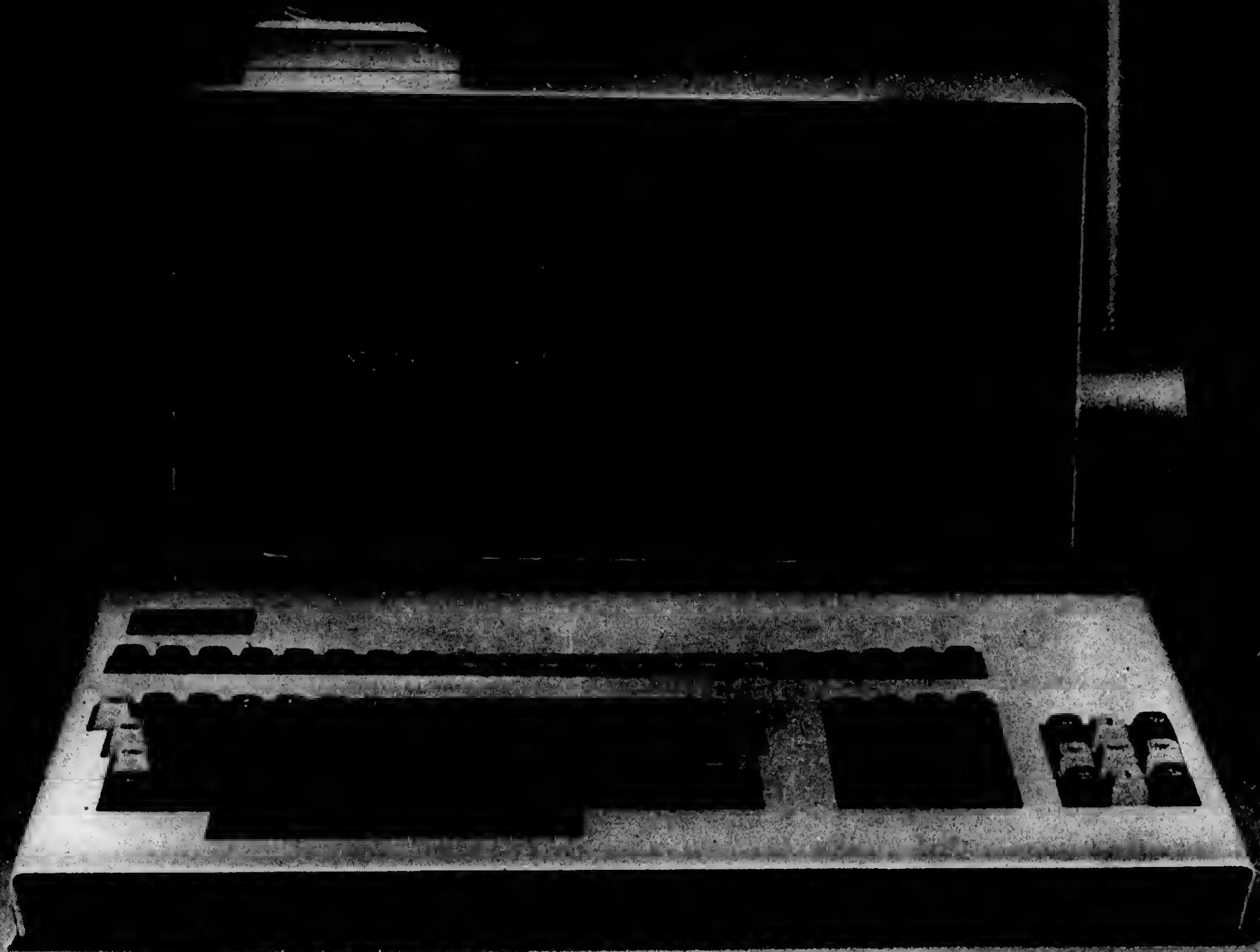
Computer Operating System

Johnson Systems, Inc.

8400 Westpark Drive
McLean, Virginia 22101 (703) 893-8700

C227





The odds were against coming up with a consistent winner in this business. But we beat the odds when a lot of smart money saw the pricing of our Infoton 400 Data Display Terminal: just \$1,095 in quantities of 100 or more. A remarkable price considering the Infoton 400 is designed around the Z-80 microprocessor, with editing and formatting modes settable through software that give it more flexibility than any other terminal in the industry for the price. That's what made Infoton data display terminals one of the largest selling in Europe.

And for options, choose from two additional pages of memory, a directly addressable printer interface, and polling capabilities.

No wonder we beat the odds.

To make the winning choice in video terminals, call Infoton collect at (617) 272-6660. Ask for Barbara Worth. Or write Barbara Worth at Infoton, Second Avenue, Burlington, MA 01803.



 **Infoton 400**

Editorial

Sites for Sore Eyes

There's good news and bad news on the CRT front.

First, the good. The National Institute for Occupational Safety and Health (NIOSH) has found CRTs do not emit radiation that could harm the workers using them [CW, Feb. 20].

However, the government agency did note that continual viewing of such devices can lead to eye strain and fatigue, particularly when the working environment is not designed with CRTs in mind. With between 5 million and 10 million CRTs in use in the U.S., it is a good bet many are located in high-glare areas, causing eyestrain to the people who have to work with them regularly.

There are many steps users of CRTs can — and should — take to help reduce operator eye fatigue. For example, the equipment should be used in areas where there is a minimum of glare on the screen. Further, users can program the systems to produce short columns —

like those in a newspaper — instead of forcing people to read a line that spans the entire screen.

Users should also survey the areas where CRTs are in use — particularly those areas where the systems are in use all day long by the same operator — to identify necessary changes.

Furthermore, users need to be more aware of the possible hazards associated with using DP equipment.

In designing systems, the human element should be taken into consideration more often. By designing for operator comfort, manufacturers can help to not only make the work place a bit more humane, but also head off problems that might crop up in the future.

After all, if a system is hard to use, people will tend to resist it. Even the most elegantly designed system from the DP point of view may fail its user if the human interface is poorly planned.

Patchwork Problems

President Carter has promised a major reform of the tax laws during his administration and while that may be good — or bad, depending on your politics — for the public, it is sure to create a headache for DPs.

Recent changes in the reporting requirements for Social Security have already set off one flurry of reprogramming [CW, Feb. 13] and any other changes in the law are sure to set off more efforts in this area.

The Administration and Congress

should enact tax reform measures all at one time, causing DPs just one major effort rather than many separate patch jobs.

Unfortunately, this will probably not happen, and almost every business DP shop in the country will have to face continual patches of its payroll programs for the next several years.

DPs need to keep a careful eye on Washington for the changes that surely will come along. A lot of fancy footwork is going to be required to keep up with the changes.

Letters to the Editor

Out of This League

It is no wonder Barry Starkman ["Any Advice for DP Grad Looking for Job?" CW, Feb. 13] hasn't been hired as an entry-level programmer — he doesn't meet the illiteracy requirement.

After all, what programmer writes short, coherent sentences without misspelled words?

I am sure the DP manager who reviewed his resume couldn't read it since he most likely was a programmer at one time. Unless Starkman has a programmer ghostwrite his resume, he will remain in the ranks of the unemployable. I suggest he try journalism.

Don L. Weimer

Columbus, Ohio

Good, Bad News at ACM

In response to "Write-Ins Join ACM Election Slate" [CW, Feb. 6], I have some good news and some bad news.

The bad news is that a nominating committee, by its nature, cannot nominate everyone who aspires to office. Hard choices must be made after long hours of discussion.

The good news is that the ballot may be enlarged by the petition process. I personally encouraged some of the present petitioners and signed their petitions.

Olin G. Johnson

Chairman

Nominating Committee

Association for Computing Machinery
Houston, Texas

'It Ain't What You Get'

Thomas D. Barr's letter [CW, Feb. 13] was very disturbing. It appears

by his response that the U.S. vs. IBM antitrust suit is turning into a secret trial.

Barr's letter implied the IBM lawyers, IBM, the Justice Department antitrust desk and the judge are the only people who know what is going on behind the scenes of this very important suit.

Barr, in effect, was saying, "What you see ain't what you get." It seems the parties listed above are the only ones who will be involved in the secret negotiation settlement on this very important antitrust suit.

It is clear that those injured by IBM monopolistic actions will never be heard from or gain relief in the future. They are only pawns in these supergovernment, super-business transactions.

George S. McLaughlin

Summit, N.J.

Consider the Source

The "prediction" by Adolf Monosson about the pending demise of the 370 leasing community ["Dealer Predicts 'Bloodbath' for 370 Lessors," CW, Feb. 6] would be laughable had it not appeared in a reputable publication such as Computerworld.

Monosson is not in the leasing business. The key point to bear in mind is that any upward or downward fluctuation in the price of used computers — fanned by "predictions" like this — means business for Monosson and his company.

Such business is apparently far more important to him than either facts or common sense.

James F. Benton

Executive Director

Computer Lessors Association, Inc.
Washington, D.C.

Data Past

Five Years Ago
Feb. 28, 1973

SAN FRANCISCO — A Service Bureau Corp. (SBC) employee here filed a \$100 million class action suit in district court against IBM charging that the transfer of SBC to Control Data Corp. deprived SBC employees of important IBM benefits. Some of the benefits named in the suit were the right to purchase stock below price, military benefits and the career progression through IBM.

WHITE PLAINS, N.Y. — IBM informed its customers it would no longer provide hourly machine time at its data centers for production work. CPU time would be restricted to "program testing and other activities, including conversion, directly related to program testing." Those services would still be available to "users and prospective users of IBM products."

Eight Years Ago
March 4, 1970

WHITE PLAINS, N.Y. — IBM filled in the major gap in System/3 capabilities with the announcement of a communications adapter that allowed the System/3 to be used as a communications terminal, exchanging data with other System/3s and all models of the IBM 360 series, except the 360/44, over telephone lines.

WELLESLEY HILLS, Mass. — Honeywell announced its Model 115 disk-oriented system, aimed at bolstering the lower end of the Series 200 family of computers. Designed for the first-time user as well as users of such competitive small systems as the IBM 360/20, NCR Century 100 and Univac 9200, the 115 was priced in the \$2,500 to \$6,000/mo rental range, placing it between the 110 and 120 in the Honeywell 200 series.



'But the Vendor Said All Keyholes Are Round!'

COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news;
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

☐ Please enter my subscription
(details on back)

☐ I'm already a subscriber,
but I'd like you to
change my:
address
title
industry
other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

RATES. United States — \$18 Canada and PUAS — \$28
Europe and Middle East — \$50 All Other Foreign — \$65

[illegible]

First Initial	Middle Initial	Surname										
Your Title												
Company Name												
Mail To:												
City			State			Zip Code						

Address shown is:

☐ Business

☐ Home

☐ Check here if you do not wish to receive promotional mail from Computerworld

☐ Check here if you're interested in receiving information on Computerworld's Index.

- | BUSINESS INDUSTRY | | TITLE OCCUPATION FUNCTION | |
|-------------------|---|---------------------------|--|
| 1 | 2 | 3 | 4 |
| 10 | Manufacturer of Computer or DP Hardware/Peripherals | 11 | President/Owner/Partner/General Manager |
| 20 | Manufacturer (other) | 12 | VP/Assistant VP |
| 30 | DP Service Bureau/Software/Planning/Consulting | 13 | Treasurer/Controller/Finance Officer |
| 40 | Public Utility/Communication Systems/Transportation | 21 | Director/Manager of Operation/Planning/ Administrative Service |
| 50 | Wholesale/Retail Trade | 22 | Director/Manager/Supervisor DP |
| 60 | Finance/Insurance/Real Estate | 23 | Systems Manager/Systems Analyst |
| 70 | Mining/Construction/Petroleum/Refining | 31 | Manager/Supervisor/Programming |
| 75 | Business Service (except DP) | 32 | Programmer/Methods Analyst |
| 80 | Education/Medicine/Law | 41 | Application Engineer |
| 85 | Government - Federal/State/Local | 42 | Other Engineering |
| 90 | Printing/Publishing/Other Communication Service | 51 | Mfg. Sales Representative |
| 95 | Other | 52 | Other Sales/Marketing |
| | | 60 | Consultant |
| | | 70 | Lawyer/Accountant |
| | | 80 | Librarian/Educator/Student |
| | | 90 | Other |



Detach here, fold, and place in post-paid envelope attached through binding.

Power Motive Apparent in Manager Profile

By Jack Stone
And Ida Mason

Special to CW

Everybody talks about good DP management, but few agree on just what it is that makes a good DP manager.

David C. McClelland and David H. Burham recently coauthored an article in the *Harvard Business Review* that draws upon academic theory and empirical research to reach some sensible and definitive conclusions on the characteristics of a good manager. This work plus some of our own ideas form the substance of this column.

Let's first examine the employee's perspective. Research data indicates that subordinates describe successful managers as people capable of motivating the work force; they instill feelings of responsibility, a sense of organization and team spirit in their workers. These same managers were also perceived as doing more and doing it better.

Now let's look at the question, "What driving forces — motives, needs, strivings, desires — are consistently found in successful managers?"

One is the "achievement motive." This is a strong need to succeed — a desire to do things better and more efficiently than before. In small organizations, this motive may be the key to survival, but it must be tempered for effective management of larger organizations. This is so be-

cause individuals motivated by achievement tend to expect relatively rapid progress in meeting work goals, and if they can't move and shake the bureaucracy, they will try to do the job themselves.

This situation exists in a good many programming organizations.

Another force behind successful managers is the "affiliation motive." They think of themselves as "nice guys" and certainly want to be liked. They believe they can empathize with their employees and respond to their feelings.

Again, this force must be kept under control. Otherwise, these managers may create negative feelings in their subordinates who may perceive undue fraternization with the staff as favoritism. We have seen a number of operations departments where this case was apparent.

Most Significant Need

A third drive, and quite frankly the most significant, is said to be the "power motive." This need to have "impact," this desire to influence others, may be the most consistent characteristic of the successful manager.

It can take two forms. The first results when the person has an overweening need for self-aggrandizement and ego gratification. The second is the altruistic, institutionalized form; in which the drive is socialized and controlled. Better managers fall into the latter group, but unfortunately, many DP

managers are identified with the former.

By way of amplification, we should note that mature individuals of any age are definitely short on egotism. They are not defensive and take advice. They view the "total picture" and their self-image is positive enough so that they do

orderly manner.

Third, they are not above sacrifice when the welfare of the firm is at stake. Self-interest is not as important to these people as the need to serve.

Fourth, they have a sense of justice and believe that one who sacrifices and works hard will eventually be rewarded.

There are several conclusions one can draw from the discussion. First, the considerations described above are only intended to provide a basic framework for understanding the mental makeup of the successful manager. Interested readers should pursue the subject with additional study.

Second, the reader, as an exercise, might wish to evaluate his own self-image against the points made in the discussion. It might stimulate a serious evaluation, a better understanding of power and other motives and how they can be developed and controlled.

And finally, schools of business around the country appear to be taking an increasing interest in the psychology of management. According to Dr. Donald Hudson, professor of management at the University of Miami, "a required course in Power 101 is just around the corner."

Ida Mason, a professor of DP at Lehigh (Pa.) Community College, is currently on sabbatical doing research on women in management.

The Human Connection

not feel their job is on the line every time they make a decision.

And with regard to control, although several individuals may have the same power motive, the more successful ones are likely to control their acts. They are more democratic than authoritarian in dealing with subordinates so as to promote strengths and help people overcome their weaknesses. In short, they coach, not coerce.

Subsidiary Characteristics

Let us mention four subsidiary characteristics commonly found in successful managers. First, they tend to be joiners and usually belong to many organizations. They also feel a serious responsibility to help build these groups.

Second, they seem to thoroughly enjoy their work. They like the work ethic and derive much satisfaction in seeing things done in an

Readers Document DP-Controlled Rip-Offs

Computer-controlled rip-offs of consumers in this country, according to my mail bag, consist of the 10 following methods:

- Printing accounts receivable statements without credit balances.
- Printing accounts receivable statements with credit balances, but not mailing them to the persons to whom they are owed.
- Printing a special report of suppressed credit balances for credit department use in the event of an investigation.
- Dropping all credit balances when an account is inactive for a year.
- Printing a code on credit balance statements that allows them to be segregated for further action.
- Maintaining a correct credit balance then waiting to see if the customer claims them. If it becomes obvious the customer is unaware of the balance, writing it off.
- Suppressing notification of mistakes that favor the customer while notifying him of mistakes that favor the seller.
- Maintaining computer balances that show untrue balances for customers by confusing rental payments due with retail value.
- Always rounding off amounts

against the customer.

- Creating "administrative transactions that wipe out small credits without notifying customers.

Who, Where and Why

Ten types of businesses are most often cited as using these methods. They are banking, mortgage banking, manufacturing, service bureaus, mass merchandisers, retailers, catalog stores, medical billers, wholesalers and sellers of schoolchildren's supplies.

No particular geographical area seems to be involved. Complaints are coming in from all over.

And the frequency of those complaints appears to be considerable. The highest range of figures I have puts the frequency of potentially abusing situations (credit balances, for example) at more than 15%.

What justifications are used? The most common are, "It's accepted business practice," "The dishonesty of our customers is greater than our dishonesty"; "Our job is to match the specifications, even if the specs cause incorrect results" and "The system is correct if it accomplishes management-set goals".

What happens when an employee of a firm that uses rip-off techniques questions them? The methods of handling such questions are not very varied, consisting of evasion (bypassing the DP manager or another responsible authority) or direct or indirect threats of the questioners dismissal.

Here are some of the comments I received from readers:

- "When I spoke out against this practice (dropping inactive credit

balances), I was told, 'Just do it.'"

- "In most instances after pointing out the situation, I am required to

(Continued on Page 25)

Headhunters vs. Confidentiality

1. Are you aware of any cases in which mere circulation of a resume was regarded as grounds for dismissal? _____

2. Have you known cases in which a job applicant's name was released without his approval to his boss? To anyone else? Please describe: _____

3. Have you known of any policy or any other mechanism that would cause a "headhunter" to release a job applicant's name without approval? _____

4. Are you aware of any attempts by employers to obtain the unauthorized release of names from job agencies to monitor employee activities? _____

5. Do you know of any methods that have been tried to combat agencies' unauthorized release of names? Did they succeed or fail? _____

Name _____ Position _____
Street _____
City/State/Zip _____

Please return to Alan Taylor, Computerworld, 797 Washington St., Newton, Mass. 02160. Detailed letters are welcome.

The
Taylor
Report
By
Alan
Taylor
CDP

INFORMATICS.

INFORMATIQUE

INFORMATIKA

INFORMATICA

INFORMATIKK

INFORMATICA

INFORMATIK

Wherever it's said, however it's spelled, Informatics[®] fulfills the promise of the computer...universally!

Informatics . . . throughout the world, the word is synonymous with the ultimate in modern data processing. In the United States and many other countries, it means the people, products and services of Informatics Inc. Many people know us for our software products, such as MARK IV[®], or our professional services. But we also provide a full range of information processing services. Everything from conventional time-sharing user languages to powerful data base management systems provided on a nationwide communications network. Business reporting services, financial analysis and modeling systems, graphic and statistical tools, litigation management systems, text codification and photocomposition services, and a full array of specialized data services for the insurance and distribution industries.

Informatics Inc. . . . one of the world's leading independent suppliers of software products and services. Drop us a line and we'll send you a colorful brochure that tells how we can help you fulfill the promise of *your* computer.

SOFTWARE PRODUCTS
PROFESSIONAL SERVICES
INFORMATION PROCESSING SERVICES

informatics inc



Corporate Offices/21031 Ventura Boulevard/Woodland Hills, California 91364/(213) 887-9040/Telex 69-8473

Member SIA  Software Industry Association [®]U.S. registered service marks and trademarks of Informatics Inc.

Thanks to DP, Rhymesters Can Rest Easy

By Sherwood Springer

Special to CW

By sheer chance, a lack of tight programming recently solved a problem that has nagged a certain esoteric group for several hundred years.

This concerns the search for a rhyme for the word "orange," traditionally No. 1 on the list of English

words which, because of their unique rhyming structure, have frustrated generations of versifiers.

More than 40 years ago "porringer" was suggested, using the suffix as an end-around; that, to our knowledge, is the best anyone has been able to do.

Until a few days ago.

As you may know, the type for

many newspapers nowadays is set by a photographic process entailing a keyboard-operated input of copy. A computing unit measures the

Reader Commentary

copy into lines to fit the newspaper's column width.

When word divisions are necessary at the end of lines, programming is supposed to indicate proper division by syllables. But, as you must have noticed in your daily reading, the results are occasionally weird.

Thus, the following two lines recently appeared in a news story comparing President Carter's handling of options to that of his predecessor:

policies, both domestic and foreign, Jerry Ford, unlike Carter, was generally

Like the mold spore accident that led to the discovery of penicillin, this slip has provided us serendipitously with "foreign-j" — or, more simply, "foreignj" — a singularly happy rhyme for orange. May rhymesters all around the world sleep well tonight.

Springer is former financial editor of the Springfield, Mass. Republican.

Readers Detail Rip-Offs Perpetrated by Computer

(Continued from Page 23)

meet the specifications, and it is the specifications that determines when I am paid."

• "As a DP manager, I have had upper management bypass me to get their slippery deals pulled off."

Complicating Problem

A different problem appears to be complicating the issue. This is the failure of "head hunters" to keep one's name from being revealed to a boss.

A New Jersey reader wrote "In recent months I have personally known two cases in which a friend submitted a resume to an agency without permitting its circulation. Within a few days, his manager was aware that his resume was on the market... recently I was informed that if my resume were on the market, my manager would know of it and I could be dismissed."

If this is true or even feared as being true, it could effectively prevent the standard approach that lets people stay clear of unethical problems simply by changing jobs. As one reader put it, "You change jobs so much to find an ethical firm that your resume makes you seem like a gypsy."

Do any other readers find "confidential" resumes getting back to bosses? Do any know how? Is the placement agency for example, told it won't place anyone with the firm unless the names of employees looking for jobs are leaked?

Or are resumes simply circulated freely despite restrictions on circulation? Is it the "old-boy network." Has anyone found any answers to this problem that suc-

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

Attention VIDEO 370 Users!

KEY MASTER gives you more in-depth data entry

- Improved data entry
- On-line data entry
- Easy storage
- Fast retrieval

See page 7 for more details

BUYING HARDWARE

Pros



Photo courtesy of Computerland of San Francisco

Cons



Computerland, the DP Department Store. Hazeltine & Diablo on Display.

Time was, buying hardware meant dealing factory direct. Then came the distributor, or factory indirect. The phone/mail order ad reads, "15% off." 15% off what? Delivery schedule maybe. After sales service perhaps. The only real savings just might be the Toll Free number in the ad.

Now there's an alternative. Introducing Computerland, a national network of DP equipment stores, with outlets across the nation. This means you, and the DP director, programmer, general manager or purchasing agent can take a quick ride across town, try out working equipment in a user environment, make product comparisons, then drive off with the hardware of your choice. And, still be back in time for the afternoon coffee break.

Below is a sampling of the quality business information products, from more than 60 manufacturers of micro and mini-computer systems and peripherals, available for you to try out, buy or lease and take home today from Computerland.

Computerland™

1922 Republic Ave., San Leandro, CA 94577 (415) 895-9363

Franchise opportunities available.



HAZELTINE 1500

- ☐ 24 X 80 Display (upper/lower case) ☐ High legibility 7 X 10 dot matrix ☐ Teletypewriter format for alphanumeric plus numeric pad ☐ Switch-selectable upper/lower case ☐ RS-232/C 20 ma. current loop interface ☐ Switch-reversible video.



DIABLO 1620-3

- ☐ HyType daisy wheel character printer ☐ Full keyboard with numeric pad ☐ Microprocessor controlled ☐ RS-232/C interface ☐ 45 CPS ☐ Tractor feed ☐ Internal power supply.

See our ad on page 74.

© Copyright Computerland 1978

ALABAMA
3020 University Dr., N.W.
Montreal 205-539-1200

CALIFORNIA
6743 Dublin Blvd.
Dublin 415-828-8090

11071 San Pablo Ave.
El Cerrito 415-233-5010

22634 Foothill Blvd.
Hayward 415-538-8080

6840 La Cienega Blvd.
Inglewood 213-776-8080

20001 Via Fabricante, #904
Mission Viejo 714-770-0131

4233 Conway St.
San Diego 714-560-9912

42 42nd Ave.
San Mateo 415-572-8080

117 Fremont St.
San Francisco 415-546-1592

El Cid Plaza, Suite 105
Thousand Oaks 805-495-3554

104 W. First St.
Tustin 714-544-0542

1815 Ygnacio Valley Rd.
Walnut Creek, CA 94598
(Call directory assistant)

COLORADO
2422 So. Colorado Blvd.
Denver 303-759-4685

CONNECTICUT
2475 Black Rock Turnpike
Fairfield 203-374-2227

DELAWARE
Astro Shopping Center
Newark 302-738-9656

GEORGIA
Cumberland Square North
Atlanta 404-953-0406

ILLINOIS
50 East Rand Road
Arlington Hts. 312-255-6488

9511 No. Milwaukee Ave.
Niles 312-967-1714

10935 S. Cicero Ave.
Oak Lawn 312-422-8080

KENTUCKY
813 B. Lyndon Lane
Louisville 502-425-8308

MARYLAND
16065 Frederick Rd. (Rt. 355)
Rockville 301-948-7676

MICHIGAN
2927 28th St., S.E.
Kentwood 616-942-2931

29673 Northwestern Hwy.
Southfield 313-356-8111

NEW HAMPSHIRE
419 Amherst
Nashua 603-889-5238

NEW JERSEY
2 De Hart St.
Morristown 201-539-4077

NEW YORK
1612 Niagara Falls Blvd.
Buffalo 716-836-6511

225 Elmira Road
Ithaca 607-277-4888

OHIO
1288 SOM Center Road
Cleveland 216-461-1200

TEXAS
Shoal Creek Plaza
Austin 512-452-5701

6439 Westheimer
Houston 713-977-0909/0910

WASHINGTON
Parkway Center, Suite 12
Federal Way 206-838-9363

Can't Eliminate Satellite Delay

"Firm Uses Device to Cut Satellite Delay" [CW, Feb. 6] contained some implications and statements that are misleading.

It stated that the device provided by American Satellite Corp. is used by General Felt Industries "to eliminate propagation delays."

The fact is that propagation delays cannot be eliminated. The signal must travel to the satellite and

back down again and that takes a finite period of time.

Additional delays occur in the ground stations and the satellite itself. Nothing can change the fact that a coast-to-coast satellite circuit covers over 40,000 miles while the equivalent terrestrial circuit is under 3,000 miles.

Although the propagation delay cannot be eliminated, the effective throughput on the circuit can be increased

by a variety of means to partially overcome its effect. However, as described, the system is primarily overcoming difficulties imposed not by a circuit, but by a poor communications protocol.

Clark N. Okun
Montclair, N.J.

Consent Order Violation?

Our Seattle Regional Of-

fice has forwarded for our information a copy of Alan Taylor's column "Saks Billing System May Violate ICCP Code" [CW, Dec. 26-Jan. 2].

Two statements in the article, if factually accurate, suggest the named company may be in violation of a Federal Trade Commission consent order.

The statements are as follows: "Where merchandise

is returned and credited, but where the account remains inactive the credit is placed in some archives making location difficult throughout the system," "Billing statements inform only that the person concerned owes all the current transactions but fail to give the consumer credit for the true balance in the consumer's account because it is located in the archives."

The procedure described would be inconsistent with the requirements of a Consent Order entered by the commission against Gimbel Brothers, Inc., of which Saks is a division.

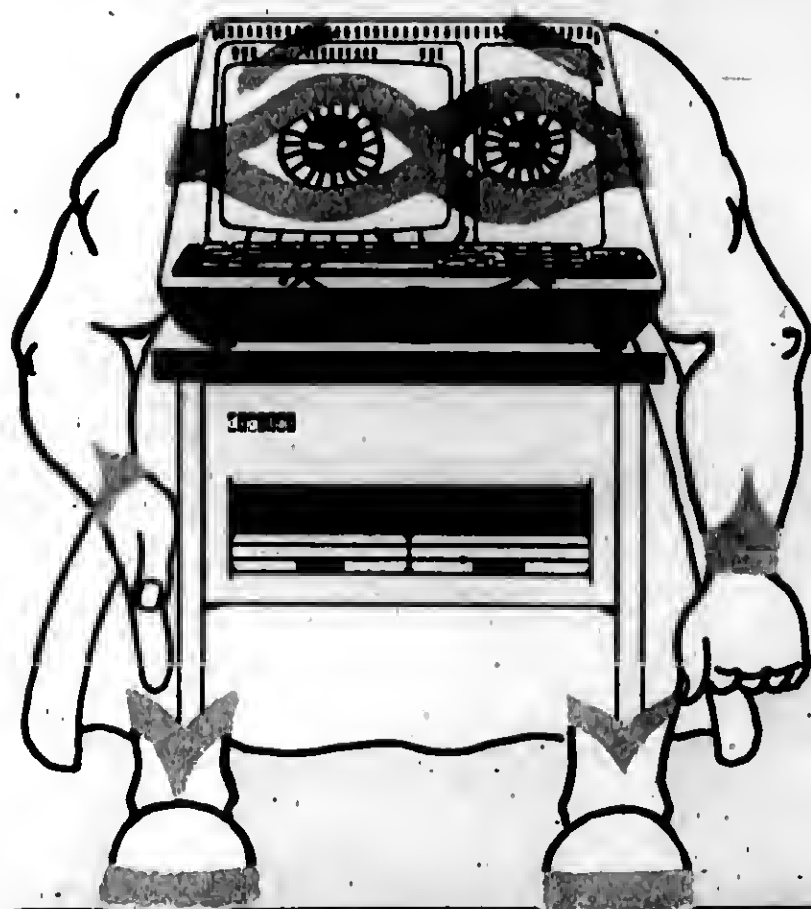
That order provides in part that the respondents must cease and desist from writing off or deleting any credit balances of more than one dollar from the customer's account before the respondent has made a cash refund or the customer has made a fully offsetting purchase.

We would appreciate any information that supports the part of the article cited above.

Justin Dingfelder
Deputy Assistant Director
for Credit Practices
Federal Trade Commission
Washington, D.C.

Taylor said his material will be forwarded. Other people may wish to contact Dingfelder directly. Ed.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.



*** More Powerful Than Basic.**

*** Faster Than Basic.**

*** Able To Leap Over Development Problems With A Single Bound.**

*** It's DECstation 78® with HIBOL/78™ Available Only From FAST COMPUTER! ... and at No Additional Cost**

Feature	OS/78 BASIC	HIBOL/78
Precision—Number of Significant Digits	6 Digits	11½ Digits
Statement Tags	1-5 Digits	Variable Length Alphanumeric
Variable Names	Single Alpha or an Alpha and a Single Numeric	Variable Length Alphanumeric
String Length	80 Characters	255 Characters
File Access Sequential Direct	Yes No	Yes Yes
Boolean Operations	No	Yes
Listing Format Controls	No	Yes
Virtual Program Space (Automatic Overlays)	No	Yes
Debugging	None	Extensive*

*Extensive Debugging Features such as: Full Directory Support, Symbolic Debugging, Multiple Breakpoints, and an optional Cross Reference Listing.

78 DECstation Information Systems Corp. (DEC) Oak Park, Illinois
© Digital Equipment Corp., Maynard, Mass.

- Attractive Discounts.
- Super Discounts For OEM Quantities.
- Off-The-Shelf Delivery.
- Complete Hibel™ Documentation and 1 Year Support Included.
- All Standard DEC® Software Included.
- DEC Word Processing Models (WT78) And Software Also Available.

Complete LAB® systems and LSI-11® and the new LSI-11/2® components and systems Also Available With Attractive Discounts.

Call FAST (312) 920-1060
first for all your DEC computing needs.

FAST COMPUTER CORPORATION
764 Burr Oak Drive • Westmont, Illinois 60559



'It's Our New Bubble Memory!'

DECwriter II & III
FOR SALE
• LA36 • LS120

300 323 2288

Even Though He's Loyal . . .

Late Software Delivery Hurts B80 User

By Don Leavitt
CW Staff

McALLEN, Texas — Hector Villarreal thought he had a perfect timetable for installing a Burroughs Corp. B80 and its companion Commercial Business Management System (CBMS-II) software. But things didn't work out as smoothly as he had hoped.

Various setbacks — some of Villarreal's own making, but principally delays by Burroughs in delivering both the hardware and the software — have left the comptroller (and part-time programmer) of M.W. Fruit Co. still putting together a system he had expected to have up and running last September.

September was an important target for the company, which grows and packs citrus fruit, because it marks the start of its active season, a season that doesn't end until May. Villarreal had been promised that the B80 and all the modules on CBMS-II would be delivered in June 1977, which would have allowed time for customizing and the rest of the preparation needed to ease the fit of user and system.

Having had one, and then two, Burroughs magnetic ledger card systems before ordering the B80, Villarreal was well acquainted

with the vendor and perhaps in a better position to cope with DP chores than some users of the small business system.

He programmed the initial B80 application, for example, to support a subsidiary of M.W. Fruit that supplies fruit to civic groups for fund-raising drives.

But Villarreal was counting on the CBMS-II modules to handle most of the company's work, and "one of the most effective parts of Burroughs' sales pitch was that all the software to support the B80 would be ready in June, when the hardware was to be de-

livered, or July at the latest.

Slipped Deliveries

Burroughs in fact slipped delivery on the B80 till August and even worse on the software.

"Actually I got the first application in August, the second in October, the third in November . . . and I still lack the accounts payable package," Villarreal said. Despite having now phased in general ledger and accounts receivable and working on payroll, the missing "payables" really bothers him.

Accounts payable is more im-

portant to M.W. Fruit Co. than most of the other applications he said, and it could have been implemented fairly easily because it doesn't require a severe change in the user's way of doing things — "but the programs are still not available and that hurts."

Villarreal's reluctance to impose changes on internal systems during the active season is one of the main reasons he hasn't pushed ahead with invoicing and inventory control at this time. It's also obviously the reason he wanted the software last summer, when

(Continued on Page 28)

'MFE/IV' Extends Four-Phase Use

CUPERTINO, Calif. — By the end of the year, users of Four-Phase Systems' System IV/90 processor with expanded memory reportedly will be able to handle a range of functions on each of the CRTs linked to the small business system instead of dedicating the units to specific functions.

This flexibility will be made possible by the Multifunction Executive (MFE/IV), which supports data entry operations, execution of Cobol programs, word processing and interactive in-

quiry against files residing within an IBM 360/370 mainframe, Four-Phase said.

Users are free to switch from one function to any other at any of the 16 1,920-character CRT units that can be attached to a single System IV/90. Activity at one CRT has no effect on what can be done at any other; MFE/IV dynamically allocates CPU and I/O resources to optimize system performance, a spokesman claimed.

Existing software supported by the executive includes Four-

Phase's Data IV, Vision, Foreword and Cobol runtime system. Cobol programs can be compiled in batch mode for use under MFE/IV, he said.

Data IV was designed for data entry operations and provides support for CRT screen formatting, while Vision is a transaction-oriented access technique for working with files at the System IV/90 or at the host mainframe. Foreword supports word processing.

Users working under MFE/IV can transfer from one mode to another "on the fly" to put together the work they have to get done.

To support MFE/IV, Four-Phase announced two memory modules for the System IV/90, expanding storage capacity from 192K bytes to either 288K or 396K bytes.

Monthly cost of a 288K system with appropriate disk drives, 16 CRTs, line printer and communications controller is \$3,522 on a 42-month lease. This includes MFE/IV — scheduled for delivery beginning in the fourth quarter.

Four-Phase Systems is at 10700 N. De Anza Blvd., Cupertino, Calif. 95014.

'RTSort' Supports PDP-11 Shops

NASHVILLE, Tenn. — A disk sort for Digital Equipment Corp. PDP-11 minicomputers running under DEC's RT-11 or CTS-300 operating systems has been announced here by S&H Computer Leasing, Inc.

RTSort requires a minimum of 16K bytes of main memory and typically needs less than 1.1 times the input file space to store temporary sort files on disk, according to a spokesman. The sort can be run directly, chained from Dibal or Fortran programs or run as a detached job called by user

message packets, he added.

This assembly language program handles both fixed- and variable-length records; the user can specify up to 16 sort keys, the firm said, noting key types include signed and unsigned binary integers, single- and double-precision floating-point numbers, Ascii character strings, dates and Dibal numbers.

The following sort times are said to have been attained while running RTSort on a PDP-11/10 with 56K bytes of memory and RK05 disk drive; input data con-

sisted of randomly ordered 80-character records:

Number Of Records	Time (Min:Sec)
1,000	0:15
2,000	0:25
5,000	1:02
10,000	2:08
15,000	3:45

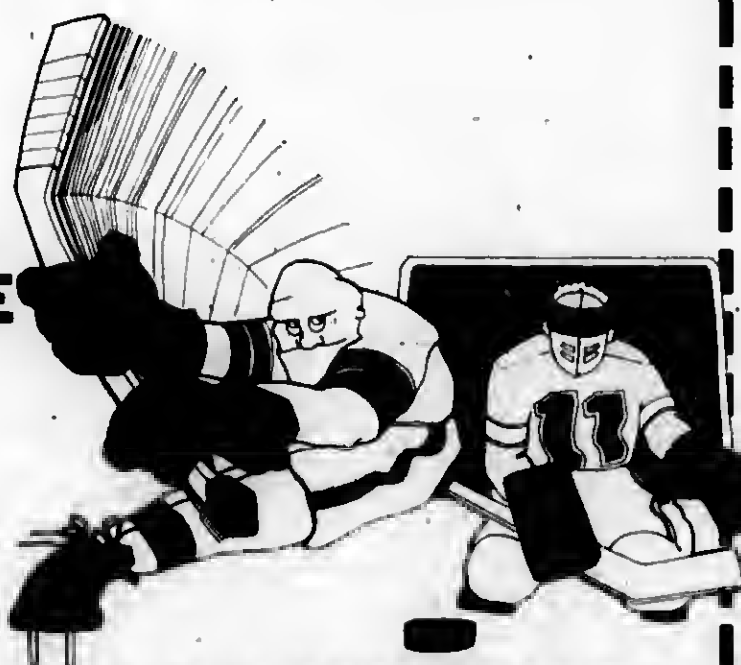
Priced at \$450, RTSort is distributed on floppy disks from S&H Computer Leasing, 3709 Trimble Road, Nashville, Tenn. 37215.

SAVE your financial decision-makers with our GENERAL LEDGER, ACCOUNTS RECEIVABLE AND ACCOUNTS PAYABLE Systems.

Don't let your company management face-off against tough decisions wearing information blind-folds. Give them a great assist with proven, reliable systems from the No. 1 company — Software International.

Our hard-hitting first line includes the famous GENERAL LEDGER and FINANCIAL REPORTING SYSTEM, powerful ACCOUNTS RECEIVABLE and agile ACCOUNTS PAYABLE Systems.

They know their way around the league, operating in DOS, O/S, IMS, IDMS, DL/1, TOTAL, as well as on-line under CICS.



Give your financial management the most effective power-play you can, the three-way combination of GENERAL LEDGER, ACCOUNTS RECEIVABLE and ACCOUNTS PAYABLE, only from Software International. SCORE!

We've been in the penalty box for too long. Software International, Shoot your latest information to me about:

Large Computer Systems

- ☐ General Ledger and Financial Reporting System
- ☐ Accounts Payable
- ☐ Accounts Receivable

Manufacturing

- ☐ Master Production Scheduling
- ☐ Material Requirements Planning
- ☐ Capacity Planning
- ☐ Shop Floor Control
- ☐ Comprehensive Report Generator
- ☐ FILETAB

Name _____

Title _____

Company _____

Address _____

City _____

Small Computer Systems

- ☐ System/3
- ☐ General Ledger and Financial Reporting System
- ☐ Accounts Receivable
- ☐ Accounts Payable
- ☐ Burroughs B-1700/1800
- ☐ General Ledger and Financial Reporting System
- ☐ Accounts Receivable

Other small computer system application products available soon. Please specify computer and need.

State _____

Zip _____

Phone _____

Computer _____

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01810 (617) 475-5040
Atlanta • New York • Washington, D.C. • Philadelphia • Chicago
San Diego • Toronto • Houston • Columbus, OH • San Francisco
*Registered trademark of Software International CW2778

Sierra Gives PDP-8 Users Added Support for Micros

RENO, Nev. — Sierra Digital Systems is offering four microprocessor cross-assemblers for the Digital Equipment Corp. PDP-8 minicomputer.

The X8 series cross-assemblers now cover the Z-80, 1802, SC/MP and 8048 microprocessors in addition to the previous 6502, 6800, 8080, F8 and 2650 versions.

Sierra Digital's cross-assemblers run in 8K words of memory under DEC's OS/8 environment. They are written in the PDP-8 assembler language to provide fast execution with minimum memory use, according to a spokesman.

Assembling micro programs on a mini leaves the micro free for "live"

work while new coding is being developed, he noted.

Within the X8 packages, pseudo-operations and runtime options provide for conditional assembly and extensive listing control. Generated object code can be output in the microprocessor's standard loader format or in BNPF for read-only memory (ROM) generation.

Each cross-assembler costs \$400 and is distributed in DEC PDP-8 binary format on paper tape, magnetic tape or floppy diskette.

Source files are also available for an additional \$250, the company noted from 13905 Rancheros Drive, Reno, Nev. 89511.

SCMG Plans March Meet

JACKSONVILLE, Fla. — The Holiday Inn South here will be the scene for the next meeting of the Southern Computer Measurement Group (SCMG) March 16 and 17, according to program chairman Al Cartledge.

Topics to be considered include capacity planning as well as performance of Cobol and of IBM's Information Management System (IMS) software. Presentations of new

products or services by both Comten and Tesdata will also be part of the program, he noted.

The meeting is open to anyone interested in computer performance measurement, evaluation and enhancement. There will be a registration fee of \$15/person, which includes a luncheon. More information is available from Cartledge, Celanese, P.O. Box 1414, Charlotte, N.C. 28232.

Package Aids Datasystems

SUMMIT, N.J. — Print IV, a "query-type" report writer that runs on Digital Equipment Corp.'s larger Datasystems based on PDP-11s, is

now available from Symbolic Systems, Inc., a spokesman said.

The utility allows the user to select the data, sequence, format and control totals to be used in generating any desired report. Print IV is end user-oriented, requiring no programming skills, the spokesman claimed.

A clerk can set up a procedure he added, since the system is interactive and the instructions can be entered in free-form style. Beyond that, Print IV supports the storage of completed procedures so they can be recalled for use through symbolic names.

Print IV costs \$3,500 from Symbolic at 25 Chatham Road, Summit, N.J. 07901.

Delays Disturb Loyal B80 User

(Continued from Page 27)

the systems could have been set up before the season started.

With little local help available from Burroughs — McAllen is about 350 miles from Houston, 600 or 700 from Dallas — Villarreal is working his way through the documentation provided with the software, but that's a slow process. He had hoped the manuals would be "a little more instructive" for persons who, like him, can't get away to the classes Burroughs offers on the applications.

Pleased with Help

Although he'd like to see Burroughs beef up local support, the comptroller is a realist and seemed pleased with help he had gotten over the phone from Houston and Dallas. There are several other B80 users in this southernmost tip of Texas, but Villarreal believes his is the only shop going with the CBMS-II software.

Still loyal to his supplier, he is nonetheless glad to have a friend who is installing a Burroughs B800 and phasing in his applications much as Villarreal is. "We work closely together. We talk the same language, so that helps," the M.W. Fruit Co. official explained.



A shocking discovery.

The world is full of shocks. And in the computer room, they can be extremely costly. Because even small shocks caused by improper disk insertion or storage can throw delicate mechanisms off-kilter. And that often leads to expensive repairs and reduction in operating efficiency (data loss, head crashes, job reruns, downtime).

But now, though the shocks may come, you can detect them before they cost you an arm and a leg. Thanks to the Telex Shockwatch, a small but ingenious device.

Shockwatch tells you at a glance when a computer disk cartridge (or any other piece of delicate equipment) has received a damaging jolt.

A shock of pre-calibrated G-force breaks the Shockwatch's diamond-drilled glass capillary. And turns it a bright crimson red. Shockwatch tips you off to the disturbance before you damage things further.

To fit nearly all computer industry needs, Telex Shockwatches come in different sensitivity ranges (based on G-force sensitivity). They mount simply on any device with a special adhesive strip.

Major computer companies have saved over a million dollars by using Shockwatches when shipping sensitive disk cartridges, etc.

Call toll free (800-421-0506; in California 800-252-0505) or write Telex today. Once you start using Shockwatches, you'll never want to be without them.



Telex Marketing Company

A Division of
North American Telecommunications Corp.
6464 Sunset Blvd., Los Angeles, CA 90028
Tel. (213) 464-4100

Toll Free (800) 421-0506

in California (800) 252-0505

Gentlemen:

Type of cartridge or multiplatter pack: _____

Quantity ordered: _____

Shockwatch Prices
(2315 & 5440 or equivalent cartridge):

1-11	 @ \$8.75	25-49	 @ \$5.75
12-24	 7.50	50-120	 5.25

Quantity discounts and additional information
on request. Dealer inquiries invited.
ORDERS SHIPPED IN 24 HOURS.

P.O. No.: _____

Ship to: _____

Address: _____

City: _____

State: _____

Phone No.: _____

Attention: _____

☐ C.O.D.

☐ In Calif. add 6% sales tax

☐ Open account

CAUTION — HANDLE WITH CARE
DO NOT INSERT IN DRIVE IF DETECTOR IS RED

Think of it
as downtime insurance.



(402) 392-2606

VOLUME DATA ENTRY SERVICES ...
TAPE OR CARDS
"QUALITY AT A LOWER COST"

AMERICAN KEYDATA

Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106



The secret to success is a little bit of selfishness. And Perkin-Elmer peripherals.

We're a little bit selfish.

Let's face it.

You want to be successful. We want you to buy Perkin-Elmer peripherals.

The more successful you are, the more Perkin-Elmer peripherals you buy.

That's why we set up our entire peripherals operation to help make you more successful.

It's really quite simple. And a little bit selfish. Here's the way it works.

We make you really price competitive.

At Perkin-Elmer, we know a "stripped down" peripheral doesn't always make you competitive. And a peripheral with more features than you need can be just as bad. So at our Terminals and Wangco Divisions, we build peripherals with only the features you want, and you pay only for the features you need.

Using our peripherals in your product means your product hits the market sooner and stays on

the market longer. Because, together, we thought it out. And matched it to the application. From the very beginning.

Over 200,000 quality products.

When you buy Perkin-Elmer, you buy proven quality. Right now, Perkin-Elmer has over 200,000 terminals, printers, and disk, tape, and floppy drives out there. Working. In systems just like yours. That's quality.

Support when you need it.

And, when it comes to support, we're available. For consultation. Product planning. Training (your people or your customers). And especially for service. In fact, one call to our No-Hassle Toll-Free 800 number gets you service. When you need it. Where you need it. Day or night.

QC to stretch your service dollars.

Uncompromising QC. That's how we became a Fortune 500 company. Perkin-Elmer QC people and their test proce-

dures are the best in the industry, which means your product is more reliable and your service dollars go a whole lot further.

Now you be a little bit selfish.

In fact, why not get started right away? For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free (800) 631-2154.

Here is my business card. Tell me how to be a little selfish with ☐ terminals ☐ printers ☐ disk drives ☐ tape drives ☐ floppy disks.

PERKIN-ELMER
Data Systems

APL File Handlers Offered

ATLANTA — Three separate file-handling extensions for IBM's APL-SV software are now available from Interprocess Systems, Inc. Following APL convention, the packages have been labeled auxiliary processors (AP) since they provide system-level support but are outside the APL system itself.

These APs function without any change in APL-SV or in the user's operation system, an Interprocess spokesman noted. File handling has always been one of the problem areas in APL, but these APs alleviate that problem, he claimed.

APL-SV users, can for example, employ Isam/AP, one of the Interprocess packages, to access standard Isam data sets or Vsam/AP to

access Vsam files, he said.

Finally, a File Management AP (AFM/AP) utilizes Vsam file techniques to emulate Scientific Time Sharing Corp.'s APL Plus File Subsystem, he added.

Currently installed with APL-SV and with VS/APL under IBM's Virtual Storage Personal Computing (VSPC) environment, AFM/AP will soon be released for VS/APL under the Conversational Monitor System (CMS) of IBM's Virtual Machine (VM/370) facility as well.

Isam/AP and Vsam/AP each cost \$5,000; the AFM/AP license fee is \$8,500.

Interprocess is at Suite 2410, 34 Peachtree St. N.W., Atlanta, Ga. 30303.

Software for Wholesaler, Distributor Uses Eclipse

MILWAUKEE — Software designed to support wholesalers, retailers, parts suppliers or distributors in controlling large data bases and thousands of transactions per day is now being offered by Doyle Data Systems for use on Data General Corp. Eclipse C/330 minicomputers.

The Distributor I package includes 85 CRT screen-processing programs prepared under DG's Interactive Data Entry and Access (Idea) software and more than 60 other programs, written in Cobol for batch processing. System files are organized under Infos, DG's data base management system, according to a spokesman.

Applications supported by the sys-

tem include order entry, invoicing, inventory control, back order control, purchasing, accounts payable, accounts receivable and general ledger, the spokesman reported.

The system has been tested using eight input terminals operating simultaneously; typical response times have been less than one second per transaction during order entry and invoicing, he claimed. At that rate, Distributor I can handle 20,000 transaction entries in an eight-hour shift, he noted.

Back orders receive special attention, the spokesman emphasized. They are created by the system during invoicing and the purchasing department receives reports showing which items are on back order. As shipments are received from suppliers, back orders that can be satisfied are released for shipment to customers.

The vendor also noted that the Distributor I package includes installation and maintenance utilities as well as the application logic. In addition, Doyle provides a one-week system training course and two weeks of on-site installation support.

The full Distributor I system costs \$27,500, but individual modules are to be purchased separately. A 50% discount on the software is granted to users acquiring the DG Eclipse hardware from Doyle, the spokesman said from 1701 W. Wisconsin Ave., Milwaukee, Wis. 53233.

Mini Manages Manufacturing

SAN LUIS OBISPO, Calif. — The Interactive Manufacturing Planning (IMP) package from Robert F. Williams Associates runs on minicomputers using Iris-type operating systems and provides a full time-phased, net change material requirements planning (MRP) facility, according to a spokesman.

IMP includes a bill-of-materials processor, inventory control, and purchasing modules and other modules for creating and maintaining a master production schedule, shop loading, shop floor control, load smoothing, product/job cost analysis, work-in-process reporting and job status reporting, the firm said.

Financial management modules interfaced to IMP are also available, the spokesman added.

Turnkey Available

Iris is a time-sharing system for Data General Corp. Eclipse or Nova minis or other Nova-like CPUs. It supports multiple languages, multitasking, a four-level security system and data base management and is a product of Educational Data Systems, Inc. of Irvine, Calif.

IMP is available on a turnkey basis, including both hardware and software, and as a software package only. The turnkey systems range from \$45,100 to \$138,450; IMP by itself costs \$25,000.

Both Iris and the financial modules that can be linked to IMP are also available at additional cost from Williams at 626 Al-Hil Drive, San Luis Obispo, Calif. 93401.

flexible disks

Verbatim

The superb quality of Verbatim™ removable magnetic storage media is now on a dealer's shelf not far from you.

The reason Verbatim is now so accessible is that so many of you like the Verbatim idea: noticeably better quality and durability that show up in tough everyday use. The reason? We make almost everything ourselves, because we found that we could improve on the quality that we were getting from our suppliers.

Being demanding isn't always easy. But it's good for the people who buy and use Verbatim, and it's good for the scores of companies who specify Verbatim for the equipment they make. And we enjoy doing business that way.

For your nearest sales office call toll free:
(1) 800-821-7700, Ext. 515
(in Missouri call: 800-892-7655, Ext. 515)

Information Terminals Corp., 323 Sequel Way,
Sunnyvale, CA 94086. (408) 245-4400.
TWX: (910) 339-9381.

In the Far East:
ITC - Far East
404 Roppongi Skyheights
3-2-21 Roppongi, Minato-ku
Tokyo, Japan
Telephone: (03) 583-1981
Telex: J 47879

In Europe:
Information Terminals S.A.
Case Postale 296
1215 Genève 15
Switzerland
Telephone: 41 (22) 34-90-55
Telex: 22647 ITGE CH

Ask for it by name.

Verbatim™

minidisks

Verbatim

Dear Verbatim people:
Tell me where my nearest Verbatim dealer is. 89-2-27-78

My name is _____

Title _____

Department _____ Tel. _____

Organization _____

Address _____

City _____ State _____ Zip _____

And while you're at it, send me literature on _____

Information Terminals Corp., 323 Sequel Way
Sunnyvale, CA 94086. (408) 245-4400

Fujitsu's 50megabyte M2201



Finally! A reliable, low cost, front loading SMD-interface-compatible disk drive

In the world of SMD-compatible disk drives, the OEM offers a fresh new alternative for disk drive requirements. And the M2201 Disk Cartridge Drive offers high reliability and low off-line storage cost in a technically superior disk drive.

The M2201 features high reliability by virtue of a lower part count and our strong quality control.

In addition, online reliability, where it really counts, is ensured by a 0.3 micron dual filtration system that removes 99.97% of disk environment contaminants.

Moreover, with the M2201's front loading disk cartridge, off-line storage cost is lower than that of top loading storage module media. Yet the SMD-compatible interface of the M2201 connects directly into a storage module drive controller.

A close look at the drive will readily bear out the technical superiority of the M2201:

- A linear motor actuator produces 6-ms track-to-track and 30-ms average access times.
- A track following servo system with servo track recorded on cartridge ensures cartridge interchangeability.
- A 6,000 POH mean time between failure (MTBF)
- No data staging requirement since all data is on cartridge
- A small and lightweight chassis; drive easily mounts into a standard 19" rack.



M225x series fixed type disk drives

Other technically innovative products include the M2251, M2252 and M2253 fixed media storage drives with memory capacities of 12.7/25.4/50.8 megabytes, respectively.

- These models feature Winchester technology heads and rotary actuators which offer 10-ms track-to-track and 40-ms average access times. Optionally, these units provide head-per-track unformatted storage capacities of 327.7 or 655.4 kilobytes data.

For fresh, innovative solutions to your disk drive problems, contact Fujitsu America, Inc.

2945 Oakmead Village Court, Santa Clara, CA 95051.

Phone: (408) 985-2300, TWX: 910-338-0047, Telex: 357402

FUJITSU LIMITED
Communications and Electronics

Please, Read Between Lines in Ads for DBA

By Stephen L. Robinson
Special to CW

The ads are certainly enticing — high pay, prestige, responsibility. You have the requisite experience with the appropriate data base package and an impressive growth profile in data processing, leading to your present technical project managership.

Should you become a data base administrator (DBA)? Will the rewards adequately

compensate for the aggravation? Will you be able to handle the pressure? Let's explore the job by reading between the lines of recent advertisements for DBA positions. It should be noted,

before we start, that these examples from ads reflect the gamut of DBA environments;

Data Base Corner

i.e., one-person to 10-person (and up) DBA groups. In the former case, there is more emphasis on doing everything; in the latter case, the emphasis is on managing the people who are engaged in the doing.

Shortly after every data base package came on the marketplace, ads appeared for people with two years' experience. Now the absolute minimum seems to be three years, with some companies looking for a

minimum of five years.

Reasons for such stringent requirements (the absurdity of the time spans aside) do exist. The office of data base administration must perform two distinct sets of tasks relative to the data base package:

First, the DBA group should contain system programming expertise to maintain the package, do system generations design interfaces to special-purpose software, etc.

Some data base packages are sufficiently "clean" and so infrequently rereleased as to require only the part-time attention of one person. Other packages are known for their insatiable appetite for system programmers.

Second, the DBA group should design the physical (and, if appropriate to the package, logical as well) data base structures.

Many organizations are employing a data base package as an access method and are therefore allowing project managers to design their own file structure. In such environments, the DBA group should act as internal consultants to the individual projects.

Signal of Weakness

If the ad calls for experience with the XXX computer, YYY operating system and ZZZ report writer, beware.

In some organizations, where the existing system programming group is either weak or nonexistent, you, as the DBA, will end up having to manage the normal system programming activities.

The data base administrator is, of course, manager of the data base administration group, typically a group of prima donnas. Good data base designers and system programmers are as scarce as octal-based computers. And the designers and programmers know it.

Keeping such a staff happy can be quite a challenge. The alternative to acquiring really good people is making do with average or below average people and that is not easy. More managerial time is required to set deadline, monitor performance, adjust schedules, make excuses to higher management, etc.

Absolute Must

"Strong interpersonal skills are an asset." Asset, hell — they are an absolute must! DBAs are typically not very popular people. Worse, the people who like them the least are the very people they must get along with. For example, computer center managers often get quite disturbed at the massive incursion data base may make on their domains. Yet, clearly the DBA should

(Continued on Page 36)

This may persuade you to join ADR...

The Company

ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed \$20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

The Products

ADR's diverse product line is state-of-the-art. Our systems range from on-line programming systems to language translators; from text processing to performance measurement. IBM technological advances are usually heralded by new ADR products. ADR software products are rated #1 in the 1977 Datapro survey — surpassing every other company in the number of products (4) honored by Datapro.

The Environment

ADR offers the comfortable, informal surroundings best suited to system development. At ADR, members of the technical staff average twelve years of computer experience. They constantly have opportunities to expand their professional skills into new technological areas. Our role as a pioneer in the software products industry gives our employees a unique position in the computer industry. At ADR, you are part of the leading edge of technology, not a follower.

Openings for Systems Software Development

If you are a capable IBM Assembly language programmer and consider yourself a System Software Specialist, then you definitely should consider ADR. We have openings at all levels for qualified programmers and analysts who have the capabilities for developing sophisticated, state-of-the-art software. Experience with online systems (CICS, TSO, etc.) or knowledge of OS internals is a definite plus. If you have participated in the development of any type of software packages — system, utility, or application — we would really like to talk to you.

Openings for Systems Software Support

ADR knows that its products can only be as good as the service we give our customers. If you like dealing with people, enjoy an occasional trip, and have strong communication skills, you might consider a support position at ADR. To qualify, you should have a strong technical background in IBM computers and operating systems, and a college degree. As our product line continues to expand, our product support needs will grow as well. You could be a part of that growth!

This may persuade your family...



Princeton: A Top Ten Town

Princeton is on almost everyone's list of the ten best American communities in which to live. Yet it is surprisingly affordable. It offers not only beauty and serenity but a wide variety of cultural, sporting, and educational activities.

Sports Unlimited

It's been said that Princeton has almost as many tennis courts as people. You can also sail, ice boat, and skate on Lake Carnegie. Or jog to work. Or golf at one of the many courses in the area.

One hour to N.Y. or Philadelphia

You're less than an hour from the shore — a stone's throw from historic Washington's Crossing and New Hope — within easy reach of the New Jersey Turnpike and the Garden State Parkway.

Educational and Cultural Facilities

The home of Princeton University. The Institute for Advanced Studies. Westminster Choir College, and many superior grade and high schools. The McCarter Theatre is in town and the Bucks County Playhouse nearby.

Excellent Housing

You can live next to the old Raritan Canal, on a golf course, or in an old grist mill. Princeton and other beautiful communities nearby can fill your needs for an apartment or home at every price level.

ADR's new home

In the summer of 1979 ADR will be moving to a new 65,000 sq. ft. building on 40 wooded acres in the foothills of the Sourland Mountains. This new site is less than a mile from ADR's current location.

Please send your resume in complete confidence, including current salary and position desired, to:
Director, Software Products Division. Or call 609-921-8550.



APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS™

Route 206 Center, Princeton, N.J. 08540

An Equal Opportunity Employer

PROFESSIONAL RESUME KIT & Job Search Guide

"... by far the best I have seen." Dr. Ralph Keller, Director, Stanford University Placement
"... it can save the job-seeker a great deal of effort." Robert Boyd, Executive Recruiter

Send \$7.95 to
ETC PUBLICATIONS
484 Lytton Ave.
Palo Alto, CA 94301



The reason Epoch 4 has made it to the top
in the Netherlands is because it deserved to.

Quality. When you have it, the world finds out fast.

When you're moving into the future as fast as the Netherlands, you use a lot of computer tape. And you quickly find out which ones deliver and which ones don't.

When Graham introduced Epoch 4

several years back, we promised a tougher tape, a fully certified tape, a tape that would guarantee more throughput, and less downtime and overtime.

And we've delivered on those

promises. So much so that we've delivered millions of reels of Epoch 4 all over the world.

Epoch 4 is the patented one. The one that's proven itself through billions of passes.



GRAHAM MAGNETICS *Proven around the world.*

Graham, Texas 76048



If you're good, Boeing wants you in Seattle and McLean and Wichita. Now.

No matter where you go with Boeing Computer Services, you'll find career opportunities in a fast-moving organization.

BCS provides local and remote computing, custom programming, application packages, training and consulting services to The Boeing Company and a variety of commercial and government customers.

We're on the move with new ideas from

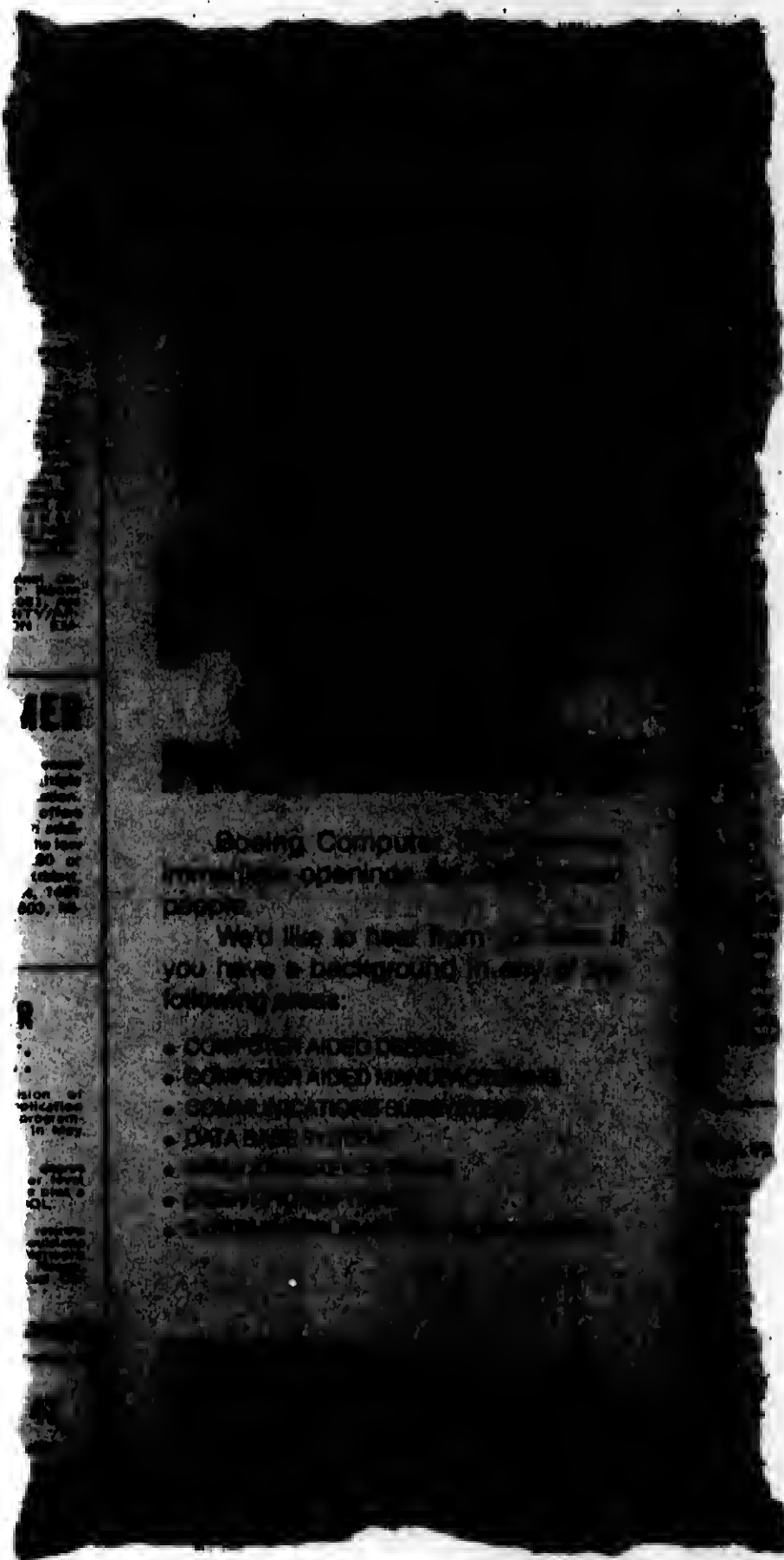
innovative people and if you're good, we'd like to hear from you.

Mail your résumé to:
Boeing Computer Services, P.O. Box 3707-JNT, Seattle, WA 98124.

Boeing Computer Services, M/S K30-42-JNT, 3801 S. Oliver, Wichita, KA 67210.

Boeing Computer Services, M/S CV-00-JNT, 7926 Jones Branch Dr., McLean, VA 22101.

An equal opportunity employer.



'Edit-Pak,' Hasp Support Enhance Datapoint Sites

WASHINGTON, D.C. — The Edit-Pak II source data library/data editing system and the Hasp/DS Interlink Hasp emulation package, for Datapoint distributed processing systems, are now available through Association Systems Co. (ASC).

The software was developed by and available from The Wyatt Co.

Edit-Pak II was designed to overcome "many of the problems associated with interactive editing" under Datapoint's Datashare environment, he said. Through its library facility, the independent editor provides up to 11,000 files of each logical drive — in contrast to the "normal" limit of 256, he added.

The use of a direct access approach lets the Edit-Pak II editor point to records in large files "considerably faster" than the command editor provided with Datapoint systems, the spokesman claimed. He also noted the editor supports global changes, multi-line deletes, block editing within both the target and external files and a data translate command.

Meanwhile, the Hasp/DS package was designed to allow all of the Datashare ports to build jobstreams

for transmission by the Hasp workstation emulator to a central site for processing. This eliminates manual intervention on the system console by each person desiring to send a message through Hasp, the spokesman explained.

If the Hasp emulator is busy or not active when a request for transmission is initiated, the request will be entered in a queue and acted upon as soon as the Hasp emulator becomes active or finishes its current transmission.

The Edit-Pak II package costs \$950 while the Hasp/DS Interlink software costs \$2,500. Either or both can be ordered from ASC, Suite 5, 1925 K St., N.W., Washington, D.C. 20006.

Philips Adds Software

WOODBURY, N.Y. — A payroll package and an indexed sequential access method (Isam) facility are available from Philips Business Systems, Inc. for use with its Visual 1 accounting systems.

The payroll package includes modules for salary and wage calculation, earnings and deduction registers, quarterly and annual state and federal reporting and check extraction, a spokesman said.

The pay calculation module lets the user define payroll frequencies as well as earning and deduction codes.

The check extraction module summarizes payroll transaction records and creates the interface to the check reconciliation module.

The File Creation and Maintenance (Fcram) utility is said to ease the development and updating of disk files by applying Isam techniques. Information on file fields and parameters are passed to Fcram, which then prompts the user interactively through a CRT.

The payroll system is available free to users just acquiring Visual 1 systems. As part of the turnkey system price, they are offered any two of several applications packages Philips has. Current installations can acquire the payroll package for \$1,200.

Fcram is free to all Visual 1 users, the spokesman added from 175 Froehlich Farm Blvd., Woodbury, N.Y. 11797.

HP 21MX Shops Gain File Help

VAN NUYS, Calif. — The keyed Sequential Access Method (Ksam) software from Theta Computer Systems was designed to allow users of Hewlett-Packard Co. 21MXs to create and maintain disk files whose records can be accessed by the value of a key field, by a relative number or sequentially.

Records may be written to a Ksam file in any order without regard for key value sequences, and they may be accessed sequentially, randomly by key or directly by the relative record number, which is posted to the record when it is created, a spokesman said.

The keys are maintained in a separate file that matches each key to the logical address of the data record. The key file is updated by the Ksam software as records are added to the data file, he said.

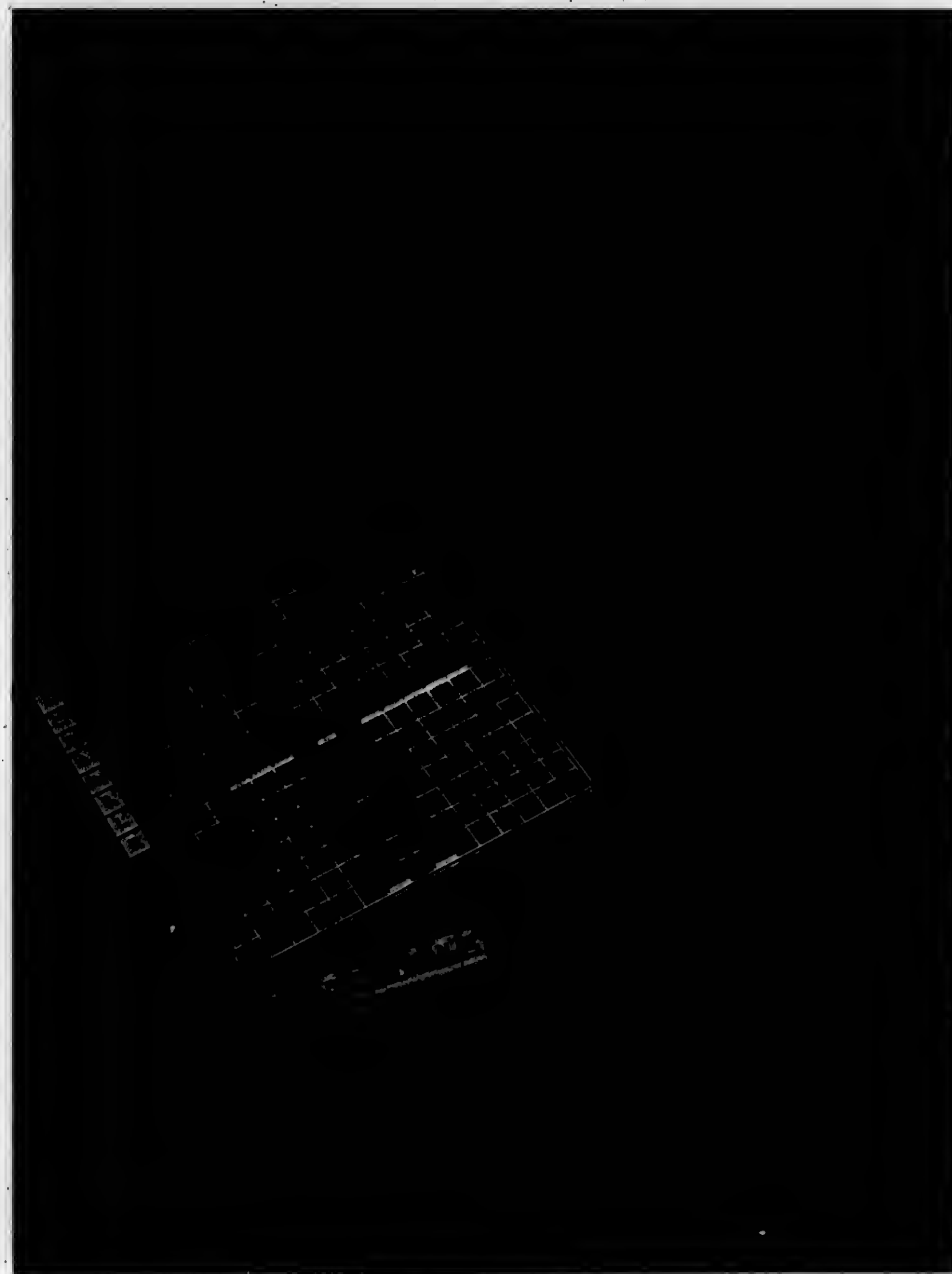
Keys may be as much as 31 words long and records may contain 2,047 words. There is a key-level lock to provide exclusive update of a data record, and Ksam files are compatible with HP's File Management Package.

Ksam automatically performs any key file reorganization required to accommodate newly added records to the associated data file. When records are deleted, the system returns the data record area to the file manager for reuse.

Ksam runs on any HP 21MX under the RTE environment. It is available on paper tape, mini-tape cartridge or magnetic tape for \$750 (plus 6% sales tax in California), the spokesman stated from 6919 Valjean Ave., Van Nuys, Calif. 91406.

Correction

The Record Extraction, Manipulation and Print (Remap) program from PASCACK Data Services, Inc. [CW, Jan 30] was designed for use on Burroughs Corp. B700s, not B4700s.



Taking DBA Ads at Face Value Can Mislead

(Continued from Page 32) endeavor to cultivate the relationship with the computer center manager, since poor allocation of computer resources to data base activities can result in disastrous performance of data base applications. In addition, project managers, as cited earlier, often resent the DBAs, since they have usurped responsibility for file design, and indeed, file processing. Again, a

poor working relationship here often results in project managers actively opposing the use of the data base package for their project.

If forced to use it, they will then proceed to blame the package for all problems associated with the application; the data administrator (DA) should be the friendliest of the DBA's interfaces. In a sense, the DBA is charged with acting as the DA's technical arm.

This sometimes means the DBA must squelch, on technical grounds, elaborate plans of the DA. This must be done diplomatically to ensure the maintenance of the crucial DBA-DA interface.

Extent of Experience

Ten years' DP experience may be a bit much, but certainly a DBA needs extensive knowledge of the total data processing environment.

In my next column, I will discuss some of the major areas of responsibility of a DBA:

- Data Entry procedures (including scrubbing and editing procedures).
- Terminal security.
- Batch security.
- Performance (data base and nondata base).
- Maintenance of software (data base package, teleprocessing package, data dic-

tionary, report writers, query facilities).

- Generation of file definitions.
- Development of standards (use and documentation).
- Backup/recovery.

Each of the above areas can in turn be subdivided (e.g., "performance" requires knowledge in such areas as operating system characteristics, disk performance as a function of such things as buffer size and quirks of various access methods).

Ulcer-Inducing

Data base administrator ranks as one of the more ulcer-inducing jobs in DP. It is primarily the technical aspects of the job that make it that way (e.g., strange error messages from the data base package during the execution of the payroll), although the diplomatic aspects of the job contribute to its high demands. On the other hand, aspects of the job (like structure design and security provisions) provide a good deal of the counterbalancing desirable (and fun) aspects of the job.

For those fence sitters who are still uncertain about whether or not to send their resumes out for a DBA job, I will devote several future columns to expansions of DBA tasks.

Robinson is an independent consultant, operating as S.L. Robinson & Associates in Morrisville, Pa.

INTERDATA USERS

The IC-120 did it for Data General users
The IC-130 did it for DEC users

**Now the TC-140
does it for you**



Interdata's TC-140 is a complete, turn-key system for data processing. It features a built-in terminal, a built-in printer, and a built-in disk drive. It is designed to be easy to use, easy to maintain, and easy to expand. It is the perfect solution for your data processing needs.

LET US SEND YOU COMPLETE INFORMATION
western peripherals



OASIS DBMS THE COMPLETE SYSTEM

OASIS is one of those quiet, effective gems of software that has acquired a group of enthusiastic users, but is not generally well known. OASIS, a generalized Data Base Management System, has all the features of major DBMS on the market today. OASIS includes all features into its system with no optional extras necessary. The development of OASIS began in 1967, which ranks it as one of the pioneer developments in the field. The system, under both DOS and OS, has been operating in various installations across North America since 1970.

OASIS offers a complete repertoire of standard integrated features including:

- Batch and On-Line Monitors
- User Interface to COBOL, PL/I, BASIC and FORTRAN programs
- Query and Report Writer facilities (both On-Line and Batch)
- Sophisticated Security with access and modify clearance down to the element level
- Backup/Restart facilities with automatic logging of transactions and system initiated analysis to determine restore/restart requirements
- Partially inverted file access method allowing access by subset list, order, index order and element value, and sequential search
- Maintenance type utilities
- System Support from the OASIS development staff
- And more... surprisingly more.

Before you make your final decision on a DBMS, contact us about OASIS. Further information on OASIS can be obtained from:

OASIS

L.F. Miernicki
University of Windsor
Windsor, Ontario, N9B 3P4
(519) 253-4232

For CRT Terminals

Incoterm Has Virtual Storage Software

By Ronald A. Frank
CW Staff

WELLESLEY HILLS, Mass. — Incoterm Corp. has upgraded its CRT terminal software with a virtual storage operating system that gives multiprogramming capabilities to existing and future users.

Called the Incoterm Transaction Edit Management System (Items), the software supports local editing, interactive and batch processing using a high-level macro language called Transaction Development Language (TDL).

Items software operates on the Incoterm Series 30 and Series 40 intelligent CRTs and is said to reduce the time required to develop distributed terminal applications. Types of transactions supported by Items include interactive data entry, local data entry with editing, local forms storage, remote batch, off-line operation, stand-alone functions and emulation.

Emulation for IBM 3270 and Honeywell

Information Systems, Inc. VIP 7700 protocol is available with Items. In the third quarter of 1978, support will be added for the Univac U-100 and Burroughs Corp. TD820 protocols, an Incoterm spokesman said.

Required Systems Configuration

A systems configuration required to operate Items software includes a Series 30 or Series 40 terminal processing unit with 64K bytes of core storage and up to 16K bytes of semiconductor memory for screen refresh functions. Eight standard Incoterm printer offerings can be supported. Storage includes 2M characters of diskette files and 40M bytes of rigid disk storage.

The application programs under Items are written by the user with TDL, which is described as a "Cobol-like" higher level language used to create software for transaction entry and editing functions. Using TDL, a program can interleave both interac-

tive and batch data entry operations, Incoterm said.

Series of TDL Statements

Application programs are written using a series of TDL statements with the TDL compiler. Where existing CRT screen formats are being retained, an off-line utility takes screen formats transmitted from the central site and translates them into TDL. This is said to simplify interfacing to existing terminal networks.

Because local storage is virtual, each programmer assumes availability of an entire 64K terminal memory. Since entered data is available locally, off-line programs can be written to produce management reports and perform other local functions "without taxing the CPU," the company said.

Smooth Addition Procedure

Items can be added to existing Incoterm CRT configurations without mainframe changes and without extensive conversion procedures, Incoterm said. The system can support up to eight terminals and printers and is said to reduce communication line costs through data compaction/expansion principles. Decreased line loading because of local intelligent features are said to lower communications costs and increase terminal response time.

Items software in object code format costs \$7,500 with maintenance and systems support available for \$2,400/year including software upgrades. The initial version of Items for 3270 emulation using binary synchronous communications is available in 60 days from Incoterm Corp. at 65 Walnut St., Wellesley Hills, Mass. 02181.

IBM Adds Three CRT Stations For Use With Its System 34

ATLANTA — IBM has introduced three CRTs designed to reduce costs and increase capabilities for System 34 users. The additions include the 5252 and the 5251 models 1 and 2. The 5251 Model 2 replaces the comparable 5251 Model 12, the firm said, and the 5252 replaces the 5251 Model 11.

The models of the 5251 display station provide 970-character displays and offer similar capabilities to those previously announced for models 11 and 12 with 1,920-character screens.

The 5252 dual display station, which functions as two independent 960-character displays, provides "low-cost" multiple stations at a single location, according to IBM.

The 5252 allows separate jobs — such as order entry and accounts payable — to be executed concurrently, it said.

The dual station reportedly attaches to the System 34 system unit or the 5251 model 2 or 12 displays and can function as the system console when attached to the System 34 system unit.

The 5252's functions include field highlighting and data editing, IBM noted.

5251 Model 1

The 5251 Model 1 also attaches to the System 34 system unit or the IBM 5251 model 2 or 12 displays. When attached directly to the system unit, it can serve as the system console, the firm added.

Model 2 provides communications capabil-

ity with the System 34 via Systems Network Architecture/Synchronous Data Link Control and allows the attachment of up to eight additional workstations.

The 960-character displays are fully supported by the System 34 System Support Program, RPG-II and Utilities Program Product.

Display screen formats created for 960-character screens (12 lines or less) can be displayed on either 960- or 1,920-character screens.

Enhancements Available

System Support Program enhancements include the capability to spool data to all printers attached to the System 34, and the System Support Program allows the user to restrict access to individual data files or program libraries, IBM explained.

The 5252 can be leased for \$100/mo and purchased for \$3,740, compared with the previously announced 5251 Model 11 at \$85 and \$3,200.

The 5251 Model 1 can be leased for \$80/mo and purchased for \$3,010.

The 5251 Model 2 can be leased for \$135/mo and purchased for \$4,655, while the comparable 5251 Model 12 can be leased for \$140/mo and purchased for \$4,830.

Prices on all models include keyboards. The IBM 5252 and IBM 5251 models 1 and 2 will be available in January 1979, IBM said.

Interface 78 Expo Coming in March

LAS VEGAS — The Interface 78 data communications conference and exposition will be held here March 6-9.

The four-day conference will include about 70 sessions dealing with various aspects of data communications applications. An estimated 175 exhibitors are expected to display products and services of interest to network and distributed DP users.

Five sessions about communications-oriented software and seven sessions on the use of hardware will be featured. Other sessions will deal with packet-switching and network protocol issues.

Information about the conference is available from Datacomm Interface, Inc., 160 Speen St., Framingham, Mass. 01701.

COMMUNICATIONS

BUDGET
BOMB?

DECWRITER II & III 3 MONTH LEASE

THEN ONLY MONTH TO MONTH TO MONTH TO
WE SHIP FROM OUR NEW STOCK IN 1 DAY

AMERICAN TERMINAL LEASING • 617-261-1100
P.O. BOX 68, KENMORE STATION, BOSTON, MASS. 02215

Insurer Sinks Its Teeth Into On-Line Processing

CHATTANOOGA, Tenn. — At Provident Life and Accident here, a terminal-based system processes a wide variety of group dental plans.

Using IBM 3270 display terminals connected to an IBM CPU, Provident's dental claim system is said to be five times faster than any manual procedure. The on-line feature has given Provident a competitive marketing edge by increasing the speed of claims handling and decreasing the costs of operations, the user said.

By January 1976, Provident had developed, tested and installed its Group On-Line Dental (Gold) system. And South Central Bell Telephone became the first user.

The Gold system runs on an IBM 370/168 linked to 17 IBM 3270 CRT

terminals in the dental claim unit. According to Bill Crumley, head of the Dental Claim Unit, the system performs on-line dental claim processing, eligibility checking, payment calculation and automatic printing of drafts and correspondence.

The system also produces patient tooth charts on CRT terminals, keeps track of each patient's claim history and calculates pretreatment estimates for predetermination of benefits.

Data Entry Function

Terminal operators in the dental unit enter patient data from employee claim forms into the system. A 3270 operator preparing to enter claim data is guided by instructions in a fill-in-the-blank mode on the terminal's display screen.

play screen.

Up to eight different screen displays are available for data entry, with an additional screen available for checking a patient's claim status. The screen displays have been structured so that for a routine claim, the operator can completely process and pay the claim by using only the first three screens, Crumley explained.

Completing a Claim

To complete a claim, the terminal operator presses a special command key. This command authorizes the payment of the claim and the printing of an explanation of benefits (EOB) for the employee. All payment drafts and EOBs are produced at night on an IBM 1403 printer and are ready for mailing

the next morning.

Transactions entered through the terminals create employee/patient master file records including name, address, all claim history and a complete tooth chart — a diagram of the patient's mouth, showing all dental work. Like any other master file information, the tooth chart is immediately available on the terminal display screen.

Pretreatment Estimates

A special feature of Gold is the pretreatment estimate for any employee contemplating expensive dental work. By filing a predetermination-of-benefits claim, the employee can find out in advance how much of the treatment will be covered.

Practicing dentists, acting as dental consultants for Provident, review the claims and determine the proper benefit amount. Provident advises both the employee and the dentist of the benefit amount by sending a pretreatment estimate to each of them.

In the meantime, the employee's pretreatment data is kept on-line. When the predetermination-of-benefits turnaround document comes in, the employee's draft can be authorized immediately.

60 Seconds to Pay

"The major advantage to the system," Crumley summarized, "is the speed with which we can expedite a claim for our policyholder and his employees. Our 3270 CRT operators can process and pay a routine claim in 60 seconds.

"The most difficult claim should take no more than five minutes. Our on-line computer system allows us to handle a far greater volume with fewer people."

Study Says SNA Catching On

SAN JOSE, Calif. — IBM's Systems Network Architecture (SNA) approach is catching on, according to a new study, *Thirty Years of SNA Experience: Costs vs. Benefits*, from SBS Publishing.

The report states there are over 400 SNA users, many of which decided to follow the SNA approach within the last six months.

Further, it says all users have underestimated their initial costs, memory requirements and the difficulty of getting Vtam installed. But despite these problems, users were found to be positive on the long-term rewards of SNA.

30 Man-Years' Experience

The report is based on the experience of companies that have combined experience with SNA in excess of 30 man-years. Forty SNA users were contacted for background, and 15 companies granted in-depth interviews.

The report is written for companies that are considering IBM's SNA approach and want to learn from the experience of other users and for those that have already embarked on SNA and want a reference for comparing their experiences, the publisher said.

The study is available for \$149 from SBS Publishing, Suite 230, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

**THINKING ABOUT AN S/34? PDP-11/70? ECLIPSE?
PREFER A VIRTUAL MEMORY SYSTEM?**

CONSIDER WANG'S NEW 2200VS.

A virtual memory system at an entry level price under \$50,000.

Interactive. Responsive. 2.3 billion bytes of online storage. ANSI '74 COBOL, RPG II, BASIC and ASSEMBLER. IBM 360/370 instructions.

Multiprocessing; multi-programming. Software automatically adapts to sys-

tem size. High, immediate programmer productivity.

The first-time computer that protects your investment.

The replacement computer for the yield you never got.

The remote computer to which you distribute 90% of the application's processing.

Modular. Expandable without system conversion.



If you want to bite into something you can chew, mail this coupon to Wang Laboratories, Inc., Lowell, MA 01851. Or call (617) 851-4111.

I'm hungry. Send me information on Wang's 2200VS.

Name

Title

Company

Address

City State

Zip Phone

OP80/CW38



For Home Deliveries

Service Designed to Reduce Oil Dealers' Costs

By William Gaze
Special to CW

PRINCETON, N.J. — Truck drivers for close to 175 home heating oil retailers from Canada to South Carolina begin the working day with delivery schedules drawn from information input through high-speed CRT terminals. The on-line terminals provide real-time access to the DP equipment of Petroleum Data Corp., a service facility based here.

Petroleum Data's computers are designed to cut dealers' costs by increasing average drop size, reducing the number of deliveries and automating invoicing, accounts receivable, burner service scheduling and other accounting procedures.

The Petroleum Data system lets dealers accurately determine which customers need delivery and when, based on degree day readings and customers' consumption history.

A weather monitor unit at each fuel oil dealer's location provides accurate information on local weather conditions, including wind chill factors.

Use of accurate fuel consumption data allows dealers to increase the average number of gallons delivered per stop and reduce the number of deliveries by as much as 35%. This is a significant savings since Petroleum Data estimates that each customer delivery costs a dealer an average of \$7 to \$8, not including paperwork.

The firm also estimates that many dealers servicing heating systems operate at a deficit because they use a manual accounting system. Petroleum Data offers a burner service scheduling system that utilizes the on-line terminals to help solve this problem.

Improved Cash Flow

The on-line terminal system also helps improve cash flow of dealers by allowing same-day billing. After a driver has completed his deliveries, he brings his delivery slips to the terminal operator. The operator then calls up a standard display screen format and enters the daily delivery data. The grade of oil and number of gallons delivered to each customer are specified, and price calculations are automatically made by the remote Petroleum Data computers. Bills and invoices can be generated by printers at each dealership.

The effect of same-day billing on a dealer's accounts receivable is significant, with Petroleum Data customers reporting reductions in accounts receivable as high as \$400,000 since installing the on-line terminal system.

Several on-line financial accounting programs can also be accessed via dealer terminals. Dealers can maintain general ledgers with the terminals. Reports can be generated with profit and loss broken down by product line, customers or departments.

An accounts payable program is also available, allowing dealers to efficiently schedule invoices for payment, generate cash requirement forecasts and take full advantage of prompt-payment discounts.

Finally, a fixed asset program lets dealers automatically compute tax credits and depreciation.

At the firm, two IBM 360/65 CPUs process energy consumption data for

approximately 750,000 U.S. and Canadian households. Over 200,000 dealer inquiries are made and over 400,000 output messages are generated at the central site during the system's 16 hours of daily on-line operation.

Each 360/65 contains 1M byte of core memory and there are over three billion characters of on-line disk storage. For security, all data from disk is transcribed onto two magnetic tape units. One is put into a tape library and the other is stored in an off-site bank vault.

Net Covers 12,000 Miles

Petroleum Data supports its network of dealer terminals with a communica-

tions system that extends over 12,000 miles. This system includes 40 full-duplex multidrop circuits, extending east to Canada's Maritime Provinces, west to Detroit and south to Rock Hill, S.C.

The network operates at speeds of 2,400-, 4,800- and 9,600 bit/sec, with operating speed dependent on customer application and operating needs.

Modems used in the system include Racal-Milgo, Inc. 2,400 and 4,800-bit/sec units and several 9,600 bit/sec modems from Paradyne Corp. Two front-end units at the central site control traffic and terminal operation.

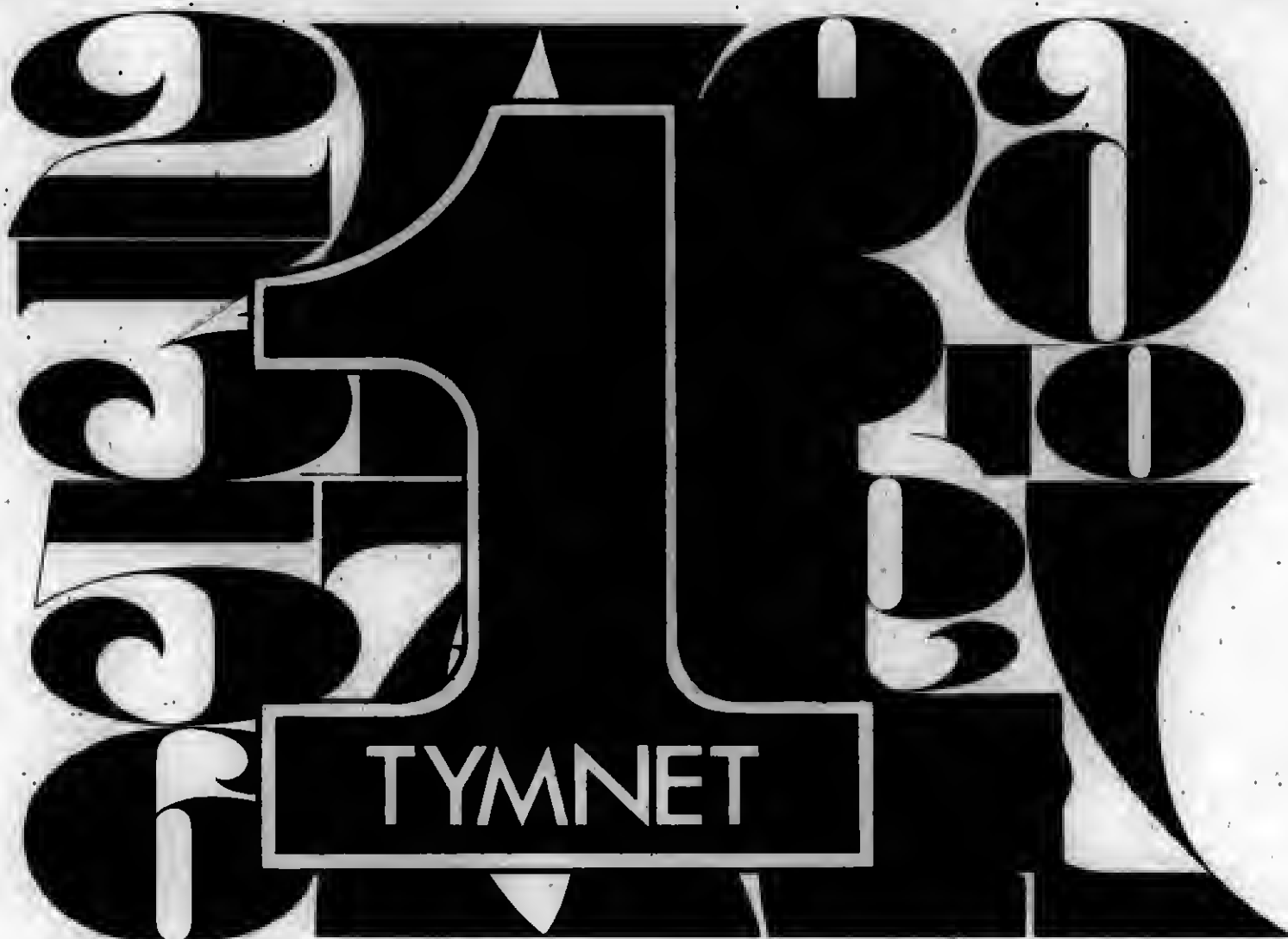
Lines and equipment are continuously monitored by digital and

analog test equipment including a Spectron Corp. Datascope. Through the use of EIA and VF patching facilities, backup lines and equipment can immediately be placed into service should the need arise.

Racal-Milgo System 400 Model 4 video display terminals, Harris Corp. terminals and Executerm 265 terminals from Courier Terminal Systems, Inc. are supplied to fuel oil dealers by Petroleum Data for remote data entry and retrieval.

Originally, Petroleum Data did not have any problem supplying its customers with Courier 265 terminals, and the company's software was de-

(Continued on Page 40)



No. 1 in packet network service for a lot of good reasons

Tymnet, Inc. is the established leader in packet network services. There are a lot of good reasons why. Our network service, TYMNET, has serviced more users with a greater variety of computers and terminals over a greater period of time, carrying a heavier volume of transmission, than any other packet service.

Consider these statistics about TYMNET, which in a typical day:

- utilizes over 265 intelligent, mini-computer nodes
- makes available over 2,500 access ports
- supports over 1,300 simultaneous terminal users
- services over 150 host computers
- carries approximately 300 million characters

TYMNET's success story is not accidental. It's based on long experience and sound planning, the use of advanced packet technology, plus an appreciation and understanding of the market for specialized data communications services, directed towards users whose network needs encompass time sharing, data base access, and message switching. These applications are distinguished by a large number of connections between

geographically dispersed, low-speed (1200 bps and below) terminals and a central computing facility. Typically such transmissions cannot be handled conveniently, reliably, or economically on standard communications facilities. But with Tymnet's existing, public packet network service users can take advantage of the operating efficiencies and economy of a national communications network designed specifically for these applications.

By incorporating the most advanced computer and communications technology in the network, Tymnet is able to offer its users a reduced operating cost plus a greatly improved communications facility.

Users of TYMNET benefit from:

- highly sophisticated error detection and correction
- alternate routing if a direct transmission facility should go down
- full compatibility with all standard terminals and transmission codes
- "turnkey" network management for the user
- significant cost savings

- the confidence and security that come from a packet network service with over 5 years of intensive operating experience

Domestically, TYMNET today provides access in over 130 cities — and the number of locations continues to grow. International operations can also be served by TYMNET, through interconnect agreements with the International Record Carriers which provide access in major world cities, from Rome to Hong Kong.

Experience — Capability — Comprehensive Coverage — Economics — in all these areas TYMNET is unsurpassed as a packet network service. And why we can proudly claim the Number 1 title. For more information on TYMNET and how it can assist with your data communication needs, contact your regional Tymnet office or write or call Tymnet, Inc., 10261 Bubb Road, Cupertino, California 95014, (408) 446-7000.

TYMNET

Eastern Region (301) 770-5710

Central Region (713) 780-4455

Western Region (408) 446-7000

Test Line Grows

PROVIDENCE, R.I. — International Data Sciences, Inc. (IDS) has expanded its 8900 series of Minitest product line with a remote control panel that reportedly accommodates 16 channels of A,B switching when used with the company's Model 8962 controller and power module.

The Model 8931's master A,B control allows remote bulk switching of all 16 channels simultaneously to A or B, IDS added. LEDs indicate at both the master and remote site the status of each channel.

With a built-in power supply, the modular 8931 reportedly is expandable in 16-channel increments.

The Model 8931 costs \$1,600, the firm said from 100 Nashua St., Providence, R.I. 02904.

Three Elements to Unit

RCA Develops Optics Data Link

SOMERVILLE, N.J. — RCA has developed a fiber optics data link designed for use in digital data transmission links and other applications.

Optical communications using fiber optics enables the transmission of light waves from one point to another through lightweight, flexible cables consisting of ultrathin strands or fibers of glass or plastic.

Optical fibers promise to supplement both wires and radio waves for communications in many cases, RCA said. Systems employing this technique have the advantages of being able to carry vast amounts of information, require low power, are not subject to static interference and are extremely

difficult to tap, a spokesman added.

The system consists of a transmitter containing an RCA gallium-aluminum-arsenide, LED and a receiver equipped with an RCA silicon photodiode. These two units may be connected to fiber optics cables made by the DuPont Co. or other fiber optics cable suppliers.

The transmitter and receiver are housed in compact modules which each measure approximately 2 in. square by 1 in. thick.

The RCA fiber optics data link, Model C86003E, including the transmitter, receiver and connector, is priced at \$850. Fiber optics cable is available at an additional cost, depending on ca-

ble length.

Details are available from the RCA Solid-State Division, Somerville, N.J. 08876.

Service Eases Dealers' Costs

(Continued from Page 39)

signed for them. When Courier stopped making the Executerm 256 terminals, however, Petroleum Data had to decide whether to buy used Courier terminals whenever new customers were put on-line or to find a new terminal supplier. The firm chose the latter option.

Presently, there are 53 of the Racal-Milgo System 400 stations with about 40 of the company's customers. The System 400 is plug and software compatible with the Courier 265 and is able to operate without any system changes. Use of the System 400 enabled Petroleum Data to add new terminals to its system without making any costly software changes.

An array of built-in diagnostics was one reason Petroleum Data felt the System 400 was a desirable substitute for the Courier 265. This is especially important, as the dealers can't afford to be without information and most of them do not have the technical background to troubleshoot their own equipment.

Diagnostics allow dealers with a problem to give an accurate report by phone to service engineers and, if the problem cannot be taken care of that way, greatly simplify the task of the Racal-Milgo field engineer who is sent out to make the repairs.

The System 400 terminal's line monitor feature displays all CPU- and terminal-generated data, including text and protocol characters.

Received data is underlined and parity errors, if detected, are shown in reverse video.

The line monitor feature lets a field engineer determine if line or terminal problems are involved and calls attention to parity errors that might otherwise go unnoticed.

Additional self-diagnostic features are visual checks of programmable read-only memories (Proms), random-access memories (RAMs) and terminal strapping. The System 400 terminals can also generate a test pattern that allows users with printers to check their accuracy against a data pattern on the video screen.

William Gaze is supervisor of on-line operations for Petroleum Data Corp. in Princeton, N.J.

Who?
What?
When?
Where?
Why?

That's what data collection is all about.

EPIC DATA offers you a simple, practical, flexible family of data collection products which can economically provide you with the information you need to answer these questions. Information which allows you to create reports on inventory status, job costing, production control, payroll, maintenance scheduling, access control, equipment circulation, time and attendance, goods consignment and circulation control so that management can make better decisions to reduce costs. And thereby increase profit.

WHO All data collected by the system can be pre-prepared. Or, where required, you may input variable data. By simply inserting his identification badge, punched or magnetic stripe, or reading the card's bar code, your employee tells the computer who he is.

WHAT Job cards, bar codes or key depression — all assigned by management — tell the computer exactly what he's doing.

WHEN An internal clock records when he started and when he finished.

WHERE The location of the terminal or variable key input tells the computer where he's working while travelling cards, bar codes or key depressions on the terminal input the amount of inventory being worked on or used.

WHY This collected data may then be prepared into reports telling you who worked on what, when, where, how many, and, often why or why not this operation was profitable.

CALL US TODAY. An Epic Data representative is ready to discuss how our simple, practical, flexible data collection systems can improve your profits.



epic data

In U.S.A.: 6350 LBJ Freeway/Oakland, TX 75240
Phone (214) 387-3121/TWX 910-860-5676

International: 7280 River Road, Richmond, B.C. Canada
Phone (604) 273-9146/Telex 04-355701

U.S. Sales Offices: 6350 LBJ Freeway, Suite 282, Dallas, TX 75240, (214) 387-3121 • 17 Amter Court, Bayshore, NY 11706, (516) 668-0797 • 3415 Hickory Trail, Downers Grove, IL 60515, (312) 968-8620 • 1724 South Heather Hill Rd., Hacienda Heights, CA 91745, (213) 965-2886
Representatives: ARIZONA BFA Corporation (602) 994-5400 • CALIFORNIA Moxon Electronics (714) 635-7600 • FLORIDA COL-INS-CO (305) 423-7615 • ILLINOIS Systems Marketing Corp. (312) 593-6220 • KANSAS/MISSOURI Digital Systems Sales (816) 765-3337 • MASSACHUSETTS J & J Associates (617) 729-5770 • MICHIGAN/OHIO WKM Associates, Inc. (313) 588-2300, (216) 267-0445 • NEW YORK Cane Technical Sales (914) 698-4411 • NEW YORK Ossmann Instruments (315) 437-6666 • PENNSYLVANIA WKM Associates (412) 892-2953 • TEXAS DMA (713) 780-2511 • WASHINGTON DPM Associates (206) 453-9082 • UNITED KINGDOM Sinterom Ellinor Ltd. Reading (0734) 85464



'Usually a C.P.A. Is All That's Needed for a Tax Audit.'

Atlantic Research Unwraps On-Line Monitor

ALEXANDRIA, Va. — Atlantic Research Corp. has added the Interview II stand-alone monitor to its family of data communications diagnostic test equipment.

Interview II is an on-line monitor that helps identify

problems in both hardware and software by displaying data being sent and received over the communications line. The unit not only finds trouble quickly, but helps spot trends and potential problems before the system fails.

The system displays data in text, hex or octal; six different languages are standard. System errors and malfunctions are identified on a 9-in., 1,024-character display.

The test unit displays two independent pages of 512 characters in full or half-screen for later comparison. Send and receive data are highlighted. Trap and freeze features eliminate the need for bulk storage in most applications, the firm said.

Key features of the Interview II monitor include the ability to connect directly to the RS-232/V.24 interface and compatibility with SDLC,

ADCCP, HDLC, DDCMP, X.25, Snap, synchronous, asynchronous, full- and half-duplex protocols.

The system displays Ascii, Ebcidic, BCD, Selectric, hex or octal.

The Interview II stand-alone monitor is available in either portable or rack-mounted configuration and costs \$4,500 from Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22314.

Racal-Milgo Introduces Modem for Short Hauls

MIAMI — Racal-Milgo, Inc. has announced the Com-Link III short-haul modems.

The modem reportedly operates at strap-selectable synchronous data rates from 2,400 bit/sec to 19.2 kbit/sec over 19- to 26-gauge wire circuits up to 25 miles long. Earlier Com-Link modems operated up to a limit of approximately 10 miles.

Reliable operation over longer distances is made possible by two features: automatic adaptive equalization and the use of delay modulation. An automatic adaptive equalizer compensates for variances in circuit amplitude, providing initial line equalization in less than 2 msec, Racal-Milgo said.

Delay Modulation

Use of delay modulation facilitates transmission by allowing operation in a narrower bandwidth at higher power. Error rates for Com-Link III are better than one in 100,000 bits, the firm claimed.

The Com-Link III modems are designed for use in point-to-point and multipoint data communications systems in which many terminals are installed to close to a CPU. It would typically be used to support data links between local administrative, warehouse, manufacturing and distribution facilities.

Circuit Sharing

When used in conjunction with a multiport modem, Com-Link III allows local terminals up to several miles apart to economically share a common long-haul circuit, Racal-Milgo said.

Com-Link III also has an expanded test capability. A remote test feature lets an operator at either end of a point-to-point line place the remote Com-Link III into a digital loopback mode for fault isolation and testing without involving an operator at the remote site.

Com-Link III costs \$975 or

\$39/mo on a 30-month lease from Racal-Milgo, Inc., 8600 N.W. 41st St., Miami, Fla. 33166.

Rare bird.

An editing CRT that's ideal for transaction processing.

Lower software costs. Easier programming.

System builders say our Model 1200 Editing Terminal is ideal for transaction processing. We agree.

The Model 1200 makes programming easier because it tells the programmer (and the host computer) the status at the terminal. Communications strap setting, printer errors, operator mode key setting, and more.

The Model 1200 also cuts down on host computer loading by automatically setting modified data "tags," whenever a field is updated, so the host computer can request only modified fields, and skip thousands of needless compare operations.

To further lighten the load on the host computer, the Model 1200 has programmable send keys that let the program regulate the amount of data returned to the computer as terminal loading varies.

More productive operators.

Thanks to a 9 x 12 character matrix, the Model 1200 has crisp, clear, strikingly sharp characters. So operators see their work better and make fewer mistakes. Data entry is incredibly accurate due to field attributes like low intensity, numeric only, blink, and inverse video.

Editing is fast and easy, too. Single keystrokes insert and delete characters and lines.

All our standard goodies. Only \$1383.*

A big, 12-inch screen, 128-character ASCII set, upper and lower case, 15 cps typematic repeat on all keys, and a 24-line display are standard. So is our exclusive No Hassle toll-free 800 number for service. One call gets you service. Where you need it. When you need it. World-wide.

So go ahead. Get a CRT terminal that's specifically designed for transaction processing. Perkin-Elmer's Model 1200 Editing Terminal.

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free 1-800-631-2154.



Quantity 75

PERKIN-ELMER

Texas Instruments
Portable Data Terminals
FOR SALE

• 743 • 745

BEST PRICE • FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-279-1960



Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

When minis are hooked up,

Sperry Univac's minis now solve the problems that curse other distributed data processing systems.

Such as the aggravating throughput problems you get from inadequate network design, limited CPU performance, and insufficient data base management capabilities.

Our PRONTO minicomputer systems have been designed to tie together simply. You can tailor your specific distributed data processing requirements to solve problems more quickly than ever before.

There's no slow down on your application — whether you're tying in one PRONTO system. Or twenty.

You can continue using the tools you already know. Like COBOL, FORTRAN, and industry standard communications protocols. What's more, our data base management system will allow you to implement efficient and user-tailored data bases.

And as your communication and data processing needs increase, you simply add more PRONTO systems. After all, they're

traffic shouldn't slow down.

designed to keep pace with your growth.

For more information, write Sperry Univac Mini-Computer Operations, 2722 Michelson Drive, Irvine, California 92713. Or call (714) 833-2400.

In Europe, write Headquarters, Mini-Computer Operations, London NW10 8LS, England.

Ask about our PRONTO system, a complete package of software and minicomputer hardware that can keep your traffic flowing smoothly.

SPERRY  **UNIVAC**
SPERRY UNIVAC IS A DIVISION OF
SPERRY RAND CORPORATION

Sycor Adds Software Features For Model 350 Terminal System

The unit costs \$1,698 from Omnitec at 2405 S. 20th St., Phoenix, Ariz. 85034.

The Model 350 software is designated Level F and includes an enhanced version of

The Level F enhancements, provide Model 350 terminal system users with a software package for increased speed of execution, reduced memory requirements for user pro-

When purchased in combination with one or both of the other diskettes, they are priced at \$25 each, the spokesman noted from 100 Phoenix Drive, Ann Arbor, Michigan 48104.

- Minicomputer card input/output
- Data transmission via modem or cable for terminal applications
- Ability to interface OCR, MICR, bar code, etc. devices for multi-media applications
- On-line and/or off-line versatility
- Reading, punching, printing, verifying, and interpreting capabilities
- Teletype* (20 MA current loop) interface
- Interface with TAB's TDC (3740 compatible) floppy disk for special applications
- Auxillary card I/O device for key-to-disk or key-to-multi-media requirements
- Proven-in-use system for your market!

**TALKING WITH
MURDERERS**

TAB

BIG

01 card p. 100

It's worth talking about.

It's worth talking about

Gentlemen: Let's talk.		Let's talk:	
Name _____		☐ General Manager	☐ Regional Manager
Company _____		☐ Marketing Program	☐ General Sales
Address _____		☐ _____	☐ _____
_____	_____		



T-SHIRTS

Posters,
Memo Pads,
Sweatshirts, and
General Nonsense. . .

Free Brochure. . .25
cents

**THE INCREDIBLE
SYSTEMS & T-SHIRT
COMPANY**
Box 2623
Menlo Park, CA 94025

In Data Entry Design

Function, Comfort Both Seen Important

By Frank Vaughan
CW Staff

LOS ANGELES — Users looking for cosmetic design features in data entry equipment may not always get what they want. However, most vendors are aware of the importance of these nonfunctional niceties.

"There are features, and there are features," John F.G. Leighton noted in a recent interview here. The human comfort factor in data entry equipment is just as important as people say, but it is just that some factors are more important than others, the product manager for the Data Systems Operations Division of Pertec Computer Corp. observed.

"In the case of a purely convenience item, such as a drawer in which the operator can store personal belongings, it is not very important, because the operator will not use that drawer very often. If it is a feature that is being used every half hour, or every minute, or every second, then it gets very important," he suggested.

Vendors have discovered that there are people who adapt to all sorts of strange sitting postures. Some have been observed keying data while sitting in a chair cross-legged with their feet tucked under them and a keyboard in their lap.

"The evolution of human engineering and the design of these things has come to where we now make independently movable keyboards and CRTs so that if somebody likes to sit in some really strange position, he can put the keyboard in his lap and turn the CRT so that he can see it," Leighton noted, adding that left-handed people can even put the keyboard sideways if they wish.

"We can divide features into two categories, the first being features that make it easier in a technical sense for an operator to achieve accuracy or to increase output. Then there are the sheer-comfort convenience or identity items for the operator who feels 'I have to live in this space for eight hours — what is it going to do to me?'" he noted.

"In a way," Leighton explained, "these features are intertwined. Some of them are physical and some of them are psychological." The modesty panel is a good example, he said.

Modesty panels are placed across the rear of a work location and their height has tended to vary over the years in an inverse ratio with the lengths of skirts, he said. These panels are designed so that operators can sit any way they want, but if a person has very long legs, the modesty panel can get in the way, he observed.

Pertec has tried to avoid becoming involved with such furniture design problems. "Following the lead of IBM, we have taken

the position that furniture, generally, is a business that other guys do better. The user has better sources than us for furniture or complete data entry workstations," he said.

Besides, he suggested, the functional design area provides enough potential headaches.

Data Entry Dimensions

"All of us have very elaborate methods of testing the quality of the data that the operator is keying. What supervisors need to know is 'is this stuff right?'" he pointed out.

"So the next question is 'how should the operator be alerted when something is wrong?' There are all sorts of schools of thought on what you should do about it. In most cases, getting the right answer, doing what is best for the operator, is super important because it affects the accuracy of the data. It is quality control," he said.

Leighton noted that something as simple as

a lamp's location, whether there should even be a lamp or whether there should be an audible alarm can become major considerations. As an example, he pointed out that if there is an audible alarm, the operator should not depend on it exclusively. "Whatever the audible scheme is, we have to make sure that it does not handicap the deaf person," he stressed.

Other questions that come up include whether or not the operator should have control of the volume of such a device.

"These questions almost have to be answered in the product development stages, because once the equipment gets designed, it gets tough to change," he added.

Industrial designers discovered years ago that if people aren't comfortable with the design or feel of an item, it won't sell, no matter how it performs its function. Appearance makes things marketable, and lack of it makes it hard to sell," Leighton asserted, noting that if users aren't willing to pay for nonfunctional features, vendors are not going to be too anxious to add them gratis, because generally, if a user is not willing to pay for an option, it is not too important to him.

Shipbuilding Costs Trimmed With Material Control System

BATH, Maine — Bath Iron Works (BIW) is using a medium-scale mainframe to help manage the flow of material used for shipbuilding, resulting in faster and less costly construction.



A system based on a medium-scale mainframe is in use at the Bath Iron Works to keep track of shipbuilding material.

The Material Control System helps manage the shipbuilding process from initial design to the purchase of parts to the use of those parts by production tradesmen. Using CRTs linked to a central IBM CPU, shipyard workers can instantly retrieve up-to-date information about the availability of material to meet work requirements.

"We believe our Material Control System is in many respects the most modern in the world," James Greenlaw, BIW director of systems, said. "We have had representatives of other shipyards come in to look at our system because they recognize it has certain unique features and is perhaps the most effective system in the industry."

"The IBM 370/145 helps us readily identify surplus or shortages among the 40,000 inventory items that are required to satisfy 300,000 individual material requirements," he said. BIW's system is configured with 750K bytes of memory and 24 IBM 3277 CRTs.

The system is capable of controlling inventory for the simultaneous construction of Navy and commercial ships, in addition to repair and modernization work in the

(Continued on Page 52)

SYSTEMS & PERIPHERALS

mti
159 Northern Boulevard
Great Neck, NY 11021

TERMINALS
LEASE • RENT • PURCHASE

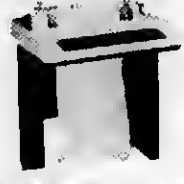
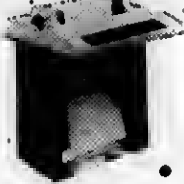
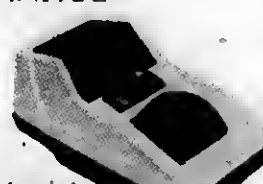
MTI's got them all including a complete line of peripherals all at the lowest prices with quick delivery!

In New York Call
516 482 3500 or 212 895 7177
Ask for Bert or Larry

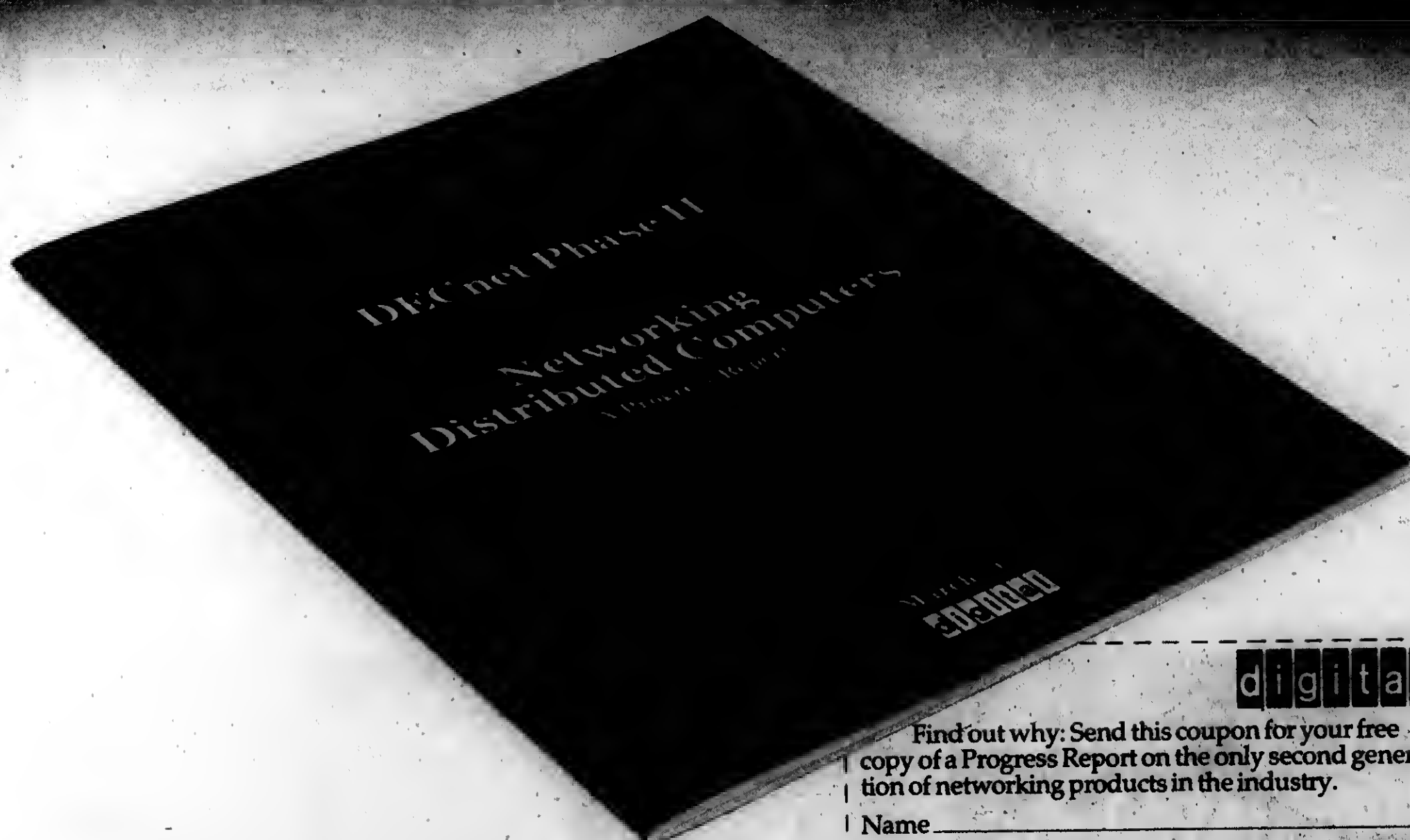
800 645 8016

Save Time & Money

COME TO ONE SOURCE FOR THE
BEST BUYS IN COMPUTER PERIPHERALS

digital  DEC writers • LA35/36	digital  • LS120 Teleprinter	LEAR SIEGLER  • ADM 1 and ADM 2 Smart Terminals • ADM 3 Dumb Terminal	digital  DEC Scopes • VT50 • VT62
Diablo  Hyterm • Bell 103A Interface • RS-232 C Interface	MITE  Digital Cassettes	OMNITEC  Couplers & Modems	intel  Micro Computer Systems

DECnet and
Digital's
computers make
the best and
least expensive
distributed
computing
networks
in the world.



digital

Find out why: Send this coupon for your free copy of a Progress Report on the only second generation of networking products in the industry.

Name _____

Title _____

Company _____

City _____ State _____ Zip _____

Mail to: Digital Equipment Corporation, 129 Parker Street (PK 3-2/M18), Maynard, MA 01754

CW2278

John Deere Saves \$30,000/Year in Rental Fees

DES MOINES, Iowa — John Deere's farm equipment plant here has harvested nearly \$30,000 in annual hardware rental savings with the installation of a multifunction data entry and remote job processing system.

The firm credited its latest system with reducing communications costs as well as the amount of operator intervention required for data handling. At the same time, according to Roger Schenke, DP manager for the Des Moines plant, the data entry system gives the company increased accuracy and improved data control.

The Des Moines Works, which produces the John Deere cotton picker and 17 other farm products, has had the problems of a normal manufacturing operation, according to Schenke. His department is responsible for all data — including accounts payable and receivable, payroll and production reporting — traditionally found in centralized keypunch sections.

The department had used IBM 129 keypunch and verify machines to enter data — most of which comes from source documents as invoices, warranties and payroll cards — but later switched to dual-station, flexible disk IBM 3742s to reduce card costs and machine rentals. Some increase in operator productivity was realized.

To transmit data to the host IBM 370/168 CPU at corporate headquarters in Moline, Ill., the company used an IBM Model 20 and a Model 2922 card transmission. The IBM 3741 was used to transmit diskettes.

Since the company continued to retain some keypunch devices, control of the constant mixing of card and flexible disk data between the data entry department and the computer operations department became increasingly difficult.

With the 3740 system, there was also time-consuming computer operator intervention involved in changing the diskettes during data transmission, Schenke said. Because the 3742 had no communications capabilities, he added, someone would have to walk the diskettes to the computer operations department to have the data transmitted and processed.

To ease some of the communications problems, the company selected a Data 100 Corp. Model 78 remote job processing system which could transmit information at speeds up to 19.2 kbit/sec. With its two 1,000 line/min printers, 1,600 bit/in. magnetic tape drive, 1,000 card/min card reader and 150 card/min. punch, the system could handle a variety of media and, at the same time, save several thousand dollars in annual hardware rental over the IBM devices.

To combine the power of the Model 78 with a more flexible data entry system, the company opted for a Model 74-Keybatch system with 11 CRT stations and 10 million characters of disk storage.

The system has helped reduce data entry errors to less than 1%, Schenke noted. Through a series of staff-written procedures, the system edits and checks the data to ensure it is correct before it goes to the CPU.

The system performs a range of pre-programming functions including range checking to make sure that a customer shipment is less than "X" days from receipt of the order; field

checks to guarantee that certain fields, such as customer name and address, are always entered; and table lookups to allow operators to enter a single

Data Entry Dimensions

character such as "P" to denote a pallet for shipments, rather than have to key in the entire word, according to Mike Peters, computer services supervisor.

When an "out of range" condition does occur, the system automatically stops and displays the error for the operator, he added.

The company has been able to reduce

the total number of keystrokes by employing the duplication feature. It is using this feature not only to duplicate common fields in records, but to generate constant data such as the current date and record codes in all records.

Formatting Capability

Besides the intelligent functions that the system performs, the company has also benefitted from the system's formatting capability. The company now utilizes about 250 different input formats — with up to 99 format levels on each "job in" — about half the number available on the previously used data entry machines, Schenke recalled.

With the IBM equipment, operators could modify the data entry process by

creating their own programs. The problem, according to Peters, was that each operator used a slightly different style, so that each program was in a slightly different format. When it came to training a new operator, it was a case of one operator learning another's idiosyncrasies.

To develop more universal programs, the company designed programs that used the most common and expedient elements of each operator's procedures, in one case reducing the number of formats in a job from 56 to 16.

While Peters admitted the operators were apprehensive at first, he believes their overall performance, as judged by the system's statistical program feature, has improved.

We know computers and we know leasing...

Over \$600,000,000 worth of computer equipment presently on lease makes General Electric Credit Corporation the industry's leading leasing source and gives it the know-how required to stay in front. This experience can work to get you the computer mainframes, peripheral equipment and distributed data processing systems you need, regardless of how complex the transaction may be.

Whether it's a multi-million-dollar leveraged lease for a large scale system or a single investor lease for a small accounting installation, GECC has the ability and the people with the expertise to provide you with the best leasing alternatives. And because we have the resources, we'll be there when you want to upgrade or add-on to your GECC-leased system. Put our resources and expertise to work for you.

Complete the coupon or, better yet, call the local GECC office nearest you and experience our fast service.



Administrative Office
Stamford, CT 06904 • (203) 357-4597

To: Mr. John J. Canning, Marketing Mgr.,
(Equipment Leasing)
General Electric Credit Corporation
P.O. Box 8300, Stamford, CT 06904 • (203) 357-4597

Dear Mr. Canning: I would like more information about
GECC's customized leasing plans.

Name _____ Title _____
Company _____ Telephone _____
Address _____ State _____ Zip _____
City _____

ATLANTA (404) 451-5921, BOSTON (617) 272-8540, CHICAGO (312) 858-8650,
CLEVELAND (216) 842-8333, COLUMBIA (301) 957-4990, COLUMBUS (614) 891-7750,
DALLAS (214) 234-0648, DENVER (303) 320-3660, DETROIT (313) 356-1910,
HOUSTON (713) 561-7108, KANSAS CITY (913) 384-1080, LOS ANGELES (213) 572-5317,
MEMPHIS (901) 365-2457, MINNEAPOLIS (612) 835-5100 Ext. 216,
NEW YORK (203) 255-5957, OKLAHOMA CITY (405) 947-3500, PHILADELPHIA (609) 778-9011,
PITTSBURGH (412) 575-2990, SAN FRANCISCO (415) 327-0110, SEATTLE (206) 575-2990.

With 'Slightly Greater Risk'

User Opts for 'Superior' Price/Performance

By Tim Scannell
CW Staff

MAYFIELD VILLAGE, Ohio — In choosing an Intel Corp. AS/4 CPU over an IBM 370/148, "we were willing to accept a slightly greater risk in exchange for a far superior price/performance," Lee Herrington, DP vice-president for the Progressive Corp., explained. "We got past the concern that without IBM we would be cast adrift."

According to Herrington, IBM's marketing people failed to recognize Intel as a "meaningful competitor" and hesitated to compare their processor on a point-to-point basis. They "knew very little about the Intel machinery and

didn't really deem it a serious threat," Herrington said. They actually "failed to recognize [Intel's] existence."

Several months ago, the Progressive Corp., a holding company whose principal operating subsidiary is the Progressive Casualty Insurance Co., decided to upgrade its operating system from a DOS to a DOS/VS environment, a spokesman said. The firm purchased an Intel add-on memory which, when attached to its IBM 370/135, increased memory from 144K to 384K bytes.

Progressive deals mostly with high-risk insurance policies that cover such things as automobiles, motorcycles, mobile homes and various recreational

vehicles, a spokesman said.

Because of a marked increase in business since the additional memory was implemented, it was decided to obtain a new CPU with greater capabilities, the spokesman continued. However, instead of upgrading to the 370/148, Progressive chose an Intel CPU.

"We had favorable experiences with the Intel memory and its disk drives," Herrington said. This made Progressive receptive to Intel's marketing strategies, "enough at least to listen to what they had to say."

Despite probing, IBM never really answered the firm's questions, Herrington said. When asked, the IBM people said they knew very little about

the Intel machine and were not inclined to talk about a competitor, Herrington said.

"They couldn't give me any meaningful information, such as who had the superior architecture or speed, either," he added.

IBM continually stressed the added values of doing business with IBM because of its support and service capabilities, he continued. "They very rarely will take you through a point-by-point comparison with a competitor," he noted. "IBM is of an older chip technology and I suppose it's understandable why it would be rather closed-mouth about discussing which machine is better."

'Extremely Responsive'

Intel, on the other hand, "was extremely responsive in digging up answers and documentation," Herrington claimed. "I raised question after question and Intel... did everything it could to educate me so I could make an intelligent decision."

IBM did finally concede that "Intel's machine was of a newer technology, that it was in fact faster and cheaper, runs cooler, has less parts and uses less electricity," Herrington said.

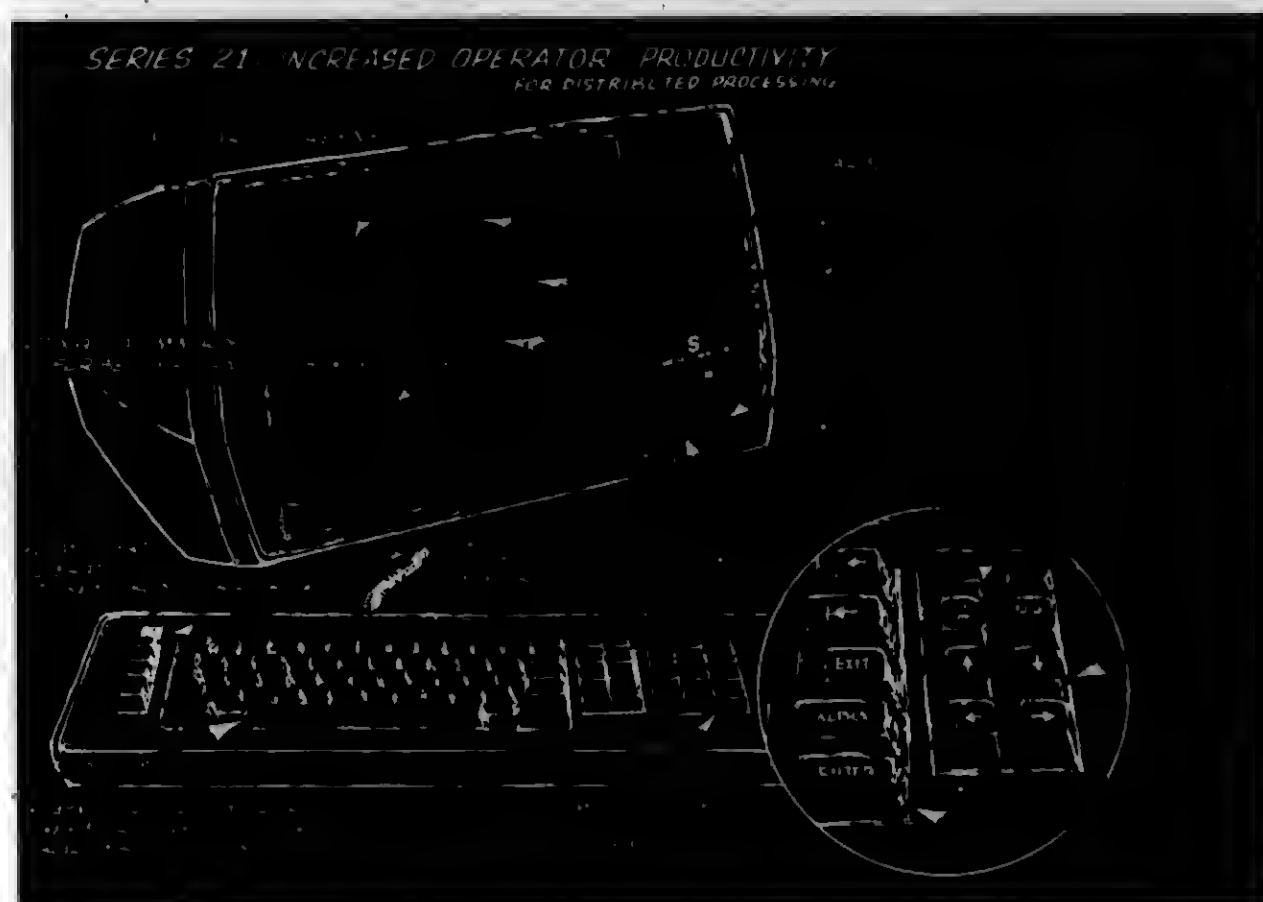
The equipment in the DP department at Progressive includes six Intel disk drives with a capacity of 100M bytes, six Storage Technology Corp. Model 3450 1,600 bit/in. tape drives, two IBM 1403 printers and a Decision Data Computer Corp. Model 6015 1,500 lin/min. printer manufactured by the Data Products Corp.

The Intel CPU was selected in large part because it was plug-compatible with the current peripherals. "We had no interest in changing our software or rewriting our programs or anything like that," Herrington stated. "Another advantage is that the system can be upgraded in the field," without having to replace the entire CPU or undergo a major overhaul.

Besides IBM and Intel machines, the firm looked at a Control Data Corp. Omega system, but "it didn't seem to be a viable entity in the marketplace at the time. The marketing people contacted us but never mentioned if they had a CPU available," Herrington remarked.

There were a few problems with defective chips when the CPU was first installed, but they were anticipated, Herrington stated. "I had surveyed other users and discovered that in the process of 'shaking down' a system there seemed inevitably to be a chip or two that would fail." He indicated, however, that Intel technicians promptly repaired any machine failures.

MDS Series 21. Engineered to make your operators more productive in 25 different ways.



Mohawk Data Sciences learned a lot about data entry productivity over the past 13 years while meeting the high-volume needs of more than 6,500 customers worldwide. In the engineering of Series 21™ we put those lessons to work. We learned, for example, that a large display screen makes an operator station easy to use. A 15-inch, non-glare CRT is standard on all Series 21 systems.



Or consider the Series 21 keyboard. We offer a choice of data entry or typewriter style layouts with features like programmable function keys, full keyboard cursor movement, and moveable keyboard.

These are only some of the 25 different features engineered into Series 21 to make your operators and your system more productive. Also consider its two-level software, its peripherals flexibility, its modem

communications capabilities and its low system prices.

MDS™ is now conducting seminars on distributed data processing in major cities throughout the country. For an invitation to a seminar and a demonstration of Series 21, call our headquarters, 1599 Littleton Road, Parsippany, N.J. 07054, (201) 540-9080 and ask for James J. Byrne, V.P., U.S. Sales.

™Trademarks of Mohawk Data Sciences Corp

Mohawk Data Sciences
1599 Littleton Road
Parsippany, New Jersey 07054
(201) 540-9080

- ☐ Please send further information on Series 21.
- ☐ Have a salesperson call.
- ☐ Send a schedule for the next free DDP seminar in my locale.

CW 02278

My application is _____
Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip Code _____ Phone _____

MD

Mohawk Data Sciences



I Warned You Not to Confuse the Computer.

INTRODUCING THE ONLY DISK DRIVE WITH A BUILT-IN COMPUTER.

ITEL'S NEW 7350.

Our new 7350 offers all you expect from ITEL disk drives, plus our exclusive Dual-Port Feature, our patented Advanced Function Capability and the industry's fastest access time (4 ms track to track vs. 10 ms for IBM's 3350), but another unique technological innovation as well. Our exclusive microprocessor makes ITEL's new 7350 the most maintainable drive in its class. And with other ITEL standard features, the 7350 provides improved performance of up to 25% over IBM's equivalent, the 3350.

Our exclusive Dual-Port Feature (dynamic device switching), which

increases subsystem availability by up to 87.5%, is a marked improvement over IBM's string switching. And ITEL's patented Advanced Function Capability increases the effectiveness of dynamic device switching and provides a potential system throughput improvement over IBM's Write Format Release. These standard features, plus the fastest access time currently available, allow an increase in throughput of up to 25%. In addition, the microprocessor also provides substantial diagnostic capability which further enhances the 7350's performance. And as always, ITEL

offers superior performance and 100% compatibility at a significantly lower cost.

When it comes to price/performance, ITEL has always been a sensible alternative to IBM. Now, when it comes to reliability, availability and serviceability, the 7350, with its built-in computer, makes ITEL the only alternative.

ITEL
CORPORATION

Data Products Group
One Embarcadero Center
San Francisco, California 94111
Telephone: (415) 955-0000

For IBM 370, System 3

Memorex Unveils Disk Drives, Controllers

SANTA CLARA, Calif. — Memorex Corp. has expanded its 3640 family of disk storage drives and controllers for IBM 370 and System 3 computers with the introduction of the firm's 3644 disk drive module.

The Memorex 3644 is a dual-spindle module with 280M bytes per spindle when used with the 370 CPUs and 203M bytes per spindle when used

with the Sytem 3 CPUs, according to a spokesman. The module's data transfer rate is 885,000 byte/sec with an average access time of 25 msec.

Each of the 3644 drives incorporates a resident head-disk assembly (HDA) that combines disks, access arms, read/write heads, spindle and voice coil bobbin. The 3644

HDA is similar to the type used in Memorex's 3650 line of 317.5M-byte drives.

The 3644 modules are designed for use with the IBM 370 models 115-2, 125-2, 135, 135-3 and 138, as well as the 3/15D, a spokesman claimed. Attachment of the 3644s is made through the Memorex 3643 disk drive module and controller to the IBM 370's

Direct Disk Attach (DDA) or Integrated File Adapter (IFA) and to the 3's Disk Storage Attachment feature.

Standard IBM software is utilized for attachment to systems with DOS/VS, OS/VS1, OS/VS2 and VM/370. Features that are standard on the 3644 in a 370 environment include rotational position sensing and read-only switch.

The 3644 sells for \$42,075, or \$1,000/mo on a two-year plan, including maintenance. First shipments will begin in July from the firm at San Tomas at Central Expressway, Santa Clara, Calif. 95052.

Firm Plans To Ensure Power Level

PETERBOROUGH, England — Emergency power systems for computer complexes have to be totally reliable, because even a break in power lasting 1 msec can cause untold damage and the loss of vital and sometimes irreplaceable information.

At the headquarters of Perkins Engines Ltd. here, power to the firm's recently installed IBM 370/158 is guaranteed through the use of a 220-volt nickel cadmium alkaline battery that will immediately take on the full load while an emergency shutdown sequence is carried out, preventing any damage or loss of information, a spokesman said.

The battery, supplied by Chloride Alcad (Chloride Systems, Inc. in the U.S.) is made up of 186 Alcad-type DLP21 plastic cased cells with a capacity of 210 amp/hr.

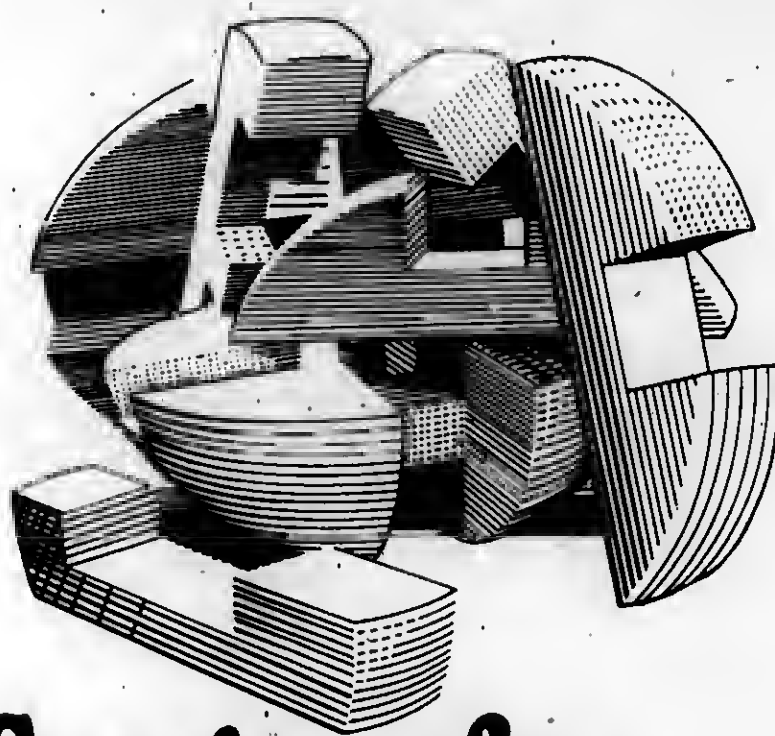
'Totally Reliable'

"We obviously needed a battery that would be totally reliable, but which would also meet the performance criteria we required. Although more expensive initially, an Alcad battery was best suited to this particular application, according to Philip Harrison, project engineer at Perkins' Civil Design Department.

Requiring only minimal maintenance over a long life cycle of some 20 years or more, Alcad batteries have the ability to recharge very quickly. This normally enables them to perform their emergency duties again within hours of a power failure.

At the Perkins computer center, the battery is floated in a no-break mode within an inverter system supplied by Franklin Electric Programmed Power, Inc.

Puzzled by Database?



Free DBMS Seminar for Problem Solvers. Don't miss it!

If you're a manager, senior DP person or user who needs to put the database puzzle together, you shouldn't miss our free one-day seminar.

It's all about INQUIRE®, the Problem-Solver's DBMS from Infodata Systems.

We'll show you how easily INQUIRE can put all the pieces—data management; on-line processing; built-in flexible reporting; a true user's language; even

full text retrieval— together into one unpuzzling package!*

*INQUIRE operates in IBM 360/370 (OS, VS, CMS) plus Amdahl and IteI environments.

INQUIRE DBMS SEMINAR

Place: Houston, Texas.
The Galleria Plaza Hotel

Date: March 9, 1978

Time: 9:00 a.m.-3:30 p.m.

Reserve now—space is limited. Fill out the coupon and mail immediately, or call us at (703) 578-3430.

INQUIRE®
Infodata Systems

© COPYRIGHT 1978 * INQUIRE REGISTERED U.S. PATENT OFFICE TO INFODATA SYSTEMS INC., ROCHESTER, NEW YORK.
U.S.A. COVERED BY U.S. PATENT NUMBER 3670310

Infodata

Infodata Systems Inc.
5205 Leesburg Pike
Falls Church, Virginia 22041

Please register me for the free INQUIRE seminar in Houston, March 9th.

Name _____

Title _____

Company _____

Street Address _____

City _____

State _____

Zip _____

Telephone _____

Sorry, I can't attend the Houston seminar in March, but I'd be interested in one planned for:

- ☐ Boston ☐ New York
☐ Chicago ☐ St. Louis
☐ Philadelphia ☐ Washington, D.C.
☐ Your City _____

**Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3**

800 323-2288
INQUIRY 800 323-2288
1-800-323-2288
1-800-323-2288
1-800-323-2288

Interface Links CDC Printers, Decsystem-20

LONG BEACH, Calif. — The Printer Sales Co. is now offering the Control Data Corp. band printers for sale to end

users of Digital Equipment Corp. Decsystem-20 general-purpose computer systems. Printer Sales has its own

Printer Uses Plain Paper

WATERTOWN, Mass. — A microprocessor-based printer that handles plain 8.5-in. paper and is RS-232C-compatible has been introduced by Integral Data Systems, Inc.

The IP-125 impact printer features an RS-232C serial interface, parallel TTL-level interface and full upper and lower case Ascii character set of 96 characters as standard equipment.

Capable of printing multiple copies on ordinary 8.5-in. roll, fanfold or sheet paper, the micro-controlled IP-125 incorporates a 256-character multiline buffer to achieve a print rate of up to 100 char./sec with a sustained throughput of 50 char./sec at 80 column/line, a spokesman claimed.

Few Moving Parts

The printer has few moving parts and features a reinking ribbon, he added.

Serial rates of 110 to 1,200

OCR Users Plan Summer Meeting

HACKENSACK, N.J. — The OCR Users Association has announced that its summer meeting will be held at the Hershey [Penn.] Motor Lodge and Convention Center July 30 through Aug. 2.

'Matured Technology'

The theme is "OCR — A Matured Technology and its Impact on Future Applications." Principal speakers will include Herb Grosch, president of the Association for Computing Machinery; Ken Hull, president of the National Association for State Information Systems; and Vico Henriques, president of the Computer and Business Equipment Manufacturers Association.

Additional information on the conference may be obtained from the association at 10 Banta Place, Hackensack, N.J. 07601.

bit/sec are switch-selectable, the vendor said.

The IP-125 sells for \$799. OEM and quantity discounts are also available from Integral Data Systems at 5 Bridge St., Watertown, Mass. 02172.

controller/interface for operating the CDC printer with the Decsystem-20. The interface consists of three plug-in circuit boards that "are retrofitted" to the Decsystem-20 electronics, the firm said.

The CDC printers are available with printing speeds of 300-, 600- or 900 line/min with a standard 64-character set. Optional 48-, 96- or 128-character sets with corresponding increases and de-

creases in printing speeds can be selected through changeable print bands.

The 300- and 600 line/min printers also offer an option of 15 char./in. density instead of the normal 10 char./in. a spokesman claimed, noting this increased density permits 132-character-wide printing to be accomplished on 11-in.-wide paper.

The printers cost \$6,390 to \$14,900 for the 300 line/min

model, \$8,315 to \$19,900 for the 600 line/min model and \$11,595 to \$25,900 for the 900 line/min model. Full payout leasing is also available.

Prices range from a "do-it-yourself" kit that does not include the controller interface; installation and some features to a complete system, including installation.

Printer Sales Corp. is at 2684 Dawson Ave., Long Beach, Calif. 90806.

Pick a number. Any number.



I700



I720



I760

The next time you pick a terminal, you don't have to gamble about which one to choose. Because Xerox has a number of communications terminals that are just right for you.

Like our 1700 and the new 1720. Both pay off with low cost operation, sharp, crisp characters from Diablo's HyType II print mechanism, 45 cps, and a full range of easily-changeable type styles. The 1720 also offers switch selectable ASCII and 2741-compatible codes. And when you consider that both terminals come with other features usually optional or not even available on most terminals you know that you've placed a good bet.

If you're doing on-line applications, then the Xerox 1760 is your lucky number. The new 1760 has an impact

matrix printer, which gives you both upper and lower case, rapid quality printing, and automatic bi-directional printing. The ASCII Coding lets you connect to almost any hardware and software system around. And if speed is the name of your game, the 1760 prints up to 200 cps.

For more information call Pete Hegerle, Xerox Data Systems Division, (213) 679-4511, or write him at 701 S. Aviation, El Segundo, CA 90245.

With the Xerox 1700, 1720, and 1760, there's no reason to take chances the next time you choose a terminal. Because each one of our numbers is a winner.

XEROX

IBM SERIES/1 BASIC

Multi-terminal BASIC
language and other
software products
for the IBM SERIES/1

ICE CO.
OFFICE PARK, SUITE 100
BIRMINGHAM, AL
205 870 2267

XEROX® is a trademark of XEROX CORPORATION.



Dispensamatic 16

Dispenser Eases Mailings

ST. LOUIS — Commercial Mailing Accessories, Inc. has unveiled a product that aids in the handling of computer-produced, pressure-sensitive labels.

The Dispensamatic 16 operates by peeling the carrier paper away and presenting a row of labels to the operator.

Labels are removed manually, from right to left.

The unit is capable of dispensing one-up as well as any multiple columnar printout format, according to a spokesman.

The dispenser sells for \$425 from the firm at 1335 Delmar Blvd., St. Louis, Mo. 63103.

From Computer Enhancement

RAM Upgrades NCR Century 101

COSTA MESA, Calif. — A random-access memory (RAM) system designed to upgrade the NCR Corp. Century 101 computer to a level comparable with a Century 151 was announced by the Computer Enhancement Corp.

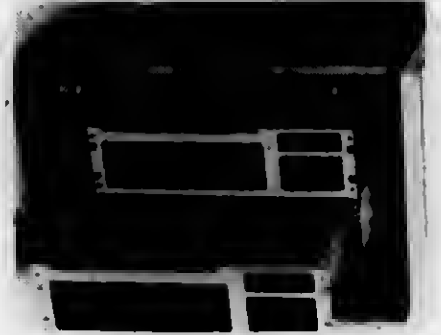
The RAM-Stor 101/151 memory system expands the memory capacity of the Century 101 to 256K bytes and increases memory speed to a 750 nsec cycle time, according to a spokesman.

With the memory enhance-

ment, instruction times for addition of unsigned, unpacked five-digit computations, for instance, have been cut from 28.8 msec to 18 msec, the firm claimed.

Similar improvements have been made for multiplication, division and most I/O bandwidths, the spokesman added.

The memory capacity is said to be fully compatible with NCR software and is available at a cost of \$45,000 for 128K bytes. Computer Enhance-



RAM-Stor 101/151

ment Corp. is at 3189-E Airway Ave., Costa Mesa, Calif. 92626.

Units Hold Documentation

WORCESTER, Mass. — Two products, both designed to aid in the filing and reference of DP documentation, manuals and program listings,

are available from Wright Line, Inc.

The Documate Desk Rack features a hanger bar assembly for center hook filing of manuals and is equipped with rubber feet to prevent marring of desk tops.

The Documate Pivot Desk Rack is similar to the above, but includes a cartridge assembly that allows reference material to pivot upward.

The Desk Rack Model 2855-71, and the Pivot Rack, Model 2950-22, are priced at \$30 and \$22.50, respectively, from the firm at 160 Gold Star Blvd., Worcester, Mass. 01606.



Documate Desk Rack

System Cuts Yard's Costs

(Continued from Page 45) shipyard, Greenlaw added.

"Before our automated system, we had to track raw material manually as it moved in and out of inventory and through the construction process, which was costly, time-consuming and administratively complicated," he said.

"Using the computer, we have reduced material and labor costs as well as 'out-of-stock' problems. This has minimized the need to work around material shortages, which has improved efficiency," he added. "Managing our material better means we have a better chance of delivering a ship on time or ahead of time."

"Other things being equal," Greenlaw added, "our cost savings can be passed on to the customer in the bid price of the ship. Specifically, this automated system allows us to provide timely, accurate information that is invaluable to BIW in developing winning bids in competition for new work. This means the customer is assured of the same BIW quality at a highly competitive price."

"This also means high-quality military ships for fewer tax dollars and lower initial overhead for commercial shippers who are seeking ways of keeping transportation costs down for their customers," he added.

Using the computer-based system, BIW buyers can make knowledgeable decisions after the computer has weighed the many variables involved.

If production schedules change, the system reschedules the parts timetable and, at the appropriate time, prints out requisitions for additional items.

"By knowing our requirements in advance, we can maintain an ordering schedule that assures the best cooperation from our vendors," Greenlaw said.

TERMINALS FROM TRANSET

DECwriter II	DECwriter III
\$1,495	\$2,895
DECprinter I	VT52 DECscope
\$2,495	\$1,695
VT55 DECscope	ADM 3A CRT
\$2,695	\$875
TI 745 Portable	ADDS Regent 100
\$1,875	\$1,325
Data Prod. 2230	TECHTRAN 8400
\$7,900	\$1,850
100% EQUITY RENTAL PLAN	
DECwriter II \$ 75 mo.	DECwriter III \$145 mo.
DECprinter I 125 mo.	VT52 DECscope 85 mo.
VT55 DECscope 135 mo.	ADM3A CRT 45 mo.
TI-745 Portable 94 mo.	ADDS Regent 100 62 mo.
DATA PRDD. 2230 .. 395 mo.	Techtran 8400 93 mo.
FULL OWNERSHIP AFTER 24 MONTHS	
RENTAL, 12 MONTH FULL OWNERSHIP AND LEASE PLANS AVAILABLE ON ABOVE AND OTHER EQUIPMENT	
 TRANSET CORPORATION 2005 ROUTE 22, UNION, N.J. 07083 201-688-7800	

Available Immediately For SHORT TERM LEASE

370/138 370/148 370/145

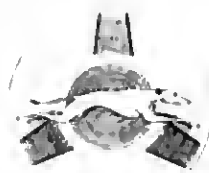
3330's and OEM 3330's

360/30 360/40 360/50 360/65's

Greyhound Phoenix ICA's

CALL US COLLECT

United States		
Austin	Ron Geil	(512) 451-0121
Boston	Tom Ryan	(617) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dave Hyland	(415) 283-8980
International		
Canada	Don Maunder (Toronto)	(416) 366-1513
Mexico	Andres Contreras	(905) 543-6850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joe Gold (Geneva)	(022) 81-27-54
Austro-Asia	John Hallmark (Dallas)	(214) 233-1818
Non-IBM:		
UNIVAC or)	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**
GREYHOUND TOWER, PHOENIX, ARIZONA 85077

LOCATE MINICOMPUTER SOFTWARE

—NOW TWO VOLUMES—

MINICOMPUTER SOFTWARE QUARTERLY

WITH

• Over 500 detailed program descriptions
• Indexed by: Application —
Hardware — Language

Subscription includes:
Base Volume Set + 4 up-dates
\$85. US/Cen (+5% Tax In Mass.)
\$110. Foreign (prepaid only)

INTERNATIONAL MANAGEMENT SERVICES, INC.
215 Oak Street, Dept. C, Natick, Mass. 01760

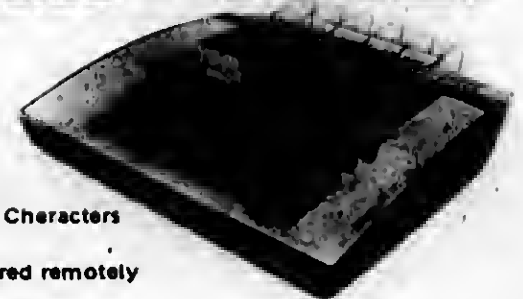


ECONOMY and POWER

IN STOCK!

Teletype® Model 43

- Display 24 lines, 1920 Characters
- Addressable Cursor
- Keyboard may be cleared remotely
- Me Bell Compatible



- 110-300 Beud, 132 Characters
- Upper-Lower Case
- RS232 Compatible 20ma option
- 9 x 6 Dot Matrix
- Height 5 1/2", Width 18", Depth 21 1/2", Weight 30 lb.

ADM-3A

Multiterm® Teletype® Data General® Lear Siegler® Data Media®

Sales - Service - Rentals

36 TERMINAL SYSTEMS INC.

8000 BAYLAND STREET, NORTH HOLLYWOOD, CALIFORNIA 91605

213-769-6772

415-573-7723

For All your Mini Computer and Tele-Communication Needs

For a free brochure of California 800 423 2400

In Drug Store Net

Business Micros Serve Concerned Public

By Esther Surden
CW Staff

PITTSBURGH, Pa. — To cope with an increased load of third-party insurance claims paperwork and to better serve a public concerned with drug interactions and possible complications, Thrift Drug Co. here is plan-

Mini Bits

Cado Turnkeys Designed For Auto, Insurance Fields

TORRANCE, Calif. — Two turnkey systems — one designed for the automotive leasing industry and another for insurance agencies — are available from Cado Systems Corp.

The Automotive Lease Fleet Management (ALFM) system features programs that provide centralized lessee processing, lease fleet management, automatic billing and receivables processing and financial information, a spokesman said.

The Independent Agency Management System (IAMS) is designed to give insurance agency management information on policies, premiums and commissions as well as the usual accounting data.

Both systems include a microprocessor CPU, a 300 line/min printer and a Teletype Corp. Model 40. The ALFM system costs \$21,995 and the IAMS system costs \$22,495 from Cado at 2730 Monterey St., Torrance, Calif. 90503.

IBM Users Group to Meet

MIAMI BEACH, Fla. — The Spring Conference of Common, the IBM small systems user group, will be held April 9 to 12 at the Carillon Hotel here.

According to a Common spokesman, the organization's membership is comprised of over 640 users of IBM 3, 7, 32, 34, 1130, 1800, 5100, 370 and Series/1 systems.

Users will meet to talk about DP management, data base management, education and manufacturing applications. IBM personnel will be present to respond to technical questions.

During the conference, attendees will take a tour of IBM's Boca Raton facility where the Series/1 is manufactured, a spokesman said.

Information is available from David G. Lister, administrative director, Common Dept. M2, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

ning a network of about 300 in-store microcomputers connected to a central data base residing on two mainframes.

According to DP director Jim Nelson, the impetus to develop this application came about seven years ago, when management forecast increased government intervention with the possible advent of national health insurance. Pharmacists already had to cope with a growing number of insurance forms, and the public was becoming more aware of drug interactions, allergies and other complications.

"We looked for a feasible way to automate the prescriptions in our drug stores," Nelson said.

Confronted with an application that had not been tried before, Thrift identified three possible ways of implementing it.

One approach it considered and then rejected was to place self-contained minicomputers in each store. This could have "somewhat restricted the size of the files" and would have presented great difficulty in communicating between stores. A lot of customers shop in more than one store, he pointed out.

Another possibility Nelson investigated was to go with a regional concept with two or more systems in distinct regions throughout the country. The cost of this method came out to be about the same as centralizing the data base, and since the firm was organized along centralized lines, it decided to

settle on implementing a centralized data base. Now Thrift had to come up with the mainframes to use. "We looked at a number of the major manufacturers; we are IBM users and have been all our careers," Nelson said, but Thrift chose two Digital Equipment Corp. KL10 CPUs because of their communications capabilities and the ability "we knew was coming."

Choosing the systems to be placed in the individual drug stores was another matter. "There wasn't a whole lot to choose from" at that time, he related. So the firm settled on Texas Instruments, Inc. 990/10 systems. Since the system was installed, Thrift has switched from the 990/10s to 990/4s with 16K bytes of memory, a CRT, keyboard and a Victor Comptometer Corp. printer.

The system located in each store is basically a sophisticated editing tool, Nelson explained. The keyboard has about 10 different function keys that activate a menu that appears on the screen. Each field is edited by the pharmacist as he enters it into the system, and certain mandatory fields must be filled out or the system will not accept the rest of the information.

Data is transmitted from the stores over 1,200 bit/sec multidrop lines and is first received by a front-end DEC PDP-11 minicomputer. The information is processed as it is received and turned around to the pharmacy in from four to 10 seconds, Nelson related. All of the communications is

(Continued on Page 54)

Control Store, Disk Options Join HIS Level 6 Offerings

WALTHAM, Mass. — Along with the Level 6 models of minis introduced recently, Honeywell Information Systems, Inc. came out with a raft of peripherals and options.

Writable control store, a feature many mini users need to configure their systems for special purposes, is now an option with the Level 6. An extension to the CPU's microprogram space, writable control store allows users to define their own instructions and implement time-critical algorithms in firmware, HIS said. The feature, invoked by special operational codes, costs \$8,000.

A microinstruction assembler and plug-in microcode analyzer to let users write their own firmware costs \$1,700.

The Level 6 systems now use 16K memory chips, which allows 256K bytes to be packaged on one controller. Each 256K-byte module costs \$27,950 for either single- or double-fetch memory with parity. With error correction, the memory costs \$30,350; it

can be used on present Level 6 systems, HIS noted.

At the same time, the firm dropped its prices for 4K MOS chip modules. For example, a 16K-byte unit of single-fetch memory with parity dropped from \$1,250 to \$1,050 while a 32K-byte unit of double-fetch error-correcting memory was reduced from \$4,500 to \$2,600.

Peripherals introduced with the systems included a mass storage subsystem that allows up to 1G byte of disk to be configured in four disk drives for attachment to a single controller. Multiple subsystems can be linked to the Level 6.

Two disk drives accommodate 128M bytes and 256M bytes at average seek times of 25 msec and 30 msec respectively. The drives can be mixed with previously announced disks on the same controller, the firm said.

The 128M-byte drive costs \$24,500; the

(Continued on Page 54)

DRS: The real-world data retrieval system.

DRS works for users because it was developed by users. Four simple commands fetch all the data occasional users want; 76 additional commands let sophisticated users probe, pry, massage, and create. And it's very kind to your core: occupying only 80K bytes on a DEC PDP-11; 256K bytes on an IBM 360/370. Small wonder that over 100 organizations large and small use DRS. And love it. Get the details. Call SONCO at 215-667-7670 or use the coupon.

SONCO INC., 146 Montgomery Ave., Bala Cynwyd, PA 19004
I have a ☐ DEC PDP-11 ☐ IBM 360 ☐ IBM 370
My operating system is _____

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____

MINITWORLD

Dynus Adds Disk Controller

COSTA MESA, Calif. — Dynus, Inc. is offering a single quad-size moving head disk controller that features a bipolar microprocessor and is designed to emulate the Digital Equipment Corp. RK-11 disk system for the DEC LSI-11

mini.

Called the DL-CO3, the module directly interfaces to the LSI-11 backplane, the firm said.

The unit costs \$2,500 from the firm at 3198 G Airport Loop Drive, Costa Mesa, Calif. 92626.

CBC COMPANIES

A new name in front of an old reputation for reliability. We have a CONTINUOUS INVENTORY OF TERMINALS and we STOCK AND INSTALL OPTIONS. Immediate delivery on most items.

The popular ones

DEC

- Writer II (LA-36 Printer Terminal) \$1,600 ea.
- Writer III (LS-120 Teleprinter) \$2,600 ea.
- Scope (Video Display Terminal) \$1,500 ea.
(Model VT-52)
- Printer I (LA-180 High Speed Printer) . . \$2,690 ea.

1. IAL (614) 461-5496.
2. DESCRIBE YOUR NEEDS.
3. DEPEND ON THOSE WHO USE
DIGITAL EQUIPMENT FOR YOUR BEST
ANSWERS, PRICE AND DELIVERY.

CBC COMPANIES
170 E. Town Street
Columbus, Ohio 43215
Call-614-461-5496

Writable Control Store, Disks Added to HIS Line

(Continued from Page 53)

256M-byte drive, \$29,000. The controller costs \$5,500.

A line printer, the Type PRU9109, increases the maximum printing speed of the Level 6 systems to 900 line/min over the previous maximum of 600 line/min. The 90 line/min system has a 64-character set and costs \$23,000. A 660 line/min version, the Type PRU9108, has a 96-character set and costs \$24,700.

The magnetic tape offering includes a controller and adapter for connecting up to four 9 track 1,600 bit/in. and dual-density 800/1,600 bit/in. magnetic tape drives to any Level 6 mini. Four types of tape drives that are mounted in 60-inch racks may be connected to the controller in any combination, the firm said.

The Type MTI9114 at 45 in./sec and the MTU9115 at 75 in./sec offer phase-encoded formats only. The other two offer both NRZI and PE formats: the Type MTU9109 at 45 in./sec and the Type MTU9110 at 75 in./sec.

The controller costs \$6,600, and the

tape unit prices range from \$8,200 to \$15,600. The tape systems will be available in the second quarter of 1978, HIS said.

The VIP 7200 display terminal will be supported as a console on Level 6, the company said. It provides a 1,920-character dual-intensity display and a numeric pad on the keyboard. It costs \$1,980 with a 64-character set and \$2,100 with a 96-character set.

Four new communications adapters that provide higher transmission speeds support the firm's Distributed Systems Environment with additional High-Level Data Link Control (HDLC) capabilities. They include broadband adapters for HDLC Bell 301/303 and HDLC CCITT/V.35 that operate at speeds up to 72 kbit/sec and an HDLC MIL 188C interface for speeds up to 19.2 kbit/sec.

In addition, a communications adapter for dual asynchronous MIL 188C interfaces that operate at speeds up to 9.6 kbit/sec was introduced. The communications adapters range in price from \$650 to \$1,600.

Drug Store Micros Serve Concerned Buying Public

(Continued from Page 53)

done under standard DEC software, he noted, and the applications residing on the host were written in Cobol by Thrift's staff.

Store Phase-In

Presently, the company has 47 stores on-line to the system, which Thrift calls Personalized Health Services. Thirty-six are in Pennsylvania, six in Delaware and five in New Jersey. In addition, 54 more stores are in test phases and will be brought up at a rate of five stores per week starting in mid-March, he said.

Some benefits have already been realized, Nelson pointed out. "We can collect third-party prescription information automatically and bill at a much more accurate level," he stated. In Pennsylvania, the company has been processing third-party claim forms by a tape-to-tape method for about a year, already significantly increasing billing accuracy, he added.

In time, the system should help reduce cash flow problems and free clerks and pharmacists for duties other than taking care of paperwork. In addition, the system should be able to cope with national health insurance, if and when it arrives.

For patients, the system gives the consumer protection against unknowingly taking a drug to which he is allergic. It stores information about all possible interactions and can keep track of certain patients who have particular problems that make them sensitive to certain drugs. Thrift employs a consultant to monitor all items added to its data base for possible interactions so that the information can be quickly added.

Consumers can request tax receipts any time of the year and gain detailed listings of their transactions. Since the system will eventually encompass some 25 states, a person needing a prescription while on vacation could go to the nearest Thrift drug store and get it.

Some 180,000 families (500,000 people) are already on the system. When the data base is complete, it will be contained on 32 200M-byte drives.

Thrift has made an attempt to design the system for 100% uptime. Right now, one of the systems backs up the other and is also used for development purposes. If necessary, a universal power supply could provide 20 minutes of power until Thrift got its two diesel generators working to provide extra power.

SHORT MEMORY?

**Improve it
with a CIG memory system**

When your information outruns your memory's storage capacity, you need a CIG add-on main memory.

CIG memory systems are plug-compatible with IBM 370 and 360's and are offered on short-term leases—one or two years—as well as on longer terms and purchase.

Our products include the latest 13X/14X UMS memory up to 4 megabytes, 158 and 168 memory to 16 megabytes as well as memory for the 360's.

CIG Computer Products has been a leader in the development of plug-compatible computer memory products for nearly a decade. Because we are not tied to the products of any one manufacturer, you can be sure of getting the latest equipment available. And, thanks to our own Technical Services Center, you'll receive reliable technical

support and back-up maintenance from a single source.

If your memory capability is running short, talk to us about a CIG add-on main memory to enhance your present IBM system. We can help you bring your memory capacity into line with your present needs . . . at a cost you'll want to remember.

CIG

A Subsidiary of
Computer Investors Group, Inc.
16th Floor
488 Madison Avenue
New York, New York 10022

Listed, American Stock Exchange
Call CIG at (212) 753-0845

Want to see
tomorrow's
distributed
processing
systems
at work
right now?



See Raytheon's

See it next week at INTERFACE 78

The new PTS/1200 MARK-I and MARK-II systems bring the second generation of distributed processing to computer users.

What is the second generation? Four things: multi-function concurrency on a single system; greater network productivity at lower cost; availability of advanced technology **with no change to host hardware, software or applications investment**; and more local processing capability than you thought possible.

Raytheon's new MARK-I and MARK-II systems bring additional advantages in a new family of distributed processing products that will dramatically show the benefits of distributed processing.

At Raytheon, we meet all these advantages at work at INTERFACE 78, the international computer conference, which begins September 18, 1978, in March 28.

Find out why you get with the new systems.

1. BISYNC or SDLC

Raytheon now offers the distributed processing capabilities of BISYNC or SDLC to users of the PTS/1200 MARK-I and MARK-II systems. This will result in a new level of performance for your system.

If the user can select a BISYNC or SDLC mode, they can select a mode that will work with their existing peripheral equipment. They will be able to use the same equipment as they use now. You can now choose to use BISYNC or SDLC.

2. Large capacity peripherals

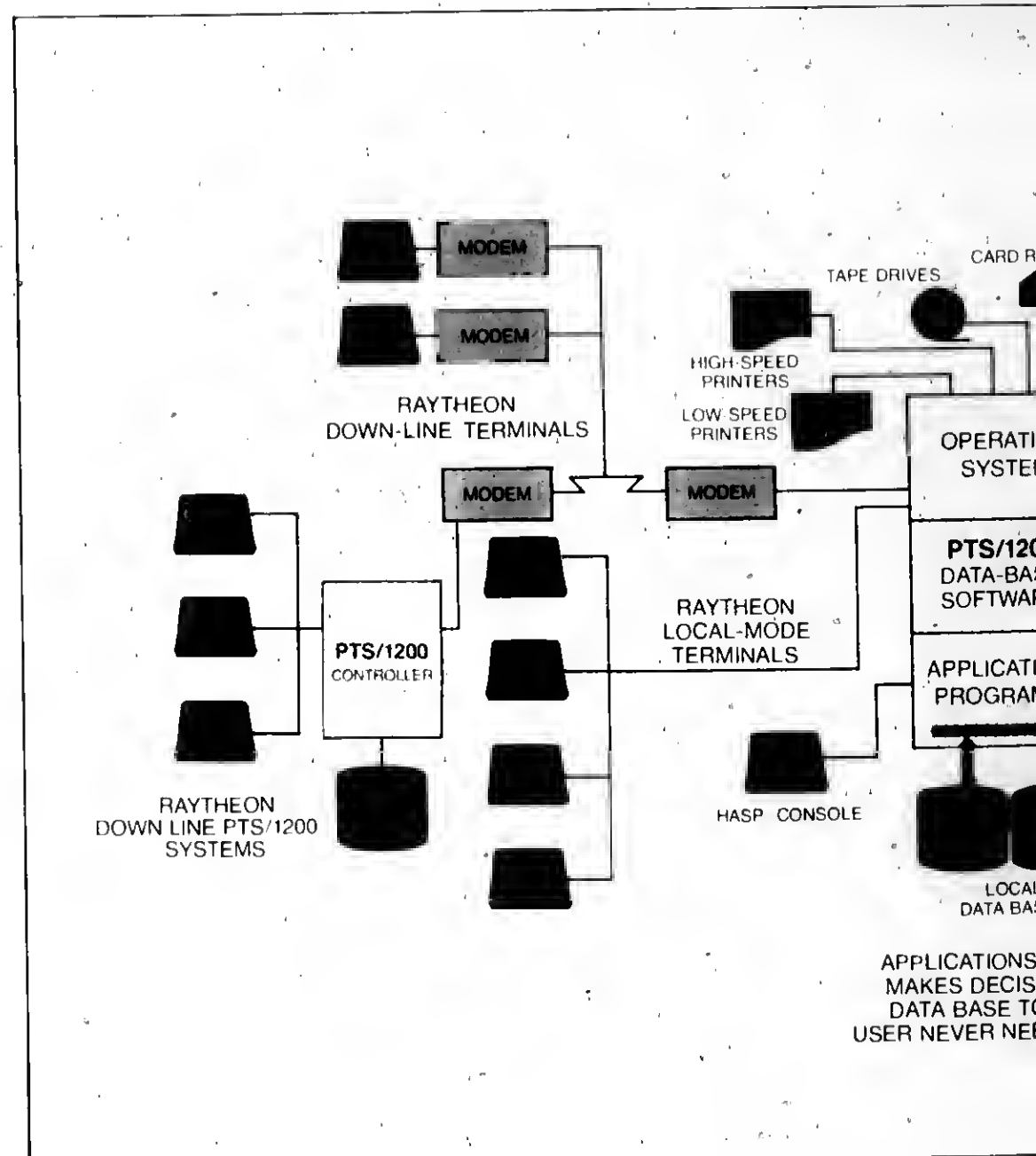
The new MARK-I and MARK-II systems offer a new level of performance. They are now capable of handling up to 80 megabytes of data. This is a significant improvement over the previous MARK-I and MARK-II systems. The new MARK-I and MARK-II systems are now capable of handling up to 80 megabytes of data. This is a significant improvement over the previous MARK-I and MARK-II systems.

3. Advanced source data entry capability

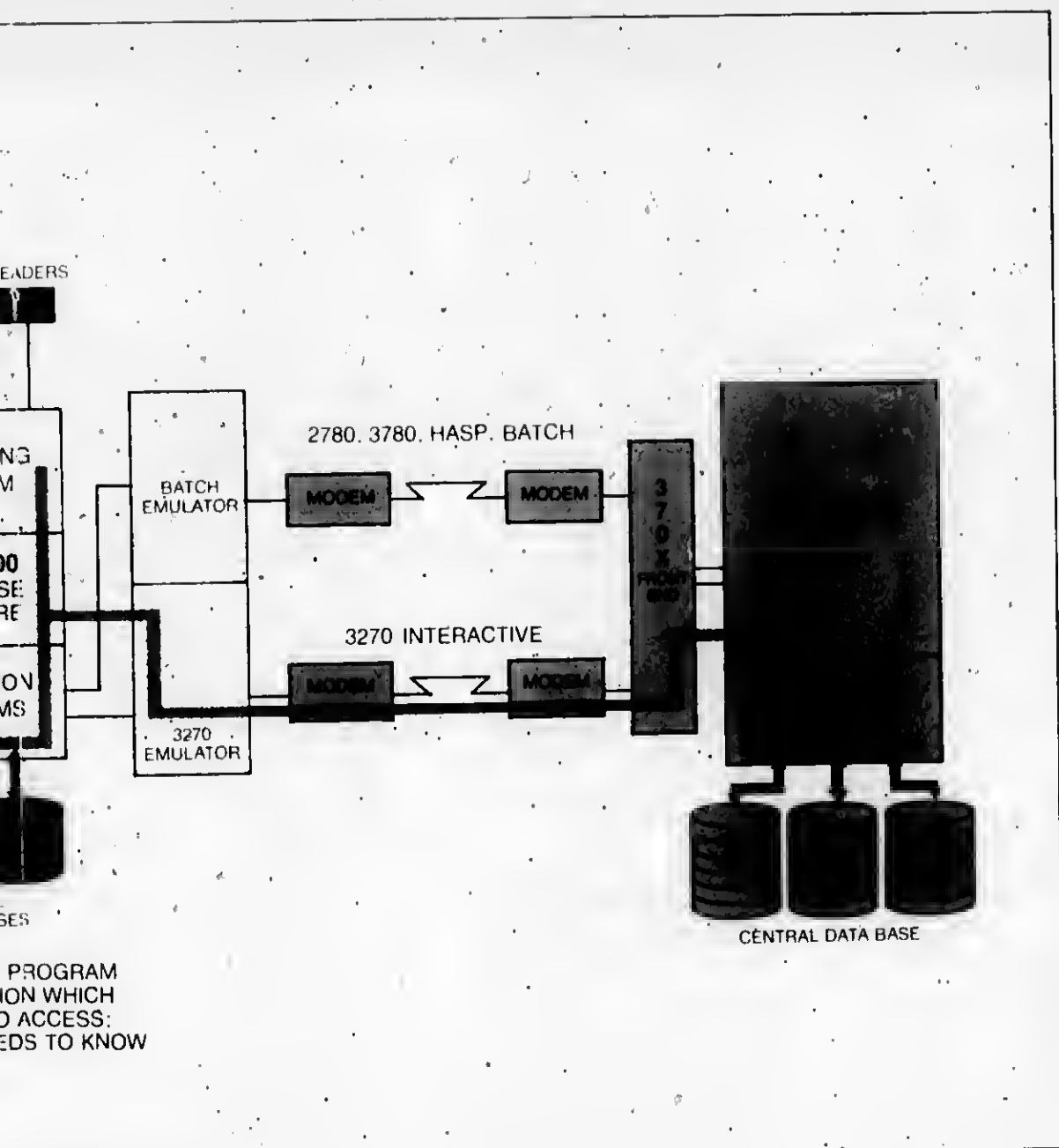
Advanced source data entry capability is a key feature of the new MARK-I and MARK-II systems. It allows users to enter data directly into the system, eliminating the need for a separate data entry system. This is a significant improvement over the previous MARK-I and MARK-II systems. The new MARK-I and MARK-II systems are now capable of handling up to 80 megabytes of data. This is a significant improvement over the previous MARK-I and MARK-II systems.

4. Five unique network productivity features

Raytheon takes the time, the effort and the complexity out of large data networks with a series of



new ^{PTS/1200} MARK I & II



five novel network support aids:

- A **downline terminal facility** lets your PTS/1200 run a multipoint network of PTS 100 and PTS/1200 systems under 3270 protocol independent of a host mainframe. This allows further distribution of processing power to even your smallest sites.
- A **teleprinter concentrator** lets your PTS/1200 control a downline TTY network and process it locally—or pass it upstream on the same lines—at the same time as your 3270 type terminal, or HASP, or RJE, or remote batchwork is being performed. It's a little extra that can cut your communications costs for teleprinter networks by more than half.
- An **enhanced software editor** incorporates significant facilities of IBM TSO software. It assists users to develop programs for their host computers by pre-editing on PTS/1200 systems. As code is developed and stored locally, it can be batched and sent to the host for analysis, editing and debugging—thus eliminating a high percentage of the message traffic and host overhead support now needed under TSO to support remote program development tasks.
- A **remote debug facility**. With it, operators at the host PTS/1200 site can patch or debug programs operating on downline systems or terminals. In just minutes, not days. And without having to send staff personnel into the field.
- And **downline program loading**. A facility that permits transmission of programs from central to remote sites. A nice extra that saves time and money.

5. Intelligent 3270 operations

Raytheon built its data systems business by emulating, and then by extending, the capabilities of 3270 type products. Within the PTS/1200 family, you can grow from basic 3270 type devices to intelligent 3270 type products, to completely concurrent on-line interactive and batch systems, to powerful free-standing local processing systems. Only Raytheon offers users a single migration path far into the future.

6. Soon, the PTS/1200 will support COBOL and word processing

Coming as part of the future of MARK I and MARK II is the addition of interactive COBOL, to supplement our easy-to-use MACROL language, and the addition of our new Videotype word processors as peripherals in a shared data base system. By the time you are ready for those capabilities, you'll be able to get them all from Raytheon.

7. Next, 3274/3276 features

In addition to the enhanced 3270 type capabilities Raytheon now offers, shortly we will be supporting 3274/3276 features on our PTS-100 and PTS/1200 product lines.

PTS/1200

Raytheon Data Systems
Part of the answer
Raytheon Data Systems
In data communications
productivity.

Did you know...

- ✓...The PTS-100 is the most popular intelligent terminal in the world?

There are more than 50,000 PTS-100 terminals in use now—all intelligent, and all working a variety of host protocols, including IBM's. The PTS-100, with more than 20 protocols, costs less than a dumb terminal, and is supported by one of the world's largest field maintenance organizations.

- ✓...The PTS/1200 was the industry's first distributed processing system with 3270 concurrency?

It was announced initially in 1975, when the term distributed processing was just coming into being. Today hundreds of PTS/1200's are installed at leading-edge users, performing multiple tasks concurrently in network environments. Our new MARK-I and MARK-II systems add many more capabilities to the pioneering PTS/1200 system.

If you don't make INTERFACE...

To find out more about the MARK-I & II or other Raytheon systems, please send us the coupon below, or call our local sales office.

- ☐ Tell me more about MARK-I & II distributed processing systems. I currently plan to establish a _____ site network with _____ operator stations under _____ protocol linked to _____ host mainframes.
- ☐ Tell me more about:
 - ☐ PTS-100 intelligent terminals
 - ☐ Other: _____

Name: _____
Title: _____
Company: _____
Street: _____
City: _____ State: _____ Zip: _____
Telephone: _____

Send coupons to:
Marketing Department
Raytheon Data Systems Company
1415 Boston Providence Turnpike
Norwood, Massachusetts 02062

- ✓...That Raytheon Data Systems is one of the world's largest manufacturers of digital communications systems?

Our products include a wide range of digital communications equipment, from local area networks to long-haul systems. We have a strong reputation for reliability and performance, and our products are used in a wide variety of applications.

- ✓...That Raytheon was the first U.S. company to link 3270-type terminals to public packet networks?

Packet switching is rapidly coming into use worldwide. This is because of its ability to use a variety of link access protocols, including X.25, SDLC, and HDLC. Last year, Raytheon introduced its PACK and DMEP software packages, which allow 3270-type terminals to attach to X.25 packet networks. This will appear to the host as 3270-type devices. As a result, Raytheon's commitment to public communications networking.

- ✓...That Raytheon is now in the word processing business?

Soon, Raytheon's T-based word processing products will be available on its distributed processing architecture, as well as its large common data bases. Another feature of your data handling products. Raytheon is now bringing enhanced benefits to computer communications network users around the world. Our commitment to a user, we back it up with our own based technical know-how, our own field service, and our worldwide support capability. You can now get more from your information system.

RAYTHEON DATA SYSTEMS

1415 BOSTON PROVIDENCE TURNPIKE
NORWOOD, MASSACHUSETTS 02062

617-552-1000

RAYTHEON

For Time-Sharing

Multiterminal System Bows

SUNNYVALE, Calif. — A multiterminal commercial time-sharing system is available from Advanced Information Design, Inc.

The System 3000/Model 60 is based on Interdata's 16-bit minicomputers. The unit features a time-sharing operating system that allows a business to run its company's accounting on the system as well as sell time to outside users, the firm noted.

An optional Integrated Accounting and Distribution system, designed for distributors, manufacturers, certified public accountants and service com-

panies, includes general ledger, accounts receivable, accounts payable, order entry, invoicing, purchasing, inventory control, payroll and word processing applications. Programmable in the firm's Virtual Basic as well as Cobol, Fortran IV and assembler, the system features remote diagnostic support to the firm's home office.

Standard peripherals on the system include a graphics CRT, 120 line/min printer and one 10M-character disk drive with both fixed and removable media. The basic system costs \$33,270, including operating software and the company's language. The applications packages are available for \$3,000 from the company at 1240 Elko Drive, Sunnyvale, Calif. 94086.

Systems Display Color Graphics

ATLANTA — A line of microcomputer-based color graphics systems has been announced by Chromatics, Inc. here.

Each model in the line includes a Zilog Z-80 CPU with full memory and I/O structure, the firm said.

The devices are available in 13-in., 15-in. and 19 in. color screens, using high resolution shadow mask tubes.

Standard interfaces include synchronous and asynchronous variable transmission rate serial I/O with TTL and RS-232C. Optional interfaces include RS-422, IEEE-488, 20Ma current loop, an additional serial port and parallel 8-bit or 16-bit port with a direct memory access controller.

The Chromatics CG series has graphics resolutions of 512 by 256 and 512 by 512 individually selectable and color-definable dots. Graphics functions include automatic generation of circles, arcs, rectangles and solid filled objects, as well as vector and concatenated vectors, the firm said.

Optional Function

An optional CREATE and REDRAW function allows recreation of graphics and alphanumerics drawn on the screen from the keyboard or with a light pen.

Alphanumerics may be placed at any point on the screen and may be multiplied to any integer size in both height and width, the company noted. A standard Ascii set is provided along with 96 separate user-definable graphic symbols. Up to 196 user-definable graphic symbols are optionally available, it added.

Using a windowing capability, the screen can be divided into a maximum of four separate independent CRT areas, with individually user-selectable window size, position and cursor, the vendor said.

The Chromatics CG series can also be used as a Z-80 development system with the optional minifloppy disk and full size single and dual disk systems.

Prices for the Chromatics CG series of graphics computers begin at \$8,995 for the CG 1398 model, which includes a 13-in. eight-color CRT system, Z-80 microprocessor, full 128-key function, keyboard, 512 x 256 individually definable and color-coded points and standard Ascii alphanumeric characters with 96 user-definable graphic characters.

Chromatics, Inc. is located at 3923 Oakcliff Industrial Court, Atlanta, Ga.

ROM Fits DEC LSI-11s

PALO ALTO, Calif. — A bank-switchable read-only memory (ROM) system, called the ROM-016, has been developed by Digital Pathways, Inc.

The unit functions within Digital Equipment Corp. LSI-11-based computers and is contained on a single quad board. It will accommodate up to 16K 16-bit words which have been programmed into Intel Corp. 2716 erasable programmable ROMs or 2316E ROMs.

Because of the addressing structure that has been incorporated within each board, it is reportedly possible to expand the system beyond the normal address limitations of the LSI-11.

The memory is physically divided into four independent "blocks," each containing 4K words. Each block can be enabled and assigned a portion of the available address space through either a set of manual switches or a device register.

Block Switched

When enabled and assigned address space manually, the memory responds similarly to all other ROM systems. However, when the block assignment is carried out through the medium of a device register, blocks can be switched in and out within microseconds, the firm said.

The ROM-016 costs \$695, from the firm at 4151 Middlefield Road, Palo Alto, Calif. 94306.

Your data is not interterminalable!

Whether your data is bar-coded, written, fast, slow, continuous or intermittent; there's a terminal that can handle it. And our March 27th Special Report will help you find just the right one for you.

Edited by Ron Frank, *Data Communications Terminals* will focus on the choice and selection of special terminal equipment for specific types of data communications networks, such as point-of-sale or EFTS. It will include topics like these:

- The use of terminals in private line, dial-up and public packet networks.
- General and special-purpose terminals in dedicated networks.
- Characteristics of terminals that help to improve the man-machine interface and make them easier to use.
- Fitting the terminal to the job instead of making management rearrange itself to fit the equipment.

Whatever kind of data communications you're involved in, you need terminals. So dial up this special report and stay ahead of this rapidly changing field.

If you're marketing terminal products or services, your ad should be there on March 27th. Closing date is March 10th. For more details, contact your *Computerworld* sales representative. Or call Terry Williams at (617)965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486

INTERACTIVE USER REPORTS

"Growth without growing pains."

Expandability. "Computer programs developed in support of U.S. Navy combat systems projects include a comprehensive data reduction and analysis system and dynamic system simulations. A powerful, flexible and easily expanded computer was required to accomplish these computer programming tasks.

"We selected a DECSYSTEM 2040 with 128K words of computer memory and 40 million words of disk storage and quickly expanded to 256K words and 80 million words of disk storage.

"Our experiences show that growth doesn't have to be accompanied by growing pains; no software to re-write, no obsolete hardware to replace.

"The people here are really impressed by the maturity and scope of the 20's Operating System and high level languages. For us it has been a superior, cost effective system."

Software. "Information Consultants, Inc., ICI, is a computer service and consulting firm specializing in time-sharing, primarily for the Federal Government.

"When we selected our computer system last year, our customers' requirements were important criteria. To satisfy those needs, our interactive system had to offer a variety of user-oriented languages. It had to be compatible with other manufacturers' equipment. And it had to operate in a secure environment with high reliability. The DECSYSTEM-20 met all of these requirements and then some.

"Compatibility is especially important in our case. ICI develops proprietary software — like ADMIT, a financial modeling, budgeting package. This software is developed on the DECSYSTEM-20 and is implemented on other

Merle Garvis, President, Information Consultants, Inc., Washington, D.C.



R. Micklas, Project Manager, ADAR System, RCA Corporation Missile and Surface Radar, Moorestown, New Jersey



digital

LARGE COMPUTER GROUP

manufacturers' hardware.

"Finally, we had to be sure that our future needs would be met. We determined that the DECSYSTEM-20 represents the state-of-the-art in interactive computing today and has the growth potential we require."

Productivity. "At Dorsch Consult, we were faced with an extremely sensitive problem. All our programs were running on a Univac operating system and obviously our programmers were comfortable with it. But, because we had to share the Univac with other customers, turn-around time was increasing and we needed more productivity.

"In our search for more computer power, we became tremendously enthusiastic with the speed and capacity of the interactive DECSYSTEM-20.

"Once we had installed one, we were truly amazed. Turn-around time was dramatically cut. We could handle lots of large programs — some with up to 50,000 statements in them.

"And finally, thanks to the TOPS-20 operating system, our programmers had very little trouble switching to the new system."



*D. Kornblicher, EDP Manager
Dorsch Consult, Munich, West Germany*

digital DECSYSTEM 20



- ☐ Please send your Interactive User Reports information packet.
- ☐ Please have a sales representative contact me.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Telephone _____

Send to: Digital Equipment Corporation, MR1-1/M49,
200 Forest St., Marlborough, MA 01752.
Tel. 617-481-9511 ext. 6885.

B-2-27-8

DECSYSTEM-20

The interactive computer
for the big system jobs.

Cleaner Built For Cassettes

TARZANA, Calif. — A digital cassette cleaner compatible with 'Philips-style' cassettes has been unveiled by Innovative Computer Products.

The Model 100 cleaner uses a built-in blade to remove surface contaminating particles.

The unit is priced at \$300. Innovative Computer Products is at 18360 Oxnard St., Tarzana, Calif. 91356.

PDP-11 Gains ROM

HOUSTON — Computer Extension Systems, Inc. here has a 32-word (16-bit) read-only memory (ROM) it said fits directly into the small peripheral controller slot of the Digital Equipment Corp. PDP-11.

The ROM11-32 is functionally equivalent to the DEC M792 programmable read-only memory, the firm said. Designed to either be user-programmed or factory-preprogrammed to user specifications, it operates from the existing PDP-11 5V power supply, a spokesman noted.

In a typical application, up to eight of the units can be combined to set up a small ROM to contain nonerasable recover routines or other frequently used routines.

The ROM11-32 costs \$285 from the company at 17311 El Camino Real, Houston, Texas 77058.

Quodata Business System Based on DEC PDP-8 Mini

HARTFORD, Conn. — Quodata Corp. has designed a minicomputer based on the Digital Equipment Corp. PDP-8 for business applications using Quodata's own programming language.

Included in the system, dubbed the QDP78, is DEC's VT78 unit with 32K bytes of memory, CRT, upper/lower case keyboard, Decwriter II printer, dual-diskette drives

and desk.

The system uses Qbol, a business language the vendor said is compatible with DEC's Dibal, but runs under the OS/8 operating system. Fortran IV and Basic are also included, the firm said.

Users can substitute a 180 char./sec printer for the 30 char./sec Decwriter if they wish and may also add another dual-diskette drive, Quodata said. For users requiring more storage, hard disks can be attached.

In addition, with the aid of other equipment, the unit can be expanded to a 16-user multiple language time-sharing system, according to the vendor.

Maintenance for the system is provided by DEC, Quodata said. The unit costs \$9,990 from the firm at 196 Trumbull St., Hartford, Conn. 06103.

GRC Mini Gets Memory Boost, Price Reduction

HARTFORD, Wis. — General Robotics Corp. (GRC) has increased the memory available on its CD/X3 minicomputer from 40K bytes to 56K bytes while reducing the system price by 15%, according to a company spokesman.

The CD/X3 is a Digital Equipment Corp. LSI-11 microcomputer system including a 20M-byte cartridge disk drive and a 60 char./sec teleprinter.

The disk is four platters (three fixed and one removable), each contain 5M bytes.

The teleprinter offers a 7 by 7 dot matrix impact printer with keyboard and prints up to five-part forms with bidirectional printing and a 132-column width.

The standard configuration with LSI-11, 56K bytes of MOS memory, 20M-byte disk, teleprinter and operating system costs \$19,900.

The firm is located at 57 N. Main St., Hartford, Wis. 53027.

It would take this many HP 7920's



to equal this many MRX 677's.



We've become an old hand at improving the performance and economy of other systems. A new case in point: the HP-3000.

It's a powerful system. All it's lacking is a little more drive (the 7920 just can't give you the storage you need). So we came up with our MRX 667. With its 150 megabytes, one of our 677's does the job of three 7920's. And you'll get it at a much lower cost/megabyte—whether you take advantage of our one, two, or three-year lease, or our attractive purchase plan.

We've also seen to it that you don't have to modify your software. The 677 is fully transparent so it simply hooks up to your present system. One at a time, if you wish, or up to a total of eight per CPU.

As far as features go, you couldn't ask for more. An error correction code (ECC) is part of the package. So is an operator oriented self-test capability

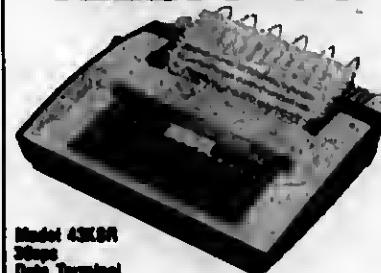
and removable media. The latter is a big plus for protecting your data files. Maintenance is easy, too, because the 677 has only three moving parts. All read-write heads are easily accessible, and so is the entire electrical package which is housed at the top of the cabinet.

And to make your HP-3000 even more efficient, hook up one of our compatible printers. Chain-train models with speeds of 300, 425, 600 or 1000 lines per minute. Naturally, they're loaded with features and cost a lot less than any comparable model.

Contact us about our triple-threat Model 677 and our high-efficiency printers: Memorex, Business Systems Division, 3015 Daimler Street, Santa Ana, California 92705; or call us toll-free (800) 854-3111; or in California call (714) 549-9961.

MEMOREX

TELETYPES®



Model 4320R
30cps
Data Terminal

New and Reconditioned
Models 28 • 32 • 33 • 35
40 • 43

FEDERAL Communications Corporation

11105 Shady Trail #107
Dallas, Texas 75229 U.S.A.
(214) 620-0844 TELEX 732211

Does Patient-Care Chores Mini-Based Unit Eases Nurses' Job

By a CW Staff Writer

MIAMI — A minicomputer-based system has freed up nursing time by handling business and patient care applications at the Green Briar Nursing Home, according to Russell Silverman, assistant administrator.

In addition to the basic accounting functions, the nursing home system performs patient billing and keeps track of medication, treatment, diet, diagnosis and general patient care, Silverman said.

The system lists the physicians with their patients so nurses can contact the doctors easily in case of emergency or for general information questions, he said.

Saves Nursing Time

Patient medication formulas entered into the system are available on-line so nurses can save time in preparing medicine. New orders for medication and treatment are added as they come in.

The system also allows doctors to review and renew the medicine and treatment they have prescribed every four weeks, according to Silverman, who said this automated method eliminates manual transcribing and stops a lot of errors that would otherwise occur.

The system also enables information about a patient, such as name, all doctor orders, diagnoses, room number, religion, special treatment and medication to be put on one record for access by the doctor or nurse, Silverman said.

System Adds Control

With the mini, the hospital administration can get better information, keep tighter controls and have a system that is more adaptable and easy to use, Silverman said.

The system is programmed to prepare a listing of each patient's problems and possible ways to solve them, Silverman said.

The nursing staff was somewhat reluctant to use the system when Green Briar first got it, but once the nurses realized it could ease their work, they were happy with it, he said.

The system reduces the amount of paperwork the hospital handles by 50% and frees up nursing time for more direct nursing care, according to Silverman.

The time saved is approximately one hour per patient each month, which adds up to 180 hours of nursing time each month, he said.

The only problem with the system is that "we are progressing faster than anticipated. Our software house had to keep up with us," Silverman said.

It took only one month to convert to the system and test the accounts receivable and patient billing programs, he said.

Set Up Master File

The first step in the billing program was to set up a master file including name, address, phone, where the patient came from, hospital or another nursing home, diagnosis and other pertinent information for Medicare billing.

The master file has an automatic feed-in to the patient census which

keeps track of patients entering and checking out of the nursing home. The patient census allows the nursing home to track the duration of stay and accrued costs of both the private and Medicare patients.

Medicare pays a flat amount per day for each patient until an audit cost report is done to determine the difference between the flat amount and the actual cost. The billing analysis for Medicare formerly took one and a half months to produce and verify but now is done along with each bill as it is produced, Silverman said.

More Information

Green Briar first automated its

180-patient nursing home six years ago with a Burroughs Corp. L5000, but eventually found it to be too cumbersome; it also needed to provide more information to the nursing staff, Silverman said.

In 1977, Green Briar switched to a Digital Equipment Corp. PDP-11/34 minicomputer. In addition to the mini, the system includes two 45M-byte disks, a 64K-byte memory, 180 char./sec printer and two terminals. The system costs approximately \$55,000.

Green Briar is planning to add an additional disk, upgrade to a 128K memory and test a program which will expand the system to six terminals.

Disks Loaded

PASADENA, Calif. — For users needing some way to back up their fixed or Winchester-type disk drives, Data Electronics, Inc. has introduced "The Funnel," a 6,400 bit/in. 1/4-in. cartridge tape drive.

Designed to load and unload fixed-disk systems, the unit features 4-track serial recording and can accommodate 11.5M bytes of data. The data transfer rate for the system is 192 kbit/sec.

Noting that the unit is small and light, the vendor said four units can provide about 46M bytes of on-line storage in a 7-in. panel.

The unit costs \$1,500 from the firm at 370 N. Halstead St., Pasadena, Calif. 91107.

Headstart for Computer Dealers:

THE SYNERGIST™
Business Systems



Get a jump on competition. Don't waste time matching hardware to software. Sell a fully integrated family of business systems. With single source engineering and software support. Already programmed to satisfy many business needs. The Synergist Business Systems from Digital Computer Controls.



Sell big system features with small system pricing. Like a plain English data base inquiry system that lets users make a complex information request in a single sentence. A text retrieval system for documents of every kind. And a complete business application library for accounting, sales analysis, order processing and inventory control.



Win customer support. With 3 sizes of mainframes and a common operating system that lets your customers grow from a single user mini to a 16 terminal, 760 MB maxi. Without spending a cent on reprogramming or costly conversions. With every system backed by Data General with over 40,000 computers already installed.



Make your business grow with the computer system that fits more of your customers' needs. Join the select group of the best managed business system dealers in the country. Sell The Synergist. Call or write Ronald S. Harvey, Business Systems Sales Manager, (201) 575-9100.

DIGITAL COMPUTER CONTROLS INC.
A Subsidiary of Data General Corporation.

23 Just Road, Fairfield, New Jersey 07006, Phone: (201) 575-9100, TWX 710-734-4310

Let Us Send You This
17" x 11" AUDICS Checklist
for Performing
DP Department Review!

FREE!



If the auditors walked into your office tomorrow, would they be able to understand your DP system well enough to carry on a valid audit?

Would they be able to audit *through* your existing system? Or would they have to audit *around* it — doubling the time required *and* the money spent by your company?

The Checklist we'd like to send you at no charge could very well help solve this costly problem!

Culled from audit guidelines in actual use by several major accounting firms for auditing the DP installations of their clients, it could well put you on the road to helping your auditors work *with* your present set up... allow you to appreciatively understand *what* they must know *and why*.

This "Checklist for Performing DP Department Review" is just one of many valuable reference materials supplied to users of AUDICS, the money-saving new training tool that truly bridges the gap between your EDP staff and the auditors. It can save you thousands of dollars!

Created and produced by Info 3, Inc., a leading professional development company, AUDICS covers the complete spectrum—from basic concepts to practical procedures that show you how to develop EDP systems that meet internal control requirements.

It's ready to use, frees you from the time-consuming task of planning and setting up a training program of your own. And AUDICS is *complete*, including workbooks, cassettes, forms and procedures. Also, a player/recorder and an attractive attache case are included.

Best of all, AUDICS is dependable and it *works*, is used and recommended by leading corporations, banks and accounting firms nationwide!

Return the handy coupon below, or call 800-423-5205, toll free (in California, call 213-999-5753, collect).

We'll send you free Checklist and more details promptly. One thing's certain — you have everything to gain and absolutely nothing to lose.

AUDICS®

Designed and Developed by INFO 3, Inc.
21241 Ventura Blvd., Woodland Hills, CA 91364

INFO 3, Inc. 21241 Ventura Blvd.
Woodland Hills, CA 91364

Rush my "Checklist for Performing DP Department Review" along with more information about your timely new AUDICS Course.

Name

Title

Street

City & State

Zip

Phone () 1788

To Ease Paperwork Load Securities Trader Uses Dual CPUs

NEW YORK — A.G. Becker & Co., Inc. recently installed a computer system to automate the paperwork associated with its daily trading, to provide capacity that will support higher volume and to maintain operational control, according to the Wall Street securities trading firm.

Built around dual Hewlett-Packard Co. 3000 Series II systems with 24 terminals, the system updates the company's portfolio with each transaction and prints the necessary receipts and bills for securities delivered and received. It also performs necessary calculations, makes ledger postings and provides management with summaries of company financial status and holdings.

Becker developed the custom-designed and configured system with help from R. Shriver Associates (RSA), a management services company located in Parsippany, N.J.

The most important advantage of the system, according to Bob McCausland, Becker's project manager and vice-president, is that it speeds the availability of information so that financing can be arranged most expeditiously on major purchases.

"Speed is key for financing and the HP system gives management a snapshot of the flow of inventory," McCausland said. "Our average transaction is about \$2 million and the financing costs are enormous. Timely information helps limit these costs and contributes in an important way to the profitability of the business."

"The system also enables the firm to process more business with the same number of employees by lowering unit costs with expanded control over higher volumes," McCausland noted.

Backup Provisions

Two HP systems are used here because the security trading business cannot tolerate much downtime, according to Bent Rasmussen, system designer and project manager for R. Shriver Associates.

"When you're dealing with security trades that entail millions of dollars in each transaction, you're in bad trouble if you can't operate. For example, if securities aren't delivered to banks before they close at 3 p.m., thousands of dollars can be lost in interest," Rasmussen explained.

There are two 15M-byte disk memory storage files on each of the systems. These disks contain the file of daily transactions, which may run to 2,000, the inventory file of 1,500 different positions, the security master file of perhaps 1,500 issues and the account master file of about 7,000 accounts.

At the same time that transactions are recorded on disk, a magnetic tape on the first unit also records them. Should a breakdown of the first system occur, the tape is also used to read the transactions into the disk of the second unit. In minutes, that unit becomes current.

The system also does simultaneous real-time updating of both units' disks. At the end of each day's business, the transaction file is cleared from the disk preparing it for the next day's file of transactions, McCausland explained.

Each day, when the securities markets and the traders open for business, Becker financial managers review their inventory of securities.

If the security is bought, the buyer prepares a hand-written ticket of the purchase which is taken to the operator of one of the HP 2640 CRTs. The terminal operator keys in the transaction by indicating whether it is a buy or a sell, and the computer then places the appropriate format on the screen, McCausland said.

The operator then fills in the form with information such as security identification numbers; security type; transaction code; account traded for; delivery instructions; face amount; maturity date and interest rate.

The Becker system accommodates all types of credit instruments, including all U.S. government securities (interest and discount), all U.S. agencies' issues, bank holding paper, certificates of deposit and banker's acceptances, according to McCausland.

When the form on the screen is completed, the operator pushes the "enter" key and the system performs a verification step, checking for missing data and account validity, and determining whether the system posts the security purchase.

It then adds the security to the inventory and prints a receipt ticket multipart form that also includes the description of the agency or corporation issuing the security.

This ticket is printed out on a terminal printer and used to receive the purchased security. In the case of a sale, the system performs a similar task, reduces the inventory and produces a billing ticket used to deliver the security.

Security Inventory

At the completion of the day's business or at any point during the day, the system can be used to produce a complete and detailed list of the security inventory. This listing may also include the exact denomination of each security certificate, McCausland said.

The system also maintains updated customer files, calculates transactions on-line, prints customer confirmations, maintains pending files, maintains the "stock record," produces required operations reports and produces required management reports, he noted.

These reports include stock record/inventory detail, trade recap, trade transaction detail, cash sheet summary, cash sheet detail and purchases and sales journal. Additional reports cover the bank load balance, daily repurchase outstanding, securities pending and profit and loss.

Becker looked at Digital Equipment Corp. and Data General equipment as well as the IBM System/3 and a few others, but settled on HP primarily because of its software capabilities, McCausland said.



You've got a Computer Terminal on your desk.

With your push-button dial telephones and our P1-5 Date Concentrator, you've got a comprehensive interactive system to front-end your computer. The P1-5 will answer up to 16 simultaneous callers and record their key entries on to dual floppy diskettes, which eliminates the key punching process.

The P1-5 Data Concentrator offers:

- User designated field duplication
- Modulo 10 checks on user designated fields
- Audio response to callers
- Blank fill to the next field with the " " key
- 3740 diskette compatibility along with automatic Time and Date recording
- Battery backup power supply
- Low monthly cost averaging \$300
- Optional 360/370 multiplexor channel interface for P1-5
- Optional CRT/Keyboard terminals for \$17/month

The P1-5 has almost unlimited applications including General Ledger, Payroll, Time and Attendance Reporting, Production Reporting, Receivables Control, Inquiries and many other uses.

Call us today and we'll tell you how the P1-5 Data Concentrator can help you get in 'touch' with your employees and customers.



PHONE 1
1330 East State St.
Rockford, Illinois 61108
Phone 815/962-8927

End to 'Near Monopoly' Forecast

IBM Warned: Beware of Personal DP

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The small personal computer is the only force on the horizon that will break IBM's "near monopoly" of the computer industry, Dr. Portia Isaacson, co-owner of the Micro Store in Richardson, Texas, and last year's National Computer Conference chairwoman, told Federal DP Expo attendees here recently.

"IBM is nervous," in Isaacson's view. The industry leader has just begun to drop its prices to stay competitive, she said, adding her belief that the corporation will continue to do so before it enters the personal computing marketplace.

But IBM isn't the only company that should beware of personal or low-cost computing.

Cheap, abundant computing capability also means the end of time-sharing services, Isaacson predicted. Personal computing is replacing time-sharing — originally designed

to provide each individual or program with a slice of a big computer. Now people can take their own black boxes home or to work.

"We really don't need time-sharing anymore," Isaacson said. "It will only survive as long as its developed software holds out. Ultimately, the shared disk will be the only time-sharing service that remains."

Personal computers are also replacing minicomputers, particularly at the low end of process control, Isaacson stated. While IBM cuts prices, mini makers exhibit their nervousness by putting their equipment into retail computer stores, she said.

Personal computing is undermining yet another force in the industry: the mystique of it all. When the computer becomes just another home appliance — albeit the controlling one — the black art qualities associated with the computing professions will vanish, Isaacson said.

As the public becomes computer-literate, the qualifications for entry-level programming and analyst jobs are likely to go up.



CW Photo by E. Holmes

Dr. Portia Isaacson

Meanwhile, the salaries for those and other positions associated with computing will go down, she stated.

(Continued on Page 66)

Mail Order Firm Plans to Make Good

By Tim Scannell

CW Staff

FULLERTON, Calif. — Associated Electronics is broke today "because we took an honest interest in our customers... and went out of our way to help" them, according to Brice Ward, president of the now-defunct firm.

It is "not our intent, has not been our intent and never was our intent" to cheat anybody out of anything, Ward insisted.

Last month an ad appeared in a national computer hobbyist publication offering an erasable programmable read-only memory (Eprom) board kit from Associated Electronics. Unbeknownst to the people who ordered the board, Associated Electronics had closed down two months before the ad appeared.

When customers tried to call the firm to find out why they had not received what they ordered, they discovered the telephones were disconnected and the building here was empty.

A spokeswoman for the Fullerton Chamber of Commerce could give little assistance in locating the "missing" company. "We've had long distance calls on that firm from other people who have been looking for them," she stated. "We had people go by there, but there's nothing we can find out — they're just gone."

Although the Better Business Bureau said that Associated Electronics "did respond to complaints" from dissatisfied customers, it wouldn't elaborate.

The Fullerton Police Department, however, proved to be more helpful. It supplied the number of a post office box through which the president of Associated Electronics was reached.

'We Haven't Disappeared'

"We haven't disappeared anywhere," Ward stated. The telephones, although disconnected for a time, are now operating — the number is (714) 539-0735 — to assist in customer queries, he noted.

"I'm honestly and truthfully furious about the whole thing," Ward said in response to charges he tried to defraud his customers. The 20 or so people who did not get the material they ordered will either get their product "or get a refund when we are in a position to refund the money," he pledged.

The reason Associated Electronics folded is

simply because of a lack of money, Ward said. "If a customer had trouble with one of our Eprom kits, we would repair it even though we had no obligation to do so. The responsibility for repairing those things rested with the guy who built the kit," he pointed out.

"We not only went to the extent of servicing the things and returning them to the customer free of charge, we also, in some cases, redesigned the whole card on the assumption there might have been some problem in the original construction," he continued. "It cost us a fortune."

"There are about five [customers] who are complaining... and I don't blame them," Ward said. "We've made arrangements with Byte Industries of Sunnyvale, Calif., to

manufacture these cards. It has assured us it will supply memory boards to the people who ordered cards from us.

"I can remember when we were down in our building in Irvine, Calif.," Ward said, reminiscing about his business. "My wife would sit and wait for me to finish work," which he said wouldn't be until 2 o'clock in the morning. "Our kids would be curled up in a corner on a sleeping bag, while I tried to get products out to our customers."

Nobody "noticed or acknowledged us when we were still viable," Ward said, but "now that we're out of it all, all of a sudden we are really grist for the mill."

Ward and Associated Electronics can be reached at P.O. Box 1720A, Garden Grove, Calif.

West Coast Faire Opening Friday

SAN JOSE, Calif. — The three-day Second West Coast Computer Faire will begin Friday at the San Jose Convention Center here.

The Faire, whose organizers expect more than 10,000 visitors, will feature four keynote speakers at two banquets, over 200 booths of exhibits and 50 to 80 conference sessions, tutorials and technical talks.

Each of the banquets will have two speakers; one will discuss "present world" concerns and the other "future world" topics.

Friday's "present world" speaker will be Dr. Adam Osborne, president of Osborne & Associates of Berkeley, Calif., who will discuss "Significant Personal Computing Events for 1978." He will also be giving the first presentation of his "Maybe-Annual, Unilateral White Elephant Award for 1977" in personal computing, a Faire spokesman noted.

Alan Kay, Friday's "future world" speaker, will tell attendees, "Don't Settle for Anything Less." Kay is a scientist at Xerox Corp's Palo Alto, Calif. research center and head of its Learning Research Group.

Saturday's "present world" speaker will be Dr. Portia Isaacson, who will discuss how "Dinky Computers Are Changing Our Lives." Isaacson is the Chairwoman

of the Association for Computing Machinery's Special Interest Group on Personal Computing.

"All Those Things You Wanted to Computer, But Didn't Think You Could Afford," is Saturday's "future world" topic. Bill McKeeman from the University of California at Santa Cruz will make the presentation.

A major portion of the Faire's program will be dedicated to "Computers for the Physically Disabled." The section's keynote speaker will be Dr. Robert Suding of the Digital Group. He will focus, according to the spokesman, on where the microcomputer revolution is going in the solution of the many needs of handicapped persons.

To assist the disabled who attend the Faire, organizers will be providing simultaneous translation of selected conference talks for the hearing-impaired as well as offering a special \$6 fee for 3 days' admission. The convention center is equipped with facilities for the disabled.

At-the-door registration Friday will cost \$8 and be good for all three days. Saturday registration at the door will cost \$9 and be good for two days and Sunday-only registration at the door will cost \$8. Those below college age with student identification will be charged \$6, as will senior citizens.

MICROCOMPUTING

Micro Bytes

Signetics Reduces Price of ABC Kit

SUNNYVALE, Calif. — Signetics has reduced the price of its Adaptable Board Computer (ABC) 1500 kit from \$190 to \$89.95.

Assembled and tested, the unit is now available for \$149, reduced from \$275.

The ABC 1500 includes a 2650 microprocessor with 1,000 bytes of read-only memory and 512 bytes of random-access memory, serial and parallel I/O ports and a dual monostable on-board clock.

Signetics is located at 811 E. Arques Ave., Sunnyvale, Calif. 94086.

Personal DP Seen Bane of IBM

(Continued from Page 65)

The prestige will go out of the corporate DP executive's job; he is no longer managing so expensive — although still so valuable — a resource.

Depressed? Isaacson laughed as she contemplated the future worth of her Ph.D. in computer science.

No, not alarmed, she said. "We are incredibly lucky" to be present at the dawning of the "age of abundant computing."

For Isaacson and many others, personal computing means an infinite number of possible computer applications; it means the continued growth of an industry and of an important tool.

Think of the possibilities, she suggested. It's possible to simulate the stock market, do astrological analyses,

play Star Trek, run a computer dating service, use a system as a smart typewriter for text composition, learn to program, get into the biorhythm business, project one's personal finances, file family genealogical information, keep an inventory of stamp or beer can collection, drill your kids in arithmetic.

Litter Box the Clue

When Isaacson first opened her computer store in Richardson, one of nearly 500 computer stores in the U.S. today, she wasn't sure who her first customer would be. She may have expected an engineer or computer-type; what she got was an art professor from Southern Methodist University.

It wasn't until her store was asked to debug a system that a cat had mistaken

for its litter box, however, that Isaacson really knew computers had come home.

Today's computer store offers personal computing users equipment from about a half-dozen of the more than 100 manufacturers in the field. The leaders, Isaacson said, are companies specifically formed to produce computers and peripherals for this market: Processor Technology, Mits Altair, Cromenco and Southwest Technical Products.

Even offerings from such traditional computer companies as Pertec, Intel and California Computer Products can now be found in computer stores, she pointed out. Electronics companies such as Heath and Radio Shack have already jumped into the business and they will soon be followed by Texas Instruments, she stated.

In addition to personal computing equipment, computer stores sell books. They also service and maintain software, provide consulting services on how to configure a system for a given application and are heavily involved in computer education, Isaacson said.

In her opinion, the store that caters to small business and industrial applications, the store that is really "a small systems house in disguise as a retail outlet" has the greatest potential for growth.

Those computer stores that have catered strictly to hobbyists and are now having financial trouble have misjudged the market, Isaacson contended.

A third type of computer equipment outlet — the home or consumer store that carries fully assembled systems and competes with Sears Roebuck and Co. — will do better than the hobby computer stores, but not as well as the "disguised" small systems house, she said.

Ultimately, Isaacson believes millions of personal computers will be sold for home as well as small business and industrial use. What the personal computing industry needs now is a huge library of applications programs, she said.

And Then Came Disk

Last year saw the advent of disks for personal computer systems and the beginning of application software development, Isaacson noted. She predicted that in 1978 the industry will develop hard disks subsystems.

"Graphics will be the other area of great innovation this year," Isaacson said. Better black-and-white and color set resolution and good software support are essential to the growth of graphics, she stated.

Graphics, in turn, are important because they will help solve the human interface problem. Consumers will be much more attracted to personal computer systems with graphics capabilities, she suggested.

Hoping to have converted some members of the Expo audience into personal computing buffs, Isaacson recommended that anyone interested in a computer of his own should choose a computer store that is nearby and trustworthy.

"Secondly, buy a computer that the store backs and is willing to service," she advised. "If a store recommends them all, your best bet is to go on color."

Are you a user?

Sophisticated? Becoming experienced? First time? Or still thinking it over?

Whatever your level, one thing is certain. You'll be more of a computer user in the near future. And Computer Expo 78's Conference has vital information you can't afford to miss. At least one of these days should be a must on your calendar:

TUESDAY

You're on the executive level. You deal with data processing personnel, problems, payments and plans. Today is yours.

The Executive Briefing

- Keynote speech: "Strategic Systems Planning: a View from the Top," by an official of the consulting firm, Booz, Allen & Hamilton
- Case Studies: Data Base and the Executive; Potentials of Distributed Data Processing.
- Presentations: Trends and Opportunities in System Financing; The Computer Resource of the Future.

WEDNESDAY

Double Conference Day

(Two simultaneous conferences)

You're bringing in a first computer system for a small company, you're involved in light, inhouse use of computers (maybe about to trade up), or just thinking of your own system. You'll want to attend the Program on Small Business Systems.

You're interfacing with computer personnel on a day to day basis. The Program on Managing People Problems is designed just for you.

Here's your schedule:

Small Business Systems

- Keynote Speech: "Data Processing in Small Business Today," by an official of Arthur Andersen and Company
- Case Studies: Computer Uses in Financial Reports; Computer Uses in Operations Planning & Reporting
- Presentation: How to Negotiate with Vendors • Days-end panel that includes you, your questions, views and comments.

Managing People Problems

- Keynote Speech: Given by a recognized expert in data processing personnel management • Case Studies: Career Pathing for Operators and Programmers; Improving the User/DP Relationship • Presentations: Testing for DP Competence; Coping with Security/Privacy Regulations.

THURSDAY

You're a manager or technician, and your organization is thinking of distributing its computer resources to regional offices and plants. This is your can't-miss day:

Distributed Data Processing

- Keynote Speech: "Critical Issues in DDP" • Case Studies: Applications for DDP; Equipment Selection
- Presentations: Networking Aspects of DDP; The Data Base Question.

Anaheim

Southern California Computer Expo

March 21, 22, 23
Disneyland Hotel

San Francisco

Northwestern Computer Expo

March 28, 29, 30
San Francisco Civic Aud.

Houston

Southwestern Computer Expo

April 11, 12, 13
Astrohall

Atlanta

Southeastern Computer Expo

April 18, 19, 20
World Congress Center

St. Louis

Gateway Computer Expo

April 25, 26, 27
Gateway Convention Ctr.

Chicago

Midwestern Computer Expo

May 2, 3, 4
McCormick Place

New York

Mid-Atlantic Computer Expo

May 9, 10, 11
New York Coliseum

Detroit

Great Lakes Computer Expo

May 23, 24, 25
Cobo Hall

Boston

New England Computer Expo

May 30, 31, June 1
Northeast Trade Center

Each Conference day is just \$55. All three days only \$135. The Exposition is FREE.

Take one, two, or all three days. And send your key personnel to the days that will benefit them most. You'll profit! Now in its 7th successful year, Computer Expo 78 brings you a nationally-respected Conference. No frills, all usable facts. Answers to critical questions you face now, designed for you to put to practical use now. You'll have the chance to talk with leading consultants and users from all over the U.S. Gain insight, trade ideas, learn the latest. At the free exhibitors' seminars every afternoon you'll talk with knowledgeable representatives from the nation's top manufacturers.

Come to Computer Expo 78's Conference and Exposition, and come away a smarter user.

*All conferences will be held from 9AM to 1PM

Register now! Space is truly limited.

How to register.

No advance registration is required for the Exposition. Your business card will admit you.

To register for the Conference, or for more information, call TOLL FREE (800) 225-4242. In Massachusetts call collect: (617) 964-4550.

COMPUTER CARAVAN'S

COMPUTER



L **LOOP** — 1. Basically a self-contained series of instructions in which the last instruction can modify and repeat itself until a terminal condition is reached. The productive instructions in the loop generally manipulate the operands, while bookkeeping instructions modify the productive instructions and keep count of the number of repetitions. A loop may contain any number of conditions for termination. The equivalent of a loop can be achieved by the technique of straight-line coding, whereby the repetition of productive and bookkeeping operations is accomplished by explicitly writing the instructions for each repetition. Synonymous with cycle 1. 2. A communications circuit between two private subscribers or between a subscriber and the local switching center.

M **MACHINE CYCLE** — The shortest complete process or action that is repeated in order. The minimum length of time in which the foregoing can be performed.

MACHINE LANGUAGE — The final language all computers must use is binary. All other programming languages must be compiled or translated ultimately into binary code before entering the processor. Binary language is machine language.

MACRO ASSEMBLER — A macro assembler simplifies coding when similar sections of code are used repeatedly, but variations preclude the use of conventional subroutine techniques. With a macro assembler, a single instruction yields the necessary expansion without undue complexity.

MACRO CODE — A coding system which assembles groups of computer instructions into single code words and which therefore requires interpretation or translation so a computer can follow it.

MAGNETIC CORE STORAGE — A type of computer storage which employs a core of magnetic material surrounded by a coil of wire. The core can be magnetized to represent a binary 1 or 0.

MAGNETIC TAPE — Flexible plastic tape, e.g., 1/2-in. wide, on one side of which is a uniform coating of dispersed magnetic material, in which signals are registered for subsequent reproduction. Used for registering television images or sound or computer code.

MAINFRAME — Refers to the basic or main part of the computer, i.e., the arithmetic or logic unit. The central processing unit.

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers Inc. 207 Kenyon Road, Champagne, Ill. 61820.



COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

COMPUTERAMA Software Products. Octal memory dump program. 8K BASIC. \$15. Polydimensional. Box 248, Ocean Springs, MS 39564.

3P+s I/O Boards. Processor Technology assembled new; excess inventory. \$125.00 each. Computer Systems For Business, 3300 Sirius Avenue, Las Vegas, Nevada 89102.

Continuous Forms - our lowest prices ever for custom or stock forms. Send spec's or sample for free estimate. D.C. Printers, P.O. Box 1470, Reedsport, OR 97467 (503) 271-3674.

HOW TO ADVERTISE: This special classified section in solid (non-dispersy) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02160.

I have read the rules, and would like to place my ad as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (_____) _____

These countries represent three quarters of the worldwide computer market

These publications reach key computer executives in all of these countries



And you can advertise in all of them through us.

The International computer market is incredibly concentrated. More than 40% of the world's general purpose computer systems are found in the United States alone, and another 30% can be found in the next four largest computer using countries (Japan, Germany, United Kingdom and France). Add Italy (8th) and Brazil, and you get more than 75% of worldwide general purpose computers. (1)

All of these foreign countries are also heavy importers of U.S.-made computer products and services, with almost a billion and a quarter dollars of imports from the United States in 1976. (2)

As publishers of *Computerworld*, *Computerwoche*, *Computer Management*, *Shukan Computer* and *Data News*; and U.S. representatives of the French and Italian publications, we can give you one-stop advertising service in all of them — including translation and production services. We can also send you one bill — in dollars. So it's as simple as placing space in U.S. publications.

We'll be glad to send you a free market brief with more facts on the international marketplace for computers, as well as information on each publication. Just send in the coupon or give us a call.

Notes:

- (1) Measured by value, based on data from International Data Corporation, the world's leading EDP market research company. General purpose computer systems do not include mini-computers or small business systems.
- (2) U.S. Commerce Department figures.



CW COMMUNICATIONS/INC.

To: Roy J. Einreinhofer, Vice President, Marketing
COMPUTERWORLD, 797 Washington Street
Newton, MA 02160 (617) 965-5800

I'd like a free copy of your marketbrief, "The International Marketplace for Computer Products and Services" as well as information on your publications in the countries I have checked.

☐ Germany ☐ United Kingdom ☐ Italy ☐ Brazil
☐ France ☐ United States ☐ Japan

Name _____

Title _____

Company _____

Address _____

Regarding Capital Formation

Adapso Urges Changes in Federal Policy

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — Two spokesmen for the Association of Data Processing Service Organizations (Adapso) recently urged the federal government to revise its policies on capital formation for the computer services and other technology-based industries. In testimony before the U.S. Senate Committee on Small Business, Leslie Srager, secretary and general counsel of National CSS, Inc. of Norwalk, Conn., and John Imlay, the association's senior vice-president, said the computer services area still requires more favorable government attitudes toward venture capital and new business financing, even though it is the second largest sector of the \$31 billion computer industry.

Computer services firms must remain in the forefront of emerging technology to stay in business, Srager said. Unfortunately, keeping abreast of the rapid pace of technological developments demands massive transfusions of investment capital.

Most computer services firms, however, lack the financial wherewithal to generate

this capital internally, Srager explained. Nor can they easily attract the necessary financing from outside sources.

In fact, some 2,300 of the estimated 2,600 corporations in the computer services industry gross less than \$10 million annually, well under the \$20 million that most venture capital firms regard as the minimum qualification for their financial services, Srager noted.

As a result, most computer services firms experience great difficulty obtaining much needed investment capital, and the problem is becoming more serious each year, Srager warned.

MSA Story

The history of Atlanta-based Management Science America, Inc. (MSA) provides a convenient case in point.

In 1971, MSA declared bankruptcy but later reorganized with help from debtor relief provisions of the Federal Bankruptcy Act and the Internal Revenue Code. Unfortunately for MSA, the provisions that fostered the company's comeback no longer

exist, and "we are again facing the problems that confronted us in 1971," according to Imlay, the firm's president.

Moreover, many other computer services firms face a similar crisis, primarily because of tax system inequities and federal business regulations that favor the few giants of the industry, he added.

"The conventional markets (for capital) are foreclosed to us by virtue of the accounting principles with which we are burdened," Imlay noted. "In order to grow and expand, we must have additional capital."

If they don't receive that extra capital, many of the companies in the computer services industry will either grow at a prohibitive cost and become unprofitable, or stagnate and become noncompetitive, Imlay said.

Potential Being Limited

Echoing Imlay's sentiments, Srager warned that "the potential of companies in our industry is being limited by restrictions in the availability of venture capital and capital formation." As a result, some computer services firms have experienced difficulty in expanding their product lines through increased research and development, penetrating new product and geographical markets, acquiring highly skilled new computer personnel and competing with other suppliers of computer technology and equipment.

Other companies in the industry have gone out of business entirely or have been forced to sell out to much larger competitors and thus hastened the process they fear most — the concentration of computer services in fewer and fewer firms.

"Small companies should not be allowed to become extinct or be absorbed by larger entities, Srager argued. "Not infrequently, the best ideas come from small entities," he said.

Moreover, he added, "the thrust of our antitrust laws and other rules against monopoly and monopolization is to try to keep smaller firms alive. To simply stand by while these firms are absorbed through the lack of capital is to run counter to the basic philosophy that has guided this country almost from its beginning."

Some Mass. DP Workers Poorer As Result of Recent Snowstorm

BOSTON — Salaried employees of Massachusetts computer companies suffered few economic hardships as a result of a merciless blizzard that recently dumped as much as four feet of windblown snow in the eastern part of the state. Hourly workers, however, were not as fortunate.

When the hourly wage earners finally returned to their jobs after a four-day storm shutdown, many learned they would receive no pay for the period they had been unable to get to work. Others found their paychecks ready and waiting — but with a catch.

Salaried employees, by contrast, received no cut in earnings, even though they had missed as much work as their assembly line counterparts.

HIS Policy

Honeywell Information Systems, Inc., which typified the no work/no wages policy, paid its 4,750 salaried workers but withheld paychecks for its 1,450 hourly employees. The company explained its action by saying that in business many differences in privileges and payment practices traditionally distinguish hourly from salaried employees.

Data General Corp., took a somewhat different approach. Instead of paying its pro-

duction workers unconditionally for their missed work time, the minicomputer vendor advanced them a full paycheck and required them to make up the missed time by June 1. If the employees earn less than the required sum, DG will deduct the remainder from their future paychecks.

Other area computer companies, however, proved more generous in their payment practices. Digital Equipment Corp., Prime Computer, Inc. and Inforex, Inc. paid both their salaried and hourly workers in full.

DEC, which has no unions, paid its 8,000 production employees \$2 million for time away from their jobs. Company officials said they felt their employees had already suffered enough from the storm without enduring the further hardship of a pay loss.

Japanese Exploring IBM Plans

TOKYO — The six major computer companies here have embarked on a joint investigation into the possible Future Series (FS) of computers expected from IBM, according to the *Japan Economic Journal*.

The group has hired a U.S. consultant through the Japan Electronic Industry Development Association, the *Journal* reported.

As a followup, the group will establish a project team to glean any information available on the possible architecture for the new systems in order to develop their own new models at around the same time IBM announces FS.

It is the first time the six have banded together in a joint investigation, according to the *Journal*.

**Next to your Centronics Printers
your best investment is
a Centronics Service Contract.**

Why gamble? Call today for details. Toll free:
1-800-258-1952. Or write Centronics Data Computer Corp., Hudson, NH 03051.

CENTRONICS® SERVICE
Simply Better

COMPUTER INDUSTRY

CI Notes

Amdahl Doubles Earnings, Dividends

SUNNYVALE, Calif. — Amdahl Corp. appears to be booming along, announcing revenues and pretax earnings double those of 1976 and simultaneously doubling the dividends and announcing a two-for-one stock split.

The split is subject to approval of stockholders at the April 18 annual meeting of a move to increase the authorized number of shares from 10 million to 40 million, the firm noted.

Revenues for 1977 amounted to \$188.8 million, and pretax net was \$54.2 million — representing a 103% and 126% increase, respectively, over 1976, the firm added, when revenues were \$92.8 million and income was \$24 million.

Net income, with an extraordinary credit of almost \$10 million, was \$36.6 million (\$4.48 per share) compared with \$22.7 million in 1976, the firm said.

The dividend has now been set at 10

cents per share and Dr. Gene Amdahl, board chairman, said it is the intention of the board to pay a quarterly dividend of 5 cents per share after the two-for-one stock split.

Taiwan Eyes Electronic Banking

TAIPEI, Taiwan — The Ministry of Finance here is seeking U.S. computer equipment suppliers to bid on developing an electronic banking system for the island in a contract the U.S. Department of Commerce estimates could amount to \$100 million over the next few years.

Vendors wishing more information should contact Richard K. Chi, director, Department of Monetary Affairs, Ministry of Finance, 2 Ai Kuo West Road, Taipei, Taiwan.

A coalition of institutional investors has made a \$1 million equity investment in Printronix Inc., Irvine, Calif., according to Robert A. Kleist, president. The investment was arranged by Robertson, Colman, Siebel and Weisel.

The 1,000th Hewlett-Packard Co. HP 3000 Series II has gone to the Consumer Food Group of General Mills, Inc., where it will be used in a distributed network. It is the fifth unit purchased by this General Mills group.

Computer Network Corp. has postponed its plans to sell 400,000 shares of common because "management believes that the current market price trend of Comnet stock caused by

general market conditions is not satisfactory."

Computer Automation, Inc. has set up a division called the Small Computer Group in Richardson, Texas, to handle engineering, manufacturing and marketing in the low-end OEM minicomputer marketplace.

The Computer Dealers Association has voted to grant associate membership to computer leasing firms.

Dataproducts Corp. has signed a five-year agreement for the purchase of its Model 2470 line printers with Electronum of Romania. The initial amount of the agreement is \$3.6 million, the firm said.

Foreign Orders & Installations

Lion Fat & Oil Co. of Tokyo, manufacturer of synthetic detergents, and Amada Co. Ltd., an integrated manufacturer of metalworking machinery headquartered in Kanagawa Prefecture, Japan, have each ordered a Univac 1100/11 system valued at more than \$4 million from Nippon Univac Kaisha, Ltd.

Tahsis Co. Ltd., a British Columbia forest products company, has installed a Honeywell Model 64/20 system valued at \$600,000. It will be used for on-line weight scaling, log inventory and general-ledger functions.

The Royal Bank of Scotland Ltd. is installing a 44-display Harris 8170 terminal network to handle customer investment, inquiry and systems development applications. The value of the purchase is approximately \$238,000.

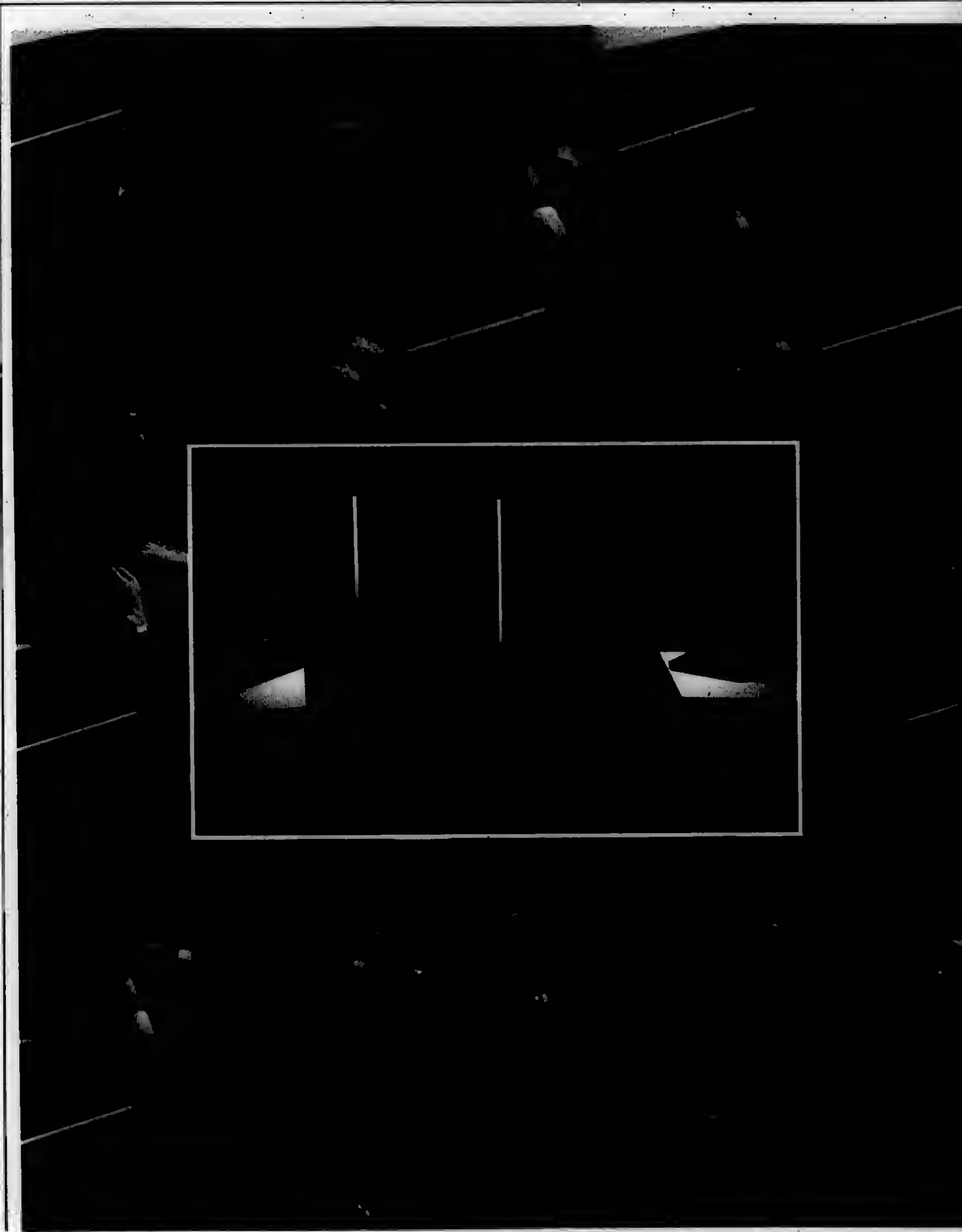
P.C.W. Underwriting Agencies Ltd., an affiliate of the Lloyd's insurance group, has ordered an NCR 8550 system to enhance its services. The system will be installed at the company's headquarters in Farnborough, Hants, England.

Abbey National Building Society, a UK mortgage loan institution, has ordered a Univac 1100/80 computer system. The computer will be installed at the society's headquarters in London.

Unitex Ltd., a Hong Kong garment manufacturer, has installed an NCR 8250 system to help process the company's 1,800-person payroll and provide management information.

The Japanese National Mutual Insurance Federation of Agricultural Cooperatives, headquartered in Tokyo, has ordered a Univac 1100/81 computer system valued at approximately \$2.8 million from Nippon Univac Kaisha Ltd.

Supershorts



After Firm Presents Case

Judge Suggests Jury Decide Memorex's Cause

By Molly Upton
CW Staff

SAN FRANCISCO — "The jury is the judge of the facts." That's what judges usually tell juries.

But Judge Samuel Conti, presiding over the Memorex vs. IBM antitrust trial, has proposed that the jury decide at the end of Memorex's case whether Memorex has shown cause to support its antitrust complaints. Normally this decision could be the province of the judge.

In a suggestion that surprised both IBM and Memorex attorneys and which Conti admitted has little precedent, the judge suggested that if the attorneys both agreed, the jury could de-

cide whether the case should continue through IBM's defense. One attorney termed the idea "novel."

Conti indicated that neither side had anything to lose: if the jury found Memorex had not shown cause, then the case simply would be cut short; if it found Memorex had made a sound antitrust case, then the trial would continue and it would go to the jury after IBM's defense, as would normally be the case in a trial in which the judge does not declare a directed verdict.

There has been considerable speculation as to whether Conti would care to become the third judge in recent times to declare a directed verdict in an anti-

trust case against IBM.

The Ninth Circuit Court of Appeals recently overruled a directed verdict in the case of Greyhound vs. IBM and ordered that case back to court for a full trial. The appeal before the same court for the same reason in the California Computer Products, Inc. vs. IBM case could be heard as soon as this spring.

If his suggestion is accepted, Conti could relieve himself of the responsibility of declaring a directed verdict for lack of evidence.

Conti told the attorneys they need not make a decision on his suggestion until the end of Memorex's case. Both parties would have to stipulate giving the authority to the jury.

Acquisitions

Graham Magnetics, Inc.'s stockholders have approved the merger of Graham Magnetics into a wholly

owned subsidiary of Carlisle Corp.

Intel Corp. has acquired United Medical Data Systems of Long Beach, Calif.

Microdata Corp. has concluded a transaction to acquire a majority interest in Computer Machinery Ltd. of Hemel Hempstead near London.

On-Line Systems, Inc. has acquired Atkins Computing Services, a UK company, and Timesharing B.V., in The Hague, from the W.S. Atkins Group.

Intel Corp. has acquired Compumet, Inc. of Hayward, Calif., a wholly owned subsidiary of Fireman's Fund Insurance Co.

Recognition Equipment, Inc. has acquired Universal Business Machines, Inc. (UBM) of Columbia, S.C.

ITT Corp. has agreed in principle to purchase Courier Terminal Systems, Inc., a subsidiary of Boothe Computer Corp., and the business and assets of Courier Terminals, a division of Canadian Boothe Corp., Ltd.

Ferranti Ltd., headquartered in England, has acquired all the common stock of Interdesign, Inc., Sunnyvale, Calif.

Xerox Corp. has acquired the assets of the manufacturing division of Arista Information Systems, Inc. of Winston-Salem, N.C.

Valtec Corp., a Massachusetts electro-optics and fiber optics manufacturer, has received approval for the acquisition of Comm/Scope Co., a private Catawba, N.C., cable making firm.

Alanthus Corp. has agreed in principle to merge with a new subsidiary of UTG, Inc. Alanthus valued the proposed merger at about \$11 million. Alanthus leases computers and communications and copying equipment. UTG, based in New York, operates oceangoing tankers.

Raytheon Co.'s principal British subsidiary, Cossor Electronics, Ltd., has acquired Data Logic Ltd., a computer software and systems firm, for approximately \$6 million.

All at once, it's Harris.

Harris now delivers the most cost/performance effective multi-use computer system in the industry.

Our new family of high performance systems—S115, S125 and S135—together with our powerful VULCAN Virtual Memory Operating System supports more than 50 terminals. Simultaneously.

This is a whole new line of medium-scale, multi-use systems with increased reliability and new state-of-the-art technology. You get greater I/O throughput. MOS memory with error correction. Powerful micro processor based CPU. Broad selection of highly reliable peripherals. And all operate with ANSI 74 COBOL, FORTRAN, RPG II, FORGO, SNOBOL, and extended BASIC.

The Harris S100 systems take on many different jobs all at the same time. Multi-stream batch processing. Multiple concurrent RJE's, both host and remote. Multiple interactive time sharing. Real-time processing. And this new generation of high performance computer systems from Harris delivers these all to you, concurrently.

If your need is distributed processing, time sharing, data base management, or any type of concurrent multi-use application, benchmark our new computer system against any other system in the industry.

Harris Computer Systems, 1200 Gateway Drive, Fort Lauderdale, Florida 33309. Telephone (305) 974-1700. Europe: Harris Intertype, Ltd., 145 Farnham Road, Slough, SL1 4XD, England.

All at once, it's Harris.



HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING



"Who's Winning?"

Amdahl Expects Big Growth in Jobs, Production

NEW YORK — Amdahl Corp. will enjoy strong growth this year with plans for "substantial" increases in employment, production capability and international activities, according to company president John C. Lewis.

In a recent address before the New York Society of Security Analysts, Lewis reported that Amdahl's employment grew from less than 800 to more

than 1,700 in 1977 and that the company expects another "significant" increase in employment this year. The firm's production capacity, which more than doubled last year, will also grow in 1978, he added.

At the same meeting, Amdahl's senior vice-president for finance, Clifford J. Madden, reported that the company's net worth and cash balance

totaled \$92.5 million and \$71.9 million, respectively, for the fiscal year ended Dec. 30, 1977. During that period, the firm's earnings totaled almost \$36.7 million on revenues of nearly \$189 million, while for the last quarter earnings amounted to \$8.99 million on sales of \$59.2 million, Madden added.

International Expansion

Amdahl also plans further expansion into international markets, with most of the company's European production coming from its new manufacturing facility in Ireland, Lewis said. The firm plans to ship the first system

from Ireland during the second quarter of this year.

Lewis also announced that the company's Sunnyvale, Calif., headquarters recently shipped its 100th system, destined for Chrysler Corp. in Detroit. The cumulative value of Amdahl's worldwide installed base totals about \$350 million, half of which the firm shipped last year, he added.

The company installed six systems in 1975, 27 in 1976 and 57 in 1977.

Lewis said Amdahl has appointed Fujitsu Australia as one of the company's distributors. The first Australian shipment went to Qantas Airlines in January.

Proposal Book Rocks Industry!

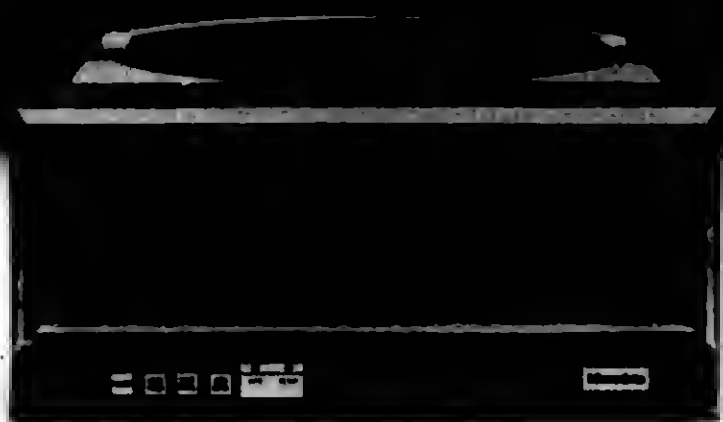
A California publishing firm has literally taken the computer industry by storm with a recently-published "how-to" proposal book. The book, a 4½ pound loose-leaf volume entitled *How to Create a Winning Proposal*, covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top West Coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in commercial, government and OEM proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

Using a step-by-step instructional technique, the authors provide a virtual roadmap to the entire proposal process... including section-by-section checklists to ensure the proposal team of covering all the important bases. Excellent guidelines are given on the contents, structure and methods of preparation for both solicited and unsolicited proposals. A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team, and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's, and IFB's are included.

Copies are available from Mercury Communications Corp., 730-CW Mission Street, Santa Cruz, CA 95060. \$65 (pre-paid) includes 3-5 day delivery inside USA. In Calif. add \$3.90. For outside USA, U.S. \$76 (Int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

Marathon disc drive.
The long distance runner.
\$2842*



The Marathon 5440 type disc drive gives you fast, dependable random access storage of 5 or 10 megabytes. Ten million bytes of on-line storage in 8.75 inches of rack space.

What it doesn't give you is trouble. Because Marathon is designed as much for reliability as for speed. The electronics are modular, and mechanism has fewer moving parts. So service is a snap. It's been proven in thousands of applications all over the world.

Marathon is available for immediate delivery. And the interface is industry standard, so you can just plug it into your system. Marathon. Built and backed by Microdata.

Contact one of our local sales offices or the Director of Peripheral Sales, Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.

*In OEM quantities of 100.

Microdata OEM Peripherals
A significant difference.

SALES OFFICES:

Atlanta, GA: 404/252-9700 • Boston, MA: 617/862-1882 • Dallas, TX: 214/387-3073 • Los Angeles, CA: 714/533-8035 • Philadelphia, PA: 215/628-8698 • San Francisco, CA: 415/573-7461 • Scarsdale, NY: 914/472-1141 • Schiller Park, IL: 312/671-5212 • Seattle, WA: 206/455-0152 • Tampa, FL: 813/872-1557 • Washington, DC: 703/620-3995.

Expansions

Data General Corp. has signed an agreement to purchase a 100-acre site in Austin, Texas for expansion of its manufacturing and product development activities.

Sycor, Inc. will build an 84,000 sq-ft research and development center as part of its 20-acre complex in the Ann Arbor (Mich.) Industrial Park. The company will also occupy and additional 10,200 sq ft of space in its headquarters' administrative facility at the Wolverine Tower in Ann Arbor. This space will house the company's education center. Construction on a 24,000 sq ft addition to its Goldsboro, N.C., plant will begin soon.

Pertec Computer Corp.'s Microsystems Division has moved into a new \$1 million administrative and manufacturing facility in the Nordhoff Industrial Complex in Chatsworth, Calif. The division is leasing the facility, which has 17,000 sq ft of office space and 31,000 sq ft of manufacturing space.

Memorex Corp. has broken ground in Santa Clara, Calif., for a 68,000 sq ft distribution center and warehouse located across from its headquarters.

Ampex Corp.'s Data Products Division has consolidated its West Coast

production at the company's El Segundo, Calif., facility and more capacity has been added at a site in Juarez, Mexico.

Data Electronics, Inc. has doubled its plant space through lease of an additional building adjacent to its Pasadena, Calif., headquarters.

American Modern Corp., a subsidiary of Intech Laboratories, Inc., has moved to a new 10,000 sq ft facility in the Airport Industrial Park, Bohemia, N.Y.

Prime Computer, Inc. will construct two new buildings in Framingham, Mass., with an initial 200,000 sq ft of manufacturing and office space and will lease an additional 125,000 sq ft of space in Natick and Newton, Mass.

Computerland Corp. has built new corporate headquarters at 14400 Catalina St., San Leandro, Calif. The 25,000 sq ft building will house the company's purchasing and distribution facilities in addition to its general offices.

The Computer Products Division of Electronic Memories and Magnetics Corp. has expanded its facilities by 42,000 sq ft. The new mailing address is 2311 W. El Segundo Blvd., Hawthorne, Calif. 90250.

Contracts

Business EDP Services, Inc. has been awarded a contract valued at \$557,624 by the Texas Rehabilitation Commission with an option provision for up to \$163,380 in additional equipment and services.

Tennecomp Systems, Inc. has been awarded a contract valued at \$1 million by Arkansas Power and Light Co. (AP&L) for computer-based security system for AP&L's Arkansas Nuclear One facility.

Microprocessor Computer Systems Corp. of Boulder, Colo., has been awarded a \$14,000 contract for the sale of terminal equipment to the University of Colorado Computing Center.

Honeywell Information Systems, Inc. has received a contract from the U.S. Air Force Acquisition Office for hardware, software and maintenance for the Remote Job Entry Terminal Systems. The contract is valued at \$3.35 million.

The Pertec Division of Pertec Computer Corp. has been awarded a \$500,000 contract from Infortext, Inc. for the purchase of tape drives and buffered magnetic tape transports for use in the V-9 CPU.

The Telecommunications Department of Atlantic Research Corp. has been awarded a study contract by the Baltimore City Fire Department for a computer-aided dispatch and communications system.

Cambridge-Memories, Inc. has been awarded a contract to provide memory systems to federal agencies using certain models of IBM and Digital Equipment Corporation computers by the Automated Data and Telecommunications Service of the General Services Administration.

Digital Equipment Corp. has signed a \$3.5 million contract with First Computer Corp. for DEC's LSI-11/2 family of microcomputers.

Involving Product Codes

Europeans Urged to Proceed Slowly With POS

LONDON — An industry leader in retail ordering systems has warned against the premature adoption of expensive point-of-sale (POS) systems based on the newly launched European Article Numbering (EAN) system.

Bill Patton, MSI Data Corp.'s vice-president for marketing, cautioned that despite their potential benefits, EAN-based scanning systems could prove very slow to implement. Under the system, most packaged groceries would bear the EAN product code on their containers.

"All retailers, particularly high-volume operations such as supermarkets, will be affected by the new coding system," Patton said. "The unique numbering will allow automatic capture of information on coded articles for such tasks as stock control and sales reporting.

Scanning Devices

"We can expect emphasis to be placed by equipment manufacturers on the use of cash registers with devices able to scan the bar-coded information printed on the product," he said.

Heeding the American experience with the five-year-old Universal Product Code, prospective users of EAN systems should recognize that several years will pass before packaged goods manufacturers can mark enough merchandise with the EAN code to make POS equipment viable, Patton said.

Account for Delay

UK retailers that are considering adopting EAN systems should take this deal into account. They should also realize that manufacturers will need a long leadtime to register themselves in the EAN number bank, he added.

"POS systems are not only premature, they're expensive," as the American experience with scanning systems illustrates, Patton asserted.

Randal Develops Micro Subsidiary

TORRANCE, Calif. — Randal Data Systems has announced the formation of Vista Computer Co., a wholly owned subsidiary, to serve the personal computing marketplace.

Vista intends to focus on the software and service needs of microcomputer users by manufacturing support systems and peripherals. Plans to expand an already existing service company include having a service location within 50 miles of every computer sold, according to Tom Pine, Vista president.

Makeshift Features

"Hardware prices are rapidly coming down, but the user still must cope with core images, keyed-in debuggers, low-level software and other makeshift features that make it difficult to accomplish any useful work with the equipment," Pine said.

Vista is located at 2807 Oregon Court, Torrance, Calif. 90503.

Only 173 of the approximately 200,000 food stores in the U.S. have installed computerized scanning systems thus far, according to an August 1977 report by the Food Marketing Institute.

In-store Computer Machinery

"Suitable POS terminals with scanners costing around \$5,790 per checkout need the support of an in-store computer," Patton said. "The cost of the in-store computer must be spread over the number of checkouts in the supermarket."

In the UK, where supermarkets average far fewer checkouts than their American counterparts, the cost/

checkout could total as much as \$8,685, he warned.

"At a far lower cost, retailers can quickly take advantage of the introduction of the EAN by adopting a stock replenishment system using portable data terminals," Patton explained.

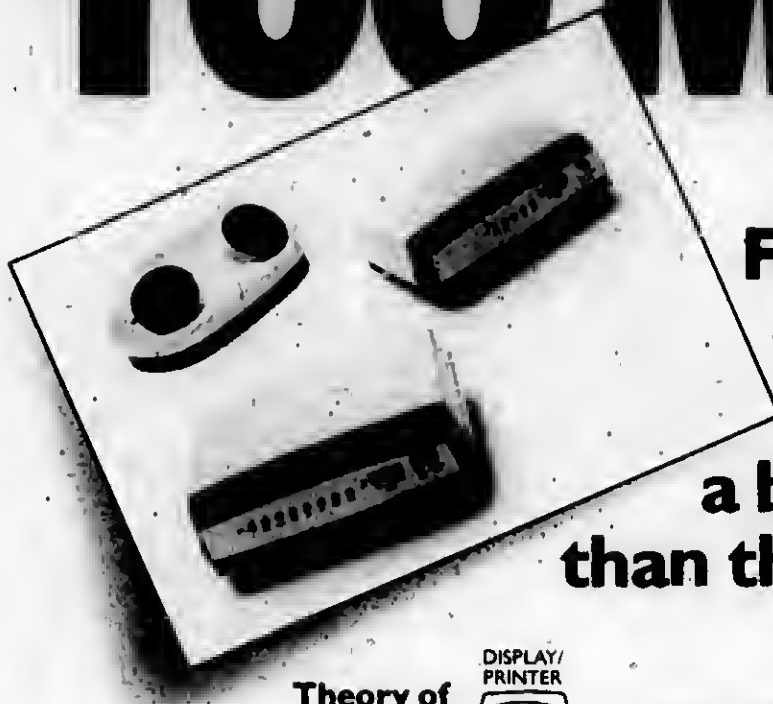
Under MSI's version of this system, shelf labels, rather than the product containers themselves, would bear a product description and bar-coded EAN equivalent. When reviewing stock for replenishment, retailers would pass a wand scanner attached to an MSI terminal over the bar-coded shelf label and record the quantity required.

Then, by coupling the terminal to a telephone, the retailers would automatically transmit the information to a DP center or warehouse.

"Unlike POS, the benefits are not confined to larger multiples," Patton explained. Using the stock replenishment system, small independent retailers can enjoy 90% of the advantages of article numbering, even though they lack a computer, distribution network and warehouse.

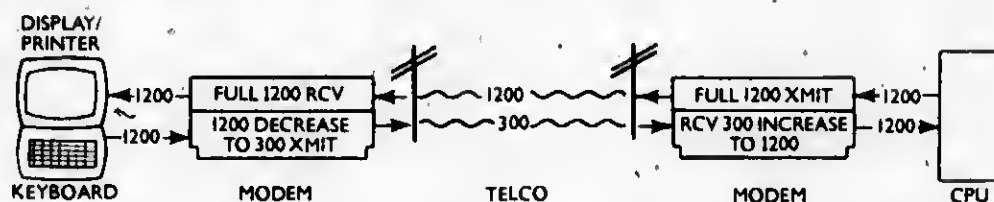
Moreover, they can achieve these benefits "for a fraction of the cost of cash registers with scanning devices," he said. "All [they] need is a simple MSI terminal costing around \$1,930 and shelf labels."

TOO MUCH IS TOO MUCH.



For 1200 baud keyboard conversation, a better way than the 212A.

Theory of Operation



Sometimes enough is enough. And too much is, well, just too much. That's the story behind Ven-Tel's MD1212, a conversational modem that takes a common sense approach to keyboard entry data communications. The idea? Look at the diagram.

You use 1200 baud speed where you need it, while using 300 baud speed where 300 is more than enough.

The Ven-Tel MD1212 does just that. Automatically.

It's a matter of effective speed and that's really a matter of money. The money you save with the MD1212. Add that to the fact that the MD1212 can be acoustically coupled, a Ven-Tel exclusive, and you've got

flexibility that lets you move the installation across the room or across the country. Without asking the phone company. Or paying them.

Of course, Ven-Tel's MD1212 isn't for everyone. If you use line, page, tape or disc transmission, you need the 212A. And our 212A is among the best. But if you use character-by-character or block mode for data transmission, the intelligent alternative is the MD1212. With 2-wire full or half duplex operation. Acoustic, Telco (DDD) or leased line models. 103/113 communication protocols. Diagnostic indicators. Remote testing. And, now, built-in FCC-registered DAA's.

Ven-Tel's MD1212. Another innovation from a company that seems to make a habit of them. Take our "Zero Downtime" ALD, for instance. Or the exclusive five-year warranty option on our acoustic couplers. We also manufacture a complete line of low and medium speed modems as well as frequency division multiplexors—all top-of-the-line products.

Call our toll free number (800) 453-2400 and ask for H.K. White. You'll get the name of your nearest Ven-Tel distributor who, in turn, will give you the complete Ven-Tel story. Or, like our MD1212, as much as you need.

VEN-TEL

Maybe not number one. But the one to watch.

2360 Walsh Avenue Santa Clara, California 95050 (408) 984-2727

Consolidated Distribution Services, a public warehouse firm located in Lawrence, Mass., has installed a Honeywell Information Systems Level 62.

The city of Anderson, Ind. has ordered a 90/30 system from Univac to be used for on-line customer services, a utility billing and collection system, inventory control, payroll, a permit system and a police system.

International Creative Management, a talent agency, has ordered a Honeywell Information Systems Level 62 to monitor contracts, royalties, commissions and fees for clients. The system is valued at \$198,000.

A.W. Mathews Engineering Co. of Hibbing, Minn., has ordered a Univac 90/25 to be used for special services and for the processing of payroll and project cost control.

Orders & Installations

Ohio College Library Center has received a 10-processor system from Tandem Computers Inc. The system is valued at \$1.9 million.

The City of Tempe, Ariz., has ordered a Hewlett-Packard 3000 Series II.

Dixon Paper Co., Denver, Colo., has ordered a Univac 90/30 system to implement an on-line product information system.

Thrift Drug Co. has signed a contract with Texas Instruments, Inc. for more than 300 advanced pharmacy systems to be installed in pharmacies in 25 states.

Midwest Advanced Computer Ser-

vices, Inc. of Southfield, Mich., has ordered two Burroughs B4800 systems valued at \$2 million.

Carle Clinic, a hospital and medical clinic in Urbana, Ill., will install four Harris 8180 intelligent terminal systems with 32 CRT keyboard/display units for computerized scheduling and patient admissions applications.

Keenan Supply, Inc., a piping distributor, has ordered a Honeywell Information Systems Level 62 for use in order entry and invoicing applications. Other uses will include accounts receivable, accounts payable, sales analysis and data collection.

The Hertz Corp. has ordered a Univac 1100/82, valued at approximately \$7 million, to be used in car reservations, billing, credit card accounting and general accounting work.

Strawbridge and Clothier of Philadelphia, Pa., has ordered 640 additional TRW 2001 terminals and associated data communications equipment valued at \$3 million.

Buster Brown Textiles, Inc., a nationwide distributor of children's clothing, has installed five Series 21 distributed processing systems from Mohawk Data Sciences Corp. for use in data entry application.

Dickerson, Inc. of Monroe, N.C., a heavy-construction company, has ordered a Honeywell Information Systems Level 62 to expedite job-costing.

Florida Software Services of Altamonte Springs has added an IBM 370/138 for use in its financial computing systems program.

Western Airlines has leased a 200-line Corp. CBX with automatic call distribution for telephone reservation service.

Centax, a Dallas building contractor; A&M Direct Mail Service, Inc. of Los Angeles; and International Terminal Operations (ITO) of New York have ordered Inforex, Inc.'s System 500r for file management.

Butterick Fashions of New York City, a producer of dress patterns, has purchased an Imlac Corp. Composer-1552, a multistation composition system for use in producing multilanguage yardage blocks for both Butterick and Vogue patterns.

Princeton University has ordered 13 SEL 32/75 systems from Systems Engineering Laboratories, Inc. for use in the Tokamak Fusion Test Reactor (TFTR). The systems are valued at nearly \$2 million.

Reynolds & Reynolds, a producer of business forms and supplier of DP services based in Dayton, Ohio, has installed 10 Scan-Optics OCR System 501s.

Seattle-First National Bank of Seattle, Wash., has ordered the Incoterm Corp. Series 7000 retail banking system, which will link tellers statewide with the bank's computer in Seattle.

Peterson, Howell & Heather, Inc., a business services firm headquartered in Baltimore, Md., has installed a Harris Corp. 8770 intelligent CRT terminal system for inventory, ordering and account status applications.

The Management & Information Systems Department of the City of Houston, Texas, has ordered a Univac 1100/12, valued at more than \$3 million. The system will be used for computer-aided dispatch of patrol cars and an automated records system.

Perhaps the most dynamic franchise opportunity since fast food burgers.

A National ComputerLand Retail Franchise

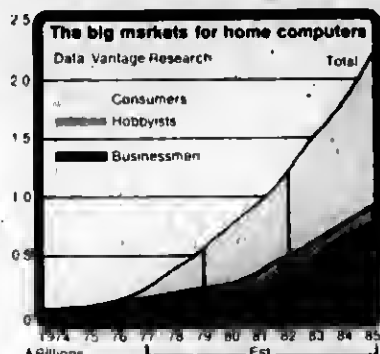
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying, end warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 35 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Mail to E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW San Leandro, CA 94577 (415) 895-9363

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

Executive Corner

• Karl E. Gates has been elected president of Business Systems Products, Inc. Other officers reelected for 1978

include H.D. Thoreau, chairman of the board; George C. Erickson, executive vice-president; and Calvin J. Eberle and A.S. Gugliotta, vice-presidents.

• Gary H. Lohn has been named vice-president of human resource development and public affairs for Control Data Corp.

• R. LaMar Thayne has been appointed vice-president of information systems at Envirotech Corp.

• Charles F. Sheridan has been appointed vice-president responsible for the Government Systems Division and Allen F. Joseph has been appointed manager of the Commercial Systems Division at Infodata Systems, Inc.

• David L. Mitchell has been named president of Data I/O Corp. Grant C. Record will remain chairman of the board and will oversee the company's sales activities.

• Timothy P. Fitzgerald has been appointed chief executive officer for Image Systems.

• John Music has been appointed vice-president and general manager of Docuprint, Inc.

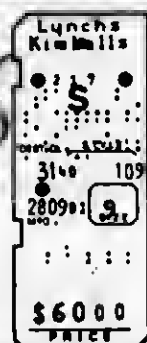
• Jack Garrity has been named to the position of director of sales for Centronics Data Computer Corp.

• William P. Conlin was elected vice-president of product management and Robert D. Merrell was elected vice-president and group executive for the Computer Systems Group at Burroughs Corp.

WHETHER YOU USE BAR CODE, PRINT PUNCH or OCR TICKET READERS, PORTA-VERTER CAN CAPTURE AND TRANSMIT YOUR DATA DIRECTLY TO YOUR COMPUTER.



PRINT PUNCH



OCR



Porta-verter is a reliable low maintenance electronic gathering device that transmits information via telephone lines to your computer. For full information on how you can capture and transmit sales data faster — and more reliably, give us a call.

DIGITRONICS

Div. of Comtec Information Systems, Inc.
53 John Street, Cumberland, R. I. 02864. Phone: 401-724-8500 TWX 710-387-1171



Cray in the Black

Mainframers Post Strong Results in Earnings

Mainframe computer companies continue to show strong revenues and earnings, with Honeywell, Inc., NCR Corp. and Univac reporting sharp earnings increases and Cray Research, Inc. breaking into the black for the first time.

At Honeywell, earnings from operation of the firm's computer business increased to \$79 million in 1977 from \$41 million in 1976.

Overall, the company showed revenues of \$2.9 billion, up from \$2.5 billion, and earnings totaled \$145.1 million compared with 1976 earnings of \$101.1 million from ongoing business. The firm also showed \$2 million capital gain from the sale of Honeywell Bull.

For the fourth quarter ended Dec. 31, sales, rental and service revenues were \$832 million compared with \$738 million in the previous fourth quarter. Earnings were \$48.6 million compared with earnings of \$43.2 million.

During 1977, the company purchased in the open market 2.2 million shares of its own stock for \$105.3 million in connection with transactions related to the computer business. Of these shares, 1.4 million were exchanged for the 11.7% interest that the General Electric Co. owned in Honeywell Information Systems as a result of Honeywell's 1970 purchase of the GE computer business.

The remaining shares purchased were used in 1978 in an exchange of shares for stock of terminal maker In-cterm Corp.

Honeywell Information Systems revenues of \$1.037 billion increased 13.5% over 1976. Operating profit rose to \$79 million from \$41 million in 1976.

"Worldwide computer orders continued at a very strong pace and increased significantly over the previous 12-month period," Honeywell said. Computer rental and service revenue increased 14.6% to \$598 million in 1977. Outright sales rose 12% to \$439 million in 1977.

NCR Quarter Up 52%

At NCR, earnings in the fourth quarter rose 52% to \$59.3 million, compared with \$38.9 million in the fourth quarter of 1976.

The fourth-quarter results brought year earnings to \$143.6 million, a 50% gain over the \$95.6 million reported in 1976. On a per-share basis, 1977 earnings were \$5.09 compared with \$3.60 per share in 1976.

Worldwide revenues for 1977's final quarter totaled \$774.3 million vs. \$715.8 million in the prior year's quarter, an increase of 8%. Revenues for 1977 totaled \$2.5 billion, up 9% over 1976 revenues of \$2.3 billion.

All of the 1977 earnings and revenue figures represented records for the company on top of record 1976 figures, a spokesman noted.

Univac Revenues Grow

Univac's parent, Sperry Rand Corp., reported earnings for its third quarter ended Dec. 31 of \$39.6 million, up 8.1% over the \$36.7 million earned in the same period last year.

Third-quarter revenues totaled \$906.1 million, up 12% over the \$808.7 million reported in the year-ago

period.

Backlog was \$2.55 billion, up 22% over a year ago, an all-time high for the corporation.

Univac computer revenues rose 16% for the quarter, the firm said.

"We're very pleased with the computer business both in the U.S. and in our principal international markets," a spokesman noted. "Bookings for the quarter are again up substantially and our large-scale 1100/80 series has been especially well received."

"Our total computer backlog is up 30% over a year ago. We see continuing strength in demand and we are confident we can continue to attract new users and increase our installed

base, which should soon top \$9 billion," he added.

The sale of an \$8.8 million Cray-1 computer system, installed at the National Center for Atmospheric Re-

Financial News

search, has produced the first profitable quarter and year for Cray Research.

Fourth-quarter revenues of \$9.8 million produced earnings from operations of \$3 million. Additional income

of \$1 million, equal to 68 cents per share, from tax benefit of operating loss carryforwards brought quarter earnings to \$4 million, or \$2.75 per share.

A year ago the company was in its development phase and quarterly revenues were \$508,999 with a net loss of \$555,217.

For the year ended Dec. 31, revenues were \$11.4 million, up from \$508,999 in 1976. Operating income was \$1 million. The tax-loss carryforward of \$1 million increased net income to \$2 million or \$1.41 a share.

This compared with a net loss of \$1 million for the same period a year ago.

Your top competition is going to meet your prime prospects. What are you going to do about it?

They've made a smart decision. Last year the nine computer market areas on our itinerary drew 42,178 qualified buyers.

This year we expect more than 50,000. Can you afford to miss this chance to present your products and services?

There's still room for you. But it's going fast. Get complete information with this coupon now, on how Computer Expo 78 can work for you. Or save time by calling Kim Wichert collect at 617-964-4550.

These companies have already signed to exhibit at Computer Expo 78:

NCR	Computerworld	Trac Associates
Varian Graphics	NCI	Sperry Univac
Informatics	AT&T	Xerox
Honeywell	Kodak	Sykes Datatronics
Qatamion	BASF	Cummins Allison
Communication News	IBM	American Microprocessor
McCormack & Dodge	Anderson Jacobson	International Data Corp.
Data Rentals	Computer Input Services	Programs, Inc.
Computer Sales International	Paradyne	Beehive International
Intel	ComData	Interlec Data Systems
Electronic Ventures	Genesis One	Software AG
Computer Roomers	Data Processing Sciences	Creative Engineering
Customer Priorities	Applied Computer Systems	Graphic Controls
Computer Software Solutions	Agile	Mini-Computer Systems
Systems Marketing	Woodford Systems	Tandem Computer
S.E.A.	American Used Computer	PCC/Perlec
Tri-Data	Business Forms Service	Compuend
Midwest Marketing	Itel Corporation	Extel
Logabax	Deltak	Meniel
AAA Chicago Computer	Peripheral Products	Sycor
Intelligent Systems	General DataComm Industries	Digitronics
Shasta	Continental Peripherals	Computer Services
Mostek	Computer Associates	Datamart
DIVA	Qantel	Courier Terminals
SBC Magazine	Diablo Systems	Modems Plus
Tele-dynamics	Marketechs	Software Design
Control Data	Racal-Milgo	Curtis 1000
National Semiconductor	Data Systems Specialists	Spectron
Printonix	Key Tronic	K&K Associates
Codex	Administrative Management	Applied Digital Data
Lear Siegler	Small Systems World	Epic Data
E.M. & M.	American Terminal Leasing	Terminal Rentals
The Morley Company	Journal Systems Management	Applied Data Communications
Vanier Graphics	Optical Business Machines	Data Forms Company
Total Typography	McGunn Safe	Imperial Technology
Wang Labs	Allstate Computer	Mathematica
Computer Devices	H/G Professional Forms	Rianda Electronics
Ann Arbor Terminals	Nichols & Company	Computer Corp of America
Datapro Research	Datapro	Cullinane
Inforex	Input Services	Hewlett Packard
Perkin-Elmer	Plessey Services	Pansophic Systems
Telcon Industries	Industrial Computer Controls	
Versatec	Vincent Data Products	
Computer Performance	World Info Systems	
Advanced Systems	DP Power	
Delta Data Systems	Conrac	
Inform	Educational Data Systems	
Computer Decisions	Cybertek	
Infosystems	Cosmic	
T-Bar	Business Automation	
Corporate Systems	Insyte Datacomm	
Dynatech	YE Data	
Western Union	Arcus	
Calcomp	St. Louis Info	
General Computer	Digilog	
Atlantic Research	Herrera Kirby	
Telefile Computer Products	Foto-fun	
General Electric	Hamilton Sorter	
Oume	Dispotech	
Moore Business Forms	Consolidated Computer	
DataMedia	Cybersearch	
Texas Instruments	Wolfe Computer	

COMPUTER CARAVAN'S



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
☐ Have Sales Representative call me
☐ Send Reservation Agreement
☐ Send Copy of 1977 Attendee Analysis

- | | | |
|--|---------------|---------------|
| ☐ Southern California Computer Expo | Anaheim/LA | March 21-23 |
| ☐ Northwest Computer Expo | San Francisco | March 28-30 |
| ☐ Southwestern Computer Expo | Houston | April 11-13 |
| ☐ Southeastern Computer Expo | Atlanta | April 18-20 |
| ☐ Gateway Computer Expo | St. Louis | April 25-27 |
| ☐ Midwestern Computer Expo | Chicago | May 2-4 |
| ☐ Mid-Atlantic Computer Expo | New York | May 9-11 |
| ☐ Great Lakes Computer Expo | Detroit | May 23-25 |
| ☐ New England Computer Expo | Boston | May 30-June 1 |

Name _____ Title _____
 Company _____
 Address _____
 City _____ State _____ Zip _____
 Phone: (_____) _____

In Quarter, Year

Mini Makers Reach Record Earning Levels

Not to be outdone by the mainframers, mini makers Digital Equipment Corp., Prime Computer, Inc. and Systems Engineering Laboratories, Inc. (SEL) also reported record earnings in the past month.

DEC reported sales and earnings for the second quarter and first six months ending Dec. 31. For the six months, the firm reported operating revenues of \$649.2 million compared with \$445.5 million in the prior year.

Net income for the half was \$58.9 million (\$1.43 per share) against \$39.4 million (\$1.01 per share) a year ago.

There were an average 42,327,720 common and common equivalent shares outstanding compared with an

average 38,909,863 common and common equivalent shares in the period last year.

Total operating revenues for the second quarter were \$346.6 million as compared with \$241 million in the second quarter of fiscal 1977, up 44%. Net income was \$32.5 million (77 cents per share). A year ago, the company reported second-quarter earnings of \$22.7 million (58 cents per share). Earnings per share rose 33%.

According to a company spokesman, the gain in sales and earnings came from the planned acceleration in shipments of computer systems during the first half of the current fiscal year as the company's manufacturing capacity and productivity in-

creased materially. This has resulted in the ready availability of most models from the company.

He added that ongoing spending and expense control programs and a reduction in the projected effective tax rate for fiscal 1978 were also factors in the 43% gain in quarterly earnings.

The company indicated that, as a result of continuing customer adjustment to the ready availability of DEC products, the rate of growth in orders is lower than the inordinately high levels of a year ago.

The company cautioned that while the rate of revenue growth in the first six months is indicative of very favorable sales and earnings gains in fiscal 1978, second half growth rates are expected to be lower and will be influenced directly by current demand factors in the company's markets.

Prime Computer, Inc. reported sales for the year ended Dec. 31 were \$50 million, an increase of 119% over sales of \$22.8 million for 1976. Net income for the year, before utilization of tax loss carryforward, increased 215% to \$3.8 million (\$1.41 per share) compared with \$1.2 million (\$.53 per share) in 1976.

Sales for the fourth quarter of 1977 were \$15.8 million, an increase of 97% over the \$8 million recorded in the corresponding period last year. Net income for the quarter was

\$1.4 million (49 cents per share), an increase of 214% over the \$441,000 (19 cents per share) for the same period last year.

SEL Records

The best three-month and six-month periods in the financial history of SEL were reported by the company for the second quarter and first half of fiscal 1978.

For the second quarter ended Dec. 23, SEL recorded a net profit of \$1.2 million (44 cents per share) which includes an extraordinary gain resulting from the utilization of net operating loss carryforwards of \$555,000 (19 cents per share) on revenues of \$11.6 million.

For the corresponding period a year ago, the company reported a net profit of \$314,000 or 11 cents per share, which included an extraordinary

gain resulting from the utilization of net operating loss carryforwards of \$132,000 or 5 cents per share on revenues of \$7.9 million.

For the first half, the company recorded a net operating profit of \$2.1 million (75 cents per share), which included an extraordinary gain of \$975,000 (34 cents per share) on revenues of \$21.4 million. This compares to a net profit a year earlier of \$471,000 (17 cents per share), which includes an extraordinary gain of \$263,000 (10 cents per share) on revenues of \$13.9 million.

The company also announced that the new orders rate amounted to approximately \$14 million for the second quarter and \$28 million for the first half of 1978. During the reporting period, backlog increased to a record of nearly \$37 million.

Send
a little money
home to Mom.

MOM'S
WAREHOUSE
WE MOTHER YOU BY MAIL

Hardware, software,
problems, people,
pricing, ethics,
litigation,
communication,
macros, minis and
micros.

We like to make
an issue of it.
EVERY WEEK.



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

701 WASHINGTON STREET NEWTON MASSACHUSETTS 02459 • TELEPHONE (617) 552-5000

Earnings
Reports

ANACOMP Three Months Ended Dec. 31			
	1977	1976	
Shr Ernd	\$.33	\$.27	
Revenue	5,273,116	3,284,547	
Earnings	356,771	289,426	
6 Mo Shr	.60	.46	
Revenue	10,450,461	6,214,013	
Earnings	650,362	522,085	

e-Adjusted for 10% stock dividend in September 1977.

AT&T Year Ended Dec. 31			
	1977 (000)	1976 (000)	
Shr Ernd	\$6.97	\$6.05	
Revenue	38,494,606	32,815,562	
Earnings	4,543,933	3,629,151	

BUNKER RAMO Year Ended Dec. 31			
	1977	1976	
Shr Ernd	\$1.64	\$1.18	
Revenue	341,212,000	318,428,000	
Tax Cred	.....	1,660,000	
Earnings	10,340,000	9,406,000	
3 Mo Shr	.45	.53	
Revenue	83,797,000	74,661,000	
Earnings	2,622,000	3,699,000	

COMDISCO Three Months Ended Dec. 31			
	1977	1976	
Shr Ernd	\$.63	\$.71	
Revenue	30,156,649	38,902,948	
Earnings	890,122	727,028	

DATASCOPE Three Months Ended Dec. 31			
	1977	1976	
Shr Ernd	\$.25	\$.31	
Revenue	3,143,856	2,611,942	
Earnings	277,541	355,900	
6 Mo Shr	.48	.61	
Revenue	6,193,935	5,467,980	
Earnings	540,265	696,359	

HEWLETT PACKARD
3000 Series II Model 6

OEM Demonstrator System For Sale
(Getting A Bigger HP)

New Equipment Investment Tax Credit
HP Installation & Warranty Included
Application Software Also Available

CMC Associates

617-266-4933

Contact: Marketing 755 Boylston St., Boston, MA 02116

COMPUTER TERMINALS
Save Up To 40%

On purchase or lease of the following: Hazeltine Totator, Decwriter LA 36, LA180, LS120, Diable 1620, Texas Instruments 745, 746.

Example: Texas Instruments 745: \$1825

CALL FOR A QUOTE

201-469-9344

Terminal Sales & Development Inc.
867 Sebring Ave. Bound Brook, N.J. 08805



Richfield Computer Consulting

206-527-0114

PROFESSIONAL CONSULTING SPECIAL PROBLEM SOLVING HARDWARE AND SOFTWARE

Upgrade to IBM 6250 BPI
tape drives now!

SAVE IBM RENT ELIMINATE DOWN-TIME

Call Nick Dibari

312-698-3000

or your nearest Comdisco office

COMDISCO

position announcements

position announcements

position announcements

position announcements

position announcements

**position
announcements**

PROGRAMMERS/ ANALYSTS

Central New Jersey positions available in State Government agency. Experience in 370/158 using CICS and DL/I. Must be able to code in COBOL or BAL. Analysts preferred experience with large scale on-line business applications.

Salary dependent upon experience. Excellent benefits. Call collect to (609) 292-2960, Monday through Friday 8:30 to 4:30.

SYSTEM ANALYST/ PROGRAMMER

Immediate opening for a CICS System Analyst/Programmer with minimum of two years CICS experience. Degree preferred. Experience should include systems design and DOS/VS. Competitive salary and excellent fringe benefits. Send resume and references to:

Mr. Paul Estep
Personnel Department
University of Evansville
P.O. Box 329
Evansville, Indiana 47702
An Affirmative Action/
Equal Opportunity Employer

CAREER OPPORTUNITIES!

Sr. Programmers

5 years experience, degree helpful. Large scale IBM shop with large hierarchical data bases. Must know PL/I, OS-JCL, with some supervisory experience. Excellent promotion opportunity with southwest location. to \$24,000.

Software Specialists

Experience in TP software and/or IMS. Assist in migration from OS/MVT with ASP to MVS/JES 3. Midwest location with Fortuna 500 company. Knowledge of COBOL & FORTRAN. to \$20,000

EDP Auditor

3 to 4 years experience as Auditor with knowledge of COBOL. Insurance or financial background in auditing or accounting. Good communications skills helpful along with knowledge of systems design and sequential processing. Travel approx. 10%. to \$21,000

Many additional openings in other areas are also available. All fees are paid by our client companies.

In professional confidence, send resume, including salary and relocation requirements to: Jeff Holmes

**Forsey Love
& Associates Inc.**
PO Box 4486 G.S.
Springfield, MO 65804
417/883-1212

CALL TOLL FREE

PARTICIPATE IN MAJOR PROJECTS FROM SPECIFICATION THROUGH DESIGN, EVALUATION & TESTING.

CALL TOLL FREE

(800) 323-1966

In Illinois (800) 942-0491

Monday thru Friday from 8 am to 5 pm cst

Major changes will be sweeping the domestic and international telephony and related communications field in the next decade, and in large part, the technology will be generated right here ... at GTE Automatic Electric Laboratories. Talk with us about becoming an integral part of the team that will make it happen. We're looking for professionals in the following areas:

LONG RANGE PLANNING

Long Range Planning activities involve research studies on a wide variety of subjects related to the telephone communications industry. These studies include such areas as data communications, new technology, new services, future switching networks, evaluation of new switching techniques and review of the impact of political, economic and regulatory considerations. Intent is to provide well founded counsel and recommendations to upper management on future development programs and courses of action.

APPLIED RESEARCH

Performs research on circuits, systems and subsystems and related hardware and software in order to provide management with information on concept feasibility and estimated system cost for design and development. Efforts involve providing existing services with new techniques and/or new services on existing equipment.

SYSTEMS DESIGN

New Feature Design — Plan and develop the future hardware and software evolution of current large scale fully stored program controlled switching systems. Develop new features for existing equipment, study new features impact on existing systems, and estimate the development costs and requirements.

Product Design — Design advanced fully stored program controlled systems for telecommunication application. Develop large scale software programs in an on-line, real-time environment and related digital hardware using CMOS, Shottkey, TTL as well as Static and Dynamic MOS.

International Design — Develop design philosophy and Architecture Definition of switching systems for international markets. This involves high level design structure development and detailed studies of critical problem areas: Define specific design implementation tasks, review progress and coordinate developments with implementation teams abroad.

SOFTWARE DESIGN

Data Base Software — Responsible for logical and physical data base design and implementation related to telecommunications systems. Develop programs which automate the generation of data base contents for these systems in an IBM 370 environment using PL/I.

Support Software — Involved in compiler, assembler, simulator maintenance and enhancement as well as other IBM 370 software developments. Support effort is related to micro and large processor developments.

Application Software — Large scale development in telephone system real-time control. Diagnostic and fault recognition software, administrative software involving real-time data base administration, switch and network overload procedures as well as executive software.

SYSTEMS CONTROL AND TESTING

Development and execution of comprehensive test plans to evaluate the performance of large stored program switching system prototypes. Execute configuration management on all hardware, software, and components and maintain project control for all activities. System evaluation performed on both laboratory prototypes and initial field site locations.

If you have in-depth expertise in one or more of these areas, and a BS, MS, or PhD in Electrical Engineering, Computer Science, Math or other appropriate engineering discipline as well as an interest in moving forward with challenging new frontier in computer technology, talk with us.

If unable to call send resume including recent salary history to:

Manager of Technical Employment
Dept. 471 A6

400 N. Wolf Road
Northlake, IL 60164

An Equal Opportunity Employer M/F

**GTE AUTOMATIC ELECTRIC
LABORATORIES**

MAKE THE SWITCH

position announcements

Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Are you good enough at what you do to teach it?

Ken Rodrigues
Supervisor, Software Education

"What - me teach? Forget it! That's what I thought when I was a co-op instructor here. I left Data General to look for the real world. I came back. Because the real world is right here. And there's no more exciting place to be than right up front with all the new product developments. That's right - TEACH! You can too, if you're good enough!"

Sandy Kimball
Systems Training Specialist

"I've moved up from instructor to systems training specialist. We develop objectives, lesson plans and our own course materials. Then we see to it that everything works. There's a lot of responsibility and plenty of reward. You know, if you have a new idea we'll give you all the time and space you need to develop it. I call that real growth opportunity."

Maureen Hamilton
Sr. Educational Specialist

"Never a dull moment! You have to know your subject cold to teach it, when you're dealing with adults who have to know. I've always liked explaining things. As a Data General instructor I never have to worry about motivating the class. They're here because they're already motivated."

Ron Berman
Supervisor, Hardware Training

"It's a unique teaching situation. We aren't considered part of the overhead. We're vital to Data General's business and they let us know it."

Mike Renzi
Manager, Marketing Training

"I've never had a position with more challenge. Here, your ability shows every day. It's a high-visibility department, and when it comes to teaching aids, machine labs and corporate support we have what we need. Our ability to provide top-notch training to our sales and systems people is unmatched in the industry."

Systems Training Specialists

You need 5 or more years in systems or applications programming in a real time disc operating system environment. Minicomputer experience is desirable. Teaching or presentation experience a plus. You will develop and conduct systems courses for our sales and applications personnel and work with customers on advanced systems/application programs.

Software Instructors

With 2 or more years' real time systems or applications programming experience (assembler and higher level languages) on mini-to-medium computers, you're on your way. Knowledge of operating systems and communications, previous teaching experience desirable. You will develop and conduct programming/software courses for customers. And there is the opportunity to keep your hand in applications programming.

Hardware Instructors

You need 2 or more years in field service engineering or design. You should have peripheral device experience as well, and minicomputer and teaching experience will help. You will develop and conduct hardware familiarization and maintenance courses for our customers' engineering and service personnel.

Sales Training Specialist

You will participate in the design, development, and implementation of our Sales Training courses. Programs are offered for both newly hired and experienced sales representatives. They include a variety of technical and selling skills topics. You need more than 2 years' technical background (computer programming, systems design, engineering) and direct sales experience (computer systems, peripherals, software) in an OEM or end user environment.

You don't have to be an instructor to qualify. But you do have to be good at what you do.

Send us your resume, with this ad to Jon Zion at Data General Corporation, Route 9, Mail Stop 6-1, Southboro, MA 01772. Data General is an equal opportunity employer, M/F.

I'm good enough to teach what I know. Here's my resume.

Signature _____

 **Data General**

position announcements

position announcements

position announcements

position announcements

position announcements

MOS Engineers:

In Houston, you've got the Gulf for a playground.

You can cruise up the coast to New Orleans or down the coast to Mexico. Or you can play in your own port — on the water or on the town. Houston is Big City in size and sophistication. Except for New York, it's the only U.S. city that has fully professional companies in all four of the performing arts. The cost of living is well below the national urban average. And there is no state income tax.

We give you the Gulf...

...and a green light.



At TI — Houston, you'll work with industry-leading products.

High-density MOS memories; 16k RAMS and EPROMS; and 16-bit microprocessors and minicomputers. You'll get to prove how good you are working with a broad scope of job opportunities with MOS semiconductor memories and microprocessors — the latest LSI devices.

Your technical expertise will address a wide range of applications: computers; automobiles; appliances; industrial controls; toys; and many others.

MOS Microprocessor Design Engineers

Member of a design team responsible for specification, design, and testing of MOS microprocessors and microprocessor peripheral devices. Will be responsible for MOS system, logic and circuit design, planning and supervision of chip layout, development of test programs, device testing, and characterization. Requires BS/MSEE and 1 year circuit or logic design. MOS experience desirable.

MOS Microprocessor Systems Engineers

Responsible for the specification, design and programming of microprocessor-based systems from

concept through production. Requires BS/MSEE and 1 year experience in assembly level programming, logic hardware, and minicomputer and/or microprocessor software.

Product Engineers

Work with a team of process engineers, device and system designers, and production personnel to implement new products into production and into the market. Quickly assume responsibility for test generation, yield improvement, cost reduction, and device characterization of MOS LSI devices. Requires BSEE or physics and 2 years' applicable experience. Requires knowledge of LSI fabrication and testing.

Product Manager

Coordinate test development and product engineering for digital/analog MOS LSI circuits. Requires thorough understanding of digital LSI test techniques and/or familiarity with data transmission over switched communication network. Requires BS/MSEE and 3-5 years' related experience.

Product Marketing Engineers

Handle all product marketing responsibilities for geographic area for MOS memory or microprocessor products. Provide customer presentations, proposals, spec evaluations,

and price and delivery negotiations. Develop penetration programs for market area and coordinate resources to pursue. Requires BSEE or CS and 2 years' related experience, and the ability to operate in rapidly expanding market environment.

Strategic Marketing Manager

Analyze market opportunities. Participate in product definition for MOS microprocessor products. Prepare product documentation, pricing and merchandising for specific markets. Requires BSEE or CS and 3-5 years' applicable experience.

Applications Engineers

Apply microprocessors and/or memories to systems designs. Basic design requirements include digital, analog, and systems programming from concept to prototype debug. Requires BSEE or MSCS with heavy emphasis on electronics and microprocessors/memories. Requires 2 years' related experience and assembly level programming.



If you qualify for any of the above positions, send your resume in complete confidence to: Staffing Manager/P. O. Box 1443, M.S. 605/Houston, TX 77001.

TEXAS INSTRUMENTS INCORPORATED

An Equal Opportunity Employer M/F

DATA PROCESSING MANAGER-COST SYSTEMS

A leading communications company currently has a challenging position available for an individual to manage and guide the technical efforts of an analysis and programming group.

The ideal candidate will possess the following qualifications:

- Several years of supervisory experience in addition to recent experience in a technical capacity.
- Experience in an IBM 360/370, COBOL environment with accounting, financial and/or manufacturing applications.
- Familiarity with package software including DBMS
- Knowledge of structured design and programming techniques
- Some experience with distributed systems
- Must possess good management techniques
- A bachelor's or master's degree required

Candidates must have experience. Excellent company benefits include fully paid insurance.

If you meet the above requirements write us in confidence with qualifications and salary requirements to: CW Box 1454 797 Washington St. Newton, MA 02460 EOE

DIRECTOR, UNIVERSITY COMPUTER CENTER

Responsible for directing the financial, personnel, and operational functions of the University Computer Center, which serves the instructional, research, and administrative needs of the University. Also provides technical leadership and assists all users in the area of computing and systems services. Current hardware includes IBM 360/50 with one million bytes of core and ITCL 7330 disk drives, and a DEC 1090 system with 56 on-line terminals.

A doctorate is required in administration, higher education, computer science, or a related area. Applicants must have eight years experience in computer applications or operations. Five of the eight years should be in an administrative position with three of those years in a college or university.

The University is located in Muncie, IN, a city of 80,000 people, approximately 50 miles northeast of Indianapolis. Starting salary range is \$21,100-\$27,500.

Submit applications and credentials no later than March 15, 1978 to:

Dr. Richard C. McKee
Assistant to the President

BALL STATE UNIVERSITY
Muncie, IN 47306

Ball State University Practices Equal Opportunity in Education and Employment

EDP AUDITOR

Position is available for an auditor who can cope with our sunny San Diego climate. We have no blizzards or sub-zero weather. We are looking for a person with at least three years experience in auditing and data processing, who is willing to leave stormcoat and over-shoes behind.

1. Independently analyze and appraise all data processing operations.
2. Provide technical assistance to audit staff.
3. Prepare and coordinate audit retrieval programs for internal and external audit use.

We offer a progressive auditing environment and an excellent benefit package. Applicants should have a Bachelors Degree. A CPA is also desirable.

Send resume and salary requirement to:

Employment Office
SAN DIEGO GAS

ELECTRIC COMPANY

P.O. Box 1831
San Diego, CA 92112

An Affirmative Action and Equal Opportunity Employer

SR. ANALYST FINANCE

\$21-\$33,600

Boston area consumer products manufacturer needs a systems analyst to join their finance group. Will have free hand to develop financial systems and act as liaison to M.I.S.

Please call Ted Chaloner at (617) 426-4180 or submit resume with salary requirements to:

ROGERS & SANDS

100 Federal Street, Boston, MA 02110

Member of Massachusetts Professional Placement Consultants

COMPUTER PROGRAMMER

Outstanding opportunity for qualified programmer to work with banking applications. Require 1-2 years experience with Burroughs medium system computer using CDBOL language. Financial EDP experience preferred, but not essential. Excellent benefits and opportunity for advancement. Salary commensurate with qualifications. Send resume to:

Great Lakes Computer Center, Inc.
524 E. Milham Rd.
Kalamazoo, MI 49002
Attn: Mr. J. Klosterman
An Equal Opportunity Employer

COMPUTING CENTER DIRECTOR

University of Arizona

Tucson, Arizona

The University of Arizona has an opening for the Director of the Computing Center. The Computing Center provides services to instructional, research and administrative users throughout the campus. The Computing Center has a CYBER 175 linked with a DEC 10 KL. The Director has administrative responsibility for the Center.

Candidates should have both technical knowledge and successful management experience. A doctorate is desirable but not required. Salary will depend on qualifications and experience. Applications close April 15, 1978. Send vita to Dr. Jean Weber, Chairman of the Search Committee, c/o Office of the Dean of the Graduate College, 501 Administration Building, The University of Arizona, Tucson, Arizona 85721.

Equal Opportunity/Affirmative Action Title IX/Section 504 Employer.

position announcements

position announcements

position announcements

position announcements

position announcements

positions Available Nationwide
Call Toll Free

800-426-0342

Assured Confidentiality
and Employer Retained.

SOFT ENGRS 18-24K
BS-EE with 3 yrs. experience in
process control & data acquisition.

APP. PROGS 12-22K
Several openings throughout
U.S.A..

SYS/PROG MGR 22-25K
IBM DOS/VS shop, going to OS.
Midwest location.

SYS PROGS 20-26K
Experience in OS/MVS and TSO
required.

PROJ LORS 21-25K
370 or H6000 background and
two yrs. experience.

PARKER PAGE ASSOC.

P.O. Box 12308
Seattle, WA 98111
Offices in Wash. D.C.,
Chicago, Atlanta, Portland, Or.

DATA PROCESSING MANAGER

An immediate vacancy exists, as a result of internal promotion, for a division level Data Processing Manager. This is an excellent opportunity to enter a Fortune 200 company in a progressive system 3-15 installation. The successful applicant will have extensive system development exposure preferably with system 3 RPG II experience in a manufacturing environment. MRP or IPICS experience a plus. Very attractive mid-Atlantic location, outstanding compensation/benefit package. Our employees are aware of this vacancy.

Respond in confidence including salary history to:

CW Box 1466
797 Washington St.
Newton, Mass. 02160
Equal Opportunity Employer

COMPUTER SCIENCE FACULTY POSITIONS

All Ranks. Teaching in undergraduate computer science and information systems curriculum (systems analysis, numerical analysis, non-numeric processing, mini-computers, computer architecture, operations research, languages: PL/I, Fortran, Assembly and COBOL). Doctorate preferred but Master's considered at rank of Instructor. Salary and rank dependent upon qualifications. To begin Fall semester 1978. Send resume by March 15, 1978 to: Dr. Donald Burlingame, Computer Science and Information Systems Dept.

S.U.N.Y. at

Potsdam

Box 108

Potsdam, N.Y. 13676

An Equal Opportunity

Affirmative Action Employer

INSURANCE DATA PROCESSING PROFESSIONALS

WE KNOW OUR DIRECTION, DO YOU?

We offer a ground floor opportunity to grow with a rapidly expanding Life Insurance Company.

We seek career-oriented data processing professionals to fill several new positions for Systems Analysts and Programmers in our Data Processing Department.

We offer a pleasant suburban location; a people-oriented atmosphere; training and educational programs; excellent salary; benefits; and relocation assistance.

NOW IS THE TIME TO ANALYZE YOUR CAREER

If you have two or more years data processing experience, exposure to life insurance applications, and a knowledge of IBM Assembler and COBOL, we can help you meet your career goals.

Please send your resume or qualifications, and salary requirements in confidence to:

WILLIAM S. WILKINS
Vice President of Data Processing
33045 Hamilton Boulevard
Farmington Hills, Mich. 48018



Alexander Hamilton Life Insurance Company of America

AN EQUAL OPPORTUNITY EMPLOYER M-F

SYSTEM DEVELOPMENT CORP. HAS EMPLOYMENT OPPORTUNITIES FOR QUALIFIED AND EXPERIENCED SYSTEM DESIGNERS - SYSTEM ANALYSTS SYSTEM PROGRAMMERS

THE COMPANY

SDC has been the industry leader in Systems Software Development for over 20 years. We are undergoing rapid expansion due to our demonstrated technical excellence.

THE ACTIVITY

SDC has initiated a large Research and Development project to design an advanced standard architecture for the U.S. Navy's computer based Real-Time Command and Control Systems. Our R&D effort will utilize top down design techniques, structured analysis and structured programming. Additionally, we will define and design new automated techniques for producing operating systems software.



THE LOCATION

You will live and work in fabulous Virginia Beach, Virginia. Low cost of living by the sea plus our mild year round climate.

THE FUTURE

Your opportunity is now! SDC offers top compensation and liberal fringe benefits including paid relocation. As one of our Software Professionals, you will enjoy our technically challenging but casual work environment. For consideration or information contact T.W. Salmon, Personnel Administrator, (804) 461-6662.

System Development Corporation

13 Koger Executive Center, Norfolk, Virginia 23502

SYSTEM DEVELOPMENT CORPORATION

Sr. Sales Rep's

Selling to insurance producers now. Great opportunity to join industry oriented data center. Prefer following among agents ... ex ARC, Systems, Safecom, etc. Openings in N.E., S.E., Midwest. Relocation not nec. Salary & Comm \$20M+ 1st year. Send resume or call Thos. C. Bailey, Arlington/Balley Automation, Box 12339, Winston-Salem, N.C. 27107 (919) 722-5167.

PHILADELPHIA NEEDS YOU

The exciting PHILADELPHIA growth economy needs talented programmers and our clients are prepared to make it interesting for you.

We need experience (1-10 years) in the following areas:

* IBM 360/370 (DOS/OS/VS)

* SYS 3/MOD 10-15

* H6000 SERIES (GECOS)

* COBOL, ANS COBOL, BAL

RPG II, EASYCODER

Our diverse clients offer exciting oppor. for growth into analysis and mgmt.

Depending upon experience, salary \$11,000 - \$25,000

For confidential attention, please call or forward resume to:

ROBERT HALF

PERSONNEL AGENCIES

PERSONNEL AGENCIES

2 Penn Center, Suite 708

Phila., Pa. 19102

(215) 568-4580

Software Systems Specialists

San Diego

National Semiconductor Large Systems Division, the leader in IBM compatible CPU's, is looking for software specialists to support its systems, both in-house and in the field.

Positions require a minimum of five years experience supporting IBM operating system software. Responsibilities include diagnostic evaluation, test software development, firmware release certification, and company-wide software systems.

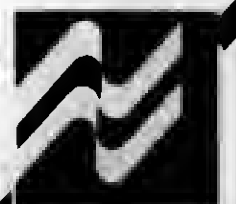
These are senior level positions requiring self motivated individuals.

These positions and others of a similar nature are immediately available. To find out more regarding National's large systems team in San Diego, send your resume in confidence to:

Jack Moyer, EXSYSCO
Personnel Manager,
10788 Roselle Street,
San Diego, California 92121.

We are on equal
opportunity
employer m/f/h.

EXSYSCO



National
Semiconductor

position announcements

position announcements

position announcements

position announcements

position announcements

OPM LEASING SERVICES INCORPORATED

HAS RECENTLY OPENED BRANCH OFFICES IN THE FOLLOWING CITIES:

**LOS ANGELES
SAN FRANCISCO
CHICAGO
DALLAS**

We are expanding our operations throughout the United States, Canada and Europe and we're looking for dynamic marketing representatives with experience in system/370 leverage leasing combined with knowledge in the remarketing of data processing equipment. Minimum two years experience.

**EXCELLENT SALARY TOP BENEFITS PROVIDED.
FOR PERSONAL INTERVIEW WRITE:**

OPM

Mr. Michael C. Iracondo, National Sales Director

O.P.M. Leasing Services, Inc.

9601 Wilshire Blvd., Beverly Hills, CA 90210

Tel: (213) 278-4117

THE CUSTOM LEASING PEOPLE

position announcements

position announcements

position announcements

position announcements

position announcements

OUR CAREERS ARE LIKE OUR NAME...

OPTIMUM.

TECHNICAL

Senior Analyst

Working in health administration and claims processing, you'll be involved in support systems design for health care, on-site customer support at management levels, and interface with OSI's technical staff. Required is a degree in Computer Science or equivalent experience, including 3 years' in programming and 3 years' as an analyst, with heavy COBOL and IBM 360/370 experience. Health care experience is desirable.

Programmer/Analysts

Several opportunities are available here involving many diverse activities, some of which include designing and coding structured COBOL programs, walk-throughs, testing and systems analysis, and other duties related to health care/claims processing. We have openings for the following experience levels:

- B.A. or B.S. degree in math, engineering or science, with a minimum of 2 years' ANS-COBOL using an IBM/OS system, or 2-4 years' large scale IBM/OS or VS experience.
- B.A. or B.S. degree, plus 3-5 years' data processing experience, including COBOL (ANS), IBM/OS, utilities, CFMS, CICS.

Project Managers

We have several openings in this area to manage technical staffs developing large life designs and data structure projects, and supervision of systems analysts. The work involves health care, claims processing, technical project control, interpretation and definition of customer requirements at management levels. Qualifications should include a B.A. or B.S. in math, engineering or science, 5 years' data processing experience including OS, COBOL and JCL, plus related health care experience.

Lead Software Programmer

This position involves the implementation of a large CICS MVS installation with over 400 CRT terminals and a massive data base. Preferred is a B.A. or B.S. in math, engineering, or science, plus 5 years' in a systems software OS VS environment. Heavy experience in CICS communications, SOFTWARE AND VSAM a must!

Systems Analysts

We have many opportunities in this area, most of which involve the analysis and design of large, complex data files with multiple entry points, all within the health care field. A B.A. or B.S. in math, engineering or science is required including the following specific duties:

- 3-5 years in large, complex data processing environments. Heavy file design experience is required.
- 2 years as a programmer/analyst, preferably with experience in health claims processing.
- 4 years data processing experience, and 1-2 years' in systems analysis/customer interface. Health care experience is desirable.

Industrial Engineer

You'll develop and implement an optimum work flow system and assist in staffing all levels of personnel for health care clients. You must be familiar with work flow systems and procedures and motion studies. An Industrial Engineering degree is required and a background in health insurance claims processing/ clerical functions preferred.

SUPPORT

Manager, Technical Support

You'll supervise our technical staff in San Francisco, and will provide technical support to marketing, including proposal preparation, cost estimates, feasibility studies and demos. Requires college degree, with emphasis on computer science or business administration, with at least 3 years' large scale IBM experience using OS (MVI, VS or MVS) in a programmer/analyst position.

Systems Engineer

You'll provide customer support in the Los Angeles/Orange County area, converting and installing systems on the OSI large scale IBM computers. Required is a B.A. or B.S. and 5 years related experience in systems analysis with MVS and interest in a Marketing environment.

Consider some of the elements, which, added together, combine to create an exceptional career opportunity. One of your first concerns should be the quality of the organization. Optimum Systems Incorporated (OSI) is one of the country's top independent computer services vendors, and pioneered the "computer utility" concept.

Equally important are the people you'll interface with every day. We've assembled a fine staff of highly-competent EDP professionals united by a common goal...the pursuit of excellence.

Finally, at OSI you'll find technical challenge and growth potential that few firms can offer. Because we've carefully selected areas of specialization, and aim to provide the industry's best data processing services in each one of them. And since this field is still relatively young, the prospects for our expansion are phenomenal.

Why not put yourself in the most favorable condition for growth and OPTIMIZE your career with us!

Marketing Representatives

Two openings are available here which involve developing contacts with existing and potential customers. A B.A. or B.S., plus 3-5 years' marketing experience in the data services computer industry or a related area is required.

Training Coordinator

You'll develop and implement a training program for customers and employees in health care services; establish training standards, training aids, and conduct classes. A B.A. and related work experience is required. A health insurance background in developing training programs for customers and employees is preferred.

Technical Marketing Support

You'll provide technical advice and consultation on difficult analysis and programming problems and provide project leadership to other staff members on systems software development and maintenance. A degree in Computer Science or Business Administration preferred and 4 years' Data Processing experience, with emphasis on project implementation; heavy programming on large scale IBM systems; and application experience in two or more industries is required.

STAFF

Senior Computer Operator

A wide variety of responsibilities are called for, including the assurance of maximum machine utilization, recommending changes in operational instructions, and problem solving. You should have at least 2 years' of experience on the IBM/370, with MVS/JES2 experience a must.

Keypunch Operator

You'll perform a variety of keypunching and verifying assignments, keeping a record of all incoming work for keypunch, and assisting in training new operators. Required is 1-3 years' of experience on IBM equipment, preferably a model 129.

Production Control Analyst

You'll maintain all production JCL for computerized medicare systems; assure proper output distribution; set up production runs; learn batch system process and recovery procedures; and interface with corporate production control. One year as a Data Processing Control Analyst or Control Clerk is required. Knowledge of OS/JCL or On-line Test Editor is desirable.

OSI offers you an excellent salary and generous benefits, as well as a very comfortable working environment which facilitates efficient communication and encourages a friendly atmosphere.

Positions Available Nationwide

For immediate and confidential consideration, please send resume and salary history to:
Employment Manager, OPTIMUM SYSTEMS INCORPORATED,
2801 Northwestern Parkway, Santa Clara, California 95051. (408) 987-4444.

Optimum Systems Incorporated

An Affirmative Action Employer, M/F/H.

announcements

position announcements

position announcements

position announcements

position announcements

ers talk about it — we've got it

Add Dimension To Your Future!

SYSTEMS SOFTWARE DEVELOPMENT

As a leader in the world of mini-computers, Sperry Univac will double in size within the next year! If you are a mini-computer professional, looking for responsibility and growth, NOW, not later, look into the opportunities at Mini-Computer Operations.

New Systems Research and Development projects are starting now...

- State-of-the-art Operating Systems for Interactive, Real-time, and batch environments.
- Distributed Data Base Management Systems.
- On-line System Diagnostics.
- Sustain and Enhance Present Software.
- High Performance Business and Scientific Compilers.
- Advanced Data Communications Software.

Diagnostics Analysts

Individuals will be members of hardware/software design team involved in mini-computer test systems development. Positions will include project responsibility for all phases of assembly language and microprogramming language implemented programs and development of system level testing and fault-isolation software.

Data Communications Analysts

Design software and be responsible for the implementation of asynchronous and synchronous protocols. Design transaction oriented systems, Distributive Communications Architecture, and front-end processors. Project Management opportunities. Direct assembly language experience required.

Data Communications Analysts

Estimate time and cost of Data Communications software for customers. Evaluate customer software RFQ/RFP's, design creative solutions for customer's needs, and provide state-of-the-art technical leadership.

Software Applications Analysts

Conduct pre/post sales software support for Mini-Computer Operations products, including benchmarks, performance analysis and competitive analysis. Requires direct experience in Operating Systems, Data Base design and high level languages.

We offer competitive salaries and a comprehensive benefits package that includes dental insurance. We invite you to send your resume to the address below, or call Employment at 714/ 833-2400 for more information.

SPERRY  UNIVAC

MINI-COMPUTER OPERATIONS
2722 Michelson Drive, Irvine, CA 92713
An Equal Opportunity Employer M/F

PROGRAMMERS CHECK THESE JOB ADVANTAGES...

Leading Southeast Insurance company located in Dallas, Texas, has openings on its programming staff. Our shop is large enough to be advanced yet small enough to offer all around experience. We operate 370-OS-VS -CICS-SPM-Data Base Management Systems. If you are looking for a personal growth situation, mail your resume to:

EMPLOYERS INSURANCE OF TEXAS

P.O. Box 2759
Dallas, TX 75221
Equal opportunity employer M/F



INTERGLOBAL is...

a subsidiary of a NYSE listed company, with an EDP service bureau placing Consultants throughout the United States and foreign countries.

To take advantage of our nearby and worldwide EDP opportunities, please submit your resume for inclusion in our worldwide computerized retrieval system, to our corporate headquarters in New York City.

Ralph Young

INTERGLOBAL
TECHNICAL SERVICES, INC.
56 W. 35 St, NY, NY 10001
(212) 695-7773

Equal Opportunity Employer M/F

OUR STANDARDS ARE HIGH THEY HAVE TO BE

Our vice presidents personally hire each programmer/analyst (over 100 will be in 1978) because they know that a professional service firm's FUTURE IS YOU.

Immediate openings in Miami, Houston, Washington, D.C., and Philadelphia areas. Call collect or send resume with current salary requirements to:

Mr. Fred Trimble

Data Technology Industries, Inc.
6811 Kanilworth Ave., Suite 413
Riverdale, Maryland 20840
(301) 779-8828

FIELD SERVICE

SYSTEMS 370/360, H-200,
XDS, Univac, CDC
All Large & Medium
CPU's

MINI's PDP, NOVA, G.A.,
HP, etc. All Mini
Systems

I/O STC, TELEX, CDC,
ITEL, CALCOMP,
etc. All Peripheral Ex-
perts

MTTR

(312) 344-8750

MTTR ASSOCIATES
1107 Mannheim Road \$12-30K
Wheaton, Ill. 60153

Field Service Specialist
National Placement
Private Employment Agency
No Fees To Applicants

NCR CIF AND FOCIS

We are a leading W. Va. bank seeking a data processing professional to assume a major role on the systems and programming staff in the expansion of its multi-bank data processing center.

Candidates must have several years of banking experience and in depth knowledge of NCR hardware and banking software. Excellent communications skills and supervisory ability are required.

We offer excellent salary/benefits package and an opportunity to become involved with the latest NCR hardware and software in an on-line environment.

Michael McKinney
Director of Data Processing

First National Bank
of Commerce
P.O. Box 633
Charleston, W.Va. 25322
(304) 348-5065

We are an affirmative
action employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SENIOR SYSTEMS ANALYST

We're a leading manufacturer of automotive products, a division of an established Fortune 500 corporation, located in the western Pennsylvania area, with an outstanding career opportunity for an energetic systems analyst capable of accepting responsibility as project leader. The ideal candidate will have a degree in computer science or related field with 4-6 years of in-depth systems experience. Must have background in ANS COBOL, IMS and JCL in an OS environment, ability to communicate and interface with users essential.

The professional that accepts this position will find an extremely challenging work environment with unprecedented opportunities for advancement and career growth. We offer an excellent starting salary and a full range of company benefits. For consideration, send your resume with salary history in confidence to:

CW Box 1452
797 Washington St.
Newton, Mass. 02160

We are an equal opportunity employer. Minorities, women and handicapped are encouraged to apply.

New! 1978 Computer Salary Survey



Call for your Free copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

This comprehensive free report also gives you expert advice on a variety of important career topics such as: when you should consider a job change; what you need to do to break into management; how to make sure you're getting the proper exposure; why timing is so crucial in your long range career development; how you can avoid stagnation... and much more.

The 1978 Computer Salary Survey has been compiled by Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

For your Free copy, call the Source Edp office nearest you.

East:	Midwest:	St. Louis:	West Coast:
Boston 617/482-7613	Chicago 312/762-0657	314/662-3600	Encino CA 213/995-6866
Hartford 203/522-6590	Cleveland 216/771-2070	St. Paul 612/771-0544	Irvine CA 714/633-1730
New York City 212/736-7445	Detroit 313/963-0510	South/Southwest: Atlanta 404/325-6370	Los Angeles 213/386-5500
Philadelphia 215/665-1717	Kansas City 616/474-3393	Dallas 214/367-1600	Oakland 415/444-5955
Stamford CT 203/329-8411	Minneapolis 612/544-3600	Denver 303/773-3700	Palo Alto 415/328-7155
Union NJ 201/687-8700	Northfield IL 312/446-6395	Fort Worth 617/336-9300	San Francisco 415/434-2410
Washington DC 703/790-5610	Oak Brook IL 312/966-0422	Houston 713/626-8705	Seattle 206/454-8400
Wellesley MA 617/237-3120	Rolling Meadows IL 312/392-0244	New Orleans 504/561-6000	Torrance CA 213/540-7500
	Southfield MI 313/352-6520		

source edp

To call, write: Source Edp, Department C3
721 Enterprise Drive, Oak Brook, Illinois 60521

(When writing, please be sure to use home address and indicate position title.)

Data Processing Professionals

Participate in the development of on-line manufacturing systems. We are looking for professionals with the following qualifications:

Senior Manufacturing Systems Analysts

- Minimum of five years experience in the development of integrated on-line manufacturing systems
- Project leader responsibility from conceptual design through implementation
- Responsibility for user interface and implementation training

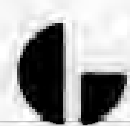
System Analysts

- Three to five years experience
- Participant in the development of on-line manufacturing systems
- Ability to prepare system design and detail program specification
- Technical proficiency including a working knowledge of Cobol and exposure to assembler. Knowledge of communications systems and data base management a plus.

Programmer Analysts

- Some Design experience preferably in manufacturing systems
- Technical proficiency including a working knowledge of Cobol and exposure to assembler
- Self sufficient debugging skills

To apply for these positions send your resume or a detailed letter to Rene Santini, Data General Corporation, Route 9, Southboro, MA 01772. Data General is an equal opportunity employer, M/F.

 Data General

IMS SPECIALIST

Major software consulting company has opening in Central New Jersey for IBM specialists to assist clients in problem solving and development of new applications. A great opportunity. \$27,000 FEE PAID

ROBERT HALF PERSONNEL AGENCIES, INC.

522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

SYSTEMS ANALYST

Immediate opening for Systems Analyst with 2-4 years previous experience. ANSI COBOL, systems design experience required. IMS, CICS or PL/I experience required. State-of-the-Art Technology includes two 370/158 CPUs, MVS, laser beam printer, extensive on-line applications.

CW Box 1462
797 Washington St.
Newton, Mass. 02160

FMC

FMC CORPORATION, a \$2 billion plus Manufacturing and Chemical products company, currently has openings for senior level professionals at its Corporate computer facility. Please send resumes to FMC CORPORATION, P.O. Box 41365, Indianapolis, Indiana 46241.

IMS SYSTEMS PROGRAMMER

Responsible for software support of IMS DB/DC. IMS is installed to provide on-line data base facilities for a variety of large applications. Candidates must be familiar with both IMS and operating systems internals.

SYSTEMS PROGRAMMER

Responsible for support of MVS/JES2 operating systems and program products. Candidates must have working knowledge of Assembler and one high level language, preferably COBOL, plus an in-depth knowledge of the internals of the operating system.

position announcements

position announcements

position announcements

position announcements

position announcements

CSC

COMPUTER PROFESSIONALS DIVERSITY...

is the word that best describes
The Applied Technology Division
of CSC!

The Applied Technology Division of CSC is expanding to meet new commitments and opportunities in the information sciences industry.

Our professional environment is both stimulating and rewarding, offering competitive income and challenges at the forefront of systems design. Please investigate the following opportunities at once...

WALLOPS ISLAND, VA.

Assembly language experience with the PDP 11 or LSI 11 real-time operating systems.

WASHINGTON, D.C.

COBOL or Fortran experience on the U-1100 or IBM 360/370 series, IMS helpful. Also, COBOL or IDS experience on the H6000.

HAMPTON, VA.

Scientific Applications Analysts with systems software on large scale computer. Familiarity with CDC STAR desired.

GREENBELT, MD.

IBM 360/370 experience in COBOL, ALC, JCL, or PL/1 on OS, MVS, MVT, VS-1, or VS-2.

MOUNTAIN VIEW, CALIF.

Fortran experience on the CDC STAR 100 or Illiac IV desired.

RIDGECREST, CALIF.

U-1100 Fortran, Assembly, or EXEC 8; also PDP 11 Assembly or Fortran experience.

BAY ST. LOUIS, MISS.

Communications software, numerical modeling, data base management, and graphics applications on microprocessors, minicomputers, and large scale computers.

For immediate consideration, please send resumes to:

Gus Siekierka
Director, Industrial Relations

**COMPUTER
SCIENCES
CORPORATION**

Applied Technology Division
6565 Arlington Boulevard
Falls Church, Virginia 22046

Major Offices and Facilities throughout the World
Equal Opportunity Employer M/F

PROGRAMMER ANALYSTS/ SYSTEMS ANALYSTS

Large progressive Midwestern Utility has career opportunities at its Corporate Headquarters located in Jackson, Michigan for Programmer Analysts and Systems Analysts with 1-3 years experience.

College degree preferred but the major prerequisite is experience in programming end/or system application design in business or engineering systems development. Experience in Data Base Management Systems, teleprocessing or internal time-sharing also desirable.

Salary commensurate with depth and range of experience. Please send resume to:

Professional Employment/PASA

Consumers Power Company

1945 W. Parnall Road
Jackson, Michigan 49201

An Equal Opportunity Employer M/F

DATA PROCESSING GROWTH OPPORTUNITIES

Located in a beautiful Southern California suburb, just minutes from beaches, mountains and the Los Angeles civic center, is Beckman Instruments, Inc.

We are a growth oriented manufacturer of instrumentation for the medical, scientific and process industries. Our pattern of continuing growth has brought about several opportunities for DP professionals.

Offering excellent opportunity for continuing career growth, a dynamic state-of-the-art environment and an excellent Southern California location, these positions are well worth looking into:

MINI/MICRO PROGRAMMERS

Will develop computer/instrument systems. These positions require 2-3 yrs. recent experience in technical or engineering software development on minicomputers and/or microprocessors.

PROGRAMMER ANALYSTS

These positions require a technical command of COBOL, Data Base and Systems 370 concepts along with systems knowledge of sales order, inventory management, distribution or financial applications. Expertise in real-time systems, TSO and structured methodology will be beneficial.

SYSTEMS PROGRAMMERS

As Systems Programmer you will provide support to data processing in the areas of software, hardware and procedures relating to DP. You should be familiar with systems generation and maintenance, SVS or MVS.

SYSTEMS ANALYSTS

These positions require 3-6 yrs. applications design experience encompassing bill of materials, sales order processing and production control.

TIME SHARING SYSTEMS ADMINISTRATOR

Administers and maintains the DEC 20 time sharing system, interfaces with user on programming applications, performs user training. Should have a working knowledge of BASIC, PLI, FORTRAN, CPL and TOPS operating systems.

In addition to excellent salary and benefit program, these positions offer an exceptional state-of-the-art environment including:

- IBM 370/158, INTEL AS6, DEC 2050
- Worldwide RJE network
- Interactive programming dev.

Send resume and earnings history in strict confidence to or call Carl Morgan.

(213) 691-0841

(714) 871-4848 ext. 1233

BECKMAN
BECKMAN INSTRUMENTS, INC.
2500 North Harbor Blvd.
Fullerton, California 92634
Equal Opportunity Employer M/F

SYSTEMS ANALYSTS

Systems Analysts needed to develop large scale business oriented Batch and Online Systems. This is an opportunity for analysts to work in a professional environment with excellent advancement potential.

Applicants must have the following qualifications:

- 2+ Years Experience
- College Degree or Equivalent Experience

Salary 15-25K (depending on qualifications) with excellent fringe benefits.

Send resume in confidence to:

Michael Cevilli
Mgr. Systems Development
Consolidated Freightways
P.O. Box 3301
Portland, Oregon 97208
An Equal Opportunity Employer

PROGRAMMERS

Large N.W. based transportation company has immediate openings for career minded programming professionals.

Successful candidates will have the following qualifications:

- 2+ Years Assembly
- CICS Experience
- Working Knowledge of COBOL
- Background on Large Scale IBM CPU's - Under OS and/or MVS
- College Degree or Equivalent Experience

This is a career opportunity for the right individual with excellent advancement possibilities. Salary 15-20K, depending on experience, end background, and excellent fringe benefit package.

Send resume in confidence to:

Michael S. Cevilli
Mgr. Systems Development
Consolidated Freightways
P.O. Box 3301
Portland, OR 97208
An Equal Opportunity Employer

Consulting Mgr./Banks \$40Kup
Excellent career path position with Int'l firm for achieving in systems design and marketing.

Director of Mfg. \$35-50K+
Quarterback a team that increased sales 50% last year. Your ability to solve the resulting delivery problems and manage the near-term quinqupling of growth means a fast track to V.P.

EDP Audit manager \$24-29K up
New position with expanding consumer products leader for ambitious self-starter who enjoys independent activity.

Ins. Sys. Exec \$28K up
Promotion created oppty for mgr. who can keep several major projects on track simultaneously. Will be groomed for AVP.

OEM Periph's Sales to \$25K+
As one of the first conversions from Mfr's Reps, you'll have an excellent shot at mgt. with this recognized name in the industry.

Tech Support Spec. to \$25K
Officer-level position with major financial services institution providing guidance to applications staff for new on-line projects.

Cobol Progr \$16-20K up
Now's the time to cash-in on the high price tags for your talents. Take your pick of a variety of exciting opportunities.

COMPU SEARCH

A Division of Management Recruiters
607 Boylston St., Boston, MA 02116
(617) 262-3050
10 Forbest Rd., Braintree, MA 02164
(617) 848-1888
1500 Main St.
Springfield, MA 01115
(413) 761-1550
446 Main St.
Worcester, MA 01608
(617) 791-2373

CAREER OPPORTUNITIES IN INFORMATION SYSTEMS

Midwestern life insurance company has three immediate openings:

MANAGER programming successful applicant will direct a staff of eight programmers and analysts. Minimum requirements are:

- Supervising experience.
- Life Insurance Data Processing experience with a consolidated functions system.
- Assembly Programming background.
- On line experience a plus.

PROGRAMMER/ANALYST

Successful candidate should have 2-3 years experience in guage background.

Life Insurance background a plus.

METHO OS ANALYST

Successful candidate should have 2-3 years experience in automated and manual systems and procedures.

You will participate in the installation of a consolidated/on-line data processing system providing external interface to insure that Manual Systems are designed and implemented properly.

Consolidated Systems or life insurance experience a plus.

Company offers an excellent benefits package with competitive salary based upon experience. If interested call toll free 1-800-843-3316.

position announcements

position announcements

position announcements

position announcements

position announcements

Fleetguard**SENIOR
PROGRAMMER**

Fleetguard one of the fastest growing manufacturers of heavy duty filter products for trucking/construction/mining equipment is seeking two (2) experienced Senior Programmers with manufacturing background.

Hardware presently installed includes IBM 370 model 125 with 3277 CRT's.

Qualifications: Knowledge of manufacturing applications, hardware, software, and a commitment to user service. In depth knowledge of COBOL and Assembler Language. BS degree required.

Salary mid to upper teens.

To arrange an interview send resume to:

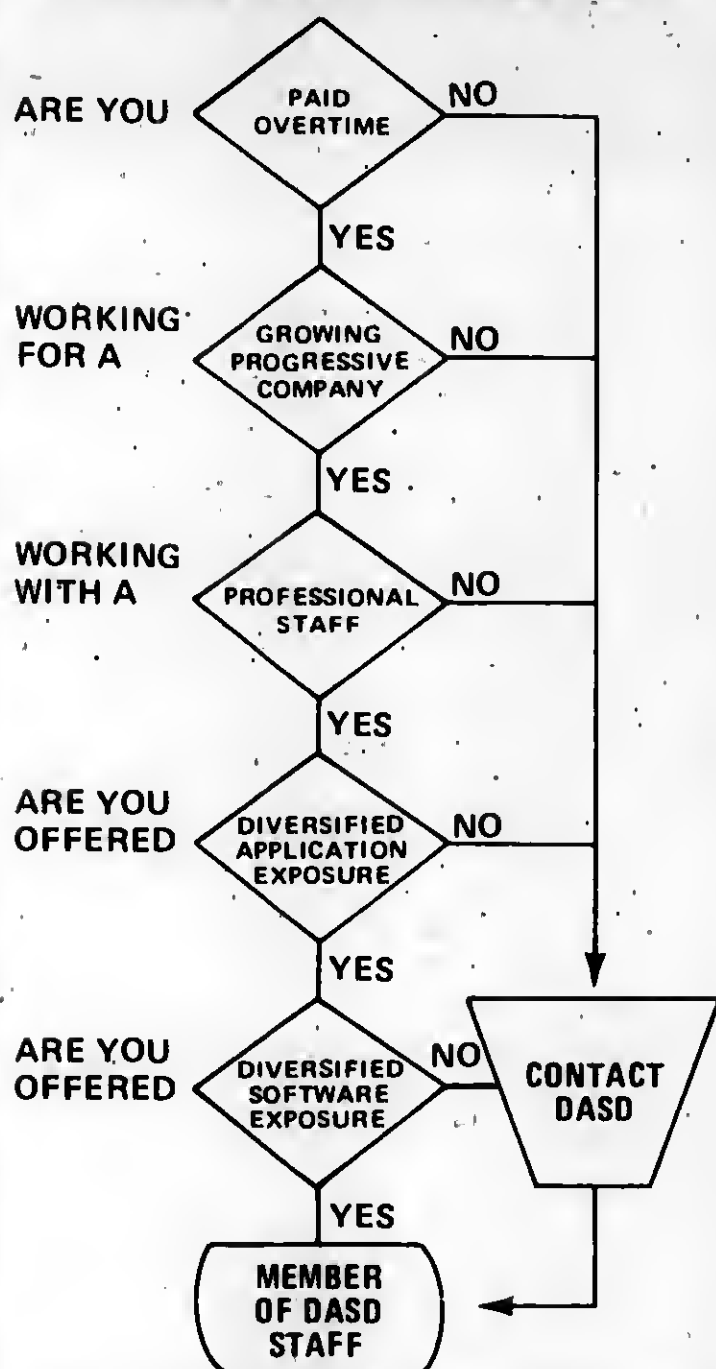
Morris Irby

FLEETGUARD, INC.

Rt. 8 Box 39

Cookville, Tn. 38501

We Are An Equal Opportunity Employer M/F

**DATA PROCESSING
PROFESSIONALS**

DASD CORPORATION, a national consulting firm, is seeking to expand its staff with career oriented professionals who are looking for all of the above advantages.

Job openings in Los Angeles, Chicago, Houston, Philadelphia, Minneapolis, Des Moines, San Francisco, Dallas, Omaha, Detroit, Seattle, Atlanta and Milwaukee. Immediate future expansion plans will create openings in all other major metropolitan areas.

If you are ready to make a move that will broaden your experience and further your career, send your resume to DASD, the company that can help you.

DASD**DASD CORPORATION**

8705 N. Port Washington Rd.
Suite 301
Milwaukee, Wis. 53217

**Burroughs Corporation
ENGINEERING
OPPORTUNITIES**

The Burroughs Westlake Plant is located in Westlake Village, California, 20 minutes from Malibu Beach and 50 miles south of Santa Barbara in a sunny, smog-free climate. We are responsible for the engineering and manufacture of computer peripheral equipment for the growing family of Burroughs commercial computers.

New product development of an advanced concept rotating memory system and a complex peripheral controller utilizing several imbedded microprocessors, is currently creating ground floor opportunities for the following Design Engineers:

- Experienced in design of servo systems employing stepper motors and linear motors. Knowledge of microprocessors as control elements desirable.
- Magnetic tape or disk control circuit design experience required. Prefer experience in both digital and analog circuits.
- Digital and analog circuit design experience required with knowledge of recording formats, media specifications, error detection, and correction codes desirable.

For information on these opportunities, call or visit Burroughs Suite at the San Francisco Jack Tar Hotel (415) 776-8200.

Tuesday, February 28 1-5 p.m.

Wednesday, March 1 9-5 p.m.

Thursday, March 2 9-Noon

If interview is not possible at this time, please send resume, and salary history to:

Burroughs Corporation

5411 No. Lindero Canyon Road
Westlake Village, CA 91361

**EDP SYSTEMS
ANALYST
\$1529-\$1893
per month**

Two years experience in analysis, design and implementation of EDP business applications, including one year on IBM 360 DQS or 370/135 or equivalent with multi programming. Apply by 3/17/78. City of Glendale Personnel, 633 E. Broadway, Room 303, Glendale, CA 91205. (213) 956-2110. EEO EMPLOYER

**RSX11M SYSTEMS
APPLICATIONS
PROGRAMMER**

Excellent career opportunity immediately available with the IIT Research Institute, a contract R&D organization. Support for research in Information Science, Chemistry, and Biology on a large PDP-11/34 system in an intimate environment. Applicants should have a strong knowledge of RSX-11/M, D, or IAS, and several years experience in Macro and FORTRAN, as well as a willingness to learn PL/I. Knowledge of IBM OS JCL and a B.S. or M.S. in Computer Science would also be advantageous.

Send resume and salary history in confidence to:

Mrs. E. Waters
IIT Research Institute
10 W. 35th St.
Chicago, IL 60616

Equal Opportunity Employer M/F

**PROGRAMMING
OPPORTUNITIES**

Racal-Milgo, Inc., South Florida's leading manufacturer of data communication equipment, has immediate openings for programmers with a minimum of 2 years real time assembly language experience with mini or micro processors. Communications, teleprocessing, remote batch IBM 3270/2260, Uniscope 100/200/400, VIP 7700 exposure helpful.

We're looking for qualified development and enhancement people to compliment our small staff of dedicated programmers. We are heavily involved in the development of new software for data entry, message processing and other real time applications of CRT terminals.

We offer excellent salary, complete company benefits, liberal relocation policy and an opportunity to join a group of highly creative people in sunny S. Florida. We invite your inquiries concerning a future with us. Send your resume in complete confidence to Al Garcia, Employment Manager, or call collect (305) 591-5214 Ref. Job #CW2/27F85.

Racal-Milgo —the new name for ICC

8600 N.W. 41st St. Miami, FL 33166 (305) 592-8600

Equal Opportunity Employer

RACAL
The Electronic Group

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER PROFESSIONALS:

Come enjoy the good life in San Diego!

Move ahead with one of the world's most successful computer manufacturers while living in one of America's most acclaimed vacation centers. San Diego offers you the climate of your choice, from the cool, mild breezes of the ocean to the constant dry warmth of true desert—and every gradation in between. Create your special lifestyle in a hilltop hacienda, an

urban highrise, a country club condominium. Explore mesas and canyons, 70 miles of local beaches and bays, the byways of Baja. Continue your professional education in one of the area's many major colleges and universities, enjoy sports all year, from tennis to whale-watching. NCR—for a good living and a good life.

Immediate openings in these areas

■ FIRMWARE

■ DIAGNOSTIC PROGRAMMING

(Design, develop programs to support software testing, release and repair.)

■ SOFTWARE DEVELOPMENT

(Design/implementation of multi-program O/S in a high level language. Experience desired in data base or telecommunications, distributive processing, virtual machine, time sharing compilers)

■ MICR APPLICATION SOFTWARE

(Experience desired in both Transit and Proof of Deposit applications plus features such as CRT Reject-Reentry.)

■ MIS APPLICATIONS

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

Please send resume immediately including salary history, training and experience to the Professional Placement Office at the address below

NCR

Engineering and Manufacturing
16575 W. Bernardo Drive, San Diego, Calif. 92127
An Equal Opportunity Employer

DATA PROCESSING
CAREER WEEK-END
CHICAGO MARCH 11-12
LOS ANGELES MARCH 25-26

THE FUTURE IS NOW!!

Unique opportunity to see how the data processing positions in the South West are being filled by employees for flights, fees, relocation, etc. We will be in the information Southwest salary survey, and you will be able to see how much is available in the area.

- *Programmers, analysts, management
- *Salaries, fringe benefits to 35K

1. Data Base programming
2. Financial applications
3. Microcomputer applications
4. General programming
5. Data Base programming
6. Data Base programming
7. Data Base programming
8. Data Base programming
9. Data Base programming
10. Data Base programming
11. Data Base programming
12. Data Base programming
13. Data Base programming
14. Data Base programming
15. Data Base programming
16. Data Base programming
17. Data Base programming
18. Data Base programming
19. Data Base programming
20. Data Base programming

COMPUTER LOGIC, INC.

2829 West N.W. Highway
Suite 207
Dallas, Texas 75220
(214) 350 7706

LIVE, WORK & PLAY IN

NEW HAMPSHIRE

Are you tired of high taxes and exorbitant prices? If so, listed below are only some of the many openings we have in N.H. and Northern New England.

Jr. Prog.-Ins.	To \$14K
Applic. Prog-Fortran	To \$14K
Prog/Anal-RPG, Cobol, BAL	To \$16K
Appl. Prog. COBOL, BAL	To \$18K
Soft Prog	To \$18K
Sys Prog-Mini Cptrs	To \$18K
Sys Anal-Insur	To \$18K
Sys Anal-Mfg	To \$20K
D.P. Mgr	To \$24K

For immediate, confidential consideration call or send a resume to David J. Osgood, CEC, Vice President.

availability

Personnel Consultants
160 S. River Rd., Bedford, N.H. 03102
803/889-4440
An Exclusively Employer Paid Service

SR. PROGRAMMER/ANALYST

Want to help libraries serve their users better? CLASS (California Library Authority for Systems and Services) needs a take-charge programmer to develop on-line file maintenance, telecommunications, text processing and administrative systems on a mini-computer. Knowledge of PL/I, BASIC and assembly language is desirable. Must be able to work with minimum supervision, meet schedules, prepare technical and user documentation, and work cooperatively with technical and non-technical staff of various agencies. Salary range \$19-23,000. Please send resume, including salary history and three references, to: Janice Taggart, CLASS, 1415 Koll Circle, Suite 101, San Jose, CA 95112.

EOE/AA

STATE OF WISCONSIN

HIGHER EDUCATIONAL AIDS BOARD

DATA PROCESSING TEAM

Dynamic agency presents rare chance for gifted, experienced D.P. professionals to use creative knowhow to tackle new, exciting challenges.

LOCATION: Madison, WI. - clean, safe, uncongested cosmopolitan area famous for its living and recreational facilities.

AGENCY: Independent State Agency responsible for all phases of student financial aid management and administration.

POSITIONS:

- MANAGER OF SYSTEMS & PROGRAMMING
- SYSTEMS ANALYST - (Financial Systems Quality Assurance)
- SENIOR PROGRAMMER

QUALIFICATIONS AND COMPENSATION: Minimum of 3 years relevant experience. Excellent starting salary plus excellent fringe benefits.

HARDWARE: IBM 370/158 AP with MVS, TSO, etc. with prospects for growth.

Please send resume by March 13, 1978 to:

John Pettrala
Higher Educational Aids Board
150 E. Gilman Street
Madison, Wisconsin 53702
(608) 266-0057



FINANCIAL SYSTEMS SPECIALISTS

The computer software industry is projected to grow over 1000% and reach \$2 billion by 1985. MSA, whose sole business is the design, development, and marketing of financial software; is growing profitably at a rate of over 40% per year. As a data processing professional, shouldn't you choose to be with the leader in financial software?

People are the key to our business, and our people are highly rewarded for their efforts through a very competitive salary, excellent bonus, profit sharing, and benefit plans.

If you have experience in financial systems, software development, consulting, training and installation, or marketing, you should be talking with us about our unusually attractive career opportunities.

We want to talk with you. We can offer you an attractive career move in Atlanta, Los Angeles, New York, Chicago, or Houston.

Send your resume in complete confidence or call:

Van Treadaway
Management Science America, Inc.
Suite 1300
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326
(404) 262-2376



THE FINANCIAL SOFTWARE COMPANY

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS PROGRAMMERS



THE JOB:

- Evaluate, install and maintain operating system software and system software products.
- Evaluate and tune an MVS system.

THE ENVIRONMENT:

- IBM 370/168 MP
- 3800 and MSS
- 500 + Local Terminals
- MVS 3.7 • IMS 1.1.3
- TSO • VTAM/NCP

THE REQUIREMENTS:

- 2 or more years of general technical support in an OS/VS1 /SVS/MVS background.
- Prefer 1 or more years of system software product support (COBOL, VS, PANVALET, TMS, SYNC SORT, MARK IV, TSO PCF, etc.)
- 1 or more years of systems software maintenance (OS/VS1 /SVS/MVS).

- 1 or more years of TSO/TCAM/VTAM/NCP maintenance

THE COMPANY:

- Michigan's largest Health Care Organization.
- An excellent salary review program.
- Liberal employee benefits.
- A professional environment that encourages individual growth and development.

CALL COLLECT (313) 225-9715

Or send resume and salary history to

Mr. Robert Zeiger
600 Lafayette East
Detroit, Michigan 48226

Blue Cross
Blue Shield

An Equal Opportunity Employer M/F

Data Processing Professionals

Control Data Cybersearch®
DOES make a difference.

If you're looking to explore career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS • SOFTWARE SPECIALISTS and SALES REPRESENTATIVES for companies nationwide, at no cost to you.

HERE ARE SOME OPPORTUNITIES YOU MAY WANT TO CONSIDER:

Chicago, IL
SENIOR APPLICATIONS PROGRAMMERS for progressive insurance company. To 22K.
Three openings: CF02, General Ledger and Credit/Life.

Houston, TX
PROGRAMMER/ANALYST ready to move to project leader. RPG, COBOL, FORTRAN, PL-1 or DL-1. Several positions available. Starting salaries to 20K.

Irvine, CA
EDP AUDIT ADMINISTRATOR, senior level EDP auditing administrator required for design & implementation of automated systems. To 30K.

San Jose, CA

DIAGNOSTIC PROGRAMMING, mini-computers, with data general background. Prefer 2+ years exp. To 25K.

For more information, please contact our local office.

CONTROL DATA CYBERSEARCH INC.

a subsidiary of
CONTROL DATA CORPORATION

CHICAGO, IL
214 North Michigan
60601
312-454-8490

DALLAS, TX
8585 Stemmons Freeway
75247
214-688-5810

HOUSTON, TX
2000 West Loop South
77027
713-965-5668

IRVINE, CA
17744 Sky Park Boulevard
92714
714-754-7701

LOS ANGELES, CA
8616 La Tijera Boulevard
90045
213-642-2462

MINNEAPOLIS, MN
6800 France Ave. South
55435
612-630-6650

PHILADELPHIA, PA
Two Balacynwyd Plaza
19004
215-667-2400

SAN JOSE, CA
2025 Gateway Place
95110
408-866-3186



For the Computer Professional the Best of Both Worlds

Outstanding Career Opportunities with Sperry Univac—at its expanding Computer Development Center in Salt Lake City, Utah. And Opportunities for a Great Lifestyle for you and your family—in the mountains of Utah. Skiing—Fishing—Hunting (deer, elk, bird)—Golfing—Boating and Hiking in some of the most spectacular scenery in the United States.

COMPUTER LOGIC ENGINEERS

Requires TTL and/or ECL experience.

SENIOR DESIGN ENGINEERS

Five years' experience in digital communications design and development.

POWER DESIGN ENGINEER

Experience in design of power supplies and power controls for digital computer systems. Familiar with state-of-the-art switching, regulator and converter designs.

FIRMWARE ENGINEER

BSEE or Computer Science for product definition of terminal equipment. Experience necessary in hardware AND software related to on-line terminal systems.

MICROCODERS

Minimum one year digital logic design experience.

MICROWAVE ENGINEER

Systems experience in microwave communications, antennas, operations analysis.

STANDARDS ENGINEER

Experience in electrical standards and safety.

CIRCUIT DESIGN ENGINEERS

Design of digital and analog circuits or RF design.

TEST EQUIPMENT DESIGN

BSEE with test equipment design experience BITE/ATE.

SYSTEMS PROGRAMMERS

Experience in peripheral devices, operating systems, networking and redundancy systems.

MANUFACTURING ENGINEER

Minimum of three years' electronic experience in manufacturing.

Call our Representative today on our toll-free number to discuss your career interests and plans. This may be the most rewarding phone call you have ever made.

Call

Monday through Friday—8 a.m. to 5 p.m. (Mountain time)

Mr. G. Bourne at 1-800-453-4534

If not convenient to call, please send resume to:

Employment Department
Sperry Univac
322 North 2200 West
Salt Lake City, Utah 84116

An Equal Opportunity Employer M/F

SPERRY UNIVAC

FLORIDA DP OPPORTUNITIES

1978 will be the best year ever of data sciences professionals in Florida and the Southeast. Some of our clients current requirements include:

Technical Support, Systems Software, IMS, TSO, other to \$30K
Mini-Computer, Real Time, Assembly, Fortran to \$29K
M.B.A.'s for Corporate Audit Staff, EDP, Mfg., Financial to \$22K
Banking Applications, Analysts, and Programmers to \$25K
Communications Analysts and Designers, Data and Voice to \$27K
COBOL, BAL Programmers to \$20K
Data Base Administrator, IDMS, TOTAL to \$25K

If you are planning a trip to Florida, please contact us about 2 weeks in advance. Otherwise, send a resume or call:

Ms. Louise Rasnick
DATA SCIENCES PERSONNEL, INC.
15490 N.W. 7 Ave.
Miami, Florida 33169
(305) 685-7991

SOLID CAREER OPENING WITH HEATH

Share Our Strong, Continued Growth & Expansion

You know us for our quality Heathkits—and for our reputation for "doing things right." Our progress story goes far back, and prospects are very favorable for the years ahead. In addition, as part of Schlumberger Limited (one of the world's most outstanding technical companies) we have impressive financial and technological resources. We provide our professionals with private lab areas, fine facilities, and a relaxed, productive environment.

SOFTWARE DOCUMENTATION WRITER

An effective, proven technical writer needed to write Heathkit computer systems operations manuals and applications procedures. A.B.Sc.CS or equivalent is required. Candidates must be familiar with LSI-11/PDP-11, software and applications programming, higher level languages, and operating systems, principles and techniques.

Salaries are competitive with excellent benefits additional. Our ideal location is a pleasant, small community on Lake Michigan, 90 minutes from Chicago. Please send resume in confidence, or phone collect to Mr. Ken Smith, (616) 982-3673.

HEATH

Schlumberger

HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

An Equal Opportunity Employer M/F



position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER ANALYST

Expanding computer installation in western Massachusetts has need for Programmer Analyst. Successful candidate must have 2+ years experience working with COBOL along with some exposure to on-line systems. DBOMP experience considered a plus.

Current environment includes 370/158 operating under VM, DOS/VS and CICS/VS. Excellent starting salary, insurance, tuition refund program and other benefits.

Please forward resume to: Director, Industrial Relations.

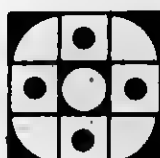
MILTON BRADLEY CO



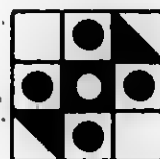
443 Shaker Road
East Longmeadow, Mass. 01028

An Equal Opportunity Employer M/F

IMS/VS - DB/DC



A DATA BASE ADMINISTRATOR IS ACTIVELY BEING SOUGHT BY OUR CLIENT. THIS SENIOR PROFESSIONAL WILL BE RESPONSIBLE FOR THE EVALUATION, DESIGN & IMPLEMENTATION OF DATA BASE MANAGEMENT SYSTEMS. EXPERIENCE SHOULD INCLUDE DATA DICTIONARY DEFINITION AND PSBGENS. KNOWLEDGE OF LARGE SCALE IBM SYSTEM 370 ENVIRONMENTS HELPFUL. EXPOSURE TO SUPERVISION AND USER INTERFACE A PLUS. ALL INTERVIEW AND RELOCATION EXPENSES WILL BE PAID. STARTING SALARY MAY REACH UP TO \$29,000. PLEASE CALL: 415/781-5260.



COMPUTER PROFESSIONALS
UNLIMITED AGENCY. 418
CLAY STREET, SF, CA 94111.

CPU

COMPUTING PROFESSIONALS

ARE YOU A RESULTS ORIENTED TECHNICAL TEAM PLAYER? Do you take pride in what you do as an individual, but also appreciate the satisfaction of working closely with highly competent technical colleagues? Do you want the visibility and the rewards that go with full utilization of your skills?

Consider COMSHARE. We are looking for people who know they are better, are willing to prove their value, and can deal with success. We have positions available from entry-level programmer to senior systems analyst for people with skills and experience in the following areas:

- OPERATING SYSTEM INTERNALS (Interactive and batch systems)
- COMMUNICATIONS/NETWORKS INTERNALS (Access methods, protocols, concepts)
- SYSTEM QUALITY ASSURANCE (Programming, statistics, hardware and software)
- PROJECT LEADERSHIP (Specification, design, implementation, coordination)

COMSHARE is a well-established, rapidly growing international computer services company headquartered in Ann Arbor, Michigan, Research Center of the Midwest. These positions command excellent salaries and fringe benefits. And by the way, our people think we're a fun place to work.

Please send your resume to: Albert Fillion, Research & Development, COMSHARE, INC., PO Box 1588, Ann Arbor, Mich. 48106.

COMSHARE

An Equal Opportunity Employer

OPERATING SYSTEM SOFTWARE PROGRAMMER/ANALYST

Design and program system software modifications and extensions, System Installation, Testing, System Performance Measurement.

Position entails hands-on access to four Control Data Cyber 70 Computers in a state-of-the-art scientific and engineering environment.

Minimum B.S. degree in Math, Computer Science, or Engineering (Systems or Electrical Engineering). Fortran IV and assembly language programming. Good understanding of computer hardware and operating system architectural concepts.

One to two years in computer field. Prior use of Control Data 6000, 7000, Cyber 70 or Cyber 170 computers. Send resume to:

Chrysler Corporation

Engineering, Product Development

& Purchasing Group

P.O. Box 1118

Detroit, MI 48288

CIMS 418-01-13



CHRYSLER
CORPORATION

An Equal Opportunity Employer

OVERSEAS OPPORTUNITY D.P. SUPERVISOR (Systems & Operations)

We are a world-wide leader in the marine engineering and construction industry and presently expanding our mid-east operations in Dubai, U.A.E.

Candidates should have a minimum of 6 years DP experience, at least 4 years directly involved in a medium to large size OOS installation 370/135 or larger. Must possess the ability to organize and control operations function, data control, data entry and systems programming. Some application language knowledge desirable (Assembler, RPG, COBOL, PLI or Fortran).

Position offers excellent salary, family status, overseas premiums and fringe benefits. Please submit resume including salary history in confidence to: W.J. Buckley.

OCEANIC CONTRACTORS, INC.
Subsidiary of
J. Ray McOermott & Co. Inc.
P.O. Box 61981
New Orleans, LA 70161

Equal Opportunity Employer M/F

MANAGER COMPUTER OPERATIONS BURROUGHS ON-LINE BANKING

Management of supervisory and support personnel for Burroughs B4700. Demonstrate ability to develop procedures and organization. Work for midwestern bank service center. Send resume with salary history to:

Champaign National Bank
Attention H. Primmer
P.O. Box 250
Champaign, Ill. 61820
Telephone (217) 351-2761

an equal opportunity employer

PROGRAMMER

Burrough's user requires individual with extensive COBOL programming experience, preferably in on-line applications. Should have a solid background in financial applications plus a desire to program operational real-time on-line systems. Please send salary history and resume to:

Strub Clinic & Hospital, Inc.
Industrial Relations Office
888 South King St.
Honolulu, Hawaii 96813

An Equal Opportunity Employer, M/F

Advertising Copy/Contact

For Arizona's leading agency

Here is a rare opportunity for a communications professional. We want a man or woman who is familiar with what's happening in today's electronics technology. A writer who would like to work on several fast-growing technology accounts.

You'll be working with some of the finest creative professionals in the West. You'll be working on a variety of projects - from national advertising for new integrated-circuit products all the way to promotional materials for sophisticated, new software programs.

You'll be working in a great environment, with bright, young clients at the top level in several exciting technology companies that are exploring new frontiers.

You'll be working in Foote, Cone & Belding's strong J&T/FCB office. It's the most dynamic advertising agency in the Southwest. Located in the center of Arizona's Valley of the Sun.

This is a longterm career opportunity. A degree in EE or computer sciences required.

If you're interested, send your resume including salary history, training and experience to Byron Mayo, President, Jannings & Thompson/FCB, 3003 North Central Avenue, Phoenix, Arizona 85012. All replies confidential. And we're an equal opportunity employer.

J&T/FCB
PHOENIX

Detach here, moisten and seal envelope securely before mailing

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

USE THE ATTACHED
ORDER FORM AND
THIS ENVELOPE FOR

a new subscription
new address
new title
new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



797 Washington Street
Newton MA 02160

position announcements

position announcements

position announcements

position announcements

position announcements

INTERNATIONAL
SALES

IPS Computer Marketing Corp. is a major international dealer in used IBM computer equipment. We are looking for a marketing representative for international sales, working out of our offices in Fort Lee, New Jersey (suburb of New York City). At least five years sales experience required, with minimum of two years experience in international market. Previous sales experience should be in data-processing-related area. Prefer someone now living in New York City area. High earning potential through commissions. Some international travel required. Please send resume (no telephone calls) to G.H. Heilborn, President.



Computer Marketing Corp.
2460 Lemaine Avenue
Fort Lee, New Jersey 07024

DATA BASE
PROFESSIONALS
IMS or TOTAL

If you have two or more years of IMS or TOTAL exposure and would like to be groomed for project leaders, send your resume in confidence to:

SEARCH E.D.P., INC.
3152 Linwood Ave.
Cincinnati, Ohio 45208

PROGRAMMER
SUPER

We need an unusually competent problem solver who can adapt quickly to a variety of computer environments and applications, overcome obstacles and deliver under pressure. Your ability to design software, lead less experienced programmers, and write quality code is more important than your experience in a particular environment. Knowledge of an assembly language and COBOL is required; other languages (BASIC, PL/I, FORTRAN, DIBOL) are highly desirable. Pay negotiable. San Francisco area. Write: PBL Associates, 145 Park Place, Pt. Richmond, CA 94801

West

Los Angeles Area

San Francisco Bay Area

Seattle

Denver

Kansas City

Minneapolis/St. Paul

Chicago

St. Louis

Shreveport

San Antonio

Houston

Dallas

El Paso

Milwaukee

There could be a
Tektronix career
in your backyard.

Or, maybe you want a
Tektronix career and a
new backyard.

Whichever, you have a choice. Stay where you are and advance your career with us, or move to another Tektronix area.

Our expansion is making it possible for even more professionals to join our winning ranks. As the undisputed leader in computer graphic terminals and computer graphic systems, Tektronix not only manufactures, sells and services the best line in the industry, we know how to care for our people.

If it's been a long, long time since you got a promotion, or a raise AND a pat on the back, or even recognized by the office receptionist, then you're ready for Tektronix. Match your career goals, interest and area of choice with what we have listed here. Then give us a call. Let's get together and YOU decide for a change just what it is you want, and where it is you want to live. It really can be that easy.

District Sales Managers
OEM Sales Engineers
Sales Engineers

Let's get together.

(800) 227-8340 Outside California
(800) 638-1915 Inside California

If you are ready for a Tektronix career, whether it be your present backyard, or one of our other openings, let's hear from you. Forward your resume or summary sheet or call one of the above TOLL FREE numbers, listing your area of preference. Address your inquiry to M.D. Westhoff, TEKTRONIX, INC., 3200 Coronado Drive, Santa Clara, California 95051. An equal opportunity employer m f h.

Tektronix
COMMITTED TO EXCELLENCE

East

Rochester, N.Y.

Syracuse, N.Y.

Philadelphia

Charleston, W.Va.

Richmond, Va.

Baltimore

Washington, D.C.

Detroit

Boston

Rhode Island

Springfield, N.Y.

New York, N.Y.

Cleveland

Atlanta

Orlando

Memphis

Louisville

Columbia, S.C.

Birmingham

Systems Software

Immediate Openings

Sargent & Lundy, a leading design engineering consultant to the power industry, has immediate openings in our Systems Support, Performance and Control Group for computer professionals. Our installation includes a UNIVAC 1100 18J operating under EXEC-8.

GROUP LEADER

Degreed Senior Software Systems Programmer with thorough capability of programming, testing, modifying, measuring and evaluating the System. Must be able to direct other Systems Programmers and possess superior written and verbal communicative skills. Several years of experience is mandatory; UNIVAC desired.

SYSTEMS PROGRAMMER

Degreed, with approximately 3 years experience on a UNIVAC system, preferably in the EXEC-8 software systems generation and maintenance functions. Responsibilities will include the programming of complex software additions or modifications to the operating system, language processors and utilities. Strong communicative skills are mandatory. Operational experience and UNIVAC exposure would be helpful.

USER COUNSELLOR

Degree preferred (others considered) and a minimum of 1-2 years experience in Fortran, coding and debugging. Duties include providing help to in-house users for problems with runstream preparation, language syntax, software and remote terminals. Some teaching experience and UNIVAC exposure helpful.

We offer an excellent starting salary, modern working conditions in the newly-constructed Mid-Continental Plaza, full fringe benefits including tuition reimbursement and a professional working atmosphere with a long-term career opportunity.

Submit your resume, in confidence including salary information, or call collect:

K. Chadwick
(312) 269-3572
Sargent & Lundy
55 E. Monroe St.
Chicago, Ill. 60603

SARGENT & LUNDY
ENGINEERS

UNIVERSITY OF VERMONT
ANALYST/PROGRAMMER

The Office of Management Information and Computing is seeking an Analyst/Programmer with two to four years of college and coursework in math or business related field. Applicants must have three to six years experience in systems analysis and programming, two of which must be in systems analysis; COBOL and IBM/DOS required. Applicants with experience in higher education applications, on-line systems or DBMS preferred. We offer an excellent benefits package. Salary is in mid-teens. Send resume and three professional references by March 13, 1978 to University of Vermont, Personnel Office, Box 57D, Waterman Building, Burlington, Vermont 05401. An Affirmative Action Employer

PROGRAMMER

Must be thoroughly experienced in RPGII and CCP for a multiple System 3 Model 15D installation. Our client in South Florida offers performers profit sharing in addition to a starting salary in the mid \$20's. Call (305) 358-9280 or send resume to Michael Rottblatt, Ott, Hertner & Associates, 1401 Brickell Avenue, Suite 603, Miami, FL 33131

SR.
COMMUNICATIONS
ENG.

Datatransmission/
Message Switching
\$32,000-\$35,000

Exeter Associates

Executive Recruiters
James O. Haselton, V.P.
Suite 602
1111 N. Westshore Blvd.
Tampa, FL 33607
(813) 877-6072

PROGRAMMER ANALYSTS

WHAT ARE YOU
WAITING FOR?

If you are waiting for an opportunity of a lifetime for career growth and challenge, you don't have to wait any longer. ASC is a leading D.P. consulting firm in need of talented and dedicated technicians and we can give you a better deal.

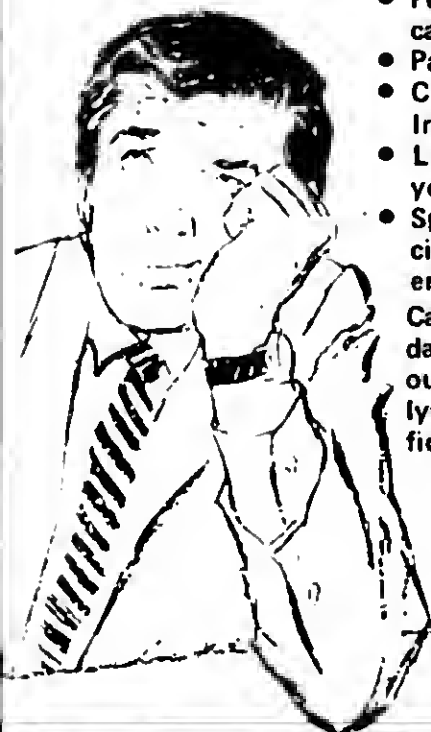
WE HAVE THE:

- Excellent Salaries
- Per diem allowance (for relocation & misc. expenses)
- Paid Vacations and Holidays
- Company paid Major Medical Insurance
- Life Insurance for you and your family
- Special welcome back financial consideration for previous employees

Call our toll free number Monday thru Saturday and ask about our numerous Programmer Analyst openings in 5 national offices.
(800) 543-7583

**ALLEN SERVICES
CORP.**

DAYTON AIRPORT OFFICE
212 West National Road
Vandalia, Ohio 45377
In Ohio Call collect
(513) 390-1200



position announcements

position announcements

position announcements

position announcements

position announcements

San Diego opportunity in EDP SYSTEMS DEVELOPMENT

Want to combine the ideal career opportunity with your favorite lifestyle? NCR Special Systems Division needs your help now in developing advanced, high-technology, EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, La Jolla and downtown San Diego. You can live in the setting of your choice — beach, valley, mountain, country, small-town or urban — and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too — from mild coast to dry desert. San Diego is a place of extraordinary choices — and right now the choice is yours.

COMPUTER PROGRAMMERS

The Special Systems Division has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- Telecommunications Software
- File Processing
- Network Development
- Large Mainframe, Mini and Micro Processor
- Operating Systems
- COBOL Applications
- Assembly Language

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems; both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.

NCR

Thom Harris, Employment Specialist
SYSTEMS ENGINEERING/TORREY PINES
4046 Sorrento Valley Blvd., San Diego, CA. 92121
An Equal Opportunity Employer

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Pennsylvania 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

Software Support Specialist

You will assist in maintaining Gould software running on IBM, UNIVAC, CDC, and DEC equipment. Close liaison with customers required to define and solve applications problems. You will also be called on to help the marketing department with pre-sale software installations.

Applicants should have experience in generation and maintenance of IBM operating systems, and be capable of resolving system and application problems. Assembly language and Fortran experience on large IBM system highly desirable. Position requires a degree in computer science, or equivalent experience.

Salary commensurate with experience. Complete benefits package including company car. Opening is at our El Monte office in Los Angeles, Calif.

Please mail resume or phone Ed Herchenrader collect to schedule a west coast interview. Gould Inc., Instruments Division, 3631 Perkins Ave., Cleveland, Ohio 44114, (216) 361-3315.

GOULD

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,

the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

COMPUTER PROGRAMMERS

Candidates should have a college degree or equivalent, and a minimum of 1 year experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and knowledge of JCL for OS/MVT is desirable.

COMPUTER SYSTEMS ADVANCED PLANNING SPECIALIST

Will perform feasibility and systems design, procurement justification and evaluation of automatic data processing equipment. Also involves performance monitoring and analysis for improving present computer systems, a CDC CYBER 70/Model 76, and CYBER 170/Model 173 computer systems. BS or equivalent in Electrical Engineering, Computer Science or related field, with 8-10 years of applicable experience.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If interested and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C

EG&G Idaho, Inc.

Box 1625, Idaho Falls, Idaho 83401

U.S. Citizenship Required

We are an equal opportunity employer M/F/H

EG&G

Senior Systems Engineer

Storage Technology Corporation, a leading computer peripheral company, is seeking a Senior Systems Engineer to be located in the Boulder, Colorado area. Join an expanding company with exciting professional advancement opportunities. Your primary responsibility will be to assist in the development of data storage subsystems.

A college degree or equivalent experience is required. A broad background in IBM 360/370 computer systems is required in addition to the ability to write and deliver presentations to clients. It is desirable that you have a knowledge of the following systems:

HASP, JES2 and JES3
MVT, VSI, SVS and MVS
(Externals & Internals)

TSO
OS ACCESS METHODS
DB/DC
DATA STORAGE PRODUCTS

(IBM 3330, 3350, 3850, 3420)

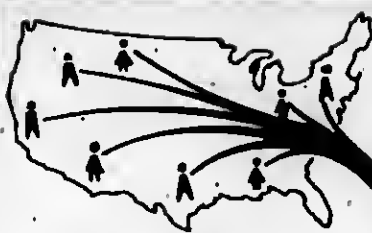
GPSS SMF 10S

We offer an excellent salary and benefits package and an environment in which a talented individual may excel. For immediate and confidential consideration, send your resume to Allen Hunt, Storage Technology Corporation, 2270 South 88th Street, Louisville, Co. 80027. We are an equal opportunity employer.

**Storage
Technology
Corporation**

STC

COMPU SEARCH



**specializes
in careers
for you...**

See us in your city

Since 1966, CompuSearch has sought out exceptional individuals with data processing related skills for large and small companies throughout the United States. We also have been very successful in locating challenging new positions for thousands of people who have requested our assistance. If you are a talented achiever interested in learning about situations that will best meet your goals, contact our office nearest you in complete confidence. We keep a close watch for the best available opportunities locally and nationally.

Appleton, WISC	(414) 731-5221
Arlington, VA	(703) 841-1700
Boston, MASS	(617) 262-5050
Braintree, MASS	(617) 848-1666
Cincinnati, OH	(513) 651-5500
Cleveland, OH	(216) 623-1037
Dearborn, MICH	(313) 336-6650
Indianapolis, IND	(317) 257-4261
Jacksonville, FL	(904) 356-8513
Los Angeles, CA	(213) 930-1313
Louisville, KY	(502) 456-4330
Milwaukee, WISC	(414) 273-4430
Omaha, NEB	(402) 397-8115
Pittsburgh, PA	(412) 343-7410
Rochester, NY	(716) 325-1660
Rockford, ILL	(815) 968-1652
San Francisco, CA	(415) 362-0911
Southfield, MICH	(313) 569-2828
Stamford, CONN	(203) 324-2232
Troy, MICH	(313) 585-4200
Tulsa, OKLA	(918) 622-6632

COMPU SEARCH
Division of
Management Recruiters

position announcements

position announcements

position announcements

position announcements

position announcements

Engineering Systems Analyst

AMCA International is a \$600 million international fabricator/manufacturer/constructor with a wide variety of highly engineered products. We have an immediate need for an engineering systems analyst to function in a challenging, fast growing environment. You will investigate requirements of various divisions for large-scale analysis, design, drafting systems, then design and develop resulting DP systems.

Applicants must have a BS in engineering, 2 yr. experience in systems analysis, and FORTRAN proficiency. Oral and written communications skills are a must. Pluses are experience with structures, graphics, and interactive systems. Send detailed resume and salary requirements to:

**Computer Services
AMCA International Corporation**

5775 Summer Trees Drive
Memphis, Tennessee 38134
Telephone 901-372-6464



data processing

PROGRAMMERS

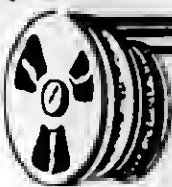
Key Positions with Our Winning Computer Consulting Team in Springfield, IL., Indianapolis and Chicago.

If you're skilled in COBOL, ALC and/or PL-1 and have at least a 2 year success record of accomplishment with large scale IBM systems under IMS... we have the programming and system challenges to match your expertise (also DEC with mfg. applications). These positions require high productivity.

As a member of our professional staff, you'll be rewarded with an excellent salary and benefits. For details call Don Breitfelder collect, from 10AM to 5PM at (312) 786-0220.



INDECON, INC.
300 South Wacker Drive
Chicago, IL 60606
since 1966
An Equal Opportunity Employer M/F



UPWARD MOBILITY WITH A LEADER IN ITS FIELD CDSI AND YOU

Accomplish your career objectives with Computer Data Systems, Inc., a leading data processing support organization with an impressive list of clients including major industrial corporations, financial institutions, and government agencies. Our steady growth and leadership in the business computer field has produced the stimulating and challenging environment that will make the most of your ability. Now is the time to put your talents to the test.

SYSTEMS ANALYSTS PROGRAMMER ANALYSTS PROGRAMMERS

You will work on large complex systems providing new program development and enhancing existing programs. Application includes areas such as: Data Base Management Systems, Financial & Accounting Systems, Energy Systems, Manpower Systems, Insurance, and General Business.

These various assignments call for either COBOL or ALC, BAL programmers and programmer analysts with 2 or more years experience on IBM 360/370 or UNIVAC 1108/EXEC 8.

We offer not only excellent salaries and comprehensive benefits that include company-paid medical and life insurance and tuition aid assistance, but continuous opportunities for career advancement in a stimulating and highly professional environment.

For immediate consideration call or send resume and salary history to:



(301) 657-1730

Computer Data Systems, Inc.

7315 Wisconsin Ave. 200W
Bethesda, Md. 20014

An Equal Opportunity Employer M/F/H

**SOFTWARE SPECIALISTS**

Programmers • Analysts • Engineers

REAL-TIME OPPORTUNITIES

If you are interested in state-of-the-art real time applications, then the Technical Services Division of Sperry Univac is the place to be. Opportunities now exist throughout the U.S. By integrating the diverse and creative talents of our people, we have formed a highly qualified team of professionals capable of solving data processing problems from concept to operation. Our projects, highly challenging and extremely rewarding, involve sophisticated, state-of-the-art techniques in the following areas:

- Real Time Weapons Systems
- Naval Tactical Data Systems
- Real Time Command and Control
- Electronic Warfare
- Fire Control Systems
- Operating Systems, Executives, Compilers
- Real-Time Communications Systems

INTERESTED?

If you have one or more years experience in any of the above areas, we would like to hear from you. We prefer a degree in computer science, EE, math or equivalent experience. While a background with Univac Military or commercial computers is a plus, equivalent computer experience, particularly with 16 bit computers is also desired.

FOR IMMEDIATE CONSIDERATION CALL COLLECT:

John DePrima (703) 558-4486

Or Rush Resume to:



UNIVAC

Technical Services Division
1901 North Moore St.
Arlington, VA 22209

An Equal Opportunity Employer M/F/H

SENIOR PROGRAMMER
Municipal Computer Center desires individual with a minimum of 3 years solid-COBOL programming and JCL experience with knowledge of several of the following:

Municipal Applications, Univac 9480-DS/4 Accounting Principles and Data Base Concepts.

Responsibilities include writing, testing, debugging, documentation, and implementation of new programs and program modifications.

Starting Annual Salary for this Mass. Civil Service Position has been established at \$15,030 with excellent benefits and projected salary increases.

Send resume including salary history immediately to: Arthur M. Bromfield, Supervisor of Data Processing, City Hall, Brockton, Mass. 02401

PROGRAMMERS/ANALYSTS

Systems Research Laboratories, Inc. is a highly diversified technology company offering challenging careers to Data Processing Professionals. We are presently looking for individuals in the Mid-west and East Coast. Responsibilities will include design of real-time mini-computer flight software and algorithms for aircraft subsystems. SRL was founded in 1955, expanding at the rate of 17% per year, on target for 100 million in sales by 1986. If you are looking for new challenges, personal recognition, and upward mobility, and a low cost of living area, then call me today or send your resume to: A.J. Davis, Technical Recruiter c/o SYSTEMS RESEARCH LABORATORIES, INC., 2800 Indian Ripple Road, Dayton, Ohio 45440. (513) 426-6000. Equal Opportunity Employer M/F/H.

COMPUTER OP. MGR.

Manage a real-time on-line system with dual 360's (DOS) and a network of minis.

APPL. PROGRAMMER

Min. 2 yrs. exp. in BAL with IBM 360.

Send resume incl. salary history to Janice Cloud, Northern Calif. Savings & Loan, P.O. Box 560, Palo Alto, CA 94302.

DATA PROCESSING MILLER IS MAKING ROOM FOR ACHIEVERS

... From Programmer Analysts to Sr. Systems Analysts

We need a variety of aggressive, innovative talent... results oriented self-starters who want to achieve in an open, receptive environment. Our record of growth and expansion has been... and continues to be... impressive. Keeping pace with this surge demands expansion in the MIS area. An effort by far-thinking, creative individuals who won't accept anything short of accomplishment.

You'll be in various aspects of the complete project life cycle... system design, programming, and implementation... working in a sophisticated environment utilizing 370/158 MVS, TP, and data base. Your background should reflect demonstrated success (minimum of 2 years) in medium to large scale assignments. Knowledge of COBOL and JCL is required. Familiarity with PL-1 BAL and on-line concepts is a plus.

As a member of our highly visible EDP staff, you can expect top professional and personal rewards. Advancement potential is controlled by your ability. Salary and benefit programs are among the best in the industry. If you rate yourself among the best in your field... get everything you deserve... at Miller. To arrange an interview, submit your resume with salary history to: Mr. Udo Schroff, Dept. 124-8 Corporate Recruiting, Miller Brewing Company, 4000 West State Street, Milwaukee WI 53208.

An Equal Opportunity Employer M/F



MILLER

IGNITION IS MOVING!

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS DESIGN ANALYSTS

We offer opportunities to participate in the design and development of on-line transaction processing software. You would also be involved with software interfaces to data base management systems. Candidates would be working with a software development team engaged in transaction processing software development for the NCR Criterion processors utilizing VRX.

To qualify for these outstanding positions, candidates would have a technical or computer science degree. One or more years experience in software development projects is required. A thorough knowledge of operating systems, assembler language programming, and real-time concepts are among the qualifications you would possess.

PROGRAMMERS (Assembler Language)

We are seeking programmers with a technical or computer science degree plus one or more years programming our manufacturing divisions and for sale to our customers the system will address the following application areas:

MANUFACTURING SYSTEMS ANALYSTS

NCR is now involved in the development of an integrated, on-line Manufacturing Control System for use both in our manufacturing divisions and for sale to our customers. The system will address the following application areas:

**BILL OF MATERIAL
STORES CONTROL
INVENTORY MANAGEMENT
STANDARD COST
ORDER ENTRY**

**ROUTING
WORK-IN-PROCESS
PURCHASING/RECEIVING
MATERIAL REQUIREMENTS
PLANNING**

This development effort has created opportunities in the following area:

SYSTEMS ANALYST/PROGRAMMERS

Major emphasis will be to prepare the system application software and documentation for external release for use on NCR's new Criterion computer line. To qualify the candidates' background should include one or more years systems and programming experience using COBOL in one or more of the above application areas. Ideally that experience will also include the use of data base and on-line processing.

The ideal candidates will have a bachelor's degree in an appropriate discipline.

To investigate these outstanding opportunities, write to:

NCR
Complete Computer Systems

Department VM
Corporate Executive &
Professional Recruitment
NCR corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

COMMUNICATIONS TECHNICIANS

Time sharing firm has immediate opening for senior communications technician to assist communications director in network management.

Minimum of four or five years experience required in the following areas:

- Programming Mux's and using TPLX gear in cascaded fashion.
- Digital and Analog line test equipment (specifically in fault isolation).
- Managing networks from remote location

Must be familiar with Timeplex Equipment, line characteristics & nationwide network. Managerial experience a must. COMTEN background helpful. Send resume with salary requirements to: (Principals only)

COMNET
5185 MacArthur Blvd, NW
Washington, D.C. 20016
Attn: Personnel
EOE

Bell & Howell needs ANALYST PROGRAMMERS

We are one of the West Coast's leading electronics manufacturing firms with exciting, challenging projects for Analyst Programmers in our Data Processing Department.

Prefer a strong background in COBOL, DOS/VS and 3 years data processing experience in a manufacturing environment including design, programming and instrumentation of data based systems.

If you want to join us in a creative environment with upward mobility, excellent salaries and fringe benefits including flexible working hours and profit sharing retirement program, call COLLECT or send your resume TODAY with salary history to:

Helen Duner
(213) 790-3331



BELL & HOWELL

360 Sierra Madra Villa Pasadena, CA 91109
Equal Opportunity/Affirmative Action Employer

EDP OPPORTUNITIES

ACCOUNT PROFITABILITY
-new design spvrs - \$28K+
MGR TCAM/TCS - \$40K
FOCUS- RAMIS-Portran/Basic/
COBOL C.M.S. - \$28K
BUSINESS ANAL. - systems trading-mktg - capital mgmt - \$33K
CLINICAL Resch Systems anal.
data base design IBM
370 - \$29.5K
MBA's quantitative discipline - Fortran/basic, mfg/mktg sales/financial systems design - \$23-29K
DATABASE Programmer anal-OS
COBOL 370/158 degree -
\$20-23K
SOFTWARE SUPPORT - small installation CICS gem's TOTAL
DL1 - \$28K
BAL programmer - applications
A/R A/P 370/135 DOS/VS - \$19-20K
FINANCIAL COMPUTER
ANAL. - Fortran/Basic Fixed Income - \$27-35K
BANKING Business Anal. MSA/UCC-OBMS - \$28K
SOFTWARE OS/VS 1-V
CMS - \$0 per

Bill Borrelli (212) 349-3610
William Harris Assoc.
Agency
150 B'Way, NY 10038

PROGRAMMERS ANALYST

"Free Resume Service"
NORTHWEST • SOUTHWEST
SOUTHWEST • MIDWEST

- Scientific and commercial applications
- Software development and systems programming
- Telecommunications
- Control Systems
- Computer Engineering

Send resume or rough note of objectives, salary, location restrictions, education and experience (including computers, models, operating systems, and languages). Our client companies pay all of our fees.

- NATIONAL
- PLACEMENT
- FOR PROFESSIONAL
- WOMEN
- P.O. Box 834
- HARTFORD, CT. 06142

We Aggressively Support
Affirmative Action

NEW SYSTEMS DEVELOPMENT

New and exciting opportunities to participate in challenging work targeted at the development of large-scale original systems for the insurance industry. Working with highly professional teams now forming at INSCO, you'll enjoy productive relationships as a systems or programmer analyst on these or other advanced development projects.

International Insurance & Reinsurance

Requires at least 1 year solid COBOL and/or BAL experience in a sophisticated large-scale environment using current EDP techniques. Insurance or accounting applications background essential. Familiarity with international insurance and reinsurance processing systems helpful.

Automated Policy Writing

This specialized commercial property/casualty application using both modular concepts and teleprocessing, requires 2 years of systems design and development experience. Insurance applications background a plus.

We offer competitive starting salaries and excellent benefits which include relocation assistance to our beautiful Jersey Shore corporate headquarters location. If you're looking for the opportunity to make your mark in the development of new and advanced technologies, forward your resume, in confidence, including salary history and requirement, to: Mr. Richard Fearn

INSCO

an affiliate of The Continental Corporation

3501 State Highway No. 66
Neptune, N.J. 07753/(201) 922-1100

An equal opportunity employer M/F

CAREER OPPORTUNITY IN DATA BASE ADMINISTRATION PROGRAMMER ANALYSTS

Excellent opportunities for Programmer/Analysts with 1-2 years experience in Data Base design or 3-5 years applications experience. Positions available on the Data Base Administration staff of the largest privately owned electric utility company in Texas. Applicant must have good communicative skills and solid experience in two or more of the following areas:

- *COBOL
- *ALC
- *JCL
- *IDMS
- *TOTAL
- *IMS
- *OS
- *DATA DICTIONARY
- *TELE PROCESSING

Excellent benefits and opportunities with a growing Company.

Prefer individuals with a Bachelors Degree in Computer Science or Math with a concentration in CS. Salaries commensurate with experience.

For more information, contact:

THE EMPLOYMENT OFFICE
HOUSTON
LIGHTING & POWER COMPANY

Houston, Texas

(713) 228-9211, Ext. 2202

An Equal Opportunity Employer M/F

MIS CAREERS

Are you looking for an opportunity to gain experience in a highly professional and sophisticated technical environment? If so, Owens-Corning Fiberglas, a fast growing Fortune 250 company, has such an opportunity for you! We are currently expanding our Corporate Management Information Systems staff, in order to implement a series of large on-line systems. As a result, we are seeking candidates who possess experience in COBOL, OS JCL, systems design, structured programming, and project management for positions as:

CHIEF PROGRAMMERS SENIOR PROGRAMMER ANALYSTS

Our technical environment will also give you exposure to CICS, IDMS, PANVALET, METACOBOL, and ROSCOE.

Each of these positions is complemented by an excellent salary and benefit package and an outstanding growth opportunity. Qualified applicants should send a current resume with complete salary history. In confidence, to: Mr. G.T. Mills, OWENS-CORNING FIBERGLAS, Fiberglas Tower, Toledo, Ohio 43659.

Discover the Future of Fiberglas

FIBERGLAS

position announcements

position announcements

position announcements

position announcements

position announcements



PROGRAMMERS: THIS AD WORTH \$ \$

AND opportunity to Programmers and Programmer Analysts in search of a challenging career.

Cutler-Williams, Inc. wants you if you have the following...

- One or more years applications programming experience.
- Large scale hardware background.
- OS COBOL (or PL1), JCL.
- Extra consideration given to persons with data base and/or telecommunications programming experience.

Cutler-Williams, Inc. is a data processing services firm specializing in on-site consulting. Our offices are located in key cities in the Midwest, South and West. Our goal is to find talented people who are looking for diversity in their data processing career.

We offer company paid insurances (life, health and accident, long term disability, and dental), excellent compensation, career development training, and if desired, travel opportunities.

Call: Ms. Kris Vollmar
Toll Free 1-800-527-4907
(inside Texas call collect 214-243-3421)

or send resume to:
CUTLER-WILLIAMS, INC.
2655 Villa Creek #205, Dallas, TX 75234

If you can't make a change just yet... SAVE THIS AD as a reminder of who to call when you're looking for that challenge.

an equal opportunity employer M/F

OMICRON

Consultants to the Computer Industry

DATA COMMUNICATIONS PROFESSIONALS

Meet us in
LAS VEGAS
during
INTERFACE '78

If you're a Data Communications Professional attending the LAS VEGAS Conference, March 6-9, we want to meet with you.

OMICRON is a SAN FRANCISCO-based professional search firm specializing in the recruitment of systems software people. We are currently looking for systems professionals with a background in:

- On-line Communications
- Large Scale Data Base Design
- IBM Operating Systems Support
- Distributed Data Processing

Salaries, depending on experience, range from \$20-30,000.

To schedule a LAS VEGAS interview, please call Robert F. Leis, President, or write, in confidence, to:

OMICRON INC.

One Ecker Street 525 University Avenue
San Francisco, CA 94105 Palo Alto, CA 94301
(415) 546-7200 (415) 328-6150

PROGRAMMER/ANALYSTS DIGITAL SYSTEMS ENGINEERS & TECHNICIANS

Share Our Future In Space ...

Computer Sciences Corporation, with over 8,500 computer professionals, knows how to develop and reward computer expertise.

CSC's System Sciences Division is meeting new project demands in support of our Space Tracking Data Network Project at the NASA Goddard Space Flight Center, located in suburban Washington, D.C. If you want to share our future in Space and feel you fit the requirements listed below, please investigate immediately...

PROGRAMMER/ ANALYSTS

Positions require a degree in Computer Science, Math, Physics, or Engineering with programming experience on any hardware configuration. Opportunities include design and development of real-time and non real-time telemetry communications systems, satellite command and communications systems, operating systems, distributive network systems AND design and development of hardware diagnostics for communications, operator, and data storage devices.

DIGITAL SYSTEMS ENGINEERS DIGITAL TECHNICIANS

Will participate in a wide range of activities from hardware installation, modifications, and diagnostic testing to analysis and resolution of software/hardware related anomalies. These technical support services are required on mini and medium size mainframes, disc and drum storage units, CRT terminals, magnetic tape units, data transmission units, stored program decomputers, timing systems and other peripheral devices. We require a BSEE or technical/military school training (as applicable to the position) and 3-6 years related experience.

CSC offers an excellent benefits package including a liberal relocation policy and competitive salaries. For immediate consideration, please send resume or call:

Gary Johnson
Toll Free: 800-638-0842 OR Call Collect: (301) 589-1545

System Sciences Division
8728 Colesville Rd.
Silver Spring, MD 20910

COMPUTER SCIENCES CORPORATION

Applied Technology Division
6565 Arlington Boulevard
Falls Church, Virginia 22046

Major Offices and Facilities throughout the World
Equal Opportunity Employer M/F

EXECUTIVE DIRECTOR Board of Governors COOPERATIVE COMPUTER CENTER

Located in west suburban Chicago, the Cooperative Computer Center serves the administrative data processing needs of three Board of Governors Institutions: Chicago State University, Governors State University, and Northeastern Illinois University. Resources include a staff of 60, production software developed by SCT Corp. and an ITCL AS/4 computer supporting several RJE stations in an OS/VS1 environment.

Reporting to a council of the three university presidents, chaired by the governing board's Executive Director, the Executive Director is responsible for optimizing the performance of present resources, developing long-range ADP plans, preparing operating budgets, recruiting staff, allocating resources, project management, and ensuring that the universities receive timely and accurate management information.

Minimum academic qualification is a bachelor's degree; a masters degree in Computer Science or a related field is preferred. In addition, candidates should possess significant technical and administrative experience related to the management of an administrative computer center. Such experience should include a successful record of planning, budgeting, policy development, coordination and technical leadership for cost-effective university information systems. Candidates must be able to establish effective working relationships both with senior executives and technical personnel, and be sensitive to the varying information needs and political considerations within a university cooperative.

Starting annual salary will be \$33,000 to \$37,000, depending upon experience.

Resume, reference, and salary history must be received by March 31, 1978 and should be addressed to: Dr. Donald E. Wetters, Chairman, CCC Director Search Committee, Board of Governors of State Colleges and Universities, 544 Iles Park Place, Springfield, Ill. 62718. An Equal Opportunity/Affirmative Action Employer.

HONGKONG POLYTECHNIC



The Hong Kong Polytechnic is an expanding institution which is now putting into effect a forward looking development plan relevant to the needs of Hong Kong.

Applications are invited for posts at Principal Lecturer, Senior Lecturer and Lecturer levels in Computing Science. Areas of interest to the Polytechnic include Commercial Systems Analysis and Design, Data Processing, Programming, Systems Programming, Management Information Systems, Computer Education in Schools, Computer Assisted Instruction, Computer Graphics, Microcomputers and Computer Applications in areas relevant to the Polytechnic including Engineering, Mathematics, Design, Accountancy, Business Studies and Textiles. Indication of aptitude, experience and interest in one or more of these areas would be appreciated.

Successful applicants will be required to teach on one or more of the following courses:

- (a) 3-year Higher Diploma in Systems Analysis
- (b) 1-year Certificate in Computer Programming
- (c) 2-year Diploma in Computing Studies
- (d) 2-year Higher Diploma in Computing Studies
- (e) service courses to other Departments in the Polytechnic
- (f) short courses during the day or evening relating to various computer applications

Salary Scales

Principal Lecturer: HK\$91,740 to HK\$113,340 p.a.
Senior Lecturer: HK\$74,460 to HK\$100,380 p.a.
Lecturer: HK\$40,920 to HK\$73,980 p.a.

(Note: on 23.1.1978 HK \$4.62 = US\$1)

(Starting salaries will be commensurate with qualifications and experience)

Conditions of Service

Appointment will be on a two-year gratuity-bearing contract terms initially. Thereafter suitable appointees may be offered further contracts or super-annuable terms of service at the discretion of the Polytechnic. Other fringe benefits include:

- 25% gratuity on salary
- Free medical insurance
- Education allowances
- Low tax area
- Subsidized accommodation
- School passages

Application forms and further information are obtainable from the General Secretary, Hong Kong Polytechnic, Hung Hom, Kowloon, Hong Kong. Completed application forms should be returned direct to the General Secretary, Hong Kong Polytechnic, Hung Hom, Kowloon, Hong Kong by March 20, 1978.

position announcements

position announcements

position announcements

position announcements

position announcements

NEW OPPORTUNITIES IN DATA PROCESSING

SYSTEMS ANALYST

3-5 years experience

SR. PROGRAMMER

3-4 years experience

PROGRAMMER

0-2 years experience

REQUIREMENTS

Degree

Manufacturing/Marketing Background

COBOL Language

IBM 370 OS/JCL

Division of Bristol Myers

Warsaw, Indiana 46580

An Equal Opportunity Employer M/F

ZIMMER USA



Zimmer USA, a recognized leader in the manufacture of quality health care products, offers rewarding career development opportunities for data processing professionals seeking new challenges and an innovative environment.

We offer a salary commensurate with experience plus an attractive benefit package. Send letter or resume to: J. Steger, Director of Staffing or call (219) 267-6131 ext. 235.

PROGRAMMERS

AVX Ceramics is the nation's largest manufacturer of ceramic capacitors for the electronics revolution, and we are located in the beautiful Atlantic Ocean resort of Myrtle Beach, South Carolina. Now we are EXPANDING facilities and equipment dramatically, creating new professional opportunities for your talent and skill...

Position requires minimum 1 year of applications experience utilizing CICS/VS, DOS/VS and ANS COBOL required. IBM 370/138 equipment. Experience in a manufacturing environment with System 3 or 32 experience especially desirable.

You will be earning a salary commensurate with your experience and education, benefits including profit sharing and relocation, and enjoying the excellent potential for both professional and personal growth we can offer now.

For confidential review of your professional qualifications send a resume to Mr. Russ Karpick.

AVX CERAMICS
DIVISION OF AVX CORPORATION

P.O. Box 867

Myrtle Beach, S.C. 29577

An Equal Opportunity Employer M/F

Mechanical Design / Analysis Computer Graphics Applications

We are looking for an experienced applications developer to assist in the design and implementation of interactive graphic computer systems for the mechanical engineer. An interest in Ergonomics and a background in Finite Element Methods or Computer Aided Design is required. Educational background should include a combination of Mechanical/Civil Engineering and Computer Science.

Tektronix, Inc. develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Larry Green, TEKTRONIX, INC., P.O. Box 500, C86, Beaverton, Oregon 97077.

An Equal Opportunity Employer M/F/H.

Tektronix

COMMITTED TO EXCELLENCE

PROGRAMMER ANALYST

Are you looking for a different job with good benefits and job potential? Then consider San Diego Transit, public transportation company located in San Diego, California.

We are interested in a Programmer Analyst with RPG II, CCP experience on System III Model 15D.

Apply now and match your career plans with our growth opportunities.

SAN DIEGO

TRANSIT CORP.

P.O. Box 2511

San Diego, Calif. 92112

An Equal Opportunity Employer

PROGRAMMER/ANALYSTS

We are a respected Actuarial Consulting firm with an inhouse 370/135 seeking highly motivated individuals who possess the following:

- 2+ years experience using Cobol under CICS in DOS/VS environment.
- Ability to use creative talents to see a project through completion.
- Desire to work on all aspects of state-of-the-art projects in a professional environment.
- Need to advance within a growth oriented firm.

If you are the type of person we seek, please submit your resume to:

WOODWARD, RYAN,

SHARP, AND DAVIS

3 Park Avenue

New York, N.Y. 10016

Attn: V.P. Application/Systems

Salary is commensurate with experience.

PROGRAMMER Process Controls

Our controls programmer will be responsible for the software design of process control systems, participate in selecting hardware, programming the systems in assembler and higher level languages, testing the systems and monitoring every phase of system development from conception to implementation.

The successful candidate will have a computer science or engineering degree plus 2-4 years' experience in the software design, programming and testing process control systems using minicomputer systems like DEC or Data General.

Please send resume and salary history to Personnel Office:

P.O. Box 1000
Carrollton, Ga. 30117



SOUTHWIRE COMPANY

An Equal Opportunity Employer

DIRECTOR of ENGINEERING

We are seeking a sophisticated Engineering Manager to head-up our rapidly expanding engineering department. Required is an engineering degree and 10-15 years of experience, at least 5 in Management, with communications hardware design and development. Knowledge must include microprocessor based hardware, software applications and manufacturing interface capability for product delivery.

This position reports to the Vice President of Marketing and is responsible for the Product Engineering, Applications Engineering and Software Engineering groups. The current engineering budget exceeding One Million Dollars is planned to more than double in 1980. Our Company is a National supplier of Data Communications Terminals with headquarters located in the East.

Compensation is salary and bonus plus an excellent benefit package.

Interviews will be scheduled at headquarters, or, if convenient at the Interface '78 show March 6 to 9th in Las Vegas. All replies will be acknowledged.

Write or Send Resume to:

S. CURTIS, F.R. ADVERTISING, 24th FLOOR

1700 Broadway, New York, N.Y. 10019

Make a Major Career Move ...

Mini-Computer Programmer

... to Teledyne Continental Motors Aircraft Products Division, a leading force in the development and manufacture of internal combustion engines for general aviation. This brand new position with our dynamic DP staff represents an exciting entry level opportunity in manufacturing applications. To qualify you'll need 0-2 years DP experience and a degree in Computer Science or related field. Exposure to Mini-Computers and knowledge of Data Base management also required.

... To the Sunny Gulf Coast!

Competitive salary, liberal benefits and outstanding prospects for future advancement. For information write to: Ms. Lee Carroll

or call (205) 438-3411

TELEDYNE CONTINENTAL MOTORS
Aircraft Products Division

P.O. Box 90

Mobile, Alabama 36601

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Technical Specialist CDC Support Services

Broadly diversified energy systems company, COMBUSTION ENGINEERING runs on one of the most advanced state-of-the-art data processing and communications networks currently in operation. Our equipment includes a COC 7600 and CYBER 172 which are part of a worldwide computer network.

Responsibilities will include consulting, user education, documentation, programming and benchmarking new hardware and software. The successful candidate will have 3+ years experience and considerable expertise in Control Data computers, including competence with FORTRAN and BASIC (COBOL and/or APL a plus), a thorough knowledge of COC control language, utilities, and familiarity with COMPASS, system internals, and/or data-base applications.

Located at our Windsor, Connecticut Data Center, this position offers an excellent starting salary and a full range of benefits. For prompt, confidential consideration, forward your resume, including salary history, to: H.R. KAIN, COMBUSTION ENGINEERING, 100 Lambertson Road, Windsor, Connecticut 06095

COMBUSTION ENGINEERING
The Energy Systems Company
An equal opportunity employer M/F

Digital Computer Systems Administrator D.C. Superior Court

Large urban trial court with independent DOS/VS, CICS/VS 370/14S installation with distributed processing seeks aggressive, dynamic individual to plan, coordinate, and supervise its computer system. The individual will be responsible for expanding on-line applications into the juvenile and civil areas and planning for the development of a fully integrated court information system. Implementation of a data base management system throughout the court is planned.

The successful candidate must have demonstrated management competence and technical ability and should have a minimum of a bachelors degree and 5 years of O.P. experience in progressively more responsible positions. Individual must have a proven ability to manage timely and successful completion of OP projects, must be able to develop short and long range OP plans, and provide internal training programs for OP staff and users. It is imperative that the individual selected be able to communicate successfully with court executives and other OP users as well as with OP personnel. It is desirable that applicants have experience in the use of data processing in the justice environment and OP management experience is preferred.

The job offers a salary in the range of \$36,171 through \$47,025 and excellent government benefits.

Respond by March 10, 1978 to director of personnel, O.C. Superior Court, 613 G St. N.W., Rm. 505, Washington, O.C. 20001, providing a detailed summary of experience and references.

PROGRAMMER

or

PROGRAMMER/ANALYST

Due to a reorganization within our Data Processing department, we have an immediate opening for an individual who has a minimum of 2 to 3 years BAL experience in a DOS environment, preferably with a Financial institution. The person we select will be given an opportunity to work in all facets of our On-Line systems.

COBOL and REAL time experience helpful, but not essential.

If you want to work in a challenging environment and are looking for a professional growth position, then you should consider us.

Excellent starting salary with many company paid benefits.

Please send your resume, in complete confidence, including experience and salary requirements to:

CW Box 1459
797 Washington St.
Newton, MA 02160

Come to Coastal S. Carolina Manufacturing PROGRAMMER/ANALYST

The Robert Bosch Corporation, an international pioneer in manufacturing diesel fuel injection products, has an immediate opening for a Programmer/Analyst.

The successful candidate should have a B.S. degree or equivalent with 3-5 years manufacturing systems experience in the following areas: Cost Accounting; Inventory Control; Requirements planning; shop flow control, and capacity planning.

Knowledge of DOS/VS, COBOL, ALC, and DBOMP a must.

Duties will be in the design and installation of various manufacturing systems.

You will be living in a warm coastal city and working in a modern sophisticated setting that offers excellent technical development opportunities.

We offer excellent wages and a fringe benefit package that includes Life insurance; short and long term disability, hospital, medical and dental insurance, 10 paid holidays, paid vacation and sick leave, educational assistance, company paid retirement plan, credit union and relocation expenses.

If you have a proven track record and desire to move south, send your resume in confidence to:

Robert Bosch Corporation
P.O. Box 10347
Charleston, S.C. 29411
AN EQUAL OPPORTUNITY EMPLOYER

SYSTEMS ANALYSTS PROGRAMMERS HEALTH CARE

The Information Systems Department in one of Upstate New York's largest medical centers is currently expanding. We offer outstanding opportunities for Computer Programmers and Systems Analysts with 1 to 6 years experience in a medical center and/or large progressive computer installation. Assignments will include involvement in Online Data Base Applications in a 320 DOS/VS environment using CICS and QL/1. Salary commensurate with experience. Outstanding fringe benefit package. Send resume with complete salary history and requirements in confidence to:

Department of Employee Affairs,
Crouse-Ingvar Memorial Hospital,
736 Irving Avenue, Syracuse,
N.Y. 13210 (315) 424-6521. An
Equal Opportunity Affirmative
Action Employer.

PROGRAMMER: NCR

Expanding Modern Medical Center has position available for person with Century NEAT/3 knowledge and Payroll System experience. Other hospital exposure a plus. Central New Jersey suburbs, near shore and major highways. Excellent benefits. Salary based on experience and ability. Send resume to J.C. Dunnigan, Personnel Office, J.F.K. Medical Center, James St., Edison, NJ 08817.

IN HOUSE FIELD SERVICE SPECIALIST

for DEC System 10 & PDP/11 Systems. No travel required. Write or call: Rex Humbard Found., 2690 State Rd., Cuyahoga Falls, OH 44223; (216) 923-0434 X 380 - Bill Forsyth, Mgr. D.P.

PROGRAMMERS

Full time programmer POS. 1-5 yrs. exp. nec. with IBM 370/360 OS, VS, OOS, COBOL, BAL-SYS, III, RPG II, POP 10 or 11. Also Prog/Analysts, OP Proj. Leaders, Sys. Engineers, Software Engineers, Data Processing Mgrs. Call Nicholas Denaro (617) 237-5995.

DENARO EDP

118 Cedar St.
Wellesley Hills, Ma.
DP Personnel Specialists

MARKETING EXECUTIVE MARKETING MANAGERS CONSULTANTS

Get out of the fray and into your own DP consulting business. We make it possible with an absolute minimum cash investment.

Consulting is acknowledged to be one of the two fastest growing segments of the computer industry and the traditional institutions are not keeping pace with demand.

Consulting offers exceptional earnings, independence and the ability to build your own business which has added value over time. You are immune to the politics and ups and downs of individual vendor firms.

Litton, Calder and Associates offers a complete business plan, structure and personal assistance designed to achieve first year revenues in the high 30's and a second year cash flow of from 50 to 85K. The business can be operated successfully out of your personal residence. The plan is based upon years of highly successful experience in the Chicago area.

Want to know more? Send us a resume and let us determine whether or not you qualify. If you do, we will return descriptive materials on the details of the plan.

LITTON, CALDER and associates

248 Michael John Drive
Park Ridge, IL 60068
(312) 692-6859
Attn: Gil Powell

PROGRAMMER/ANALYST

Unlock your career with
CSC's Commercial Division

Computer Sciences Corporation is expanding again, creating this excellent career position at our Piscataway, New Jersey facility. We're the world's leading independent supplier of computer software, and offer you the best growth opportunities in the industry.

As a member of CSC you will be working with one of the world's largest communications companies. You'll work within a challenging, high-technology environment on sophisticated, state-of-the-art projects. Required is at least 3 years' experience with IMS, COBOL or BAL, plus the desire to constantly improve your skills as we grow together.

Let us be the key to your future. We offer you an excellent salary commensurate with your experience and abilities, plus a liberal benefits package. For consideration, please call or send your resume in confidence to:

Cathy D'Amico
(201) 272-7600

COMPUTER SCIENCES CORPORATION
Commercial Division
25 Commerce Drive
Cranford, N.J. 07016
Major Offices and Facilities
throughout the World
Equal Opportunity Employer M/F

COMPUTER RESOURCES GROUP

Data Processing Placement Specialists

SAN FRANCISCO BAY AREA

Project Leader

Financial institution needs individuals with strong project leadership ability and systems design experience. IMS experience is highly desirable - to \$27K

Systems Programming Manager

Manage OS systems programmers. MVS/VS2 experience is required in addition to teleprocessing - to \$35K

We also have numerous openings for programmers and analysts with large scale or mini computer experience. For these and other career opportunities, please call collect or write, in confidence to:

THE COMPUTER RESOURCES GROUP, INC.

303 Sacramento St.
San Francisco, CA 94111
(415) 398-3535

Exclusively Employer Retained Agency

position announcements

position announcements

position announcements

position announcements

position announcements

SENIOR SYSTEMS ANALYST

Pic 'N Pay, located in the southeast, is one of the fastest growing retail shoe chains in America. We have an immediate opening for a self starter with proven leadership abilities. You must be degreed and have a minimum of 5 years experience in COBOL programs and systems development.

Duties and responsibilities involve all phases of EDP work, the design and implementation of new systems, the maintenance, improvement and modification of existing system and tailoring and implementation of packaged systems to our requirements.

We offer an excellent salary and benefit package, as well as growth opportunities for the candidates who meet our requirements.

To apply, send resume and salary requirements in confidence to:

FAYE THOMPSON
PIC 'N PAY STORES, INC.
P.O. Box 745, Matthews, N.C. 28105
An Equal Opportunity Employer M/F

Immediate Career Opportunities

Morrison Incorporated in Mobile, Alabama is growing rapidly and needs the following career EDP positions filled as soon as possible:

Systems Engineer — 3 to 5 years functioning as a systems engineer/programmer with knowledge of DOS/power/VS INTERNALS, CICS INTERNALS, Telecommunications and 370 Assembler Language

Senior Systems Analyst — 3 to 5 years functioning as a systems analyst with experience including DOS/power/VS, ANS COBOL, DATA COMMUNICATIONS/DATA BASE (CICS). Requirements definition and systems design of financial and merchandising applications.

Programmer Analyst — 2 years functioning as a programmer writing program specs and designing COBOL programs. Specific experience should include DOS/POWER/VS, ANS COBOL, CICS and developing programs for financial, merchandising and inventory control applications.

Competitive starting salaries, excellent benefits program and opportunities for career growth

Call now or send resume to

MORRISON INCORPORATED

 Human Resources Department
First National Bank Building
P.O. Box 2608
Mobile, Alabama 36625
205/432-9711 Extension 263

MULTICS SYSTEM SPECIALISTS

Honeywell's Computer Network Operations Department (CNO) has immediate openings for computer professionals with experience on MULTICS and GCOS operating systems.

SYSTEMS ANALYST/PROGRAMMERS

Will be primarily responsible for providing the initial user support and user interface from Honeywell's Control Systems users as they interface with the MULTICS/LEVEL 6 system operated by CNO. Duties will involve implementation and support of specific communications and networking services for the system. College degree or equivalent training, with 2-5 years experience as a programmer/analyst required. Telecommunications and minicomputer software/hardware experience necessary. Honeywell Series 16 and Level 6 experience strongly desired.

COMPUTER APPLICATIONS ENGINEERS

Responsibilities will include the development of strategies and long range plans for the implementation of a Corporate distributed processing computer network. Requires the ability to work from generally defined project descriptions and the fitting of user computer applications to specific configurations.

College degree or equivalent computer training, plus 3-5 years host and minicomputer experience necessary. Experience in planning the use and integration of minicomputers into an integrated, multi-computer network required. Familiarity with operating system architecture and project leadership involving planning, analysis, and execution necessary.

PLEASE SEND RESUME, INCLUDING SALARY HISTORY, IN COMPLETE CONFIDENCE OR CALL (612) 870-2802:

Wanda Taitner

HONEYWELL, INC.

Honeywell Plaza
Minneapolis, MN 55408
An Equal Opportunity Employer M/F

PROGRAMMERS...
IF YOU CAN BE
HERE...

WHY STAY
HERE?

Now, you can
move up. Just
contact office
nearest to you.
No obligation.
No charge, ever.

National Computer Associates

DALLAS
Dartmouth Personnel Consultants
4255 LBJ Freeway
Suite 187
Dallas, Texas 75234

DETROIT
Electronic Systems Personnel
Prudential Tower Center
3000 Town Center, Suite 2500
Southfield, Michigan 48035

FLORIDA
Data Sciences Personnel, Inc.
Suite 205, 15480 N.W. 7th Ave.
Miami, Florida 33188

HARTFORD
Compnet, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Constellation Personnel
Suite 900, 3250 Wilshire Blvd.
Los Angeles, California 90010

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
801 Nicollet Mall, Suite 1716
Minneapolis, Minnesota 55402

NEW JERSEY
Systems Search II
75 South Orange Avenue
South Orange, N.J. 07075

NEW YORK
Betal Associates, Inc.
405 Lexington Avenue
New York, New York 10017

NORTH CAROLINA
Taskforce, Inc.
1048 E. Wendover Ave.
P.O. Box 6888
Greensboro, N. Carolina 27405

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa. 19088

PITTSBURGH
Electronic Systems Personnel
108 Leapers Building
428 Forbes Avenue
Pittsburgh, Pennsylvania 15219

SAN FRANCISCO
Tier Computer Resources Group
Agency, Inc.
355 Sacramento Street
San Francisco, California 94111

SYRACUSE
CFA Associates Personnel, Inc.
(Agency)
2530 Junius Street
Syracuse, New York 13208

WASHINGTON, D.C.
ISP Systems Corporation
Suite 210
1211 Connecticut Avenue N.W.
Washington, D.C. 20036

Programmer

With sound Electrical Engineering background. Applicant must have usable working knowledge of: ALGOL, SPL, COBOL, and BASIC; Stack Architecture Computers; System Science Computer Science, preferably degreed or skills and experience comparable. Outlets: interfacing phototypesetting equipment to H-P 3000 creating comprehensive typesetting system. \$10,400 per yr. Free Parking. Send resume to Job Service, 505 Washington, St. Louis, Mo. 63101, Attn: Maxine Whelan.

EDP CONSULTANT

Here's an exceptional opportunity
in sunny, Southern California

If you're seeking unlimited growth potential and technical challenge, we have it for you in Southern California. We're a leading international computer services firm in need of a top-level technical manager/consultant.

The position will involve you in computer programs for state and local governments, as well as FM marketing support. You'll have considerable customer interface, and will write up proposals to support their marketing needs. Up to 35% of your time will be spent on travel. Your qualifications should include a computer-related degree, excellent writing skills, and a broad data processing background encompassing at least 8 years.

Our offer includes a salary of \$30,000+, depending on your experience and abilities, plus a generous benefits package. For immediate and confidential consideration, please send your resume and salary history to:

CW Box 1465
797 Washington St.
Newton, MA 02160

**ENGINEERING
COMPUTER
SYSTEMS**

The Corporate Engineering Group of this Fortune 500 leader in commercial printing has career opportunities for degreed Engineers or Computer Scientists involving the implementation of mini computer based systems over a broad range of applications.

These positions require comprehensive skills including the specification, design, programming and implementation of engineering/manufacturing systems. Typical systems involve either process control or manufacturing logistics.

2 years experience with Fortran systems are required. Work with PDP-11 RSX operating systems a plus. If you meet the requirements for this position and seek a challenging career opportunity, please send your resume and salary history in confidence to:

P. KLINGE

Recruiting Coordinator

R.R. DONNELLEY & SONS CO.

2223 S. King Drive, Chicago, Ill. 60616
An Equal Opportunity Employer M/F

**PROJECT
MANAGER**
for one of DP's top 20 companies
Programming & Systems

We have been exclusively retained by a major corporation to assist them in filling an excellent opportunity for a person with significant experience in a sophisticated 370 environment who is skilled at interfacing with those utilizing data processing services. This individual must have strength in managing programming professionals and be adept at handling project coordination (including budget forecasting and preparation).

Based in the metropolitan NY area (not NYC), the work requires 6-8 years of comparable experience, including some systems background, management of programmers and/or special projects. Previous exposure to payroll work would be a plus. Degree would be helpful but not mandatory. If experience is substantial. Candidates must demonstrate their ability to take overall responsibility for program design, specification, development and implementation.

Generous compensation package will include salary, bonus, stock options, full benefits, and paid relocation for the right person. Both a lucrative potential income level and realistic advancement opportunity are within your grasp, due to this company's exceptional track record and its remarkable profitability.

Even if you are not necessarily seeking an immediate change, you may be interested in this or other opportunities in the future. Send your resume in STRICTEST CONFIDENCE — and please indicate your earnings history and compensation requirements. We'll be in touch with qualified candidates and make arrangements to give you specifics concerning the company and the unique position available.

Write to: William F. Ramsey

RAMSEY & CROUSE ASSOCIATES

Search consultants specializing in Data Processing
c/o Box 0222PM, Suite 1100, New York, NY 10017
Our client is an equal opportunity employer

position announcements

position announcements

position announcements

position announcements

position announcements

• TECHNICAL ANALYST PROGRAMMER • ANALYST/PROGRAMMER

We are one of the world's largest manufacturers of quality wrenches and socket sets and we continue to grow at a rapid rate.

Our Information Systems Department has an opening for a Technical Analyst/Programmer which would involve identifying and evaluating data processing needs for machine utilization, software, data base and other technical programming requirements. Knowledge of DBOMP and one other data base system is required.

We also need an Analyst/Programmer with strong experience in applications such as production control, purchasing, receiving and market analysis.

We operate on an IBM 370-148 Computer in a DOS environment and use Cobol and Assembly languages.

Qualified candidates should have a degree in computer science, math or other related subjects.

Qualified candidates should send a resume of experience and salary history to the address below. Information may also be obtained by calling (413) 785-5381, ext. 266.

PROFESSIONAL EMPLOYMENT



The Moore Company, Inc.

156 Wason Avenue, Springfield, Massachusetts 01107
An Equal Opportunity Employer M/F

DATA PROCESSING POSITIONS SAUDI ARABIA

A rapidly growing systems management company has immediate openings in Riyadh, Saudi Arabia.

PROJECT MANAGER
Challenging position involves development and operation of innovative TP system for Government Ministries. Will manage international staff of OP and Micrographics professionals with interaction at the highest levels of government. Must have at least 10 years solid OP experience and at least 5 years in significant management positions. Experience with large scale IBM TP systems required.

SYSTEMS PROGRAMMER
Position involves implementation and maintenance of an innovative IBM 370 TP system with CRT and Microfilm terminals. At least two years in-depth experience maintaining IBM OS TP systems required, preferably CICS with 3270 terminals. Must be able to maintain system single-handedly.

SENIOR SYSTEMS ANALYSTS
Minimum of five years experience in analysis and design of business TP applications. Must be knowledgeable in COBOL and IBM OS TP systems, preferably CICS and 3270 terminals. Should be capable of leading large projects.

PROGRAMMER ANALYSTS
Minimum five years experience in applications design and programming in a TP environment on IBM 370 OS systems. Must be fluent in COBOL and assembler and possess knowledge of IBM's CICS and 3270 terminals.

Salaries commensurate with experience. Excellent benefits. Six weeks paid vacation annually with round-trip air fares to place of residence. Free furnished housing and free education for children. Send resume and salary history to:

SYSOREX INTERNATIONAL, INC.
10590 North Tantau Ave.
Cupertino, California 95014
Attn: J. Singleton

programmers/ systems analysts

Sperry Univac needs a few key people experienced in medium and large scale systems. Candidates should be knowledgeable in one or more of the following areas:

- On line, real time processing
- Data Base applications or design (IDMS, S2000, EDMS, IMS, or other similar system)
- Experience in conversion or migration between operating systems.
- Syntax analysis or compiler development skills
- Multiple language experience
- APL/Fortran/PL-1/ASCII COBOL
- Sperry Univac 1100 series
- Computer Instruction - experience in design and instruction of computer training courses.

These openings exist in our Customer Support Services organization and afford travel opportunities. Assignments are on the Univac 1100 Series Computers, are highly varied and offer the applicant maximum exposure to many technical disciplines and diverse applications.

Please submit resume and salary requirements to:

P.K. Vervais

SPERRY UNIVAC

P.O. Box 3525
St. Paul, MN 55165

SPERRY UNIVAC

an equal opportunity employer m/f

COMPUTER LEASING SALESMAN

IPS Computer Marketing Corp. is a major dealer and lessor of used IBM computer equipment. We are looking for an experienced leasing salesman for our office in Fort Lee, New Jersey. Will have responsibility for leases in present portfolio, lease brokerage, and leasing of new IBM processors. At least five years successful sales experience required, with minimum of two years in leasing field. Prefer someone now living in New York City area. High earnings potential through commissions. Please send resume (no telephone calls) to G.H. Heilborn, President.



Computer Marketing Corp.
2460 Lemelne Avenue
Fort Lee, New Jersey 07024

USER SERVICES CONSULTANTS

University Computing Center seeking programmer and analyst/programmer. Must have good technical skills and be able to communicate that effectively with faculty, staff, and students in an academic community. Prefer degree in computer science or statistics with:

- two years experience in design and programming of time sharing system or applications, and experience with TSO; or
- two years experience in design and programming of job accounting or financial management applications.

North Carolina State University,
P.O. Box 5445, Raleigh, N.C. 27650. An Equal Opportunity/Affirmative Action Employer.

PROGRAMMER

D.P. Service Center in Los Angeles has opening for experienced COBOL and Assembler Language Programmer.

DOS Systems Programming and TP. experience desirable.

Successful applicants will be given ample opportunity to develop and implement their creative skills and assume decision-making responsibilities.

Salary is open to the right individual.

Send Resume To:
President

Republic Service
Bureau, Inc.
19110 Van Ness Ave.
Torrance, Calif. 90501

REAL-TIME PROGRAMMERS

Systems Research Laboratories, Inc., is a highly diversified technological company. Our Computer Systems Group needs six Real-time Mini-computer Programmer/Analysts for Process Control, real-time data acquisition and graphics applications. SRL was founded in 1955, expanding at the rate of 17% per year, on target for 100 million in business by 1986. If you are interested in professional growth, challenging assignments and excellent career opportunities on the East Coast or Mid-west, call me or send me a resume today: A.J. Davis, Technical Recruiter c/o SYSTEMS RESEARCH LABORATORIES, INC., 2800 Indian Ripple Road, Dayton, Ohio 45440, (513) 426-6000. Equal Opportunity Employer. M/F/H.

Computer Science
University of
Wisconsin-La Crosse

One or more teaching positions possible for 1978-79 academic year. Applicants should have preference for undergraduate teaching and strong background in computing. Successful applicant will be expected to provide leadership for department in his/her area of specialization. Must be willing to participate fully in program and teach a variety of undergrad courses. Ph.D. required for tenure track appt.; M.S. considered for non-tenure track. Salary open.

Apply by March 15 to: Lonny B. Winick, Chairperson, Computer Science Dept., University of Wisconsin-La Crosse, La Crosse, WI 54601 (608) 785-8284.

UW-La Crosse is an Affirmative Action/Equal Opportunity Employer.

DIRECTOR OF DATA PROCESSING

Management opening with a major, independent fossil fuel producer, headquartered in the Midwest.

This is a solid opportunity to be the key force in systems development for an expanding company. Requirements include: BS degree minimum; proven management ability; experience in a 370 OS MVS environment utilizing PL-1 and COBOL; and communications skills ensuring effective liaison with users through upper management. Attractive compensation package plus excellent benefits.

Strict confidence is assured in responding with resume and salary requirements to:

J. DALE MEIER

GRANT COOPER & ASSOCIATES

Consultants to Management
2388 Schuetz Rd.
St. Louis, Mo. 63141
(314) 567-4690

An Equal Opportunity Employer m/f

PROGRAMMERS

Relocate to Beautiful Santa Barbara!

We have an immediate position available for a Programmer to do problem analysis, preparation of diagrams, flow charts, writing machine instructions and procedures for computer operators, as well as to document programs.

Our successful candidate should have a working knowledge of PL/1 or Assembly. Languages plus 1-2 years experience in business applications on an IBM-370-DOS/VS, CICS configuration.

We offer an excellent salary and outstanding benefits including cash profit sharing, life, health and dental insurance, in addition to relocation assistance to beautiful, smog-free Santa Barbara.

For immediate consideration, please forward your resume to:

Personnel Administrator

Applied Magnetics
Magnetic Head Division

75 Robin Hill Road, Goshute, CA 93017

Equal Opportunity Employer M/F

COMPUTER PROFESSIONALS

ComPro specializes exclusively in the placement of computer professionals on a national scale. With more than 175 affiliate offices in over 130 major U.S. cities we can explore opportunities in whatever geographic area you wish. We currently have urgent needs in the following areas:

APPLICATIONS PROGRAMMING

requires COBOL or PL1 experience in large scale systems using CICS, TOTAL or MIS technology. Applications include manufacturing, marketing, financial, banking and insurance. Salaries to \$28,500

MINICOMPUTER PROGRAMMERS/ENGINEERS

requires FORTRAN and/or Assembly level language programming experience. Will perform software and/or applications development on DEC, Data General, Interdata, Honeywell, Hewlett-Packard or other minicomputers. Applications are real-time and include process control (chemical, petroleum, pulp and paper and manufacturing test processes) and message switching (hardware/software and communications). Salaries to \$30,000

If you're ready to explore new opportunities, please forward your resume with your current salary and geographic preference in complete confidence to Ky McCarthy (agency).

SPECIALISTS IN COMPUTER PERSONNEL PLACEMENT

ComPro

A Division of Waterings & Agnew, Inc.
425 Midtown Tower, Rochester, N.Y. 14604 • 716-454-4790

TECHNICAL REPRESENTATIVE DATA BASE MANAGEMENT SYSTEM

Person wanted for systems analysis, data base design, technical support, and customer training for a proprietary data base management system operating on DEC PDP 11/70, GA 1830, CHI 2130 DSC Meta-4, IBM 1130 and IBM 360/370. Emphasis on applications. Knowledge of data base concepts and/or programming experience beneficial. Salary commensurate with experience.

Send Resumes To:

Ms. Beirne Donaldson

A.R.A.P.

50 Washington Road, P.O. Box 2229
Princeton, New Jersey 08540

An Equal Opportunity/Affirmative Action Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SR. SOFTWARE SPECIALIST

Rapidly growing Denver firm is looking for a Sr. Software Specialist with several years experience in OS/VS Internals, BAL, BTAM and VTAM. Position involves technical leadership and development of complex software. Excellent salary and benefits with opportunity for advancement into management. Interested applicants may send their resume, including salary requirements, to:

CW Box 1453
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer M/F

ANALYST - BANKING

Position requires some supervision of junior programmers, application systems designs, and programming. Experience with bank "On-Line" and batch systems desired. Presently using two Burroughs systems. Send resume and salary requirements to: David E. Jones, Vice President.

THIRD NATIONAL BANK

P.O. Box 1270
ASHLAND, KY. 41101

DATA PROCESSING**INFORMATION SYSTEMS****DIRECTOR****WASHINGTON, D.C. AREA**

Challenging career opportunity exists for an individual to plan and direct the total Hospital Information System needs of a progressive, 1050-bed, multiple hospital association. Responsibilities include overseeing Data Processing Department, long range planning, large scale equipment selection and negotiating with vendors. Individual would report directly to the Vice President for Operations.

The person we are seeking should have at least five years' experience, preferably in data processing department management. A track record of completing difficult projects and the ability to deal with top management is essential. MBA preferred.

We offer a competitive salary, excellent benefits and an exciting atmosphere created by our proximity to the Nation's Capital. Please send resume in confidence, including salary history to:



THE FAIRFAX HOSPITAL
EMPLOYMENT MANAGER
3300 Gallows Road
Falls Church, VA 22046

An Equal Opportunity Employer M/F

MGR. SYSTEMS & PROGRAMMING

Atlanta, Ga.

SALARY \$25,000 RANGE

Our client, a prestigious international company, has an outstanding opportunity for a technically competent manager in its new IBM 370 OS installation. Plus factors are manufacturing applications, data base, and data communications. Outstanding fringes. Some travel required until installation is operational. Call anytime for appointment.

MCCORMICK & ASSOC.

386 N. York, Elmhurst, Ill. 60126
(312) 530-1200
Affiliates Nationwide

PROGRAMMERS**PROGRAMMER/ANALYST**

Are you looking for a JOB or CAREER??? If the reply is a CAREER, you should consider the following:

- Opportunity to become involved with the initial design and implementation of a corporate data base.
- Exposure to major DB/DC (IMS) concepts and techniques.
- State-of-the-Art environment, i.e., large scale 370 system, IMS, on-line processing, SVS, plus other programming aids.

Qualified candidates should have 3 to 5 years large scale 370 Programming experience using DS/JCL and CDBOL. IMS Batch or on-line experience desirable, however training will be provided. These positions are located at our Corporate Data Center and would include company paid relocation to an excellent Southeastern location.

CW Box 1464
797 Washington St.
Newton, MA 02160

PROGRAMMERS

Advancement opportunities for System 3 programmers with experience in all aspects of RPGII, especially table and array processing and exception output. Must be knowledgeable of indexed, random and sequential file organization, and be familiar with computer procedures and operations. Background in business applications such as: AR, AP, GL, Payroll, Inventory Control, plus a knowledge of the auto insurance business desired. Central New Jersey location. Good Company, good working environment, good benefits. For interview, send your particulars to:

CW Box 1456
797 Washington St.
Newton, MA 02160
An Equal Opportunity Employer M/F

Palo Alto, Calif.

The Palo Alto Unified School District has an immediate opportunity for MANAGER OF COMPUTER SERVICES: Instructional program, student information and personnel information systems. Interactive HP3000 and HP2000 systems supporting over 50 student and staff user terminals: CAI, CMI, problem solving, data base, and administrative data processing. Qualifications: Master's or equivalent, successful experience in administration of computer services and in teaching. Salary: depending upon experience, to \$31K, plus excellent fringe benefits. Send letter of application and resume by March 13, 1978 to Dr. Robert McLean, Certificated Personnel Dept., Palo Alto Unified School District, 25 Churchill Ave., Palo Alto, CA 94306. An equal opportunity employer.

ATLANTA AND THE SUNNY SOUTH SYSTEMS PROGRAMMERS

Multiple positions exist in Atlanta and the sunbelt states for IBM experience. Salaries \$21,000 - \$33,000.

MINI-COMPUTER POSITIONS

Multiple openings in Atlanta; Tampa and Houston exist for DEC or D.G. experience. Salaries \$19,000 - \$30,000.

For more information on these or many other EDP openings throughout the U.S. CALL NATHAN MORDLER or send resume to:

Dunhill

of Atlanta, Inc.

Suite 815 3445 Peachtree Rd.
Atlanta, GA. 30326 (404) 261-3751

Wanted**Sr. Applications Programmer**

for

Washington, D.C. based energy consulting firm. Fortran experience on IBM 360/370 or Amdahl required. Math, engineering, or science degree preferred. APL desirable. Salary open. Contact: Martha Heisel, EEA, Inc., 1111 No. 19th St., Arlington, VA 22209. E.D.E.

Faculty Position

Individual sought to teach systems analysis/systems design classes in software-oriented computer science program at Sangamon State University, Springfield, Illinois, an upper level, two year and graduate institution offering bachelor's and master's degrees. Rank and salary negotiable. Background in systems analysis, data base design, data communications, and performance evaluation desired. Ph.D. in computer, information, or management science preferred, master's degree considered. Business and/or government experience desirable. Located in state capital, Sangamon State has an HP3000 computer, six Plato terminals and has full access to a CDC Cyber 72 and a large-scale IBM computer. Send resume by March 15 to Prof. Phillip Koltun, Sangamon State University, Springfield, IL 62708. An affirmative action/equal opportunity employer.

Data Processing Manager

Due to an expansion in our Systems and Data Processing activities, an opportunity exists in our 222-bed general hospital in Wisconsin's Fox River Valley. The successful applicant will have the ability to plan, organize and control all Data Processing Department functions. Hospital experience is preferred with knowledge of NCR computer systems desired. Submit your resume and salary requirements to:

Robert Christ
Director, Systems & Data Processing
Appleton Memorial Hospital
1818 N. Maeda Street
Appleton, WI 54911
(414) 731-4101

Sacramento Peak National Observatory is seeking a Chief Programmer/Supervisor. As chief programmer, the successful applicant would be responsible for the design, implementation, and maintenance of software at the Observatory's data reduction and real-time data acquisition facilities. As supervisor, he or she would manage an operation with several machines and two or three employees and participate in facility planning. Present equipment consists of a Sigma 5, Sigma 3 and a PDP 11/10. Applicants should have a master's degree in computer science or a related field. A minimum of four years experience in system programming, scientific Fortran, and real-time software are required. Additional experience and a bachelor's degree may be substituted for the master's requirement. This position demands an advanced knowledge of programming and a good knowledge of computer design, digital electronics, and astronomical instrumentation, as well as the ability to interact with scientists and direct subordinate personnel. Send resume including salary history to:

Frank Hagwer
Sacramento Peak Observatory
Sunspot, New Mexico 88349
An Equal Opportunity Employer

SENIOR EDUCATION ANALYST

This newly created position offers a challenging opportunity with a NYSE listed hospital company.

Position requires BS in Computer Science/Business plus 2 to 3 years experience teaching System Education Documentation.

Responsibilities include developing, directing and teaching System Education; will also involve working with Task Forces and User Groups in System Education Programs.

Write in confidence to:

CW Box 1457
797 Washington St.
Newton, MA 02160
An Equal Opportunity Employer M/F

PROGRAMMER/ANALYST & SR. PROGRAMMER

Design and implementation of Software to control physical processes and produce related output data and reports. Must have programming experience in a manufacturing environment with Fortran, PDP-11 hardware and RSX-11M Operating Systems. Experience with IBM-370 software will be considered a plus. Degree in Science, Math or Engineering Field. Applications include automated inspection, production and laboratory equipment.

SR. PROGRAMMER

Design, implement and install computer business systems. Two years experience in implementing Manufacturing Systems, utilizing IBM S/370 ODS/V5 and CDBOL. Exposure to CICS, DL/I and BDM packages. Four year degree or equivalent experience.

Tired of the hustle-bustle and expense of urban living? Try our rural Connecticut environment.

If you are interested, please send resume and salary history in confidence to:

CW Box 1456
797 Washington St.
Newton, Mass. 02160
An equal opportunity employer; M/F

PROGRAMMERS

Recent expansion has created new opportunities for data processing professionals:

- Software support position to assist systems programming in on-line assembler, teleprocessing applications; software for maintenance and batch processing for on line files. Excellent growth opportunity for one with strong ALC to develop in the systems area.
- Programmer/analyst position for the professional well versed in user interface and with 2-4 years experience.
- Programming positions for Cobol professionals with 2-4 years experience.

Call or Write Leslie Clem (713) 792-2240

The University of Texas System Cancer Center
M.D. Anderson Hospital and Tumor Institute
6723 Bertner Ave., Suite 112, Houston, TX 77030
An Equal Opportunity/Affirmative Action Employer

SENIOR PROGRAMMER (COBOL)

SET UP PART
OF OUR MIS SYSTEM
AT PHILIPS INDUSTRIES

Working in a rapidly growing and changing project environment, program for cost accounting, production control and order entry in a manufacturing environment. You will be working on independent problems with little supervision, earning an excellent salary and benefits in our expanding corporation. You will have every opportunity to interact with users, provide input into systems design, be involved with our IBM 370/148, and a small team of professionals. If you are ready for major challenge, in our Dayton, Ohio based 250 million dollar sales manufacturing organization...

FOR IMMEDIATE ATTENTION
CALL COLLECT OR SEND RESUME TO:
BONNIE FILOSO

PHILIPS
INDUSTRIES INC.

4801 SPRINGFIELD ST.
Dayton, Ohio 45401
(513) 253-7171

We are an Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

GENERAL INSTRUMENT CORP.
Data Systems and Services Group

PROGRAMMER / ANALYSTS MANAGEMENT INFORMATION SYSTEMS

We have several responsible positions for programmer/analysts with experience and interest in the design and programming of carefully integrated file processing systems, and who have a thorough understanding of system organization and file design.

These positions will be of particular interest to people who regard themselves as well above the average in technical competence and who are interested in playing a major role in the design decisions for a new management information system.

Please write us if you would like to explore this opportunity. We would appreciate a resume and, in addition, a letter describing your abilities, experience, and professional interests. Please address your reply to:



Director of Systems Development
General Instrument Corporation
11126 McCormick Road
Hunt Valley, Maryland 21031

DATA PROCESSING SYSTEM PROGRAMMER VM/370

The Kinney Shoe Corporation, a major manufacturer and retailer of footwear and apparel is seeking a qualified individual to fill a key slot in our Systems Programming Dept. at our Camp Hill Management Information Center. Successful applicant will work in an exciting, professional environment. Current hardware consist of a 370/158 AP with 3 Meg. storage, sixteen 3330-11s going to 3350s and two 1287 scanners. Our software is the latest. We are currently running VM/370 Release 4, VSI Release 6, DOS/VSI Release 34, IMS/VSI, CMS & APL. During the next 2 years, our TP Network (IMS, CMS & POS) will grow from our present 400 terminals to 2000 terminals. We will be utilizing VM/370 & MVS as our future operating systems.

A minimum of 5 years EDP experience is necessary. Including 1 year of VM/370 & 1 year of OS, MVS experience is preferred, but not required. Applicant must be able to plan, install & maintain VM/370 and OS/VSI or MVS. Applicant must be familiar with VM Internals and be able to modify VM code. A general knowledge of CMS and writing EXECs will be a plus. Excellent working conditions & fringe benefits. Please send your resume to:

MR. JOHN A. BECK
KINNEY SHOE CORPORATION
P.O. Box 2437, Harrisburg, PA 17105
An Equal Opportunity Employer M/F

ANALYST PROGRAMMER

Rapidly expanding Orange County Transit District in Southern California requires professional in Fortran and COBOL languages with accounting procedures understanding. Will be joining recently organized and innovative staff, to identify and define requirements for manual and automated systems. Send resume to:

O.C.T.D.

1200 N. Main St.
Santa Ana, CA 92702
Equal Opportunity Employer

PROGRAMMERS

Consider the challenges of data processing development for Minnesota's largest local government body. Consider the responsibility of wide ranging and unique applications. Consider the growth potential of a rapidly expanding organization. When you've considered all these things, consider coming to Hennepin County to continue your data processing career.

Our Data Processing Department is undergoing a phenomenal growth period. We need qualified COBOL programmers to continue our success story. Our salary and benefits are better than the market, our IBM hardware and software is still "tomorrow" at most places. Besides all that, by joining us now, you would be in an ideal position to take advantage of the growth still to come. To get in on the action, all it takes is one year's COBOL programming.

In light of all this, can you really afford NOT to consider us? Send your resume today to:

ROBERT SMUTKA
(612) 348-5583
Hennepin County
Personnel Department
A-3 Government Center
Minneapolis, Minn. 55487

An Equal Opportunity Employer M/F

SYSTEMS PROGRAMMER

The University of Iowa Computer Center is seeking an exceptional person with systems programming experience on COC NOS or KRONOS operating systems. The qualified applicant will have three to five years' experience and a strong background in CP and PP COMPASS. Responsibilities will include systems maintenance and participation in challenging software development projects. We offer competitive salary, exceptional benefits, and the special advantages of living and working in a University environment.

Send resume and salary history in confidence to Wayne L. Robinson, 112 LCM, The University of Iowa, Iowa City, IA 52242.

An EOE/AA

DATA PROCESSING MGR.

DATA PROCESSING MGR. — Seasoned Sys. 3 Mod 10 pro needed to manage intimate shop including operations. Heavy financial systems exp. a plus. Position reports directly to controller. \$22,500. Fee paid.

ROBERT HALF
PERSONNEL AGENCIES
1310 Liberty Bank Building
Buffalo, N.Y. 14202
716-842-0801

PROGRAMMER

Analyze Specifications, design program logic, code in COBOL in batch and CICS/VS, document programs, other project record requirements. Position available immediately. Salary \$15,000+. Write or Call: Jack Weiss, Director, Renner Learning Resources Center, Elgin Community College, 1700 Spartan Cr., Elgin, IL 60120. Phone — (312) 697-1000, ext. 258. An equal opportunity/affirmative action employer.

OPERATIONS RESEARCH ANALYST TO \$20,000

Prominent PHILADELPHIA based INSURANCE firm seeks bright, aggressive MBA w/diversified business sys exposure. Must have sound FORTRAN programming bkgd. Reason final & statistical analysis, quant. resch & sys develop. Sophisticated communicator essential.

ROBERT HALF
PERSONNEL AGENCIES, INC.
2 Penn Center, Suite 706
Phila., PA 19102
(215) 568-4580

ENGINEERS, COMPUTER SYSTEMS

Compek Research, Inc., a rapidly expanding computer technology company, has an immediate opening and the growth opportunity for a shirt-sleeve professional in the following area:

BS or MS in Electrical Engineering or Computer Science with demonstrated capabilities in the area of mini/micro computers interface and peripheral design, computer systems design and development, and real-time assembly language programming. Project management experience desirable.

Forward your resume to: Ms. Ruth M. Jansan, Compek Research, Inc., 455 Cayuga Rd., Buffalo, NY 14225. An Equal Opportunity Employer.

SYSTEMS PROFESSIONALS

NATIONWIDE SERVICE
MGR, OP \$29K
No. Central
370, syst, pgmg, optns, strong mfg & matl control syst dev
MGR FIN SYS \$27K
Midwest top mfg corp. Supv 5, IBM/168
Sr. Sys Anal, \$23K
New England
Mfg systems, matl control, Shop floor development.
Relocation & Fees Paid by Client Co.

FOR-T-U-N-E
OIV FORTUNE
PERSONNEL AGENCY
505 5th Av. NYC 10017.
(212) 582-5800
Company Inquiries Invited

EDP PROFESSIONALS

Manager Applications Programming
Project Leaders Applications
Senior Analysts
Analysts

Waters Associates is a growing (40% per year) \$35-million profitable development, manufacturing and marketing company. We are the market leader in Liquid Chromatography. Liquid Chromatography is the fastest growing instrumental technology according to Industrial Research magazine. LC is applicable to a wide range of problem situations in basic research, quality control and analysis. Uses for LC exist in chemical manufacturing, plastics and polymers, pharmaceutical companies, universities and medical and biological research.

Our continued expansion and a recently completed conversion effort to a 370-148 have created several outstanding openings in information services. Positions are available at several levels for first-rate experienced applications people with backgrounds in the following areas:

- financial systems
- manufacturing systems
- marketing systems
- human resource systems

We offer excellent salaries, unusual opportunities for growth and competitive benefits. Please send your resume and salary history to Dolph Banks.



WATERS ASSOCIATES

34 Maple Street, Milford, MA 01757
An Equal Opportunity Employer

PROGRAMMERS

We're seeking individuals able to design, code, test and implement application programs written in ANS COBOL. A B.S. Degree in Information or Computer Science is preferred but not necessary plus 2-5 years batch and real-time experience. Salary to \$18,000. Please submit resume to:

CW Box 1467
797 Washington St., Newton, MA 02160



SOUTHWIRE COMPANY

An Equal Opportunity Employer

SUNBELT PROGRAMMERS

We have many clients in the sunny recreational sunbelt area looking for programmers, programmer analysts, system analysts, and systems programmers with IBM (OS or DOS) cobol, burroughs, assembler, BAL or CICS experience. Salaries \$14,000 to \$25,000. Submit resume with current and required salary, relocation preference to:

Executive Recruiters
Personnel Agency, Inc.
3700 Cantrell Suite 104
Little Rock, AR 72202
(501) 664-3313

CADILLAC EDP OPPORTUNITIES

ALL FEE PAID NATIONWIDE COVERAGE
CONFIDENTIAL

CADILLAC offers you assistance in finding a position that meets your objectives. . . NATIONWIDE or in your present locality. For 45 years CADILLAC has been helping professional people find new positions that offer greater growth more responsibility, new experience, relocation, higher salary, etc. . . we'll make every effort to do the same for you. Just send your resume, or a note outlining your experience. . . no cost or obligation to you. Sys Prog (Tech Support) \$20-30 Prog (Applications) \$14-20 Sr. Anal/Proj Mgrs \$22-30 Prog (MINI, PDP, etc) \$16-23 System Anal \$20-25 EDP Auditors \$18-22 Prog/Anal \$16-22 Managers IBM Sys/3 \$16-23



Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

position announcements	position announcements	position announcements	buy sell swap	buy sell swap
------------------------	------------------------	------------------------	---------------	---------------

SYSTEMS ANALYSTS PROGRAMMERS

Potomac Research, Incorporated has immediate openings nationwide; Long term assignments developing information systems, financial systems, scientific systems, and training/standards. Our Data Processing professionals utilize Honeywell, Burroughs, IBM, CDC, UNIVAC, and minicomputer hardware; Cobol, PL/1, Fortran and Assembly languages. Systems are developed in a state of the art atmosphere using various data base managers, structured analyses and structured programming.

P.R.I. is a highly successful and growing Data Processing company with openings in the following cities:

OENVER, COL
LAS VEGAS, NV
HUNTSVILLE, AL
PANAMA CITY, FLA
NORFOLK, VA
PENSACOLA, FLA
VICKSBURG, MS

SAN DIEGO, CA
SAN FRANCISCO, CA
HONOLULU, HI
SEATTLE, WA
PITTSBURGH, PA
KITTERY, MAINE

These permanent positions feature a liberal benefit package, competitive salaries and great opportunities for advancement. Interested persons should send resume, including salary history and geographical preference to:

RI POTOMAC RESEARCH INCORPORATED

P.O. Box 1101
West Station
Huntsville, AL 35807
Attn: Personnel Manager

An Equal Opportunity Employer M/F

BUSINESS ADMIN. DEPT. 1

Permanent opening beginning September 1978 at the assistant or associate professor rank. Salary range: \$13,371-\$21,749. Duties include teaching undergraduate and graduate systems courses. Ph.D. or D.B.A. required. Five years of related COBOL and Systems experience required for associate professor; four years experience in related COBOL and Systems required for assistant professor. Send applications to John C. Shepherd, Systems Representative, Faculty Search Committee, Business Administration Department, Indiana University of Pennsylvania, Indiana, PA 15701, by March 4, 1978. An Affirmative Action/Equal Opportunity Employer.



WHY EDP SEARCH?

Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

FLORIDA SYSTEMS ANALYSTS

Orange County Government

B.S. and two years' responsible Analyst/Programming experience in Public Safety Systems. Starting salary \$14,580.00, excellent fringe benefits. Submit resume to Personnel Department, P.O. Box 1393, Orlando, Florida 32802. An equal opportunity employer-M/F.

SYSTEMS SUPERVISOR

To head up staff of minicomputer software. Co. Experience with Datapoint preferred. Send Resume and Salary Requirements to:

**Blumenfield
Marketing Inc.**

300 Broad Street
Stamford, CT 06901

Systems Programmer Burroughs

6700
San Francisco
Peninsula

Outstanding opportunity to provide systems support and development on Burroughs B-6700 computer... with a growth oriented firm!

Applicants should have min. 3-5 yrs. B-6700 systems programming exp. Knowledge of COBOL, MCP, ALGOL, DCALGOL, req'd. BSCS a plus; ability to effectively interface with users in a teaching/consulting/diagnostic mode is essential.

Raychem offers exceptional benefits inc. generous salary, dental & medical plans, quarterly cash bonus, profit sharing & stock purchase.

Please send your resume, including salary history, to: Barbra Shapiro, Human Resources Dept. 8304, Raychem, 300 Constitution Drive, Menlo Park, CA 94025, (415) 329-4500. An equal opportunity employer.

Raychem

DIRECTOR OF COMPUTING

Immediate opening with responsibility for DEC KI-10 installation, augmented to KL-2050T in July, connected to TYMNET and ARPANET. The director will build a technical staff and closely assist researchers on highly advanced artificial intelligence and computer science applications. Advanced degree and similar administrative experience are required. Knowledge of DEC-10, networks, LISP and other languages are desirable. Inquiries/applications should be directed to Prof. R. Smith, Dept. of Computer Science, Rutgers University, New Brunswick, N.J. 08903 (or RSMITH RUTGERS-10) Telephone (201) 932-3626. Rutgers University is an equal opportunity-affirmative action employer.

BUY SELL SWAP

360/20 Sub-5

SALE OR LEASE
• 1403 Mod 2 Printer
• 2560 with 6 lines print
• 2 2311 Disk Drives



write or call
METROPLEX COMPUTER COMPANY, INC.
Suite 1206 Honeywell Bldg.
1111 W. Mockingbird Lane
Dallas, Texas 75247 TWX 910-861-4171
(214) 634-2750

WANTED TO BUY IBM 370/155

with or without DAT

Contact: Harry Blair

(713) 524-8249

FOR SALE PDP 15/76

WITH:

32 KW, Refresh Graphics,
RS09 & RK05J Disk Drives,
DEC-tapes, Communications
Hardware, XVM/DOS license,
and more.

CONTACT: IGEL,
A.M.E. Dept.
Univ. of Arizona
Tucson, AZ 85721

(602)884-1650

FOR SALE

Used Sperry Univac
8440 Disk Controllers
And Drives
4 8033-99 Disk Controllers
8 8440-02 Disk Storage Units
8 Dual Access Features
All Equipment Is
Guaranteed Maintainable
By Sperry Univac
Marketing Dept.
(213) 787-7300
INTERSCIENCE SYSTEMS, INC.
7814 Burnet Ave.
Van Nuys, CA 91405

BEFORE YOU BUY, SELL, OR LEASE,
TAKE A 'SECOND' LOOK!

FOR SALE

3505-B1 and 3525 P3
3155-J with Dat Box
3158-U36 — Del. 9/78
3158-K — Del. 6/78
3165-K — Del. 6/78
(BUY OR LEASE)

WANT TO BUY

370/145 I2-J2
370/135 GF-I
3-1403 N 1
1442 N 1
3420-5 Single Density
3420-8 Dual Density



COMPUTER INDUSTRIES INC.

3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO 312 298 5630
WASHINGTON 703 525 3074
LOS ANGELES 213 370 4844

LEASE

3031-3032

3033

SHORT ATTRACTIVE

AND LONG RATES

TERMS 360/ 30,40,50,65

CPU 138,148,158,168/

370/ 125,135,

DISK- 145,155

TAPES

BUY SELL

National Computer Rental
415 Madison Avenue
New York, New York 10017
Tel. No. (212)532-1500

Member of Tiger Leasing Group Member of Computer Lessors Assoc.

Whether you're buying, selling, swapping, hiring or looking,
Computerworld's Classifieds work.

Issue Date Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/ Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy.

Cost: Our rates are \$55.30 per column inch. Minimum size is two column inches and costs \$110.60 per insertion. Extra space is available in half-inch increments and costs \$27.65. Box numbers are \$3.00 extra.

Billing: if you're a first-time advertiser, WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad Size _____ Issue (Date(s)) _____ Section: _____

Signature _____

Name _____

Company _____ Title _____

Address: _____ Tel: _____

Send this form to:
CLASSIFIED ADVERTISING

COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Buy or Sell Disk Packs Data Modules

Trade Ins Available

Call Lorraine

(312) 421-2900

Systems Supply Corp.
833 W. Jackson Blvd.
Chicago, IL 60607

FOR SALE DEC

16 channel - modem control
DH II AD Multiplexer
DH II AA Multiplexer
DZII Multiplier
PDP 8M - 4K and 8K
9 Centronics 508 printers
Call Don Grempler
(301) 296-0094

303X

Leasing

Large industrial corporation wishes to purchase and lease back to substantial corporations IBM 303X Systems. We will only deal with end users and equipment must be scheduled for delivery in 1978.

CW Box 1410
797 Washington St.
Newton, Mass. 02160

Why Comdisco is First in the Second Market:

IBM Processors available

135 145

145s needed
135s available
for lease

155

Immediate
delivery with
DAT

158

want to
buy or
lease

165

Available
for sale
or lease

IBM Peripherals available

3420

We will purchase
your 1600 BPI
drives and replace
with Models 4 or 6
immediately.

3330/33

All models
available for
delivery now.

3340/44

Wanted to
buy

SPECIAL

3420 models 4 & 6
available now.
3830-2 Control
Units-Now

IBM 3031, 3032, 3033 operating leases available.

Atlanta 404/256-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107



New York 201/568-9666
San Francisco 415/944-1111
Paris, France 374-1130

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

Your First Choice in the Second Market

370/165-II

- FOR SALE OR LEASE
- AVAILABLE JUNE 1978
- AS SHORT AS 24 MONTH LEASE AVAIL.

CALL TED MOLINARI AT:
(201) 947-4200



IPS COMPUTER MARKETING CORP.
2460 LeMoine Avenue
Fort Lee, N.J. 07024

For Sale

NCR Century 100 32K
4-655 Spindles
450 LPM Printer
20-655 Disk packs
2-Disk file
W/Cobol, Fortran, Naat/3
/RPM Compilers
W/CRT Interface
Under NCR Service Agreement
June 30, 1978 delivery
Incl multi-divisional G/L Accounting
w/budget comparisons
A/R, A/P, and payroll (multi-state
systems, all interfaced to G/L)
\$25,000

HOUGH BROS., INC.
9875 Grand Ledge Hwy.
Sunfield, MI 48890
Contact: David Hough
1 (517) 566-8041

WANTED

- 3420/3 Tape Drives
D.D.
- 3803/1 Tape Controllers
- March Avail. Needed

Call

FORSYTHE
MCARTHUR

(312) 943 3770

Dealer &
Lessor In IBM
Computers

FORSYTHE/MCARTHUR ASSOCIATES, INC.
919 North Michigan Ave., Chicago, IL 60611

Member: Computer Dealers Association

DEC 2040 / \$8,952 Mo.

4 YEAR LEASE * AVAILABLE NOW

Central Processor, LA36-C Console, 64K Words Memory, RP06-B
Disk System, TU45 Tape System, Eight Asynchronous Lines,
Tops-20 Operating System Plus:

- | | | |
|---|----------|-------------------------------|
| 2 | MA20-E | 32K Add-On Memory |
| 1 | MA20-A | 32K Basic Memory Module |
| 1 | RP06-AA | Add-On Disk Drive |
| 1 | DC20-AA | Basic Eight Line Group |
| 1 | DC20-DA | Eight Line Expansion Group |
| 1 | LP20-AA | 300 LPM, 64 Character Printer |
| 1 | OT001-AP | Fortran-20 |
| 1 | QT003 | Cobol-20 |
| 1 | OT007-AP | Sort-20 |
| 1 | QT012-AP | APL-20/SF |
| 1 | OT008-AP | DBMS-20 |
| 1 | QT016-AP | IOL-20 Extended for DBMS |

Equipment is under DEC Maintenance. Direct Inquiry to present user:

SUMMA CORPORATION
MANAGEMENT INFORMATION SERVICES
P.O. Box 14000
Las Vegas, Nevada 89156
(702) 361-1300 (Bill Janett)
* NOT LIMITED TO PRINCIPALS *

SALE OR LEASE

370/145

Serial Number 11192
Available March 1, 1978

Contact: Anne Rhame

Commonwealth Computer
Advisers, Inc.
707 East Main St. Suite 1650
Richmond, Virginia 23219

(804) 643-9123

FOR SALE BY OWNER

Complete DEC 11/70 System
(1 Year Old)
192K Bytes
1-16 Line Multiplexer
2-RP04 Disk Drives
1-TU16 Tape Drive
1-600 LPM Line Printer
(Data Printer V132C) (Used)
1-Console Decwriter
On DEC Maintenance

Available June 1, 1978
Contact: Rudy Verele
(714) 744-6000
Ext. 206

BUY · SELL · LEASE 370 SYSTEMS

Sale Only

370/158

ISC

Available

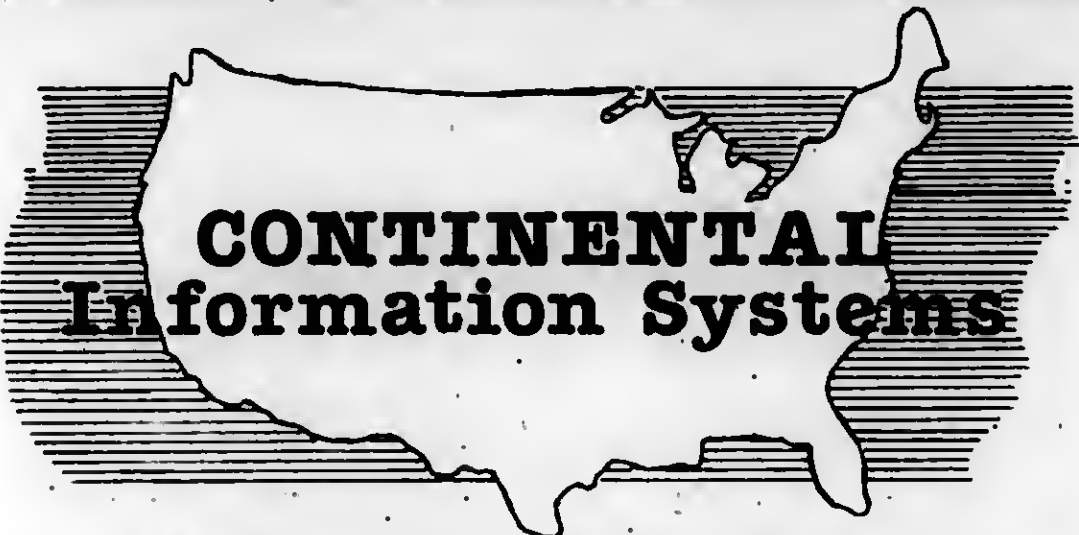
U34

4 Channel

3rd Quarter

CALL DICK FEEHAN (201) 569-3838

DCL Marketing, Inc.

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap								
WANTED TO BUY USED Interdata Model 50 and 70 Processors end related communication I/O equipment. CONTACT: Brian LaBarre COMSHARE, Inc. P.O. Box 1588 Ann Arbor, MI 48106 (313) 994-4800	 CONTINENTAL Information Systems BUY, SELL, LEASE, SUBLEASE, AND TRADE NEW AND PRE-OWNED IBM EQUIPMENT AVAILABLE <table border="0"> <tr> <td>Feb 78</td> <td>155-II 165-II 158-new, ITC qualifying 168-new, ITC qualifying</td> <td>Apr 78</td> <td>145-II 155-II 165-II 158-new, ITC qualifying 168-new, ITC qualifying</td> </tr> <tr> <td>Mar 78</td> <td>165-II 158-new, ITC qualifying 168-new, ITC qualifying</td> <td>May 78</td> <td>158, pre-owned 158-new, ITC qualifying 168-new, ITC qualifying</td> </tr> </table> Several 370 systems available beyond May, 1978 We will also take your currently installed IBM equipment in trade on a new system. Call Us! CIS CIS Corp. 600 MONY Plaza Syracuse, NY 13202 315-425-1900 Peripherals and I/O All 360/370 Disk, Tape Printers, Readers, and T/P Gene Chappell			Feb 78	155-II 165-II 158-new, ITC qualifying 168-new, ITC qualifying	Apr 78	145-II 155-II 165-II 158-new, ITC qualifying 168-new, ITC qualifying	Mar 78	165-II 158-new, ITC qualifying 168-new, ITC qualifying	May 78	158, pre-owned 158-new, ITC qualifying 168-new, ITC qualifying	MINICOMPUTER EQUIPMENT Buy-Sell-Trade DEC *DG SAVE 10% to 50% Computer Interface Technology, Inc. Santa Ana, CA (714) 979-9920 San Jose, CA (408) 225-3844
Feb 78	155-II 165-II 158-new, ITC qualifying 168-new, ITC qualifying	Apr 78	145-II 155-II 165-II 158-new, ITC qualifying 168-new, ITC qualifying									
Mar 78	165-II 158-new, ITC qualifying 168-new, ITC qualifying	May 78	158, pre-owned 158-new, ITC qualifying 168-new, ITC qualifying									
FOR SALE BY USER IBM (Avail 6-1-78) (1) 3803-001 Tape Ctl Unit (6) 3420-005 Tape Drives AMPEX (Avail 6-1-78) (1) DC-324 Disk Ctl Unit (8) DM-322 Disk Drives PERIPHONICS (Avail Now) (1) T-Comm-7 Front End Communications Processor Contact: Paul Tranchemontagne HOLLAND, INDIANAPOLIS, IN Webster Highway So., Merrimack, N.H. 03054. (603) 889-2500.				FOR SALE OR LEASE DATA GENERAL 256k ECLIPSE, 64kNOVA3 DUAL PORT 400mb DISK, 2 COMM. CHASSIS, 800BPI TAPE, 3 CRTS, 600LPM PRINTER, 2 3330 PACKS MIN. 1 yr. LEASE ALL OR PART AVAIL. IMMEDIATELY M. KELLEY, DEMAND DATA PO BOX 57, LAKELAND, FL. (813) 687-4555								
UNIVAC UNISCPE 100's QUANTITY AVAILABLE SALE OR LEASE ANRIX CORPORATION 2211 E. HIGHLAND PHOENIX, AZ. 85016 Tel. No. (602) 277-4881				'For Sale': NCS-OpScan DM100 Optical Mark Reader. Scanner and 9 trk, 800 bpi tape unit (upgradable to 1600 bpi) and manuals. Scans off-line. Purchaser will be responsible for shipping from Kenosha, Wis. Offers will be accepted through February 28, 1978. For more information call: John C. Bernard Phone (414) 658-2372								
BANKING SYSTEM FOR SALE 12-K-202D, 2203, 25D1, 2311 and 1259 CW Box 1455 797 Washington St. Newton, MA 02160				FOR SALE Basic Four Model 400 System Operator System Level 8J 16K 8.4M Disk Capacity 2 Model 7220 Video Display Terminals 1 Serial Printer Contact R.A. Pace A.H. Robins Co. 1407 Cummings Drive Richmond, Va 23220 (804) 257-2180								

DEC NEW
 DEC LA180 printer \$2,400.00
 DEC MS11JP-32KB parity Mos
 Memory \$2,200.00
 DEC MM11DP 32KB Core
 Memory \$2,900.00
 Used - Dataproducts 2230
 printer \$5,500.00
 R. LaBar & Associates, Inc.
 2750 Northaven Road
 Dallas, Texas 75229
(214) 243-3451

Immediate Delivery
IBM 3284-2
 Printer
 Wholesale Prices
 Some with RPG EB3995
IBM 2314-1
 with 2 Channel Switch
 Mid March Delivery
 Computer Resale Exchange, Inc.
 1223 Connecticut N.W.
 Washington, D.C. 20036
(202) 737-1401

370/125's
For Sale* Lease* Purchase
***Purchase Leaseback**
 Specialists in 125 Systems
 3410's and 3411's Also Available
 **CORPORATE COMPUTERS, INC.**
(203) 661-1500
 115 Mason St., Greenwich, CT 06830

FOR SALE
370/135I (All IBM Core)
AVAILABLE 3-15-78

★★★★

WE NEED

370/138I

DELIVERY 4-15-78

CALL OR WRITE RALPH GRAVES
(214) 630-6700

Pioneer Computer Marketing
 1165 Empire Central
 Dallas, Texas 75247

Member of Computer Dealers Association

370/158

Serial Number 23566
 Available May, 1978
 Contact: Ann Rhame
 Commonwealth Computer
 Advisers, Inc.
 707 East Main St. Suite 1650
 Richmond, Virginia 23219
(804) 643-9123

**** FOR SALE ****
INTERDATA 7/32
 192K Processor
 Tape Drive
 20 Megabyte Disks
 Cabinet and Console
 New-Large
 Discount- Contact:
 D.P. Mc Nicholas
 P.O. Box 900
 Youngstown, Ohio 44501
(216) 758-6411 X197

**When you plan to buy or
 sell your computer
 equipment...**

For complete information call the Greyhound Representative in your area.

WANT TO BUY**370/158 370/155 370/145**

U.S.	Home Office New York Chicago Dallas San Francisco	T. A. Takash Dick Ventola Pete Ahern M. W. "Bill" Tucker Henry Paulson	602-248-6037 914-849-1515 312-298-3910 214-233-1818 415-283-8980
INTERNATIONAL	Canada U.K./Europe Mexico Austro-Asia Furukawa	Don Maunder Joe Gold Andres Contreras John Hallmark Don Haworth	416-366-1513 022-61-27-54 905-543-8850 214-233-1818 214-233-1818
NON IBM			

GO GREYHOUND
 Greyhound Computer Corporation

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

SALE OR LEASE

3340-B2 3411-2
3330 -11 3410-2
3420-3,5,7

WANTED • 3348-A2 • 3272
• 3277 • 3271

215 635 1700
Computer Marketing Inc.
7704 Seminole Ave
Melrose Park, Pa
19126
Member Computer Dealers Assoc.

FOR SALE

Calcomp 114 Disk Drives

28 Megabyte for use with all types of mini computers.

Available Immediately

Contact: Gena Wendt

CompuMart Inc.

6622 Black Swan Drive
Shawnee Mission, KS 66216
913-631-2992

THE TOTAL SYSTEM

IBM 370-125 FOR SALE OR LEASE

- Mach Model 3125-Q 256K
- 1403-7 Printer 600 LPM
- 1403 Print Attach
- 3333-1 Disk & Control 200 MB
- 3410 Tape Attach
- 3411-1 Tape Drive & Control 20 KB
- 3330 Disk Attach
- 3410-1 Tape Drive 20 KB
- MPLX Channel
- ICA Med Speed BSC (4)

Vincent

Contact
MR. GREENE
Brass & Aluminum Co.

(612) 378-1131
TOLL FREE
(NATION) 800-328-7772
(MN) 800-552-1202

DEC

PROCESSORS PERIPHERALS & MODULES BUY — SELL — LEASE — RENT \$1, 000,000

NEW & USED DEC INVENTORY

DEC CPU'S

11/04 • 11/05 • 11/10 • 11/35 • 11/40 • 11/45 • 11/60 •
11/34 • 11/70 • PDP8E • DEC 310

DEC DISKS & CONTROLLERS

RK05 • RX11 • RK11D • RP02 • RP03 • RP04 • RP06

DEC TAPES

TU10 • TJU16 • TJE16

DEC TERMINALS

VT52 • VT50 • VT05 • VT20 • LA36 • LA180 • LA120

DEC PERIPHERALS

DH11 • DZ11 • DL11's • LP11 PRINTERS

MISC. BOARDS & MEMORY

M7260 • M7261 • MM11DP • MM11L • DPU1D • KW11L
MM11U • MS11BM • M792 • DU11DA • MS11JP •
MFI1L • MM11F • MFI1U

Hundreds of Miscellaneous Modules & Cables Available
CALL FOR OTHER COMPONENTS IN STOCK

SAVE 33%

NEW 11T34 CONFIGURATION

***** \$23,333.33 *****

For Fast Delivery & Substantial Savings
Call the DATALEASE Digital HOTLINE

800-854-0350

DATALEASE

700 North Valley Street, Anaheim, CA 92801
(714) 533-3920 TELEX 692439

IPB
201-947-4200

WANTED TO BUY

168, 158, 165, 155's
3420-3's with con-
trollers.
145-12 and 135-H
380/65,
3330/3333/3340

IPB

Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

FOR SALE

165-K11

DATed, up to 4. mega-
byte. For Sale or Lease.

158-K

Available in March with
or w/o ISC.

155-J

Avail. in March with
or without new DAT.

135-GF

Avail. March 1, Will
configure to your specs.

3420-7

available now with
switching features.

158 Memory

K to KJ available
March 1.

FOR LEASE

145-10

available immediately for
sale or short term lease.

125's

We will purchase and
leaseback your 125 sys-
tem. Save rent starting
today. Call for a quote.

IBM RENTAL CREDITS

We will pay for your
rental credits on
FTP, ETP, and MAC
machines. Call us be-
fore sending your
machines back to
IBM.



LEASES

3138

March 24, 1978
April 21, 1978

3148

March 31, 1978
April 14, 1978
May 19, 1978

3158

Six to 24 Month Leases (or longer) on your Rented
or Owned System. Upgrades to 303X Available.

3168



Computer
Capital
Corporation

1351 Washington Boulevard
Stamford, Connecticut 06902
Tel 203 357 9663

KEYPUNCH MACHINES

2 Decision Data 8010,

\$4500 Ea.

2 Univac 1701,
\$2400 Ea.

Now on mfg. maintenance

Sue Miller

Sage Systems, Inc.
2323 S. Sheridan
Tulsa, Ok. 74129

918-838-8611

WANT TO BUY
OR LEASE

IBM 360/65J 1 MEG

w/ 3 Channels

IBM High Speed I/O Set

(1403N1, 2821-1, 2540-1)

IBM 2401-6 Tape Drives

w/ Controller

Calcomp 3330-1 Disk System

May Delivery

Contact: G. Arditti
(914) 634-3630



dearborn giveth:

370's: 370-145J (mod 2 & ISC avail.);
3420-7 single.

dearborn taketh:

370-145's; 370-135's; 3420's; 3330's; 3340's.

Call Tom Millunchick: 312/827-9200
or any dearborn office.



dearborn
computer company

dealer IBM computers
systems software
leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st louis (314) 727-7277 • houston (713) 965-0788

THREE AND FOUR YEAR WALK-AWAY LEASES

1. ATTACHED PROCESSOR FOR 3158

2. 3158 - 3 MEG WITH APU FEATURE

SPRING AVAILABILITY

3. 3158 - 3 MEG MOD 3

SUMMER AVAILABILITY



THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle - (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman - (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Huntington Station, New York 11746

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

COMPUTER Facilities & Offices

25,000 sq ft. lease
Teterboro, N.J.
•Quality building & construc.
•8,000 ft. raised computer floor
•17,000 ft. MOD A/C offices
•Fully sprinklered plus utilities
•Excellent location for professional & skilled
•Nr. Rte. 80, Rte. 46,
G.S. Pkwy., 20 min from NYC
•Parking facilities
50 cars more avail.)
Brokers invited. Call
MAJESTIC INDUSTRIES, INC.
212/594-7235 201/489-7100

WANTED

Data Processing Equipment
We can buy most surplus
computers/terminals/peripherals
OR
find what items you need
Give us a try — its FREE

Call John Pinzone

(214) 296-1981

U.S. BROKERS
P.O. Box 311
Duncanville, TX 75116

IBM UNIT RECORD EQUIPMENT

024 077 085 402 514 552 026
082 087 403 519 557 029 083
088 407 523 602 056 084 089
408 548 604 029 129

We Buy Sell or Lease
360s 1400s 1440s



Data
Automation
Company

Pioneers in the Computer Industry
National Disk Pack Center
(214) 637-6570
4858 Cash Road
Dallas, Texas 75247

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340's

IBM UNIT RECORD EQUIPMENT

026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557,

029-059-129

Call us for all your needs, we buy
rent and sell all types of IBM unit
record equipment. Over 12 years
of serving commercial and govern-
ment requirements. Contact ACS
for proposal.

7126 Mullins
Houston TX 77081
(713) 666-2122
TWX 910-881-1526

ACS
EQUIPMENT CORP.

CMI BUY LINES

BUY-SELL-LEASE-TRADE

3031/3032/3033

(Lease Only)

John Mills
(313) 642-8000

370/165 370/168

Bob Van Hellemont
(313) 642-8000

370/158

Ron Baker
(313) 642-8000

370/155

Gary Smith
(313) 642-8000

370
148/145/138/135

Pam Hoban
(313) 642-8000

370/115/125

Bob Southwell
(313) 642-8000

3420 3803

3333 3830

3330 3340

Darryl Hastings
(313) 642-8000

IN CANADA

IBM 360 370

Don DuPuis
Windsor, Ont.
(519) 258-8910

Ron Ridding
Toronto, Ont.
(416) 683-3704

Jacques Degenais
Montreal, Que.
(514) 374-5920

CMI Company

1403 2821

2501 1442

1443

If you rent any of these and
are returning them to IBM call
me. I'll show you how to
make money using your rental
credits. We buy and sell all of
these units.

Kathy Housey
(313) 642-8000

360
30/40/50/65

Gary Smith
(313) 642-8000

3270 CRT's

Printers/Controllers

1130
Call Jim Carlson
(313) 642-8000

System/3

Model 15
Jerry Roberts
(313) 642-8000

3742

3741

5496

Jerry Sharon
(313) 642-8000

360/20

083-029-059-026

Call Maria Bednerz
(313) 642-8000



The IBM Specialists

CORPORATION

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000



Member
Computer Dealers
Association

Wanted To Buy

3672-Memorex storage
control unit

3673-Memorex disc controller

3670-Memorex disc module

3675-Memorex disc module

Contact:

Harry Blair 713-524-1401

DEC HARDWARE

PDP 11 PDP 8
Processors Peripherals
Memories

VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES

Seekers and Sellers
(516) 585-0800

BUY SELL LEASE SYSTEM/3

Models 15, 10, 8, 6

Systems 32 & 34

All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298

Memphis, Tn. 38128

Phone 901/372-2622

Member CDA

BUY SELL LEASE -BROKERAGE

Buy sell lease sublease. We
your agent in placement of your
pre-owned IBM 360/370/System
3, or other unit.
COMPUTER INTERNATIONAL LTD
BEACH COMPUTER CORP
CWC Leasing Division
COMPUTER WHOLESALE CORP
(504) 581-7741

Suite 507 508 First National
Bank of Commerce Bldg.
New Orleans, LA 70112
Member Computer Dealers Association

SALE ALL IBM Unit Record Equipment

129 & 029's

East Coast

(717) 564-8870

West Coast

(415) 332-6265

Unit Record
Leasing Company
110 Hivista Rd.
Seasalt, CA.

BUY • SELL • LEASE

026 - 5 850	085 - 5 750
029 - 1850	088 - 2500
059 - 1375	129 - 3350
082 - 800	514 - 800
083 - 1800	548 - 1500
084 - 2500	552 - 900
	557 - 2800

MOHAWK-6401-6403 NCR-736

Want to buy IBM 029's, 129's, 3741's, 3742's

COMPLETE LINE BUSTERS, SHREDDERS,
DECOLLATORS AND BINDERS
ECONOMICAL LEASE PURCHASE PLANS

DP SERVICE INC.
CALL STAN PELC or NATALIE REYES
312-774-2556

5505 N. MENARD AVENUE, CHICAGO, ILLINOIS 60630



INDEPENDENT

WE BUY - SELL -
INSTALL & REPAIR
AT REASONABLE PRICES

HONEYWELL USED
SERIES 200 EQUIPMENT
COMPUTER SYSTEMS
PARTS - PERIPHERALS

Now in stock

2040-64K M7-32K M9
120-1250 - TAPE DRIVES
READERS, PRINTERS, PUNCHES
3200-131K Avail. 6/78

CALL NOW

Wilson Grabill (513) 674-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati, Ohio 45248

call... the
Matchmakers
BUYING • SELLING • LEASING • TRADING
1.800.654.9179
TOLL FREE!
COMPUTER
SALES INTERNATIONAL, INC.

efm computer
leasing, inc.



3000 Marcus Avenue
Lake Success, NY 11040
(516) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65

360/50 370/135

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115
370/125



ECONOCOM
1255 LYNNFIELD ROAD
P.O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE HEWLETT PACKARD 2000 ACCESS System

Dual HP 2108 Processors
64K Words Memory
5 Million Bytes of Disc
16 Ports
Paper Tape Reader

\$33,000
ALSO

HP 1000
Real Time Sys

2100 Processor
32K Words Memory
5 Million Bytes of Disc
Assorted I/F Cards
\$17,500

CALL
COMARCO INC.
(805) 488-6441
Ask for
BERNIE HEERE

FOR SALE BY OWNER

PDP 11/70 DA
AVAILABLE
IMMEDIATELY

PDP 11/70 64K
1 FP 11-C Floating Point
1 RMP04-AA Disk Drive
1 TNU1G-EA Tape Drive & Control
1 LP11-VA Printer & Control
6 DL11-E Modems
2 LA36 DEC Terminals
1 AR11-KT Analog Sub-system
(All Under Continuous
DEC Maintenance)
PRINCIPALS ONLY
For Full Particulars
Respond to
CW Box 1445
797 Washington St.
Newton, Mass. 02160

WANTED

RANDOLPH NEEDS:
3340-A2 DISKS
3420-3, 4 & 8
MODEL TAPE DRIVES
CALL: MIKE SEEKINGS
TOLL FREE
800-243-5308

RANDOLPH COMPUTER COMPANY
Division of Firstbank Financial Corporation
A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
537 Steamboat Rd., Greenwich, CT 06830 • (203) 661-4200

370/138
370/148
370/135
370/145

... and all other IBM systems ...
from S/3's and 115's ... to 168's
and all 303X CPU's or full systems.
Up to 3-year leases available.

CALL THE 370 HOTLINE
800-243-5307

Randolph Computer Company
537 Steamboat Rd., Greenwich, CT 06830
(203) 661-4200

GRAPHIC RESOURCES CORPORATION

The Graphics Specialists
Plotters-Sale, Purchase, Leasing
Plotter Supplies-Manufacturer
Plotter Re-Conditioning
Services & Parts
Interactive Graphic Systems
Line Printers
All Manufacturer's Equipment
Available

GRAPHIC RESOURCES CORP.
Offices Located In:
Los Angeles, Houston
Denver, Washington, D.C.
CORPORATE OFFICE:
(213) 598-3318 (714) 898-3584
5442 Research Drive
Huntington Beach, Calif. 92649
CALL OR WRITE FOR FREE
BROCHURES & SAMPLE
PLOTTER MATERIAL SWITCH

LIQUID COOLED MAIN FRAME USERS

We have a cooling unit for liquid
cooled CPU's that operates up to
50% cheaper than other available
units. Saves installation time and
money. Does not take up space in
computer room. Comes complete
with 100% back-up system.

CONTROLLED
ENVIRONMENT CORP.

640 Reynolds
Kansas City, KS 66101
(913) 342-3599

Over ten years experience in com-
puter room environments. Ask
about a heat recovery system for
your EDP site. Could save you a
small fortune in utilities.

JUDY WHITE'S SPECIAL SALE

MEMORY SALE

PDP11/03 &
LSI-11*

Sale prices good thru 3/10/78.
All items NEW unless otherwise noted.

	DEC List	NCE Price	SALE Price
Monolithic Systems			
8K RAM (quad board)	—	\$ 870	\$ 800
12K RAM (quad board)	—	1,094	1,025
16K RAM (quad board)	—	1,311	1,250
MMV11A			
4K Core (quad board)	990	941	850
MSV11B			
4K RAM (dual board)	625	594	535
MEV11C			
4K RAM (dual board)	625	450	425

Our usual 90-day parts & labor
warranty applies to these items.

*LSI-11 is a trademark of the Digital Equipment Corp.

NEWMAN COMPUTER EXCHANGE

(313) 994-3200

FOR SALE

370/155 Serial #10736

3155J
7855
3215I
1433
1434
1435

Proc. Unit
Adapter
Keybrd. Prntr.
Bl. Mul. Ch. #3
Bl. Mul. Ch. #4
Bl. Mul. Ch. #5

Available May 1, 1978
(No Core or D.A.T.
Associated with Sale)
Call or Write
Charles T. Hall
(513) 632-3201
Cinfil. Gas & Elec. Co
P.O. Box 980
Cinfil, Ohio 45201

For Sale Or Lease System 3/15 Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.
Also complete inventory tapes — disks.
Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

PREVIOUSLY OWNED EQUIPMENT & SYSTEMS N.C.R. & BURROUGHS

N.C.R. 31, 32 & 151 & 152 Teller Units
735/735 & 745 Mag. Tape Enc. & Line Printers
N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S

Also B-700 Thru B-4700 Systems w/wo Peripherals

WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS

BUYING OR SELLING—CALL US FIRST.

KEY EXIMPORT CORP.

256 LIVINGSTON ST. (P.O. BOX 129) NORTHVALE N.J. 07647
TELE. N.J. (201) 767-3444 N.Y.C. (212) 736-7736
TELEX 135149 CABLE KEYEXIMP NORTHVALE NJ

digital

Factory Refurbished Equipment

All quality tested and warranted
by the people who made them.

- Complete systems
- Processors
- Peripherals
- Accessories
- Complete Documentation

Digital Equipment Corporation
Traditional Products
125 Northeastern Boulevard
Nashua, New Hampshire 03060.

☐ Please send your complete product listing.

☐ Please call, I'm specifically interested in: _____

Name _____

Address _____

City _____

State _____

ZIP _____

Phone _____

CW2278

buy sell swap		buy sell swap		buy sell swap		buy sell swap		buy sell swap																																																																																																																																																																																																																																								
AVAILABLE NOW 370/125 CANADIAN SYSTEM LEASE OR SALE <table border="0"> <tr> <td>3125</td> <td>H2</td> <td>256K Memory</td> <td>S/N 10567</td> <td colspan="6"></td> </tr> <tr> <td></td> <td>4640</td> <td>ICA</td> <td></td> <td colspan="6"></td> </tr> <tr> <td></td> <td>4650</td> <td>ICA</td> <td></td> <td colspan="6"></td> </tr> <tr> <td></td> <td>4675</td> <td>3411 Attach</td> <td></td> <td colspan="6"></td> </tr> <tr> <td></td> <td>4680</td> <td>3504 Attach</td> <td></td> <td colspan="6"></td> </tr> <tr> <td>3340</td> <td>A2</td> <td>OASF</td> <td>S/N 25403</td> <td colspan="6"></td> </tr> <tr> <td>3340</td> <td>B2</td> <td>DASF</td> <td>S/N 24059</td> <td colspan="6"></td> </tr> <tr> <td>3411</td> <td>3</td> <td>Tape Unit & Control</td> <td>S/N 61012</td> <td colspan="6"></td> </tr> <tr> <td></td> <td>7361</td> <td>125 Attach</td> <td></td> <td colspan="6"></td> </tr> <tr> <td></td> <td>3221</td> <td>Dual Density</td> <td></td> <td colspan="6"></td> </tr> <tr> <td>3203</td> <td>2</td> <td>Printer: 1200 LPM</td> <td>S/N 10448</td> <td colspan="6"></td> </tr> <tr> <td>3504</td> <td>A1</td> <td>Card Reader</td> <td>S/N 10211</td> <td colspan="6"></td> </tr> <tr> <td></td> <td>6555</td> <td>Selective Stacker</td> <td></td> <td colspan="6"></td> </tr> </table> 370/135, 138, 145 AND PERIPHERALS AVAILABLE NOW Computer Systems of America, Inc. Marv Berger Computer Systems of America, Inc. (617) 482-4671 or (800) 225-2036										3125	H2	256K Memory	S/N 10567								4640	ICA									4650	ICA									4675	3411 Attach									4680	3504 Attach								3340	A2	OASF	S/N 25403							3340	B2	DASF	S/N 24059							3411	3	Tape Unit & Control	S/N 61012								7361	125 Attach									3221	Dual Density								3203	2	Printer: 1200 LPM	S/N 10448							3504	A1	Card Reader	S/N 10211								6555	Selective Stacker								SELL NEW • REBUILT TELETYPE MODELS 43-33-32 NATIONAL TELETYPEWRITER CORP. 207 Newtown Rd. Plainview, N.Y. 11803 (516) 293-0444										IBM UNIT RECORD EQUIPMENT <table border="0"> <tr> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> </tr> <tr> <td>024</td> <td>\$ 300</td> <td>\$20/Mo.</td> <td>082</td> <td>\$ 850</td> <td>\$ 35/Mo.</td> <td>407</td> <td>\$1800</td> <td>\$ 80/Mo.</td> </tr> <tr> <td>026</td> <td>\$ 900</td> <td>\$35/Mo.</td> <td>083</td> <td>\$1800</td> <td>\$ 60/Mo.</td> <td>514</td> <td>\$ 800</td> <td>\$ 45/Mo.</td> </tr> <tr> <td>029</td> <td>\$1800</td> <td>\$55/Mo.</td> <td>084</td> <td>\$2500</td> <td>\$100/Mo.</td> <td>519</td> <td>\$1000</td> <td>\$ 55/Mo.</td> </tr> <tr> <td>046</td> <td>\$1200</td> <td>\$50/Mo.</td> <td>085</td> <td>\$1200</td> <td>\$ 60/Mo.</td> <td>526</td> <td>\$1400</td> <td>\$ 70/Mo.</td> </tr> <tr> <td>047</td> <td>\$1500</td> <td>\$60/Mo.</td> <td>088</td> <td>\$2500</td> <td>\$175/Mo.</td> <td>548</td> <td>\$1600</td> <td>\$ 60/Mo.</td> </tr> <tr> <td>056</td> <td>\$ 250</td> <td>\$15/Mo.</td> <td>129</td> <td>\$3400</td> <td>\$105/Mo.</td> <td>552</td> <td>\$1000</td> <td>\$ 40/Mo.</td> </tr> <tr> <td>059</td> <td>\$1400</td> <td>\$50/Mo.</td> <td>402</td> <td>\$1200</td> <td>\$ 60/Mo.</td> <td>557</td> <td>\$3000</td> <td>\$100/Mo.</td> </tr> <tr> <td>077</td> <td>\$ 450</td> <td>\$25/Mo.</td> <td>403</td> <td>\$1500</td> <td>\$ 70/Mo.</td> <td></td> <td></td> <td></td> </tr> </table> THOMAS COMPUTER CORPORATION 600 N. McClurg Court - Suite 4202 Chicago, Illinois 60611 (312) 944-1401 116 Harbor Island Rd. Newport Beach, CA 92660 (714) 675-2810										MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE	024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.	026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.	029	\$1800	\$55/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.	046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.	047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.	056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.	059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.	077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.			
3125	H2	256K Memory	S/N 10567																																																																																																																																																																																																																																													
	4640	ICA																																																																																																																																																																																																																																														
	4650	ICA																																																																																																																																																																																																																																														
	4675	3411 Attach																																																																																																																																																																																																																																														
	4680	3504 Attach																																																																																																																																																																																																																																														
3340	A2	OASF	S/N 25403																																																																																																																																																																																																																																													
3340	B2	DASF	S/N 24059																																																																																																																																																																																																																																													
3411	3	Tape Unit & Control	S/N 61012																																																																																																																																																																																																																																													
	7361	125 Attach																																																																																																																																																																																																																																														
	3221	Dual Density																																																																																																																																																																																																																																														
3203	2	Printer: 1200 LPM	S/N 10448																																																																																																																																																																																																																																													
3504	A1	Card Reader	S/N 10211																																																																																																																																																																																																																																													
	6555	Selective Stacker																																																																																																																																																																																																																																														
MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE																																																																																																																																																																																																																																								
024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.																																																																																																																																																																																																																																								
026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.																																																																																																																																																																																																																																								
029	\$1800	\$55/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.																																																																																																																																																																																																																																								
046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.																																																																																																																																																																																																																																								
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.																																																																																																																																																																																																																																								
056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.																																																																																																																																																																																																																																								
059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.																																																																																																																																																																																																																																								
077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.																																																																																																																																																																																																																																											
BUY-SELL TRADE For Computer Call Action Write CAC P.O. Box 80572 Atlanta, Ga. 30366 404/458-4425										WANTED ALL 360/370 SYSTEMS AND SYSTEM/3 AND PERIPHERALS WE BUY • SELL • LEASE • TRADE transdata P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647																																																																																																																																																																																																																																						

dataserv

buy • sell • lease • trade

370
 115/125/135
 Steve Locny
 800-328-2406

For Sale or Lease
 Any 115/125 configuration
 Sending 115/125
 Back to IBM

Call us! We'll show
 you how to make money
 using your rental credits.

370
 138 THROUGH 158
 Dave Miller
 616-637-8481

For Sale or Lease
 138 - 145 - 155
 CPUs — Peripherals —
 Memory
370/145-H

7855
 8810
 6982
 6983
 3215 Console
 3047 Power Units

370
 Peripherals
 800-328-2406
 Tom Anderson

Avail. Now **WTB**
 3203-02 3272, 3271
 3340-B2 3277, 3420
 3410/3411 3803, 3830
 3505/3525

STOP! Before you send
 any of the above machines
 back to IBM call us. We'll
 show you how to make
 money.

360
 CPUs and Peripherals
 Neal Johnson
 800-328-2406

For Sale or Lease
 360/30-40-50-65s
 CPU — Peripherals —
 Memory

We'll Buy
 Any 360 CPU
 IBM Peripheral
 Non-IBM Periph/Memory

Sys/3
 CPUs and Peripherals
 800-328-2406
 SYS/32's

SYSTEM/3
5410-5415
SYSTEM/32
SYSTEM/34
ALL MODELS

Deliver Positions

Call Toll Free 800-328-2406
or 612-544-0335

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd
 P.O. Box 9488, Minneapolis MN 55440

PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS

Bob Russell
 Jack Emery
 Dava Hepburn
 Paul Beattie

SYSTEMS MARKETING, INC.
 200 E. Thomas Road
 Phoenix, Arizona 85012
 (602) 264-5600 Telex 607134

SALE
 or short or long-term
LEASE
IBM 3271s, 3272s, 3277s

write or call
METROPLEX COMPUTER COMPANY, INC.
 Suite 1208 Honeywell Bldg
 1111 W. Mockingbird Lane
 Dallas, Texas 75247 TWX 910-861-4171
 (214) 634-2750

PRINTERS

SUCH A DEAL!!
Unopened - Still
in Cartons
Ten Okidata CP110
Will Sacrifice!!
CALL KATHY
COLLECT
(615) 367-2000

The Logical Choice
BUYING SELLING
LEASING

360/30-40-50-65s
CPU — Peripherals
AND SYSTEM/3

3340 A02, 8023303-1, 11 5410-A14
 3830-2 3333-1 11 3971
 3420-4, 6, 6 3420-3, 5 4100
 3330-1, 11 3410's 6378
 3420-3, 5, 7 1403's 5424-A1
 3803-1, 2 3420's 5203-2
 2501's 5560
 2401's 6444-2
 5444-2

DATA AUTOMATION CO., INC.
 4858 CASH ROAD
 DALLAS, TEXAS 75247



AC 214 637-6570

BROKER
IN
DEC COMPUTER
SYSTEMS AND
COMPONENTS

C.D. SMITH
 730 N. Post Oak Road
 #301
 Houston, Texas 77024
 (713) 686-9405

For Immediate Lease or Sale
138's, 148's
3203-4's
3033 (11/78, 2/79)
(Lease Only)

BARRETT
CAPITAL
& LEASING
CORPORATION
 14 Redwood Road
 White Plains, N.Y. 10605
 (914) 761-0070

THIS IS NOT A REQUEST FOR
PROPOSALS OR AN INVITATION FOR BIOS

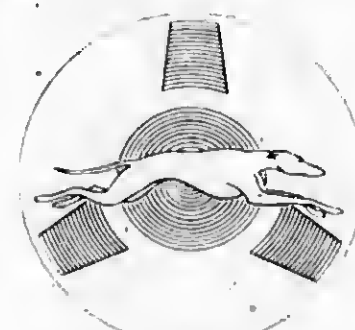
The State of California Department of Health Services is planning to implement an automated organizational and program cost accounting information system. This system will require the following capabilities consistent with GAFFR principles:

- Capability to maintain appropriation, program, and organizational cost information
- Ability to provide direct, indirect, and overhead cost distributions using several rates
- Accounting for reimbursements and collections
- Integrating fund, general ledger, and appropriation revenue and subsidiary ledgers
- Preparing fund cash reports and cash projections by period
- Providing timely financial information for program budgeting and evaluation
- Federal grant accounting

This is a request for information to those vendors interested in bidding subsequently on providing software systems whether proprietary or in the public domain which could meet the above needs. If your firm has a package which could meet these needs, information about your system and its capabilities should be directed to the attention of:

STATE OF CALIFORNIA DEPARTMENT OF HEALTH
Accounting Systems Development
 714 P Street, Room 1092, Sacramento, CA 95814

If you wish to be considered on any future procurement for professional software services, please notify the above agency.



GO GREYHOUND

When you plan to
Buy or Sell your
Computer Equipment

For complete information
call the Greyhound Repre-
sentative in your area.

FOR SALE

3145-HO
360/65J

U.S.

Home Office
New York
Chicago
Dallas
San Francisco

T.A. Takash
Dick Ventola
Pete Ahern
M.W. "Bill" Tucker
Henry Paulson

602-248-6037
914-949-1615
312-298-3910
214-233-1818
415-283-8980

INTERNATIONAL

Canada
U.K./Europe
Mexico
Austro-Asia
Eurasie

Don Maunder
Joe Gold
Andres Contreras
John Hallmark
Don Haworth

418-366-1513
022-61-27-54
905-543-6850
214-233-1818
214-233-1818

NON IBM

Dallas

John Hallmark

214-233-1818

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Data Systems Marketing Delivery from Stock

Microcomputer Systems

Digital: PDP 11/03 Family with Both Floppy and Hard Disks.
VT-7B Micro 8, Word Station 78
Data General: Micronova Family

Printer Terminals

Digital: LA-36, LA-35, LA-180, LS-120
Teletype Model 43
Data General: Dasher 50 and 60 CPS
Diablo: Hyterm 1620 and 1610
Lear Siegler: Hydra Series 200 180 CPS
Texas Instruments: 743, 745, 810

Video Terminals

Lear Siegler: ADM-3A, ADM-2, ADM-2B, ADM-1A, VDP-400
User Programmable

ADD5: Regent 100 and 200

Digital: VT-52

Data General: Dasher 6053 and 6052

Data Communications and Accessories

DSM: Acoustic Couplers, 103F, 113A, 113B
General Data Comm: 1138 Direct Connect, Frequency Division
Multiplex Equipment

Sykes: Single and Dual Drive RS-232 Floppy Disk, IBM 5100
Compatible Floppy Disk

Techtran: 815, B410, B400, B420, B421 Single and Dual Cassette
Systems

Software

General Purpose: Disk Operating System, Fortran and Business
Basic for PDP 11/03 and Micronova Families

Distributed Processing: Remote Job Entry, Asynchronous and
Bisync Communication for PDP 11/03 and Micronova
Families

Business: Public Accountant Client Write Up and Complete Set
of Business Accounting Packages for PDP 11V03

Call 714-560-9222, 800-532-3717 (California)
or 800-854-2684 for OSM Showroom Nearest You

Sale or Lease

- 3420 Tapes
Single & Dual Density
- 3271/002
Controller LWI
minimum of
6 CRT's
- 3410/3411
TAPE & CONTROL
- 129-3 Key Punches

Purchase Lease/Back
Plans on All IBM
I/O. Avail.



383 LAFAYETTE ST. N.Y. 10003
212-673-9300

For Sale or Lease

370/168

with attached
processor
July, 1978

Call
R. Van Hellemont
(313) 642-8000
CMI Corporation

★ NEW DG NOVA 3/12's

WITH BATTERY BACKUP AND
AUTO PROGRAM LOAD
AND RESTART
NEW DG MEMORY
32 OR 16 KB

IMMEDIATE DELIVERY WITH
22% DISCOUNT

CALL CLARK & ASSOC.
(816) 741-3183

WANTED

029-129

We Buy
Rental Credit Machines.
Continue to Rent at A
Discount From IBM Prices.
Call Bob Stackhouse

Data Rentals/Sales

(213) 559-3822

FOR SALE OR LEASE

SYSTEM 3/10

24 K
5203 Mod. 002
5410 Mod. A15
5424 Mod. A01
5444 Mod. 002
5444 Mod. 003
5471 Mod. 001

SYSTEM 7

12 K
5010 Mod. A12
5013 Mod. A01
5022 Mod. 001
5026 Mod. C03
5028 Mod. 001

FOR SALE

75 pack 4-hour
Diabold safe
(6' by 6' by 3')
20 pack 4-hour
Shaw-Walker safe
(36" by 36" by 36")
Misc. file
cabinets and supplies

43215 (614) 228-6531

We are buying, selling, & leasing!

Buying: 3830, 3420, 3330, 3333
Selling: 360/65, 360/40
Leasing: 360/65, 370/135

Please contact:

Linda Vaughn / (415) 955-0220

Tommy Talbot / (415) 955-0238

ITEL

CORPORATION
Data Products Group

BUY

Surplus DEC And Data General Hardware

SELL

PHIL THOMAS

For Sale

(305) 272-8753

Thomas Business Systems, Inc.

FOR SALE OR LEASE Immediately Available

IBM 3330/001's

IBM 3330/011's

IBM 3333/011's

with features #8150

Contact: Harry Blair 713-524-8249

155's

BUY-SELL-LEASE CMI CORPORATION

GARY SMITH — 313-642-8000

TOTAL OUTPUT SERVICE

DIRECTLY FROM
YOUR TAPES

Delivered in Hours!!

- XEROX 1200 8-1/2 x 11 Hard Copy
- Computer Graphics
- Full Kodak KOM-85 Service
- Round-the-clock operation: 24-hrs. a day/7 days a week!

Call Joel Cartun
(212) 669-0640

COMVESTRIX

The Output People
1500 B'way, NYC 10036

MINICOMPUTERS & SYSTEMS

Don't waste company time or money. Check with us before you buy or sell.

New DEC Equipment
Immediate Delivery

RK11-RK05 Disk Systems -

\$6500

PDP 11/04s and 11/34s - 20% off

list

DZ 11

DEC Station 78

New DG Equipment

Immediate Delivery

DG 10 Mbyte Disk Systems from

\$7500

DASHERS - 15% to 25% off list

Nova 3/12 or 3D - 20% off list

Immediate delivery for MOS!

Inventory Clearance

call us for free brochure

MINICOMPUTER EXCHANGE

(408) 733-4400

TWX 910-339-9272

CONVERTING?



Try the experts. DASD Corporation encourages test evaluations of all of our language translators.

RPG/RPG II to COBOL (OOS or OS) will accept all types of RPG and produce ANS COBOL. Most translations are 100% error free. Our modular, COBOL simplifies maintainability.

SYSTEM/3 COBOL to OS COBOL makes this tedious, redundant conversion completely automatic. We're 97% clean, which frees a lot of man hours for more important tasks.

DOS COBOL to OS COBOL is basically a difference of syntax, but may mean a lot of wasted man hours.

GE MAP to OS COBOL will allow immediate upgrade of your GE 400 series to full ANS COBOL.

360/20 BAL to 360/370 OS ALC is an extremely solid product eliminating a monotonous programming job.

DASD TRANSLATORS SAVE TIME AND MONEY

Many service options are available: lease, conversion only, conversion and clean compile, full conversion responsibility including testing and JCL.

For a prompt solution to your conversion problems, write or call today.

DASD CORPORATION

National Marketing
1480 Renaissance Drive—Suite 315
Park Ridge, Illinois 60068
312/299-5005



software for sale

software for sale

software for sale

software wanted

TONE 3

The only
TSO for VS1
Redesigned to eliminate
TCAM and the staggering
overhead of user swapping

ISP

(Intersystem Spool)
Processor

System-to-System
Communication for VS1

(Write or phone for details)

TONE

Software Corp.

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

**ACCOUNTING SOFTWARE
FOR DEC RSTS/E OR
CTS-500 USERS**

From one of the pioneers in commercial data processing using RSTS. Completely on-line, interactive systems available for ACCOUNTS-PAYABLE, GENERAL-LEDGER, FINANCIAL-REPORTING, ACCOUNTS-RECEIVABLE and PAYROLL applications.

These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

If you are installing or have installed a Digital Equipment Corporation RSTS/E or CTS-500 system, contact us for cost-effective solutions to your core accounting problems.

Plycom services, Inc.

(219) 936-2183
P.O. Box 160
Plymouth, IN 46563

**MEDICAL/DENTAL
BILLING**

Complete Billing and Insurance Processing for doctors, groups and clinics.

- Complete Insurance Forms
- Profile, RVS, ICD-9 Files
- Bal. Forward, Ledger
- COBOL or RPG II
- 30+ users
- 360/370 or mini-computers
- On line, Real-Time or Batch Processing

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our translators, write or call today

Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

**HEWLETT PACKARD
3000 Series II Model 6**

OEM Demonstrator System For Sale
(Getting A Bigger HP)

New Equipment Investment Tax Credit
HP Installation & Warranty Included
Application Software Also Available

CMC Associates 617-266-4933
Contact: Marketing 755 Boylston St., Boston, MA 02116

ACCOUNTS PAYABLE

Many system features including:

- Auto. discount calculation
- Cost center reporting
- G/L interface tape
- Check reconciliation
- Written in COBOL
- Single data base
- Audit trail & file control
- 3 manuals & 3 yr. warranty
- Batch mini or main frame
- Low purchase price or rent.

Write or call for more information

LEGLER SYSTEMS COMPANY
23 Charles Hill Road
Orinda, CA 94563
(Est. 1972) (415) 254-1264

RPG II SYSTEMS

- *A/R-OPEN ITEM OR B/F
- *ACCOUNTS PAYABLE
- *GENERAL LEDGER
- *PAYROLL AND LABOR DIST.
- *INVENTORY
- *CREDIT UNION MAILING, ETC

Extensive Documentation Provided

Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

Blue Chip Software

Lots of blue chip companies use our software systems for one simple reason: blue chip performance.
May we tell you more?

MCCORMACK & DODGE CORPORATION
381 Elliot Street, Newton Upper Falls, MA 02164, (617) 964-6610

Please send me more information on the system(s) I have checked.

- ☐ General Ledger ☐ Purchasing
☐ Fixed Assets Analysis ☐ Construction in Progress
☐ Accounts Payable

Name _____

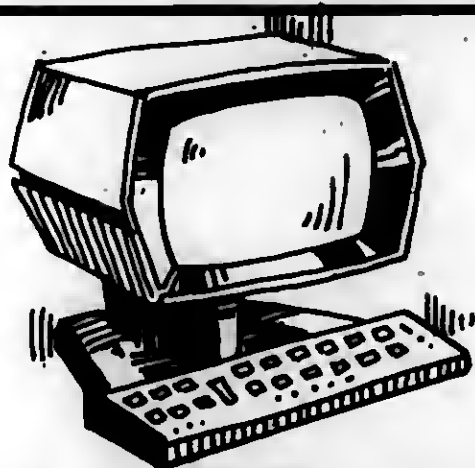
Title _____

Company _____

Computer _____

Address _____

City _____ State _____ Zip _____



**CICS
USERS**

DASD's new utility map generator (MAPGEN) will increase your BMS coding productivity by at least 75%.

MAPGEN is not a new language. It is a system where the completion of a simple specification form will greatly improve accuracy by eliminating unnecessary data, add flexibility and greatly simplify maintenance. All DFHMSD, DFHMDI and DFHMOD macro source statements are program generated.

A hard copy image of each screen is automatically printed at the time the map is defined.

'Map build' features aid in the use of extended features under CICS/VS.

Call or write today

DASD CORPORATION
National Marketing
1480 Renaissance Drive — Suite 315
Park Ridge, Illinois 60068
312/299-5005

**SOFTWARE
WANTED****WANTED
RPG II
FOR 6800**

CW Box 1460
797 Washington St.
Newton, MA 02160

TIME

&

SERVICES**NATIONAL DATA
SYSTEMS, INC.**

RSX-11M
SYSTEMS DESIGN
CONSULTING/PROGRAMMING
APPLICATIONS:

- Online
- Teleprocessing
- Point of Sale
- Business
- Scientific
- Real Time

Turnkey Systems Installed
Call Roy S. Nicolosi:
(201) 843-5300

CONNECTICUT
Corporate Data Center
OS VS 1
370/158
3330 3330-11 3340

**LONG TERM
RJE USER
DESIRED**

RTAM EP/3705 VTAM
NCP/3704, SOLC for Distributed
Processing, Excellent Technical
Support, Very Reasonable Rates.
CALL (203) 579-8158 For Details

**TIME AVAILABLE
370/135
DOS/VS**

Up to 8 hours 2nd shift
some first shift available.

Attractive Rates
192K, 2-3420,
5-3330, 2-1403 N1

Commonwealth Avenue

Across from Armory

Contact:

Jo-Ann Fanti

(617) 738-6410

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI,
Data Craft, Data General, CDC,
DEC, EMM, Fabri-Tek, Honey-
well, GAI, HP, Interdata, Lock-
heed, Plessey, NCR, SMI, Univac,
Microdata, Varian, XDS.

Any Manufacturer's Memory

THREE DELTA CORP

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

**REMOTE
JOB ENTRY****PHOENIX HECHT**

- IBM 370/158-3
- Nationwide Incoming Watstones
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, HASP, INTERCOMM, ROSCOE
- Complete data security including off-site storage

For information
call John MacGougan
at (312) 861-7100

PHOENIX HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

**COMPUTER
TIME**

RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 15511
360/30

- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

WE ARE

**BROKERS OF
COMPUTER
TIME**

New York & New Jersey Only

Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

**370/158 mod 3
Datacenter**

3.5 meg MVS
Specializing in
Remote Job Entry
TSO, CICS, and Batch,
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Kerlevsky
(212) 564-3030

Datamor

132 West 31 St.
New York, N.Y. 10001

I.B.M. 360-40

All Shifts 128K, 4-2401
MOD-2, 9-2314, 1403-N1,
2540, 1401 Compatibility.

From \$35/Hour

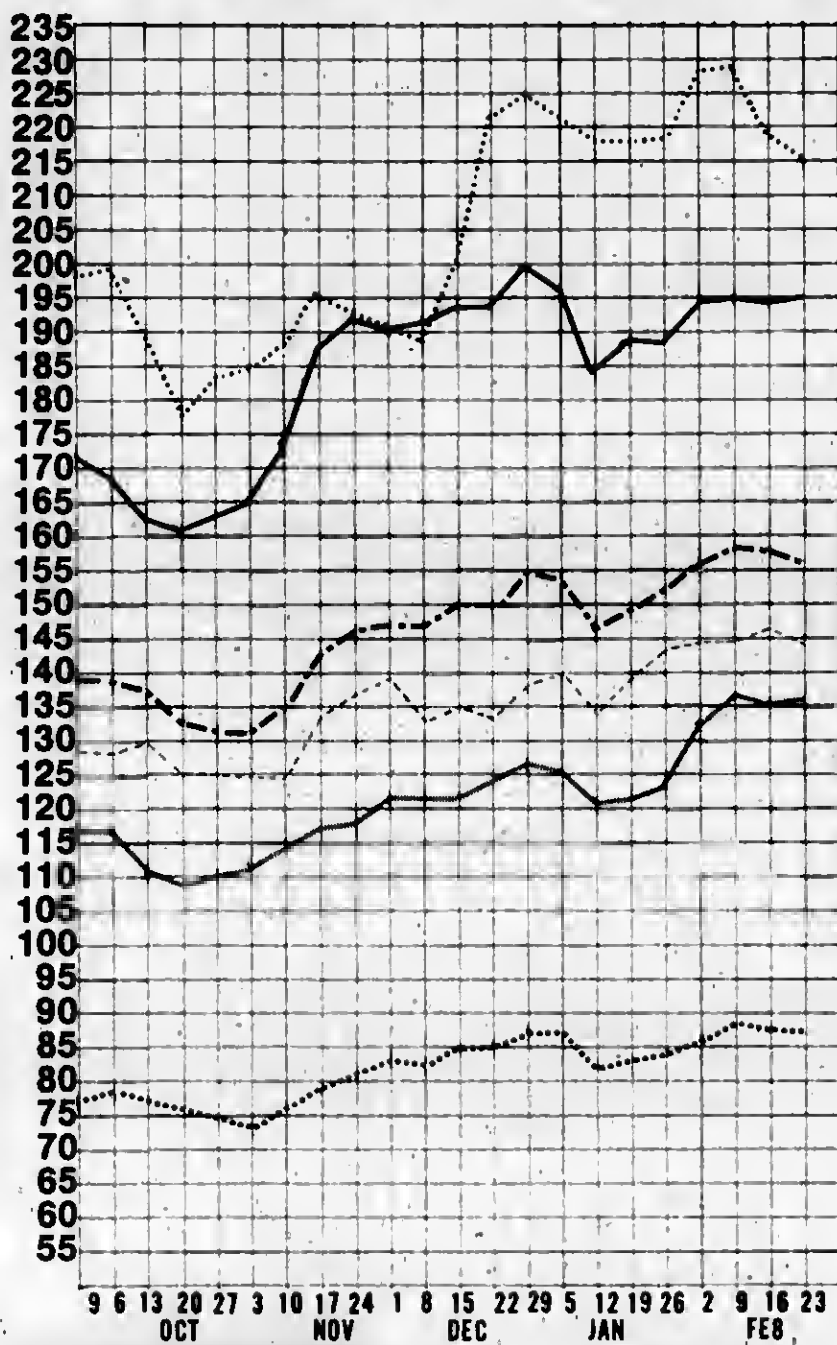
Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036

Contact:

Al Pelmo (212) 997-1413
Charles Leigey (212) 997-1411

COMPUTERWORLD Computer Stocks Trading Indexes

— Computer Systems — Software & EDP Services
 Peripherals & Subsystems Leasing Companies
 — Supplies & Accessories — CW Composite Index



Earnings Reports

ELECTRONIC DATA SYSTEMS

	1977	1976
Shr Ernd	\$37	\$33
Revenue	\$9,874,000	\$8,444,000
Earnings	4,774,000	4,030,000
6 Mo Shr	.71	.59
Revenue	\$9,090,000	\$12,150,000
Earnings	0,058,000	7,338,000

ITEL

	1977	1976
Shr Ernd	\$3.11	\$2.30
Revenue	\$1,800,000	\$260,100,000
aSpec Cred	800,000	
Earnings	31,500,000	18,100,000
3 Mo Shr	1.13	.82
Revenue	\$138,500,000	\$78,700,000
Earnings	\$11,800,000	\$5,900,000

a-Consists of \$1.9 million gain from accounting change, less a \$1,100,000 loss from redemption of debentures.

LOGICON

	1977	1976
Shr Ernd	\$2.27	\$6.60
Revenue	\$8,905,000	\$7,674,000
Earnings	242,000	\$17,000
9 Mo Shr	.90	1.18
Revenue	\$24,262,000	\$21,538,000
Earnings	\$13,000	\$1,018,000

SOLO Automated Systems

	1977	1976
Shr Ernd	\$1.17	\$1.15
Revenue	\$8,338,000	\$2,609,000
Earnings	\$3,570,000	\$3,441,000

TEC

	1977	1976
Shr Ernd	\$2.24	\$3.35
Revenue	\$3,183,538	\$3,128,501
Earnings	196,173	288,680
6 Mo Shr	.37	.60
Revenue	\$5,795,105	\$5,733,288
Earnings	\$304,964	\$490,330

a-Adjusted for a 20% stock dividend in January 1977.

Computerworld Sales Offices

Vice-President/Marketing
 Roy Einreinhofer
 Advertising Administrator
 Terry Williams
 COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800
 Telex: USA-92-2529

Boston
 Robert Ziegel
 Northern Regional Manager
 Mike Burman
 Frank Collins
 Account Managers
 COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800

New York
 Donald E. Fagan
 Eastern Regional Manager
 Frank Gallo
 Account Manager
 COMPUTERWORLD
 2125 Center Avenue
 Fort Lee, N.J. 07024
 Phone: (201) 461-2575

San Francisco
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Donna Dezalan
 Account Coordinator
 COMPUTERWORLD
 353 Sacramento Street
 Suite 600
 San Francisco, Calif. 94111
 Phone: (415) 421-7330

Los Angeles
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Judy Milford
 Account Coordinator
 COMPUTERWORLD
 1434 Westwood Boulevard
 Los Angeles, Calif. 90024
 Phone: (213) 475-8486

Japan
 Mr. Shigemasa Takahashi
 General Manager
 DEMPA/COMPUTERWORLD
 1-11-15 Higashi Gotanda
 Shinagawa-ku, Tokyo 141
 Japan
 Phone: (03) 445-6101
 Telex: J2424461

United Kingdom
 Tony Vickers
 IDG PUBLISHING LTD.
 140-146 Camden Street
 London NW1 9PF
 England
 Phone: (01) 267-1201
 Telex: UK-264737

West Germany
 Hans-Jürgen Ballnath
 COMPUTERWORLD GmbH
 8000 Munich 40
 Tristenstrasse 11
 West Germany
 Phone: (089) 36-40-36
 Telex: W.Ger-5-215250-IKFD



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 22, 1978

All statistics compiled,
 computed and formatted
 by
 TRADE QUOTES, INC.
 Cambridge, Mass. 02139

F X C H	PRICE				F X C H	PRICE				F X C H	PRICE						
	1977-78	CLOSE	WEEK	WEEK		1977-78	CLOSE	WEEK	WEEK		1977-78	CLOSE	WEEK	WEEK			
	RANGE	FEB 22	NET	PCT		RANGE	FEB 22	NET	PCT		RANGE	FEB 22	NET	PCT			
111					111					111							
1978					1978					1978							
CHNGE					CHNGE					CHNGE							
COMPUTER SYSTEMS					SOFTWARE & EDP SERVICES												
A	AMDHL CORP	22-55	47 1/2	+1 1/2	+1.0	N	ADVANCED COMP TECH	0-2	1 3/8	-3/8	-21.4	N	DATA ACCESS SYSTEMS	4-5	3 1/2	0	0.0
N	PURPUGH'S CORP	55-91	59 7/8	-1 1/2	-2.4	N	ANACOMP INC	7-10	8 3/4	-1/4	-2.7	N	DATA 100	6-11	9 3/4	+1/4	+2.6
N	COMPUTER AUTOMATION	18-30	24 1/2	+1 1/4	+5.3	A	APPLIED DATA RES.	5-10	8 1/2	-3/8	-4.2	A	DATA PRODUCTS CORP	9-19	15 3/8	+1/8	+0.8
N	CONTROL DATA CORP	20-29	23 3/8	-5/8	-2.6	N	AUTOMATIC DATA PROC	23-30	23 3/4	-3/8	-1.5	N	DATA TECHNOLOGY	3-4	4	-1/4	-5.8
N	CRAY RESEARCH INC	15-31	27	-3/4	-2.7	N	COLEMAN AMERICAN COS	1-2	1 3/8	-3/8	-21.4	N	DATUM INC	1-3	2 1/2	+1/8	+5.2
N	DATA GENERAL CORP	35-54	42 3/4	-3/4	-1.7	N	COMPU-SERV NETWORK	9-15	9 1/2	+1/4	+2.7	N	DECISION DATA COMPUT	2-3	2	0	0.0
N	DATAPoint CORP	18-41	38 1/4	+3/8	+0.9	C	COMP ELECTION SYSTEMS	6-10	9	-1/8	-1.3	N	DELTA DATA SYSTEMS	1-1	3/8	0	0.0
N	DIGITAL EQUIPMENT	37-53	39 1/4	-5/8	-1.5	N	COMPUTER HORIZONS	1-2	2	-1/4	-11.1	A	EDUCATION INC	6-12	11 1/2	0	0.0
N	ELECTRONIC ASSOC.	2-4	3 5/8	+3/4	+26.0	C	COMPUTER NETWORK	6-11	8 1/2	-1/2	-5.5	N	DATARAM CORP	2-24	16 3/4	-1 1/4	-6.9
A	ELECTRONIC ENGINEER	8-16	13 5/8	-1/8	-0.9	N	COMPUTER SCIENCES	7-10	8 3/4	-1/4	-2.7	N	ELECTRONIC M & M	4-5	4	-1/4	-5.8
N	FOUR-PHASE SYSTEMS	13-23	21 3/8	-3/4	-3.3	N	COMPUTER TASK GROUP	1-2	1 1/2	+1/8	+9.0	N	FARRI-TEK	1-2	1 1/8	0	0.0
N	FOXBORO	28-54	29 1/2	-7/8	-2.8	C	COMPUTER USAGE	1-3	1 3/4	+1/8	+7.6	N	GENERAL COMPUTER SYS	0-2	1 1/4	-1/4	-16.6
N	GENERAL AUTOMATION	6-9	7 1/2	-1/4	-3.2	N	COMSHAPE	5-9	8 1/4	0	0.0	N	HAZELTINE CORP	8-12	10 3/4	+7/8	+8.8
N	GRI COMPUTER CORP	1-1	1	0	0.0	N	DATA DIMENSIONS INC	3-5	4 1/8	-1/8	-2.5	N	HARRIS CORP	28-47	42 1/4	+3/8	+0.8
N	HEWLETT-PACKARD CO	63-81	63 5/8	-7/8	-1.3	N	DATATAR	1-2	1 1/4	0	0.0	N	INFOEX INC	4-8	7 5/8	+1/8	+1.6
N	HONEYWELL INC	43-55	44	+3/8	+0.8	N	ELECTRONIC DATA SYS.	14-20	16 7/8	-1/8	-0.7	N	INFORMATION INTL INC	8-14	8	-1/2	-5.8
N	IBM	245-286	254 3/4	-2 1/2	-0.9	N	INSYTE CORP	2-3	1 1/4	-1/8	-9.0	N	INTEL CORP	38-57	39 1/2	-1/2	-1.2
N	MANAGEMENT ASSIST	5-11	10 1/8	-1/8	-7.9	C	IRS COMPUTER MARKET	1-2	2 1/4	0	0.0	A	LUNDA ELECTRONICS	3-6	4 3/4	0	0.0
N	MICRODATA CORP	1-18	12 3/4	+1/8	+1.3	N	KEANE ASSOCIATES	3-4	3 5/8	-3/8	-9.3	N	MSI DATA CORP	6-15	12 1/2	0	0.0
N	MINI-COMPUTER SYST	5-12	5 3/8	+1/8	+2.3	N	KEYDATA CORP	1-3	1 3/8	0	0.0						
N	MODULAR COMPUTER SYS	5-9	9 1/8	+3/8	+4.2	A	LOGICON	7-17	13 5/8	-1/8	-0.9	N	MEMOREX	23-34	27 7/8	+1 1/8	+4.2
N	NCR	32-47	40 1/8	-1/2	-1.2	A	MANAGEMENT DATA	1-2	7/8	-1/8	-12.5	N	MINIMAX DATA SCI	5-8	7 1/4	-1/8	-1.6
N	PRIME COMPUTER INC	12-25	24 3/8	-1/8	-0.5	A	NATIONAL CSS INC	10-18	17 5/8	+1	+6.0	N	PENFIL CORP	2-6	5	-1/4	-4.7
N	PERKIN-ELMER	17-22	17 1/4	-1 1/8	-6.1	A	NATIONAL DATA CORP	4-8	7 3/4	+1/2	+6.8	N	PERITEC CORP	7-11	9 7/8	0	0.0
N	RAYTHEON CO	16-35	30 3/4	-1/2	-1.5	A	ON LINE SYSTEMS INC	16-23	21 3/8	+7/8	+4.2	A	POTTER INSTRUMENT	2-2	1 3/4	0	0.0
N	SPERRY RAND	30-42	33 1/4	-1/8	-0.3	N	PLANNING RESEARCH	3-6	4	0	0.0	N	PRECISION INST.	2-7	2	0	0.0
N	SYCORP INC	8-21	20 1/8	-1/8	-0.6	N	PROGRAMMING & SYS	1-1	5/8	0	0.0	N	QUANTOP CORP	3-5	3 3/4	-1/8	-3.2
A	SYSTEMS ENG. LABS	5-13	12	+1/8	+1.0	N	RAPIDATA INC	2-3	3 1/4	+1/4	+8.3	C	RECOGNITION EQUIP	6-10	7 3/4	-5/8	-1.4
A	WANG LABS.	10-14	12 1/4	-1/2	-3.9	N	REYNOLDS & REYNOLDS	17-21	18	-3/4	-4.0	N	SCAN DATA	1-2	1 1/8	0	0.0
						N	SCIENTIFIC COMPUTERS	1-4	2 3/4	-1/8	-4.3	N	STORAGE TECHNOLOGY	10-25	25 1/4	+2 1/8	+9.1
						N	TMSHAP INC	14-23	21	0	0.0	N	T-RAP INC	7-15	14 5/8	+3/8	+2.6
						A	URS SYSTEMS	4-6	5 1/4	-1/4	-4.5	A	TALLY CORP.	4-6	6 3/8	+1/2	+8.5
						N	WYLY CORP	1-2	1/2	0	0.0	N	TFC INC	6-13	6 3/8	-1/4	-3.1
												N	TEKTRONIX INC	29-40	34	-1/4	-0.7
												N	TEFY	2-4	3 3/8	-1/8	-3.5
												C	TISDATA SYSTEMS (P	13-20	14 1/4	-1/4	-1.7
												N	WILTEK INC	1-1	1/2	0	0.0
SUPPLIES & ACCESSORIES																	
A	ALANTHUS CORP	3-6	5 5/8	0	0.0	N	ADDRESSOGRAPH-MULT	10-16	15 1/4	-3/8	-2.3	A	AMERICAN BUS PRODS	6-8	7 1/4	0	0.0
C	BOOTH COURIER CORP	8-14	16	0	0.0	N	ADVANCED MEMORY SYS	7-9	8	-1/4	-3.0	N	BALTIMORE BUS FORMS	1-4	2	+1/8	+6.6
C	COMDISCO INC	10-16	9 3/4	0	0.0	N	AMPEX CORP	8-13	12 3/8	+1 1/8	+10.0	A	BARRY WRIGHT	10-19	17 3/8	+1/2	+2.9
A	COMFREE GROUP CORP	1-3	3/4	0	0.0	N	ANDERSON JACOBSON	3-6	4 3/4	-1/4	-5.0	N	CYBERNETICS INC	1-1	7/8	0	0.0
A	COMPUTER INVESTS GRP	1-2	3/4	0	0.0	N	APPLIED OIG DATA SYS	10-20	13 5/8	-3/8	-2.6	N	DMPLEX PRODUCTS INC	14-20	18 7/8	+1/8	+0.4
A	COMPLINK RENTAL	0-2	1 1/4	0	0.0	N	ARHIVE INT'L	5-12	5 1/8	+1/8	+2.1	A	ENVIS BUS FORMS	6-9	9	+1/4	+2.8
N	CPL INC	1-4	3 1/4	0	0.0	A	BULL PERMANENT & NEW	6-9	6	-1/8	-2.0	C	GRAPHIC CONTROLS	13-19	39	+1/4	+0.6
N	DPE INC	6-10	8 3/8	-1/8	-1.4	N	BUNKER-PAGE	8-13	12 1/4	+1/2	+4.2	N	IM COMPANY	45-56	45 3/4	-7/8	-1.8
N	ITEL	13-22	16 5/8	-5/8	-3.6	A	CALCOMP	3-5	3 1/8	+1/8	+4.1	C	MOORE CORP LTD	24-37	28 3/4	+1 3/4	+6.4
N	IFASCO CORP	19-27	25 3/4	-3/4	-2.8	N	CENTRONICS DATA COMP	16-30	19 3/8	+7/8	+4.7	N	NASHUA CORP	16-29	21 3/8	+5/8	+3.0
N	LEASAC CORP	1-2	1 1/4	-1/8	-10.0	N	COGNITRONICS	1-1	7/8	0	0.0	N	STANDARD RESEARCH	10-25	11 1/2	-1/4	-1.1
N	U.S. LEASING	10-16	12 1/8	-1/4	-1.9	C	COMPUTER COMMUN.	5-8	6 3/4	0	0.0	C	TAR PRODUCTS CO	8-19	7 7/8	0	0.0
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-ALTY-WASH																	
L=NATIONAL; 4=MINWEST; D=OVER-THE-COUNTER																	
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID																	
111 TO NEAREST DECIMAL																	

EXCH: N=NEW YORK; A=AMERICAN; P=PHILADELPHIA; M=MIAMI
 L=NATIONAL; W=WEST; D=OVER-THE-COUNTER
 O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
 (1) TO NEAREST DOLLAR

Get Smart.

ADDS *Regent* • Smart for the price of Dumb.

Time was, if a man bought a Dumb terminal, he was considered pretty smart. Times change.

ADDS Regent family of Smart terminals is making Dumb look dumb.

For under \$1000* our Regent 100 has features no smart man can resist.

You get cursor controls for operational simplicity and extensive remote commands that make it easy to control the Regent from the computer. Optional function keys customize Regent to your specific application.

You get a Status Line that provides current information on the terminal's operating status. And, you get visual highlights such as blinking, zero intensity, half intensity, underline and reverse video.

You also get self diagnostics.

In other words, you get Smart. Or Smarter: Our Regent 200 has everything our 100 has plus buffered transmission, auxiliary port and editing options.

You can't get a whole lot more.

Get Smart. Get ADDS.

Quality, Reliability and Integrity. It all adds up to ADDS.

*In moderate OEM quantity.

ADDS Applied Digital
Data Systems Inc.
100 Marcus Blvd., Hauppauge,
New York 11787 516-231-5400
Dept. 250

Name _____

Firm _____ Title _____

Address _____

City _____ State _____

Phone _____

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

March 6, 1978

75¢ a copy; \$18/year

Looks
at
DDP

Fairchild's Net Reaches Abroad

By Esther Surden

CW Staff

MOUNTAIN VIEW, Calif. — Fairchild Camera & Instrument Co. is implementing an ambitious international distributed DP (DDP) network under careful control of its management information systems (MIS) department here.

Planning and control are essential in implementing a DDP net, according to

'Distributed Processing: Buzzword or Byword?', a CW Special Report, follows Page 44.

Burleigh Cook, MIS director, who describes his distributed environment as "operating in a network with an overall system plan." Such a plan makes the difference between "putting minis out there and telling the people to program" and knowing exactly what's in the field, what costs are involved, what each system must do and what programming is needed, he said.

The Fairchild network of minis is replacing a variety of time-sharing services and computer gear operating in various applications. The firm uses Computer Automation, Inc. Syfa systems as the remote minis in the net, Cook said.

The first overseas implementation — in Singapore early last year — was a shipping application, most of which formerly ran on a time-sharing-option-oriented interactive terminal.

(Continued on Page 4)

IN DEPTH IN DEPTH IN DEPTH

It's time to jettison some of those pervasive but false beliefs about software, Werner L. Frank believes. See 'The Ten Great Software Myths,' starting this week on Page 13.

To Aid DP Competitors U.S. May Ask IBM Relief Now

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Justice Department will decide "soon" whether to ask for interim relief when it finishes presenting its antitrust case against IBM, Assistant Attorney General John H. Shenefield said at a trade association meeting here last week.

The head of the department's Antitrust Division declined to tell the members of the Computer & Communications Industry Association (CCIA) at its Fifth Annual Caucus here just what form of relief the government plans to propose in the middle of the nearly three-year-old trial.

Interim relief would exact some price from IBM for its alleged monopoly practices before the corporation presents its defense to Judge David E. Edelman. It would not mean that IBM is guilty of monopolizing the industry, and it would be reversed should IBM win the suit, according to A.G.W. (Jack) Biddle, executive director of the CCIA.

Relief of the industry might mean the court would require IBM to make interface specifications of new products available to competitors when they are announced or to make its installed base public by product and country on a

quarterly basis to allow an accurate census of the industry to be made, Biddle suggested.

Risk of Delay

The Justice Department must determine whether the law is sufficiently clear to allow it to proceed with interim relief proposals, Shenefield said. In addition to deciding what kind of relief it will request, the Justice Department's Antitrust Division must also decide whether it wants to risk the nine-month to one-year delay in the trial that such proposals would mean.

"An interim relief hearing would probably be held, and the resulting delay in the trial is a cost I'm very concerned about," the antitrust chief stated.

Shenefield praised Sen. Edward M. Kennedy (D-Mass.) for his support of interim relief in U.S. vs. IBM, expressed during the senator's keynote address to the CCIA meeting (see related story on Page 6). Calling Kennedy's statement "courageous," the Assistant Attorney General said he was "delighted" to read the speech and found it very reassuring that a generally unpopular arm of the Justice Department would receive such strong congressional backing.

Addressing the belief in some quar-



CW Photo by E. Holmes

Sen. Edward M. Kennedy, chairman of the Senate Antitrust and Monopoly Subcommittee, last week called the three-year-old U.S. vs. IBM antitrust trial a "sideshow" and endorsed the recommendation that the Justice Department seek interim relief in the case. Story, Page 6.

ters that the Justice Department favors settling the U.S. vs. IBM and U.S. vs. AT&T suits by some form of congressional action, Shenefield said "there will be no half-baked settlements or motions for a change of venue to Capitol Hill.

"It is no secret that we see the AT&T case as an opportunity to work out the lessons of the IBM suit, as a chance for the Antitrust Division and the courts to demonstrate that with a little hard work and common sense a very big, very significant antitrust case can be tried successfully in less than a lifetime," he said.

"We are trying very hard to produce a fine-tuned discovery effort that will

(Continued on Page 6)

DEC Introduces Mainframe Packaged as Small System

By Esther Surden

CW Staff

NEW YORK — A system that is small, doesn't require a computer room or special power considerations is a minicomputer, right? Wrong.

Digital Equipment Corp. last week introduced a mainframe in minicomputer clothes. Called the Decsystem-2020, the system extends the firm's mainframe line down into the IBM 370/115 range.

At the same time, DEC introduced the Decsystem-2060, a system that expands the capability of the firm's 2050 to handle up to 4M bytes of MOS memory and 80 concurrent jobs. The 2060 was described by the vendor as being in the range of IBM's 370/148 and 158 systems.

The highlight of the Decsystem-2020 is its packaging and architecture, which borrow many features from minicomputers, according to a spokesman.

For example, the system is housed in a five-foot-high, three-foot-wide and two-foot-deep cabinet. It reportedly runs on ordinary 110V power and uses about the same amount of power as a portable hair dryer.

The Decsystem-2020 is software-compatible with other members of the firm's 20 line so it can run programs written on the larger models, he emphasized. In addition to DEC's Tops-20 operating software, Tops-10 software designed for the firm's Decsystem-10 series can also be accommodated by the system.

(Continued on Page 4)

IBM Holding 138, 148 Sale

WHITE PLAINS, N.Y. — Purchase prices for the IBM 370/138 and 370/148 CPUs were reduced by as much as 20% last week as IBM sought to bring those systems' prices "more in line" with those of the current 30 series, a spokesman said.

Also affected by price cuts were some features common to the 138 and 148 systems as well as the 135 and 145.

A 370/138 with 512K bytes of main memory that formerly cost \$350,000 now costs \$278,600. A 1M-byte Model 138 previously cost \$405,000 and now is priced at \$333,600.

The 370/148 with 1M byte of memory now costs \$548,450 compared

with the previous \$689,000. A 2M-byte 148 formerly priced at \$799,000 now costs \$658,450.

The price reductions brought the cost of a "typically configured" system down by 17%, the spokesman noted. For example, a 370/138 Model J with 1M byte of memory, integrated communications adapter, integrated 3203 printer attachment, second and third communications adapters, 3330/3340 integrated file adapter, power unit and 3287 Model 2 console printer now costs \$405,330 compared with the previous price of \$492,040.

A 2M-byte Model 145 configured

(Continued on Page 6)



EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Associate Editor	Esther Surden
Assistant Editor	Frank Vaughan
Washington Bureau	Edith Holmes
Staff Writers	Catherine Arnt Jeffrey Beeler Timothy J. Scannell Brad Schultz Marguerite Zientara
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Barbara T. VanScoyoc Susan Gerrard Joe Hunn
Photography Editor	Ann Dooley
Editorial Assistant	Denise Petski
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger Frampton
Munich	Hans-Jürgen Ballnath
Asia	Hidetuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone
SALES	
Vice President/ Marketing	Roy Einreinhofer
Advertising Administrator	Terry Williams
Display Advertising	Mary Anne Furlong
Classified Advertising	Donna Whalen
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen
CIRCULATION	
Vice-President/ Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti
Customer Service Rep	Peggy Kelly
Assistant	Maureen Burke
PRODUCTION	
Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm
Typesetting Supervisor	Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristansstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S.—\$18 a year; Canada and PUAS—\$28 a year; Europe and Middle East—\$50 a year; all other foreign—\$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/

Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

HIS Protests Bid Process

System for Mass. Courts Hits Snag

By Ann Dooley
And Brad Schultz
CW Staff

BOSTON—A dispute over alleged procurement errors has stalled an attempt to give the Massachusetts Supreme Judicial Court (SJC) a statewide Court Case Management Information System (CCMIS)—an implementation of the Prosecutor's Management Information System (Promis) designed to break judicial "logjams."

Honeywell Information Systems, Inc., is protesting the SJC's acceptance, in November, of Burroughs Corp.'s \$815,000 bid to install the Promis package, using its hardware and systems software to create CCMIS.

An evaluation team from the court DP center had rejected HIS's runner-up \$1.2 million bid as well as those of CMC Associates, Data General Corp., Digital Equipment Corp., Harris Corp., IBM, Prime Computer, Inc. and Univac.

The Institute for Law and Social Research (Inslaw) in Washington, D.C., will go ahead with its plan to send the court a Promis package as soon as the equipment needed for implementation becomes available, Inslaw director Bill Hamilton has confirmed.

First State Installation

To date, Promis installations have been county court operations whose software, developed by Inslaw, was modified and transferred from site to site. SJC personnel inspected a Promis installation in Milwaukee, Wis., last May before deciding to transfer the system to Massachusetts.

The Mass. Committee on Criminal Justice (CCJ) Proposal Review Board has begun informal hearings into the matter, addressing two issues: whether the bids were evaluated fairly in "open and free" competition, and whether Burroughs' winning bid truly responded to the court's request for proposal (RFP) of June 22.

The hearings have had much of the drama of a courtroom trial as SJC

counsel Robert Bigelow squared off with CCJ general counsel John L. Tobin. Witnesses have been examined and cross-examined, and evidence has been accumulated and referenced.

Tobin is trying to prove that after accepting bids, the SJC DP center altered its CCMIS specifications in a "clarification" stage of the procurement process so that HIS was misinformed about what the center wanted and therefore ran handicapped in the bid competition.

HIS contends that the clarification was not open to the public and that Burroughs gained the inside track by modifying a bid that originally was not responsive to the specifications and that the bid only became acceptable after that point.

Tobin has charged the SJC Executive Office with failing "to engage in open and free competition in accordance with applicable minimum federal standards," but cautiously added, "there has been no suggestion of fraud or wrongdoing, but only a failure to observe requirements of competitive bidding."

HIS Participation

An HIS contingent has actively participated in the deliberations, securing and using presiding officer Barbara Clurman's permission to cross-examine with the benefit of an HIS attorney.

Though Burroughs people have also been present, the firm has not been represented by counsel and is in the position of having much to lose in the dispute without being a "named party." The dispute is technically between Tobin, representing CCJ in response to the HIS protest, and Bigelow, representing the court.

Bigelow noted that Massachusetts Attorney General Francis X. Bellotti disqualified his office from participation in the imbroglio, avoiding possible "conflict of interest" because Burroughs had previously furnished his office with equipment and an assistant attorney general previously served on the CCJ Review Board.

Burroughs people seemed concerned about the propriety of the hearings since Tobin, "the prosecutor," and Clurman, "the judge," work for CCJ. CCJ oversees the disbursement of all Law Enforcement Assistance Administration (LEAA) funds to the state. LEAA grants are financing the CCMIS project.

The hearings began last week with testimony from two key witnesses: the executive secretary of SJC, John A. Fiske, and the director of SJC's DP center, Robert K. Mitchell.

HIS branch manager John D. Borgman had written a formal letter of protest to Fiske last December. Among the "grounds for protest and complaint" cited in Borgman's letter were:

- Fiske's office had held no public opening of the responses to its request for clarification of bids last September.

- Burroughs' successful response to the RFP, based on its B1800 series hardware, "does not meet the mandatory specifications and requirements of the RFP in several respects and is therefore nonresponsive."

- Mitchell's evaluation team improperly allowed modifications of some bids, inciting an earlier HIS protest.

On the second of these points, Borgman's letter claimed that Burroughs' products were nonresponsive because they failed to meet the requirements for Ansi 1974 Cobol; testing, debugging and compilation; point-to-point terminal communication; and maximum growth potential.

Fiske noted in his testimony that there had been no requirement during the procurement procedure for a written statement of procurement policy, and this was corroborated later by Mitchell's testimony.

Mitchell testified that HIS had not been responsive to the RFP specifications; for example, HIS was said to have improperly expressed the pricing of certain modem equipment.

Representatives from DEC, Prime and Univac—among the vendors that had lost the bid competition—were present when the hearings began.

On the Inside This Week

NEWS

Engineers Set to Study Lighting and CRT Use	5
Kennedy Backs CCIA in Bid for Interim Relief	6
Information Policies Seen Leaking	7
U.S. Buttresses Its Case for Fleet Rates Abroad	8
HEW to Start Student Loan Collection Efforts	9
Trading System to Link Five Stock Exchanges	11
On-Line System Tracks Music Use for Royalties	12
In Depth: The Ten Great Software Myths	13-20

EDITORIAL

Editorial: ACM and Soviet Union	22
Human Connection: Jargon Hurts Credibility	23
Taylor Report: DP Could Make Willis Clearer	23

SOFTWARE & SERVICES

Model Finds DP Management Flewed	25
Enhanced 'Seed' Backs Dynamic Date Changes	28
On-Line Monitor Packages Bow	28
Seminars Stress People's Role in Systems Work	30

COMMUNICATIONS

POS Keeps Colonel's Chickens Counted	31
Canadian Service to Access Telenet, Tymnet	37

SYSTEMS & PERIPHERALS

Josaphson Superconductor Has Promise	39
MIC to Explore Data Entry	40

MINIWORLD

Modcomp Offers Cobol, 'Total' on 32-Bit Mini	45
Firm Builds Travelling Portrelt Trade on Mini	46
Smell System Suits Various Uses	47
Firm Gets DP Without Changing Operations	48

MICROCOMPUTERS

Axiom Unveils Two Electrostatic Printers	49
16-Bit Board Has Variety of Options	49

COMPUTER INDUSTRY

U.S. CPU Shipments to Jump 15% in '78	51
IBM, Bell Handed for Clash, Analysts Warn	51
Annual 18% Growth Forecast for Medical Gear	54

ADR's MetaCOBOL[®] Produces Fast, Error-Free COBOL Code for Owens-Illinois



George Shaw and Howard Abernathy are a part of O-I's Corporate DP Center team, serving the needs of 115 plants in the U.S., as well as installations overseas.

"Two years ago, O-I took a serious look at programming productivity and format standards," said George Shaw, Internal Projects Coordinator for O-I's corporate DP center. "Since the most expensive aspect of any new application is programming, we wanted to do everything we could to keep that cost down. One thing we needed was a way to shorten the process of coding COBOL programs.

MetaCOBOL shortened the process of coding COBOL programs.

MetaCOBOL met that need. It gave us a tool that would produce more accurate code and improve readability as well. A programmer can enter a short 3-line MetaCOBOL macro command; for example, and have it automatically expanded to 50 lines of error-free COBOL source code every time."

"Now, practically all our COBOL programmers use MetaCOBOL facilities," Shaw continued. "We've set up standards manuals with listings and instructions on how to use all the macros we've developed. Because we've developed so many and they're so easy to use, a programmer could use as many as 15 different macros to enter commands in his average program. As a

result, productivity has increased dramatically."

"MetaCOBOL is a tremendous tool which allows us to get things done with less actual coding," added Special Projects Supervisor, Howard Abernathy. "We now wonder how we ever got along without it."

MetaCOBOL is ADR's COBOL-oriented software product for developing and maintaining programs at either the conventional COBOL level or at a higher level. It is now in use at more than 450 sites throughout the world for conversion from one COBOL dialect to another, for natural interfacing to a data base management system, for auditing for adherence to local programming standards, for structured

The use of MetaCOBOL macros resulted in a dramatic increase in productivity.

programming, for systematic testing, for code generation, and for dozens of other cost-effective applications. For many companies, MetaCOBOL is saving countless hours of programming effort while making dramatic improvements in overall program quality. For more information on what ADR software products can do for you, call or write.

----- To find out what MetaCOBOL can do for you — clip this. -----

☐ Send MetaCOBOL product information and case histories. ☐ Please call me. I would like a MetaCOBOL presentation.

Name/Title

Company

Address

City/State/Zip

Telephone

Computer Configuration



APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS™

Route 206 Center, Princeton, N.J. 08540, Phone: 609-924-9100

Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.

ADR software products: in use at over 8000 installations worldwide. U.S. offices in Atlanta (404) 252-9130, Boston (817) 245-9540, Chicago (312) 694-2244, Cleveland (218) 826-0190, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (609) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 281-2011. International offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.

DEC Unveils Minicomputer-Sized Mainframe

(Continued from Page 1)

Designed for commercial, educational, government, engineering and service bureau applications, the 2020 is a general-purpose machine with a 36-bit word length. It is said to be able to handle programs of "more than a million bytes" in all languages.

Languages handled by the system include Ansi-standard Cobol, Fortran IV, basic and extended APL, Basic Plus-2, Algol and CPL — a PL/I subset.

In addition, the system features a Codasyl-standard data base management system, an interactive query language and report writer. It will accommodate multistream batch, transaction processing and interactive time-sharing operations with as many as 10 users, the spokesman noted.

The CPU features a centralized bus structure similar to that used on the firm's PDP-11 minis. Various compo-

nents are directly attached to the bus while peripherals interface to the CPU through a standard PDP-11 Unibus adapter and Unibus cabling. This enables the system to use standard DEC peripherals, the spokesman said.

The CPU is contained on four boards compared with the 52 boards required to implement the Decsystem-2040 and 2050 processors. One board contains 10 4-bit microprocessors.

The 2020 also makes use of a 512-word virtual address cache memory. Using a 2K-word random-access memory writable microstore, the machine's basic microinstruction cycle time is 300 nsec, DEC said.

Memory for the system consists of a control unit that connects to the backplane and can handle up to eight storage modules. Each module handles 64K words of MOS memory with 1.05 microsec cycle time and a single- and

double-bit error correction. A total of 512K words or 2M bytes of main memory can be accommodated.

Micro-Based Console

The system's console incorporates a microprocessor that controls console and diagnostic functions. An asynchronous interface allows the system operator to transmit console commands to the system from a terminal.

The console is interfaced to the central bus for data and control commands. Each day, when the system is started up, the console performs diagnostics to ensure proper operations and also activates system elements, the spokesman said.

The system can be used in distributed processing networks operating under Decnet, the spokesman pointed out. Up to 32 asynchronous terminal interfaces and two synchronous interfaces are included in the system's chassis. Eight asynchronous interfaces are standard.

The Decsystem-2060 introduced to

extend the high end of DEC's 20 line "has basically the same computer performance as the 2050" but incorporates an optimized version of the firm's processor.

Hardware, monitor and microcode changes were made to the system and racks and memory links were added, the spokesman noted. With the changes, the 2060 can handle twice the amount of memory and double the number of jobs as the 2050, DEC said.

A minimum Decsystem-2020 costs \$150,000 for the CPU, 500K bytes of MOS memory, 512-word cache, a 67M-byte disk drive, a 120 byte/sec tape subsystem, eight asynchronous communications lines, a Decwriter II console teleprinter and operating software. It will be available in July.

The basic Decsystem-2060, available in the fourth quarter, costs \$583,600 for a CPU, a 2K cache memory, LA36 console, 512K words of memory, 200M-byte disk subsystem, eight asynchronous lines and operating software.

Perhaps the most dynamic franchise opportunity since fast food burgers.

A National ComputerLand Retail Franchise

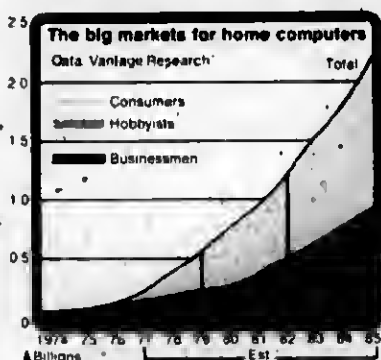
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 35 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Mail to E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW San Leandro, CA 94577 (415) 895-9363

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

DDP Net Reaches Overseas

(Continued from Page 1)

The second installation, at the consumer products group, is an integrated order entry, inventory control and invoicing application that had previously been run by a time-sharing service. The service cost became so high the company needed to find a way to replace the expense. The minicomputer system was brought in to take over the activities and interface with an existing system running on the firm's IBM 370/158 mainframe.

Local Data Sets

Much of the firm's processing, Cook noted, will still be done on the host system, but users in remote areas will have access to local data sets and the accompanying local report output.

Fairchild is also close to bringing up an order entry system for four branch sales offices in Europe and will displace a time-sharing service for order entry for the domestic U.S., he said. For the latter application, each branch sales office will use a Teletype-like device to access the Syfa through a packet-switching service the company is buying from Tymnet, he said.

The firm thought it might develop some sort of distributed network several years ago, and "in late 1975 we started the development of a shipping system on an IBM 3790," Cook said. The system was installed in February 1976 and "nine months later, with the work of six analysts, we brought up the 3790 to do shipping." He said Fairchild learned that the development time was too slow for its needs, that the transmission speeds used were too slow and that the company needed more disk capability than was available on that system.

At that point, the firm decided to look at other hardware and gave many vendors the opportunity to respond to its needs. Among those active in the selection process were Digital Equipment Corp., Data General Corp., Raytheon Co., Hewlett-Packard Co. and CA. "We found them all to have viable distributed processing systems," he said. "All of them have strengths ... and all of them were

nearly equal" in capability, he added.

The CA system was one of the last ones to be evaluated, he noted. The vendor "volunteered" to come in and bring the system up "without obligation on our part," and CA said it would do that in 30 days. "We decided to let them try," he said.

Those remote systems that are operating at the moment are communicating as Bisynch devices in IBM 3780 mode. Fairchild is in the process of bringing up a Hasp workstation mode and "in the relatively near future, we will be operating using Synchronous Data Link Control (SDLC)," Cook said. SDLC is very important to the company because all international communications now takes place via satellite, and with Bisynch communications, the throughput speeds are degraded, he pointed out. SDLC will help Fairchild avoid the degradation.

The vendor is "committed to us" to "supporting an SNA environment," Cook added, which was another factor that made the choice of the CA systems more attractive.

Along with setting up a distributed network, Fairchild is committed to finding better ways to service that net, Cook noted. The ability to remotely diagnose problems at the DDP site is "vital," he continued. Fairchild has a terminal in the data center that can "become a terminal on the Singapore Syfa," allowing the in-house staff to examine the code and diagnose failures.

"We are also developing a capability for downloading the operating system," Cook said, because there are hardware failures that can disable code and the DP department would like to "just refresh the operating system" if this happens.

One of the prime benefits of using the Syfa systems is ease of programming, Cook said. Systems can be developed quickly on the system and "we could almost meet user expectations," he added. For example, the consumer product group system took only about 60 days to bring up, he said.

To Help Avoid Vision Problems

Engineers Set to Study Lighting and CRT Use

By Marguerite Zientara
CW Staff

DETROIT — A group of illuminating engineers here is hoping to do an in-depth study on optimum lighting conditions for CRT operators to help avoid visual problems like eyestrain and eye fatigue.

According to Steve Stannard of Smith, Hinchman & Grylls, an architectural and engineering firm here, there apparently have been no previous studies made of the problem. "The problem is so obvious and so widespread that you'd think some manufacturer would spend some money to find out how best to design its equipment," Stannard said.

The Illuminating Engineering Department at Smith, Hinchman & Grylls designs lighting systems for buildings built by the company as well as for outside clients. "The type of design we do for lighting is based on visibility, not illumination, the difference being how well you can see what you're looking at as opposed to how bright it is or how much light is falling on it," Stannard explained.

The system used to evaluate visibility is called Equivalent Sphere Illumination (ESI), which was developed partly at Ohio State University and principally by the Illuminating Engineering Society (IES), a national organization. The ESI system has been accepted by the IES and the concepts for it have been accepted by the International Commission on Illumination (CIE), according to Stannard.

'Veiling Reflections'

CRT screens in particular pose the problem of what are called "veiling reflections," which is simply the reflection of a bright light coming from a source behind the operator onto the screen. That brightness on the screen reduces the contrast of the letters one is looking at, Stannard said. The problem is to minimize that reduced contrast.

"We have some computer programs, written here, that are available through national time-sharing services and can predict essentially these effects," Stannard said. "All we need to know is what the luminous environment of the room is — where the lights are placed, what the reflectances of the walls are, the photometric characteristics of the lights themselves (how they distribute the light) and how the office task to be done on the CRT reflects light," Stannard explained.

When dealing with "horizontal" office tasks — for which pencil and paper, photocopy or offset printing or typing is used in conjunction with a CRT — the procedure is to measure

with special equipment the photometric characteristics of those tasks, or how they reflect light, according to Stannard.

"That information is used with our computer program to predict what the eventual luminance and contrast will be," Stannard noted. "From that, we can calculate the visibility of these things to determine how much visibility is necessary," he added.

"We're hoping to calculate a whole series of luminous environments — rooms with different screens that are being used most commonly today — to determine how best to light a room when you have one of these terminals in it, or if you have a room with a

given lighting system, how best to orient a screen to minimize the problems," Stannard said. "Being able to balance between seeing the paper you're reading from and seeing the screen you're typing into is the ultimate goal."

Stannard sees a number of advantages with the system. For existing rooms, it might help determine which lights should be turned out for better visibility as well as energy conservation. He thinks manufacturers could use the system in order to optimize the design of their own screen materials.

According to Stannard, use of the ESI has become law in some states, notably Florida, where the educational

environment must now be designed in terms of visibility. He said that the Canadian government is accepting it and that it will eventually be used for all Canadian federal buildings. While the U.S. General Services Administration is looking at the system, it has made no decision yet, he noted.

Stannard and his colleagues are looking to the federal government for funding of the project, which he estimates will be completed within a year. The end product would be a manual on how to use certain terminals within a given environment and how to modify given environments to suit specific types of terminals.

COMPUTER ASSOCIATES PROUDLY ANNOUNCES CA-MAINT Program Development and Maintenance System for on-line job submission and control of Disk Libraries.

When you're a leader in the world of software, it's only natural to look for new ways to meet the needs of the Data Processing Industry. CA-MAINT represents a bold new advance in software to improve programmer productivity and file security. It is available for IBM 360/370 installations running under DOS or DOS/VS. All of us at Computer Associates are proud to say that there is no Software Package available that is nearly as advanced as CA-MAINT!

However, as designers of the Datapro Software Honor Roll package CA-SORT, our experience told us that sophisticated features alone aren't enough. Data Processing People like you demand an "off the shelf" package that's easy to learn and a dream to use. We're doubly pleased to say that CA-MAINT offers you "state of the art" features in a remarkably concise and ready to use form.

We're confident you'll be able to see the benefits early in our free 15-day trial period. Just look at these impressive capabilities provided through CA-MAINT's six comprehensive programs:

- **Batch Library Maintenance** - Batch library maintenance is provided for one or more disk libraries containing source programs as well as other 80-column card-image data.
- **On-Line Library Maintenance** - Books which have been catalogued into a LIBMAINT library may be displayed and/or modified on-line.

- **On-Line Job Submission** - Any control book which has been catalogued within a LIBMAINT library may be modified and submitted from a CRT device into the POWER/VS reader queue for execution.

- **On-Line Queue Display** - The POWER/VS queues (reader, list and punch) may be displayed. The data within these jobs may also be displayed and the job status may be altered.

- **On-Line Disk VTOC Display** - The VTOC information of any disk pack may be formatted and displayed in sorted EXTENT sequence.

- **On-Line Disk DISPLAY/ALTER** - Any disk record may be displayed and, at the option of the installation, may also be altered.

CA-MAINT provides six screen formats to display and/or modify a "book". The full screen editing is efficient and simple to learn. New lines of data can be added with skip, dupe, numeric and alphabetic control fields like a standard key punch. Modifications become permanent by command only and all books are stored in a special compressed format ensuring optimum usage of disk space.

In sum, the versatility of CA-MAINT's Editing, Display, and Processing features make it the superior choice for Programmers and DP Managers who want Economy combined with maximum Efficiency, Ease of Use, and Security.

Send for our FREE Information kit today. Just fill in the coupon provided or for faster action call our toll-free phone number.

800-221-4767
[NY STATE CALL: 212-355-3333]

10 U.S. OFFICES
31 OFFICES WORLD-WIDE



MEMBER: SOFTWARE
INDUSTRY ASSOCIATION

YES! Please rush the FREE CA-MAINT Information Kit and details about the free 15-day trial offer.

cw 3/6/78

Name

Title

Company

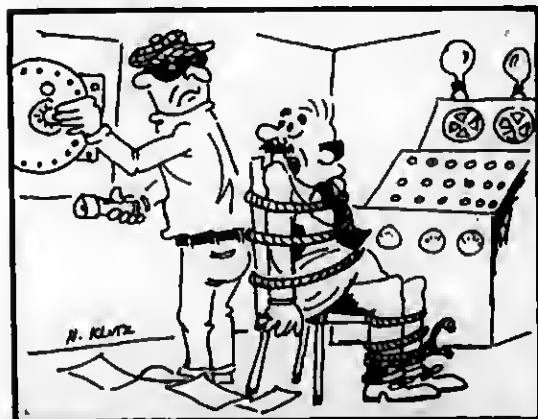
Address

City STATE ZIP

Phone No. () CPU OP/SYS

655 MADISON AVENUE, NEW YORK, NY 10021

COMPUTER ASSOCIATES



'Mind If I Run This Through the Computer to See If It's Deductible?'

Kennedy Backs CCIA in Bid for Interim Relief

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — Sen. Edward M. Kennedy (D-Mass.) last week endorsed recommendations by a trade association that the Justice Department seek interim relief in its antitrust case against IBM at the close of the government's presentation of evidence.

Kennedy, the chairman of the Senate Antitrust and Monopoly Subcommittee, did not specify the form this relief would take. According to its advocate, the Computer & Communications Industry Association (CCIA), interim relief could involve a court order requiring IBM to disclose the interface specifications of new products when they are announced or to report its installed base to permit the generation of an accurate census of the industry.

The senator also made his first public statement in opposition to the Consumer Communications Reform Act, or "Bell Bill," which would restrict competition in the communications industry by giving AT&T a broader based monopoly.

Addressing the CCIA's Fifth Annual Caucus here, Kennedy won applause when he stated that "if the opportunity exists for the government to be innovative, and even take a risk, in order to speed up the trial [U.S. vs. IBM] in the long run, then that opportunity should not be missed."

The senator credited the CCIA with suggesting that the government seek interim relief in the case, which has been at the trial in New York City for nearly three years. The Justice Department has yet to finish presenting evidence to support its charge that IBM monopolized the general-purpose computer systems and peripheral equipment and leasing markets.

'Sideshow Attraction'

"The IBM case has become a sideshow attraction for those concerned with effective and efficient antitrust enforcement," Kennedy said. "The government, the defendant and

the judge all bear some responsibility for the absurdity.

"Discovery and the government's presentation of its case have broken all records for length volume. Final resolution of the case will not come for five or 10 years or longer. And there are areas where there exist no genuine issues of fact as to IBM's practices," the senator added.

CW At CCIA

During this process, Kennedy stated, more and more independent computer companies are going out of business; viable smaller companies cannot expand their market shares because capital will not flow to companies that exist only by IBM's sufferance.

In the meantime, IBM profits have grown 200%, its sales have increased from \$7 billion to \$18 billion and its market power has increased "significantly."

For all these reasons, Kennedy said, he supports the imposition of interim relief on IBM at the conclusion of the Justice Department presentation.

Supports Antitrust Unit

In addition, the senator indicated his endorsement of the special Presidential Commission on Antitrust, established at the end of last year to address the problems associated with large, complex antitrust suits [CW, Dec. 12].

"Implementation of the com-

mission's proposals should make future IBM-style cases impossible," Kennedy said.

Even with procedural revisions of discovery practices, the granting of judicial authority to restrict and punish delaying tactics, more efficient means of entering testimony and documents into evidence and a more "imaginative performance by the [Justice Department's] Antitrust Division," there are legislative improvements that can be made in the enforcement of antitrust laws, the senator stated.

In the months to come, the Senate Antitrust and Monopoly Subcommittee plans to develop legislation that deals with concentration of economic power in the economy as a whole, not merely in a particular industry or market, Kennedy said.

The antitrust laws clearly outlaw mergers that increase a firm's dominance of a particular market, but generally fail to deal effectively with mergers that result in the increasing dominance of the entire economy by a few giant conglomerates, he added.

"Legislation which prevents the gobbling up of independent businesses by increasingly large and aggressive conglomerates should be a matter of high antitrust priority," Kennedy said.

The senator also expressed the need for legislation "that makes clear that the Sherman Act does not require the elaborate search for corporate 'intent' that mires so many antitrust suits in a decade-long search for why something was done instead of the far easier and more important fact of what was done."

"Emphasis on objective conduct rather than subjective intent would re-

turn antitrust enforcement to the principles and purposes that Congress originally intended," Kennedy said.

In the communications industry, the specialized common carrier and the terminal equipment marketplaces have benefited greatly from competition, the senator said. "Although AT&T and the other telephone companies have complained loudly about this competition, specialized common carriers only represent .1% of the telecommunications market and competitors to Bell have only .4% of the terminal equipment market," he noted.

"In addition to bringing forth new and better products and services at lower costs, competition has made AT&T more responsive to user needs," Kennedy said. "There is also ample evidence that this competition has not hurt AT&T in any way," he continued, citing hearings he chaired last May and those held by the subcommittee's former chairman, the late Sen. Philip Hart.

Kennedy told the CCIA he agrees with the association's observation that the Federal Communication Commission's (FCC) use of competition in selected portions of the communications industry "has brought about excellent results and I see no reason to discourage these initiatives."

"If anything, the FCC should be prodded to increase competition at a more rapid rate," the senator stated.

To these ends, Kennedy last week reintroduced his Competition Improvements Act, which would reaffirm and more tightly apply antitrust standards to federal regulatory agencies such as the FCC.

U.S. Deciding Whether to Ask for Relief

(Continued from Page 1)

put us in a position to litigate this case within two years," Shenefield said of U.S. vs. AT&T.

Whether it will be tried expeditiously is another matter because the defendant's incentive in an antitrust case

is to delay, the Assistant Attorney General pointed out.

"You see AT&T today acting as a rational defendant in a [Sherman Act] Section 2 case — resisting expedition, multiplying issues and obstacles and engaging in a widespread public relations campaign to portray 'the system' as the victim of quixotic government prosecutors and as the savior of everything from the national defense to pro football telecasts."

Defendants employ a "Catch-22 logic" when it comes to the quick resolution of an antitrust case, Shenefield suggested. For AT&T, which is in the midst of discovery — the amassing of witnesses and of documents from which evidence is selected — "fairness means mutuality means discovery at

the chosen pace of the slowest party," he said.

"There should be no concern about our intentions to stay the course in both the IBM and AT&T cases," Shenefield stated.

Other issues in the computer and communications industry in which the Antitrust Division is involved include opposition to the Federal Communication Commission's (FCC) approval of the joint venture known as Satellite Business Systems (SBS) and its own independent investigation of SBS; the FCC's second Computer Inquiry, which seeks to distinguish between DP and communications; the Postal Service's flirtation with electronic mail; and the Federal Reserve's affair with electronic fund transfer systems.

IBM Cuts 138, 148 Prices

(Continued from Page 1)

with CPU, integral storage controller, two 3203 printer attachments, 3047 power unit and a 3287 Model 2 console printer now carries a \$754,045 price tag compared with \$898,295 previously.

A similarly configured 3031 costs \$1 million, the spokesman noted.

Representative products and features affected by the price cuts include the 3330/3340 integrated file adapter for the models 138, 135 and 135-3; it has been reduced from \$38,910 to \$30,970. An integrated communications adapter that is now \$9,470 formerly cost

\$11,900.

On the 145, 145-3 and 148 systems, examples of units affected by the price cuts include the channel-to-channel adapter, which has been reduced from \$15,710 to \$12,510, and the control store expansion unit, which was cut from \$13,390 to \$13,050.

Power supply units were also affected by the reductions. A 3046 Model 1 for the Models 135 and 138 now costs \$13,580 compared with \$17,060 previously and a 3047 Model 1, used with the 145 and 148 CPUs, now costs \$18,140 compared with \$14,440.

Proven Mini-Software Designed For Your Business

Pre-Packaged, Off-The-Shelf Programs Covering:

- | | | |
|--|---|------------------------------------|
| ☐ accounts payable | ☐ other accounting | ☐ marketing |
| ☐ accounts receivable | ☐ financial analysis | ☐ education |
| ☐ general ledger | ☐ statistical analysis | ☐ |
| ☐ payroll | | |

Programs Designed For:

- | | | |
|-------------------------------------|--|-------------------------------------|
| ☐ BASIC Four | ☐ PDP 8/11 | ☐ Four Phase |
| ☐ Burroughs | ☐ IBM 3/32/34 | ☐ |
| ☐ Datapoint | ☐ Hewlett Packard | |

Call now or return this ad for complete details to:

Douglas R. Johnson
Resource Software International, Inc.
140 Route 3W
Englewood Cliffs, New Jersey 07632
(201) 947-6104

CW

Name _____
Title _____
Company _____
Industry _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Antitrust Overemphasized Information Policies Seen Lacking

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The fundamental issue facing the computer and communications industries and the government is not monopoly vs. competition, but how to define and administer the information age, Sen. Ernest F. Hollings (D-S.C.) said at the Computer & Communications Industry Association's (CCIA) fifth annual caucus here last week.

The government's antitrust cases against IBM and AT&T are important, the chairman of the senate communications subcommittee stated, but they are only one effort to restructure the nation's computer and communications institutions.

"In the final analysis, whether IBM is broken up [and] whether AT&T is forced to divest itself of Western Electric may be important issues to the chroniclers of antitrust cases, but it is my opinion that other issues will have a more significant impact upon the quality of our daily lives," Hollings said.

Similarly, Congress' rewrite of the Communications Act of 1934 is "an important effort" in Hollings' view, that needs to be put in perspective with such issues outside its purview as export-import policy, capital formation and federal procurement of computers and communications.

"One overriding concern is clear: The government must come to grips with communication and information policy," the senator said.

Not only do communications and information "touch every aspect of our lives," they have become big business as well, Hollings stated. In this "information age," nearly half of the nation's gross national product owes its being to these industries, he added.

'No One in Control'

But at the present time, the government has no policy regarding information and communications. "There is no one in control. There is no coordinated planning. As a result, the technology, which should be providing only the force for change, is also providing the direction," Hollings said.

Information policy is inextricably tied to computers and communications networks, the senator stated. New developments in information technology will have significant social and economic consequences that must be recognized and addressed.

He said the U.S. needs a mechanism for dealing with "internal problems" — "Where does monopoly end and competition begin?" — and "external problems" — "What is the effect of electronic funds transfer systems on the Postal Service and electronic mail?"

"The logical entity to fill this role would have been the Office of Telecommunications Policy (OTP), and I have argued long but unsuccessfully for its retention in the White House for just this reason," Hollings reminded his audience.

Whether the President's decision to abolish OTP and create a new National Telecommunications and Information Administration (NTIA) will be able to perform the role remains to be seen.

"Its revised executive order bears the

scars of successful jurisdictional grabs by the departments of Defense and State, the Office of Management and

CW At CCIA

Budget and the General Services Administration," Hollings said.

"Nevertheless, the draft executive order I have seen gives NTIA a respectable mandate, and with aggressive leadership and support from the Secretary of Commerce and the White House, it has a reasonable chance to

succeed," the Senate subcommittee chairman continued.

The Senator also predicted that a national information policy is years away. For example, when the Federal Communications Commission (FCC) releases its Second Computer Inquiry findings on the distinctions between DP and communications in June, these conclusions will necessarily be challenged in the courts, he predicted. "Further, it is inevitable that these findings will not be definitive," Hollings added. At the same time, the computer and communications industries "have proven their ability to meet special needs and to survive in the world of giants."



CW Photo by E. Holmes

Sen. Ernest F. Hollings

INCREASE PROGRAMMER PRODUCTIVITY BY GOING ON-LINE

SHADOW/QUOTA is an advanced Source Program Maintenance System which runs under the control of SHADOW II, now the world's fastest selling TP Monitor.

Benefits include:

- Reduced Development/Amendment time
- Increased Productivity
- Reduced Staff Turnover
- Reduced Operations Workload
- Reduced Paper Wastage
- Low Overheads
- Complete Security
- Local or Remote 3270-types supported

Shadow II
The World's most advanced TP Monitor
altergo

ALTERGO SOFTWARE INC.

55 WILLIAM STREET,
WELLESLEY OFFICE PARK
WELLESLEY, MASSACHUSETTS 02181

TELEPHONE: (617) 237-6132

Please send me the Concepts and Facilities Manual right away.

Name _____

Title _____

Organization _____

Address _____

Zip _____ Phone _____

My computer is IBM _____ Op. System _____

Present TP Package _____

Our need is ☐ immediate
☐ 3-6 months
☐ over 6 months

U.S. Buttresses Its Case for Flat Rates Abroad

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — Two U.S. data services firms have submitted explanations of the safeguards they employ to prevent abuse to the Consultative Committee on International Telephone and Telegraph (CCITT), which will meet in Geneva next month.

The move was seen as an effort to persuade foreign governments that their DP networks are not being "misused" as mere communications con-

duits and to buttress arguments in favor of keeping private communication lines available at flat monthly charges to all users who need them.

The firms submitting statements were Control Data Corp. and General Electric Co.

The Computer Business Equipment Manufacturers Association (Cbema) also drafted a statement to the U.S. delegates to the CCITT suggesting that, in many cases, the public data networks run by foreign governments

"do not really meet the specialized needs of the user with a large data transmission requirement."

Neither CCITT nor the Federal Communications Commission (FCC) permit the transmission of unprocessed information between users of the same DP service, Cbema pointed out in a cover statement to the CDC and GE contributions.

A communications customer operating a DP center may face serious problems, "including the discontinuance of telecommunications services, if it allows its users to violate these restrictions," the Cbema paper said.

or CDC customer is misusing the DP facility and presents the DP supplier with evidence of such a violation, the firm will meet with the customer, issue a warning and discontinue service if that warning is ignored.

Phillip C. Onstad, manager of CDC's telecommunications policies, said in the statement for his firm that "Control Data feels these procedures have been very effective as we have not received a single complaint from any communications carrier or administration concerning the misuse of the communications aspects of our data processing services."

Adherence to Rules

In answer to concern over possible misuse of DP networks, CDC and GE acknowledged their dependency on private leased circuits and, as a result, their need to ensure that the communications services connected to their DP services are used in accordance with CCITT rules.

Among the approaches taken by these two are special training for sales and service personnel detailing the restrictions on the communications aspects of their DP operations. DP customers also are informed of these restrictions.

CDC and GE customers are required to sign contracts containing clauses about communications restrictions. They are supplied with training manuals, operations manuals and sign-on procedures reminding them of the need to respect the rights of the communications carriers.

Periodic checks of system logs attempt to spot any customers who are misusing the DP service are also employed, CDC and GE said.

If a carrier has reason to believe a GE

Cbema Stresses Performance

In its paper, Cbema expressed the view that DP systems used as internal corporate tools are made available to many subscribers on a time-shared basis "rely very importantly on the traditional leased circuits and networks which are used to transmit data according to the formats, codes and speeds that mean optimum performance for each user."

The association cited as examples reservation systems and production control systems where information is needed at dispensed locations on an immediate basis.

To maintain the balance between hardware and software control in these systems, there must be control over all input and output functions, including remote terminal devices that carry information to and from the system, Cbema stated. Many interactive applications require a highly complex I/O protocol with a tailored telecommunications network in order to maintain optimum system performance, and often this need can only be met through leased circuits and networks, the association added.

HIRE A SUPER-SLEUTH

FORTRAN debugging with TRACER for NOVA/ECLIPSE and PDP-11 Users



If your program debugging efforts often seem like long-winded detective novels, odds are you're lacking the proper tools.

TRACER is a fully symbolic, FORTRAN debugging package that shows you exactly what happens as your program executes. So you can spot logic flaws at a glance. Examine variable values as they change. Determine if proper arguments are being passed to subroutines. And ferret out the culprit lines in your source code.

The cost? Minimal, if you figure in the time to be saved in software development and the increase in programmer productivity.

So, hire a super-sleuth. Call or write us today for a free TRACER User's Manual. Case closed!!!

TRACER from IPTC

2462 Embarcadero Way, Palo Alto, CA 94303
(415) 321-6284

EVENT 2000™

super low cost business computer system with double density

The small business computer market greeted the introduction of Applied Data Communications' new EVENT Series with overwhelming approval. Here's why — dual double-density floppies providing plenty of storage. Multi-user multi-task operation. Complete General Accounting Applications Software Package. Turnkey systems starting as low as \$11,300!

What Applied Data Communications is looking for in each of its distributors is an aggressive sales approach, proven performance in business system sales, and an established clientele of small businesses ready for their first computer and large



We're looking for a few
good distributors.

COMPUTER EXPO 78 — we'll be exhibiting in all 9 cities. Better yet, call Marc Covert, VP Marketing, right now at (714) 547-6954. Or write to Applied Data Communications, 1509 E. McFadden, Santa Ana, CA 92705.

ADDC APPLIED DATA
COMMUNICATIONS

EVENT™ business computer systems to begin with.

Doctors Get Expert 'Help' At Salt Lake City Hospital

By Owen K. Darrath
Special to CW

SALT LAKE CITY, Utah — A system at LDS Hospital here is helping doctors care for their patients by providing access to the latest findings from research and clinical journals.

The program, developed over a 12-year period, is also involved in other phases of patient care ranging from monitoring heart and intensive care patients to watching for interaction between drugs.

The Health Evaluation through Logical Processing (Help) program runs on dual Control Data Corp. 3300s and has been up for "better than 98% of the time," according to Dr. Homer R. Warner, chairman of medical biophysics and computing at the University of Utah College of Medicine.

Decision Making Aid

According to Warner, the program aids physicians in decision making, instead of supplanting them, and is "really affecting the way they practice medicine." Initially, he said, there was some resentment of the system, and his toughest problem was winning the confidence of the medical personnel using the system.

Now, he said, physicians feel that using the system "is like having an expert looking over their shoulders." The system requires no special training for the physician, he noted.

First Patient Contact

The first patient contact with the computer occurs during the admitting process. Patients have responded "very favorably" to the self-administered medical history, which takes an average of 14 minutes, according to Warner.

All routine testing equipment, such as blood chemistry analysis units, is interfaced to the computer, which combines the patient data and lab test results, and presents that information organized by primary and secondary diagnosis, to the physician.

CRT terminals at nursing stations, intensive care units and pharmacy are then used to enter and retrieve patient data. Presentation of data to the physician is accomplished with menus ("Choose one") to make the system easy to use.

In addition to providing diagnostic information, the system can also analyze electrocardiograph data transmitted from the patient's bedside and is used on-line by anesthesiologists during surgery.

Using 'Matched' Payroll Data

HEW to Start Student Loan Collection Efforts

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Department of Health, Education and Welfare (HEW) will use private collection firms to run down bad student loan debts identified as part of the department's computerized Project Match — but only on a pilot basis, HEW Secretary Joseph Califano announced here last week.

The federally employed loan defaulters were identified recently by matching computerized federal payroll records against lists of loan defaulters [CW, Jan. 23].

Private collection firms will be used only in HEW's Atlanta and San Francisco regions, according to Califano, who indicated that requests for proposals for this work will be put out soon.

"We are very concerned about the privacy of individuals," Margaret Rhoades of HEW's Office of Education said, adding that the pilot collection efforts will seek to measure the impact this form of recovery would have on individual privacy.

HEW hopes to collect \$416.7 million in unpaid student loans nationwide under this program [CW, Jan. 23].

The concern inside and outside the

Arizona Court Supports HIS In Tax Ruling

By Owen K. Darreth

Special to CW

PHOENIX, The Court of Appeals here has ruled that the Maricopa County tax assessor unfairly discriminated against Honeywell Information Systems, Inc. in assessing personal property taxes in 1973 against 39 pieces of computer equipment HIS had leased to various users here.

In a ruling handed down in November, the court found that the evidence offered by HIS made it apparent that the assessor levied personal property taxes against the firm on a different and more inclusive basis than other similarly situated taxpayers during the same period.

HIS had claimed that the county assessor was basing his tax claim on its published list prices, which included systems support engineering services and student instruction and which were not necessarily actual prices charged customers.

Chief Judge Donald Froeb ruled that while Arizona statutes have long authorized taxation of intangibles, "our cases have held that intangibles may not be taxed because the legislature has failed to provide a means of equalization for or collection of a tax against intangibles."

He also noted that Maricopa County is a member of the International Association of Assessing Officers, which has published guidelines for assessing DP equipment which state that intangible services should not be included in the assessed value of DP equipment.

Thomas Maher, an attorney for HIS, told CW that the case must go back to the Maricopa County Superior Court as a matter of legal form, where he expects the Court will rule in HIS's favor and order a refund of the taxes it paid on the intangible services.

federal agency is that personal information on student loan defaulters collected under Project Cross-Check may be used against these individuals by the private organizations assigned to collect that particular debt, an HEW spokesman said. Private collection firms do not have to adhere to the Privacy Act of 1974 as do federal agencies.

Other Programs Progressing

Meanwhile, other computerized matching programs run by the HEW Inspector General's office to detect fraud by federal employees in the Aid to Families With Dependent Children (AFDC) welfare program and by physicians and pharmacists in the Medicaid program are moving ahead.

Project Match, which compares federal payroll records with welfare rolls, has been conducted for the 25 largest districts in the 50 states and in the District of Columbia in an effort to find people on the rolls of more than one state in addition to those who are federal employees, the spokesman said.

So far, HEW has uncovered 13,584 cases in which a person on one welfare roll turned up on another — occasionally in the same state, but in different jurisdictions, he noted.

These cases have been turned over to the states for follow-up action, the spokesman stated.

A pharmacist in Kansas is the first to be indicted under Project Integrity, the program designed to unmask Medicaid

fraud by health care professionals. "We expect quite a number of indictments to come out of that program now," the HEW spokesman said.

The Kansas pharmacist had two pharmacies that each handled prescriptions for Medicaid patients. The two stores were permitted by law to have different pricing arrangements because of different overhead costs.

The pharmacist committed fraud when he used the more expensive pharmacy's charges for all his Medicaid prescriptions, he said.

HEW is examining some 2,400 cases of physicians and pharmacists across the 50 states under Project Integrity. They were selected for investigation because theirs were among the most aberrant Medicaid records in the U.S.

COBOL programmers... Increase your productivity now

Like it or not, management's emphasis in the next decade is going to be on productivity. With hardware performance increasing by a factor of 100 every decade and programmer productivity increasing by only three percent per year, there's no other way around it. And that means continued interest in the improved programming technologies, including top-down design, HIPO documentation, structured coding, and top-down testing. In short, the emphasis is going to be on a collection of techniques that are related to the structured programming movement.

At present, however, few companies are benefiting from the improved programming technologies. Only about one-fourth of the computer installations claim to be using the new technologies. And I know that many of these companies use the techniques far less than they would care to admit.

From a programmer's point of view, this presents a unique opportunity. If someone is going to pioneer the productivity techniques in your shop, why shouldn't that someone be you? At the least, you'll work with a new confidence and efficiency. And you're likely to be rewarded in other ways as well.

With this in mind, I'm happy to announce a book that I think will have a major effect on programmer productivity in the next decade. It is called *Structured Programming for the COBOL Programmer*. As I see it, it is the first book or course that presents a complete, consistent, and practical method for implementing the improved programming technologies. And it is chock-full of ideas that aren't available anywhere else.

What this Book Does

Like other books on structured programming, this book presents the theory behind the structured programming movement. Unlike other books, however, *Structured Programming for the COBOL Programmer* presents a complete system for applying the theory. In just six chapters, you will learn how to design, document, code, and test structured programs in COBOL.

In chapter 2, for example, you'll learn how to design a structured program. You'll learn the four steps for creating structure charts... what modules should go at what level... why there should only be one read or write module per file... the six things to watch for when reviewing a structure chart... how to number the modules in a structure chart... and much more.

In chapter 3, you'll learn how to document the modules using HIPO documentation. You'll learn the six steps for creating HIPO diagrams... what language to use in the process box... when and how to use extended descriptions... how to keep the modules independent... and so on.

In the same way, chapters 4, 5, and 6 cover everything you need to know to use the remaining techniques for improving productivity. You'll learn such things as what sequence to code the modules in... how to eliminate 77 levels from your Data Divisions... the one case in which a GOTO is required... how the paragraph names in the COBOL program relate to the HIPO diagrams and to the structure chart... when to use top-down testing... and how to code three different types of program stubs.

4 Reasons Why this Book is Effective

1. The author, Paul Noll, is a software specialist and COBOL expert. He is also responsible for the training of 250 programmers. As a result, his programming methods are superb, and his teaching methods are effective.

2. Paul never presents theory without showing its application. In contrast to other books and courses, this book is based around the development of four different kinds of business programs. Once you see how Paul's method is applied to these problems, you will forever see the value of structured programming.

3. This book presents structured programming in the context of COBOL. As a result, you will see all of the structured coding techniques in COBOL

(and only COBOL). You will also see how design and documentation are related to the programming language used.

4. This book contains dozens of illustrations taken from all phases of structured programming. You'll see structure charts and HIPO diagrams for each of the four programs developed in this book; you'll see structured COBOL, program stubs, test plans, and much more. In my experience, these illustrations, more than any other factor, determine whether an EDP course is effective... and they are the missing ingredient in other structured programming books.

Our unlimited guarantee

So there's no risk to you, this book is sold with an unlimited guarantee. If this book doesn't make you the resident expert on the improved programming technologies, you can return it for a full refund no matter how long you've had it. And if this book doesn't actually increase your productivity, by all means return it. You must be satisfied.

So mail the coupon today. For each book ordered, I'll bill you \$15 plus freight (plus sales tax in California). If the book works as I've guaranteed, it should repay its purchase price many times over.

Attention: Training Managers

If you are in charge of training for your company, by all means order a copy today. Based on our experience so far, our books will outperform any other instructional materials currently available at any price. If you prefer to call, our number is 209-229-8111.

Mike Murach & Associates, Inc. 4905 North West Avenue, Suite 102, Fresno, CA 93705

Gentlemen: Please send me _____ copies of *Structured Programming for the COBOL Programmer*. If I'm not completely satisfied, I will return the books for a full refund, no matter how long I've had them. I understand I will be billed \$15 plus postage (plus sales tax in California) for each book ordered.

Name and Title _____

Company _____

Address _____

City, State, Zip _____

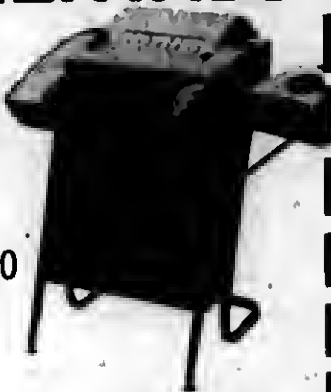
SAVE \$2.50: Send cash with order and your price is \$12.50 per book plus 50c for postage and handling (plus 75c sales tax in California). The unlimited guarantee still applies. If you return the book, you will receive a prompt refund.

TERMINAL RENTALS

MODEL

43

TTY

\$67⁵⁰
MONTH

33 ASR-FF

\$54⁰⁰
MO.

TWX-DDD

79⁵⁰
MO.

TELEX

76⁵⁰
MO.

33

KSR-FF

\$49⁰⁰
MONTHADM-
3A\$49⁵⁰
MONTH

ADM-1A — \$73.00 mo.

COUPLERS/MODEMS

TC 3002
V/A Acoustic 12⁰⁰
mo.TC 5001
202T 18⁰⁰
mo.TC 4001
113B
Auto-Ans. 18⁰⁰
mo.

MODEL

40

TTY
LINE PRINTER
300 LPM\$325⁰⁰
MONTH

All equipment includes national service

Get complete details with a direct call:

800/527-7700

or 214/252-7502 • Service 800/527-5608
TWX 910/806-5761 • TELEX 73-0022

& associates, Inc.

930 N. Bellline Road • Irving, Texas 75061
A Subsidiary of Pioneer Texas Corp.

SERVICE PROBLEMS?

NATIONWIDE SERVICE
356 CITIES
CALL

800/527-5608

IN TEXAS CALL

800/492-9802 or 214/258-2620

Calendar

March 22, Hartford, Conn. — Greater Hartford Chapter of the EDP Auditors Association Formation Meeting. Contact: Al Nirerenberg, Price Waterhouse & Co., 1 Financial Plaza, Hartford, Conn. 06103.

March 29-31, Chicago — The New Financial Systems, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

March 30-31, Washington, D.C. — Data Entry Management Association (Dema) Regional Seminar. Contact: Dema, 16E Weavers' Hill, Greenwich, Conn. 06830. Also being held May 11-12 in Columbus, Ohio.

March 31, Harrisburg, Pa. — Data Processing Management Association (DPMA) Region 11 Conference. Contact: James F. Towson, The Statesman Group, 2150 Herr St., Harrisburg, Pa. 17105.

April 3-4, New York — Planning and Initiating the Data Base Project, sponsored by Performance Development Corp. (PDC). Contact: PDC, Bldg. M, 1101 State Road, Princeton, N.J. 08540. Also April 10-11 and June 26-27 in San Francisco.

April 3-4, San Francisco — Data Communications: Advanced Concepts and Systems, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 3-5, Chestnut Hill, Mass. — Designing, Developing and Operating Teleprocessing Systems, sponsored by Boston College School of Management. Contact: Management Institute, Fulton Hall, Boston College, Chestnut Hill, Mass. 02167.

April 3-5, New York — Data Base Management Systems: General Concepts and Planning Guidelines, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also April 12-14 in Chicago, and April 17-19 in Washington, D.C.

April 3-5, Washington, D.C. — Life Cycle Management for ADP Systems, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

April 4, St. Louis — Pricing Computing Services in Colleges, Universities and Non-Profit Organizations, sponsored by Interuniversity Communications Council, Inc. (Educom). Contact: Carol Parysz, Educom, P.O. Box 364, Princeton, N.J. 08540.

April 4-5, Seattle — Computer Trade Show, sponsored by the Puget Sound Chapter of the Data Processing Management Association. Contact: Betty Matthews, Show Chairman, 1830 234th Place S.W., Bothell, Wash. 98011.

April 4-5, New York — How to Evaluate and Contract for Facilities Management/Computer Services, sponsored by Mathews & Co. Contact: R.S. Mathews, Mathews & Co., P.O. Box 2064, Darien, Conn. 06820.

April 4-6, Boston — Management Skills for Newly Appointed Managers, sponsored by Advanced Management Research (AMR). Contact: AMR International, Inc. 1370 Ave. of the Americas, New York, N.Y. 10019.

April 4-6, Washington, D.C. — National Business Equipment Show. Contact: Joseph Doblmeir, Convention Management Association, P.O. Box 32, Carle Place, N.Y. 11514.

April 4-6, Toronto — Data 78, sponsored by ComputerData Magazine. Contact: Paul J. Day, Data 78, Suite 2504, 2 Bloor St. West, Toronto, Ont. M4W 3G1, Canada.

April 5-7, New York — Word Processing Toward the Automated Office, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. B-WPAPRI, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held in Washington, D.C., Sept. 25-27.

April 5-7, Detroit — Fourth Annual Computer Graphics Conference and Equipment Display, sponsored by the Engineering Society of Detroit (ESD). Contact: ESD, 100 Farnsworth, Detroit, Mich. 48202.

April 5-7, Cherry Hill, N.J. — Data Processing: An Introduction to Concepts and Systems, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 5-7, Chicago — Effective Computer Operations Management, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held April 12-14 in San Francisco.

April 9-12, Miami — Common's 1978 Spring Conference. Contact: David G. Lister, Administrative Director, Common, Dept. M2, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

April 9-13, San Diego — Americas Univac Users Association Spring Conference. Contact: Barbara Gattus, Federal Yeast Corp., Highlandtown Post Office, Baltimore, Md. 21224.

April 10-11, Washington, D.C. — New Directions in Competitive Procurement — Computer Systems, Defense and Other Government ADP Programs, jointly sponsored by American Institute of Aeronautics & Astronautics, Data Processing Management Association and Technical Marketing Society of America (TMSA). Contact: TMSA Seminars, P.O. Box 91295, Dept. CS, Los Angeles, Calif. 90009. Also being held in Los Angeles May 11-12.

April 10-12, Washington, D.C. — Data Communications: An Introduction to Concepts and Systems, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also held in New York April 17-19.

April 10-12, Washington, D.C. — Managing Data as a Resource — How to Implement a Data Resource Management System, sponsored by Data Resource Management Associates. Contact: Arnold Barnett, 19 Orchard Way North, Rockville, Md. 20854.



Head Crash Protection You Just Can't Ignore.

Shockwatch* turns bright red if subjected to a shock that could damage a disk pack or cartridge. So it instantly tells even your newest operator not to insert the damaged media in a drive. And that eliminates the major cause of head crash.

Shockwatch is so dramatic, so simple, and so visible, nobody can miss it. And it's so cost-effective, you can't afford to ignore it. Ask your disk supplier about Shockwatch, or call us — Media Recovery, Inc., 2550 Electronic Lane, Dallas, Texas 75220, (214) 350-5725.

Internationally, call your field engineering sales manager at the local Burroughs subsidiary head office.

SHOCKWATCH®

Protection. Pure and Simple

*U.S. Pat. No. 4,068,613

Startup Expected by April

Trading System to Link Five Stock Exchanges

By Tim Scannell
CW Staff

WASHINGTON, D.C. — A computer-based market-connecting system that will link five major stock exchanges across the country is scheduled to become operational by April.

Developed by the New York Stock Exchange (NYSE) in accordance with guidelines mandated by Congress in The Securities Acts Amendments of 1975, the Intermarket Trading System (ITS) will connect the New York bureau with those of the American, Boston, Philadelphia and Pacific stock exchanges, an NYSE spokesman said.

Although ITS hasn't been hailed as "the" national market system or even a major improvement, the exchanges are cooperating with one another in an effort to ease Congressional pressure and deflect Washington charges of footdragging on the issue.

Basically, the intermarket system would work this way: If a broker on the NYSE receives an order to sell 50 shares of a particular stock, he will first check the current price offered on the New York exchange to see if it meets or exceeds the price at which he is willing to sell. If the broker is not satisfied with the New York price, he can then check the quote display of the ITS terminal and see if some other market is able to match his price, the spokesman explained.

If New York is unwilling to equal the better price, the broker can then send a message to the other exchange, via ITS, stating his interest in selling at its price. If no intervening trade has occurred, changing the selling figures, the trade is executed and confirmed in as little as 30 seconds, the spokesman said.

Communications Control

Communications between the exchanges will be handled by a centrally located T/16 dual processor manufactured by Tandem Computers, Inc., a spokesman explained. Participants will initially access other stock exchanges via AT&T Dataspeed 40 terminals linked to the computer, probably located in New York. Bureaus will

NCC Housing Set Up

MONTVALE, N.J. — A housing bureau has been set up for the 1978 National Computer Conference (NCC) to be held in Anaheim, Calif., June 5-8. Rooms are reserved at over 60 hotels and motels in the area. Accommodations are available to all NCC registrants at reduced convention rates, "providing that hotel reservations including the required deposit of \$30 per room are postmarked no later than May 19," an NCC spokesman noted.

All requests must be processed on the official registration forms, and block reservations will not be accepted. Official housing bureau registration forms are available from the American Federation of Information Processing Societies, Inc. (Afiips), 210 Summit Ave., Montvale, N.J. 07645, (201) 391-9810.

Citing the expected record-setting attendance, an NCC spokesman urged hopeful attendees to act as soon as possible to help ensure obtaining accommodations of their choice.

have as many terminals as they think are needed in order to receive and transmit the various price quotes.

Implementation of ITS is being coordinated by the Securities Industry Automation Corp. (Siac), a firm owned by both the New York and American stock exchanges. With such a system, "orders have a greater chance of achieving the best price for customers, no matter where they are," Lee Amaya, president of Siac, said. "I think it's absolutely the best way the market centers can 'break the ice' with regard to a national market system," he observed.

Not only will ITS "provide a basis for free competition among all the ex-

changes" but it will also allow brokers on participating exchanges free access to all trading floors without having to buy a membership, Amaya stated. A typical membership on the NYSE, for example, currently costs approximately \$50,000.

One potential problem that might occur would involve establishing brokers' commissions.

For instance, if a number of stocks are bought or sold on the Pacific exchange by a broker on the Boston exchange, to whom should the commission be given and on what market rate should that commission be based?

"That's a policy sort of thing," Amaya noted. "It is my opinion that

every market place will have its own policies and negotiate its commission structure with whomever the customer is."

"They [presently] have a so-called operations committee and will eventually, no doubt, have a policy committee" governing the conduct of the participants, he observed.

Although Amaya would not elaborate on the total cost of the intermarket system, he did say that individual expenses would be based on the number of trades within each exchange. Since the NYSE handles about 86% of the trades, "you can see who's going to pay the lion's share of the cost," Amaya said.

There's One Number for the Number One Computer Lease (703) 683-4606

Call Us.

CIG

A Subsidiary of
Computer Investors Group, Inc.
16th Floor
488 Madison Avenue
New York, New York 10022

Listed, American Stock Exchange
Call CIG: (212) 753-0845, or mail this coupon today

Tell me more about CIG. I am CW306	
interested in	
☐ leasing	☐ buying the following system:
I'm also interested in	
☐ Memory Systems	☐ Block Multiplexer Channel
Name _____	
Address _____	
City _____	State _____ Zip _____
Phone number _____	
Mail to CIG A Subsidiary of Computer Investors Group, Inc. 16th Floor 488 Madison Avenue New York, New York 10022	

On-Line System Tracks Music Use for Royalties

By Brad Schultz
CW Staff

NEW YORK — Music can seem as pervasive as the air through which it flows. At any moment there is a multitude of songs being played over radio and TV; in night clubs and discotheques; through jukeboxes and the Muzak speakers in lobbies and offices.

Behind each recorded song are the artists and producers that made it happen, and they are due certain royalty payments whenever their song is played. The formidable task of distributing these royalties fairly on a continuing basis is being handled here by a unique on-line music information system operated on IBM hardware.

Broadcast Music, Inc. (BMI), a non-profit music licensing organization,

uses this system to track use of more than a million song titles whose rights are owned by 47,000 songwriters and publishers. These songs are played by more than 8,000 radio stations, more than 750 television broadcasters and legions of night clubs, discotheques, symphony orchestras, background music services and jukeboxes, according to an BMI spokesman.

"We could not handle the magnitude of processing without a computer. This technology enables us to offer new services to our affiliated writers and publishers," BMI president Edward Cramer noted.

But even with a computer, performance counts upon which royalties are based cannot be made with exact precision. Instead, estimates of playing

times are derived from marketing-type surveys, according to BMI spokesman Russell Sanjek.

Usage on radio and TV is determined by a regular representative sampling of 500,000 hours of music. Jukebox, nightclub and discotheque playings are gauged more indirectly — for example, by surveying record store purchases, he added.

Jukebox owners refuse to allow the attachment of counting devices to their equipment and have only this year agreed to pay royalties at all, Sanjek explained.

One could compute performance numbers or find all the songs recorded by a given artist interactively at BMI or from three remote sites, according to the firm's DP vice-president, War-

ren McFall.

"We operate our on-line . . . network from 8:30 in the morning to 6:00 in the evening . . . and then, when we bring it down in the evening, we have five [memory] partitions available to do batch work," he said.

Conversion From Univac CPU

McFall reminisced about BMI's conversion from a Univac 9400 CPU configuration to the present setup, noting that the conversion became necessary when the 9400's capacity was exceeded by BMI's mounting demands.

BMI requested conversion proposals from several vendors. Among them, Univac estimated that conversion to another Univac system would take about five years, McFall continued, adding that "you don't go into a conversion for more than a year — too many things change."

But IBM's estimate was about 14 months, far better than Univac's although still longer than McFall's one-year "rule." BMI decided to go with IBM.

As a result of the conversion to a new vendor line, BMI had to rewrite all its on-line software with only minimal systems support from IBM, McFall noted.

"We didn't really want [IBM] to get into any programs . . . We had to live with the programs later on [and] it's always been my philosophy that if you get good systems work and bad programs, you can recover; but if it's the other way around, forget it!"

"It took us about 180 [machine] hours to extract the information from Univac disk files [and store it] on tape, and then we needed about another 50 hours to do the sorting of these records," he said. The records — corresponding to more than 900,000 BMI-licensed song titles plus more than 200,000 titles from foreign affiliates — had to then be formatted and linkages, such as title/publisher/writer, resolved.

The system's basic hardware configuration is solidly IBM and tops 1.5 billion bytes in memory capacity, McFall noted.

The configuration includes the 370/148 CPU with 1M bytes of memory; four 70 million-byte 3340 and four 280 million-byte 3344 direct-access storage modules; five 3420/5 magnetic tape units; and two 3203 1,200 line/min printers.

System software includes three IBM packages — the Customer Information Control System (CICS), DOS/VS and the DL/I Query Support Feature — buttressed by about 800 internally developed batch programs, most of them written in 370 assembly language.

Our lightpen comes attached to an alphanumeric unit with full LED display.



How many code readers can make that claim?

Just ours.
It's part of a remarkable bar code data entry terminal system. The FCP-IIa.
It's a plug-in system that eliminates errors, cuts pre-processing costs and saves valuable operator time in both plant and office data entry applications. The FCP-IIa is interactive! The operator receives both audio and visual scan confirmation immediately as well as visual computer feedback. Send/receive message length can be up to 32 characters. And, codes? The FCP-IIa handles "2 of 5", Interleaved "2 of 5", "3 of 9" (including variable length codes), Codabar and UPC. The FCP-IIa. It's what's behind the pen that counts.

(*Quantity of one, OEM and volume discounts available.)

- ☐ I'm interested in more information on the FCP-IIa
☐ I'm interested in OEM possibilities

NAME _____

COMPANY _____

ADDRESS _____

STATE _____

ZIP _____



computer identics

31 DARTMOUTH STREET WESTWOOD, MASSACHUSETTS 02090 TELEPHONE: (617) 329-1900

KID (402) 392-2606

VOLUME DATA ENTRY SERVICES . . .
TAPE OR CARDS
"QUALITY AT A LOWER COST"
AMERICAN KEY DATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

IN DEPTH IN DEPTH

The Ten Great Software Myths

By Werner L. Frank

Myth (mith), n. 1. A traditional or legendary story. 2. A story or belief that attempts to express or explain a basic truth. 3. A belief or a subject of belief whose truth or reality is accepted uncritically.

All disciplines are surrounded by myths, and the data processing field is no exception. Abstract as it is, software especially makes for an environment in which bountiful myths can thrive and become entrenched, for who really knows the truth? And who can prove anything?

The consequence of accepting what may be a myth can often be an investment decision based on unreality. Hence the discrimination of truth from half truths, of fact from belief, may serve the decision maker well.

At the risk of challenge from others who may produce a better decalogue, we present to the right the current 10 great myths of software.

MYTH NO. 1

Software represents a growing proportion of total data processing expenditures.

Many experts continue to promote the notion that software accounts for the larger proportion of total DP expenditures. A report in 1977 quoted one authority as saying, "virtually every study in existence indicates that by 1985, 90% or more of the cost of data processing will be people costs, not hardware, making data processing the most labor-intensive industry, except possibly agriculture."

B.W. Boehm, writing in the May 1973 issue of *Datamation*, cited U.S.

Software represents a growing proportion of total data processing expenditures.

* * *

Software is (necessarily) expensive.

* * *

Software must follow hardware.

* * *

Software outlasts hardware.

* * *

Software needs continuing change.

* * *

Software productivity can be enhanced.

* * *

Software product manufacturers are more efficient producers.

* * *

Software must satisfy the user.

* * *

Software systems require a data base management system capability.

* * *

Software is the result of programming.

* * *

It's time to jettison some common misconceptions about software, the executive vice-president of Informatics, Inc. believes. This week, Frank attempts to debunk three of those myths; next week, he'll explore the rest.

Air Force software costs as "going to over 90% of total [DP] system costs by 1985."

Even I made similar predictions in June 1968, also in a *Datamation* article, forecasting an 80% cost factor for software by the end of the '70s — thus reversing the hardware/software costs ratio from the 80/20 split that existed in the late '50s.

And a no less prestigious group than the authors of *Data Processing in 1980-85* asserted that "the total direct data processing dollar spent on hardware will decrease to between 15% and 25% from today's level of 25% to 45%," implying an increasing role for software.

That document, often referred to as the "Silt Report," was written by T.A. Dolotta, M.I. Bernstein, R.S. Dickson Jr., N.A. France, B.A. Rosenblatt, D.M. Smith and T.B. Steel Jr. and published in 1976.

A different set of experts, the IEEE Computer Society's Technical Committee on Computer Elements, said in a report on a July 1977 workshop that "the trend in cost of large systems has been rapidly increasing toward the software effort, with current estimates of 60% of the cost of systems comprising the software effort and 40% the hardware effort. Some prognostications predict the ratio could be as high as 98% software vs. 2% hardware by 1990."

The statistics reported in our technical journals are not lost on the general press. For example, the July 1977 issue of *Dun's Review* stated that "software is accounting for a bigger and bigger share of the data processing dollar."

Are these experts really right? To answer, one must agree first on what to count or measure and, secondly, how to ascribe costs to these complex elements.

In analyzing the cost elements of DP
(Continued on Page 14)

IN DEPTH

(Continued from Page 13)
operations, it is necessary to distinguish between the DP cost elements of the typical but individual data processing site and the expenditures for the entire economy. For example, *Datamation's* reviews of DP budgets in recent years have focused on the installation, whereas the data most often presented by International Data Corporation

(IDC) represents total user expenditures. Data from these sources are shown in Figure 1.

Tracking the Measures

In general, such data excludes indirect cost items like personnel overhead as well as costs related to the physical plant supporting the hardware.

Take advantage of the most profitable distributor plan available for the small business computer market. You'll find Randal offers the highest gross margins — from system number one on. And no quotas, billbacks or other hassles. You won't find us competing with you — we only market through distributors, so your success is ours.

Never before have your potential customers been able to buy as much reliable office computer power for such an incredibly low (Randal systems start at \$12,750) price. Every

system is available for 60 days — or less — delivery and priced lower than any comparable competitive models. Plus, you can stop worrying about training — ours is continuous, or service — ours is nationwide.

Randal Data Systems has the broadest family of software compatible small business computers and an extensive application software library. Just as important, our Business Basic makes it extremely easy to program.

Maybe that's why we have the fastest growing independent distributor network in the nation.

It is interesting to track these sets of measures, both in the past and with respect to forecasts of the future. The following is observed:

(1) Expenditure components as measured by IDC have followed a consistent pattern of increasing hardware (even excluding communications) costs as a part of total expenditures (38% in 1974 to 40% in 1977), with

personnel costs decreasing (34% in 1974 to 30% in 1977).

(2) More significantly, IDC forecast the 1975-1983 individual user site spending profile in the U.S. will move as follows:

	1975	1983
Hardware and Support Staff	57%	62%
	43%	38%

As a consequence of an 11% per year increase for nonpersonnel expenditures and only a 9% per year increase in staff costs.

(3) Quite independently, the organization Input found in every one of the 10 industry sectors it surveyed that the expenditure patterns for DP budgets for 1976 and 1977 showed equipment at a year-to-year percent increase that exceeded the in-house personnel expenditure growth. In fact, for the entire sample studied, the hardware percent increase was almost twice the expected growth in personnel costs.

Upward-Moving Index

A Diebold Group, Inc. Research Report observed in 1971 that "the whole concept of 'automation' was deeply grounded in a movement away from labor intensiveness." It therefore seems incongruous that within the DP field itself we continually predict an ever-increasing labor intensiveness.

This Diebold report selected the Hardware Index — the ratio of DP hardware expenditures to DP staff expenditures — as a measure of the labor intensiveness of the DP function. In 1971, this ratio was found to be an average of .69 for 10 industrial groups; for every dollar spent on DP staff, 69 cents was spent on hardware.

Diebold performs this survey and analysis every two years and has found the Hardware Index moved from .69 in 1971 to .74 and then .73 in 1973 and 1975, respectively. Diebold's 1975 study concluded that "the steadiness of the Hardware Index indicates that... relative proportions of hardware to personnel spending have not changed. Whatever changes are taking place in the pattern of spending must be in other areas."

We note another anomaly which serves to further undermine Myth No. 1. We already cited from the Silt Report the forecasted lower hardware component as a percentage of total DP spent of about 20% by 1985 in constant ("inflation-proof") dollars. We note the authors' additional forecast of a quadrupling of total DP expenditures in the 1975-1985 decade.

The software component, at 80%, would then have to have a real growth factor of more than 5 — an unlikely possibility in a 10-year period. In fact, such growth would require a threefold increase over the expected 1985 programmer population, according to the growth parameters published by Dolotta et al.

It may well be argued that the com-

Call us today or send coupon for details.

Randal Data Systems, 365 Maple Avenue, Torrance, California 90503, (213) 320-8550.

Yes, I'm interested in a Randal Data System distributorship. Show me the book.

Other products sold _____

Years in business _____

Geographic coverage _____

Special applications _____

Company _____ Title _____

Name _____

Address _____

City/State/Zip _____

randal data systems, inc. ICW 3-6

What Basic 4, DEC, Microdata, Data General, etc. should know about distributors.

Randal wrote the book.



THE TEN GREAT SOFTWARE MYTHS

plement of hardware is not just software, but would include data communications, outside services and supplies. Even in this instance, assuming a present 20% cost ascribable to these elements and growing to 30%, we would have the "truer" software component going from 40% to 50%, or in real terms from 40 units to 200 units — this time a growth factor of exactly five. Again — incredible!

Casters of Doubts

At least one author has cast doubts regarding Myth No. 1. M. Phister, in his authoritative work *Data Processing Technology and Economics*, asserted that "the burdened cost of the users, systems analysts and programmers is almost the same as the total value of hardware shipment, plus the total amount paid for data processing services, supplies and communications."

He went further to say that in his belief "the number of systems analysts and programmers per dollar value of general-purpose computers has remained fairly constant."

* This view is supported by the data presented by D.A. Fisher in the definitive study of DP costs in the U.S. Department of Defense (DOD). Here the operational and capital costs of the General Management Classification (GMC) category of computer systems was analyzed from data obtained from the General Services Administration publication "Inventory of Automatic Data Processing Equipment in the United States Government."

Figure 2 presents an expenditure summary, showing the stability of direct personnel costs, with even a slight decrease in the DOD component from 1968 to 1973. (The personnel costs are unburdened in the source document. Total cost will be examined below).

The balance of U.S. government GMC experience shows a small increase in the percent personnel costs — perhaps reflecting the level of use of outside services during that time frame — contrasted with the pronounced shift to such a service alternative by elements of DOD.

Manpower Leveling

A further interesting observation supports the contention that manpower is leveling off. The DOD study indicated the in-house personnel costs increased in dollar value by 48% in the five-year period 1968-1973, but a correction for inflation would find the dollar change to be negligible. This is primarily the result of a 10% drop in headcount from 1968 to 1973.

Similar observations have been made in a second setting. The June 1977 report of the Japanese Information Processing Development Center stated that in the administrative organization of the Japanese government "until recently, the number of computer personnel has been increasing yearly as a whole," but "the growth rate of the

	INDIVIDUAL DP SITE EXPENDITURES (%)			TOTAL USER EXPENDITURES (%)	
	1973	1976*	1977**	1974	1977
HARDWARE	40	45	41	38	40
DATA COMMUNICATIONS	6	***	***	7	9
SALARY	45	44	44	34	30
SUPPLIES	6	6	4	4	4
OUTSIDE SERVICES	3	5	11	17	17

* Selecting the \$500,000 to \$1 million per year hardware rental installation as a typical budget.

** Adjustment made to original data by moving data communications line cost from supplies to the hardware category; this data heavily biased in direction of the largest installations in ten industry sectors.

*** Data communications is included in the hardware category.

Figure 1. U.S. DP Expenditure Breakouts

	DEPARTMENT OF DEFENSE	OTHER U.S. GOVERNMENT
FY 1968		46%
PERSONNEL	54%	13%
EQUIPMENT RENTALS	22%	17%
CONTRACT SERVICES	9%	10%
OTHER OPERATIONAL COSTS	8%	14%
CAPITAL COSTS	7%	
FY 1973		
PERSONNEL	53%	48%
EQUIPMENT RENTALS	16%	16%
CONTRACT SERVICES	14%	17%
OTHER OPERATIONAL COSTS	7%	8%
CAPITAL COSTS	10%	10%

Figure 2. Percentage Distribution of Direct DP Operation and Computer Costs, GMC Systems

ELEMENTS OF COST	DIRECT COSTS	BURDENED COSTS	ADJUSTED COSTS
Software	34%	39%	45%
In-House	25%	33%	33%
Contract Services	9%	6%	6%
Hardware Related	—	—	6%
Hardware	33%	22%	16%
Other	33%	39%	39%
Software as Percent of Hardware Plus Software	51%	64%	74%

Figure 3. Identification of 'Truer' DOD Software Costs (Fiscal Year 1973)

number of personnel is tapering off, registering a decrease as a whole for fiscal 1976."

Software Cost=Personnel Cost?

But can software cost be equated simply to personnel costs only?

Clearly, professional services purchased from the outside are also software costs.

And what about software products which are almost 100% value-added

people costs? Or the development and support of the software offered through data services?

And, finally, what about the software from the hardware vendor which, burdened or not, may be buried in the hardware cost itself?

The identification of all people costs as software may well account for part of Myth No. 1. As DP has further penetrated the user environment, more and more personnel are concerned

with the computer — from the point of data entry to data output — from training to maintenance. The measurement criteria have become nebulous concerning which elements are counted as DP people costs relating to development and support (software) and which are counted as parts of the user environment (operations).

Even within the DP shop, it is proper to challenge what is "software cost."

(Continued on Page 16)

IN DEPTH

(Continued from Page 15)

For example, one could reasonably separate DP people salaries into at least two components — first, the operation side and, second, the development side.

I would argue that the operational element — including operators, input/output clerks, standby maintenance personnel — are a necessary extension

of the hardware in order to make the application systems perform satisfactorily for the user.

Indeed, it was just such an approach that was taken by Fisher to further analyze the DOD DP cost data cited earlier. In that study, the total direct costs were allocated to three categories — software, hardware and other — with each one of these categories in-

cluding some labor component.

The software category was comprised of two components — in-house personnel and outside contract service — in an approximately 75%/25% proportions. Here, the definition of what is called software included systems analysis, design, programming, equipment selection and studies.

Fisher made two subsequent calcula-

tions on the raw data obtained from the General Services Administration report. First, he burdened all of the DOD in-house labor in all three categories by a judgmental factor of 100%. Secondly, he assumed there was a 35% software cost bundled in the hardware prices.

Results of Study

Figure 3 shows the results of Fisher's study, based on the two steps mentioned above, that redefine software costs starting with the distribution shown in Figure 2. Two observations concerning this DOD data are necessary:

- Personnel costs in fiscal year 1973 were 53% of total direct expenditures (Figure 2). In the burdened model, Fisher cited personnel costs at approximately 70% of total costs (Figure 3).

- Burdened costs ascribable to software range between 33% (in-house) to 45% (adjusted) of total expenditures, depending upon the elements included.

Figure 3 also presents, for each model, the ratio of software, as defined, to the total of hardware and software. This ranges from 51% to 74%, the latter being close to the often-quoted current estimate of U.S. Air Force software/hardware expenditure split. In making this calculation, of course the "other" cost category is omitted.

I would argue that purchased software (i.e., packages) and vendor-supplied software, bundled or unbundled, should not be counted as part of "software" costs. These elements are extensions of hardware — mass-produced — and are not influenced by the same economic factors as are the "custom" services of a specific professional.

Hence, from the data of Figure 3, it is possible to identify as the "software" cost component a quantity taken from the "burdened costs" column ranging between 33% and 39%, say 36% of total expenditures. This would lead to a 62%/38% split between the two elements of burdened software and hardware, respectively.

One further quantitative observation is in order. The "true" software component, consisting of systems programmers and application analysts, implementors and trainers, is actually engaged in two main activities: maintenance of operational systems and new developments.

Estimates published by B.W. Boehm in the December 1976 issue of *IEEE Transactions on Computers* suggest that some 60% of this professional software staff may be occupied with necessary maintenance of ongoing operating applications. This would leave roughly only 15% (40% x 38%) of the total expenditures available for new development.

A self-correcting process seems to be in operation which limits the capacity to spend money on "software" be-

THINKING ABOUT AN S/34? PDP-11/70? ECLIPSE? PREFER A VIRTUAL MEMORY SYSTEM?

CONSIDER WANG'S NEW 2200VS.

A virtual memory system at an entry level price under \$50,000.

Interactive. Responsive. 2.3 billion bytes of online storage. ANSI '74 COBOL, RPG II, BASIC and ASSEMBLER. IBM 360/370 instructions.

Multiprocessing; multiprogramming. Software automatically adapts to sys-

tem size. High, immediate programmer productivity.

The first-time computer that protects your investment.

The replacement computer for the yield you never got.

The remote computer to which you distribute 90% of the application's processing.

Modular. Expandable without system conversion.



If you want to bite into something you can chew, mail this coupon to Wang Laboratories, Inc., Lowell, MA 01851. Or call (617) 851-4111.

I'm hungry. Send me information on Wang's 2200VS.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Phone _____

DP80/CW38



cause of continued budget constraints and the difficulty in recruiting personnel, together with growing maintenance requirements.

Remarkably Stable Costs

This brings us full circle to where we started — challenging the myth of the software behemoth. Two conclusions result:

(1) Current software (personnel) costs are not growing as a component of total costs — they are relatively stable.

(2) The popular software/hardware ratios have typically excluded from consideration many other cost elements and, therefore, distort the true portrayal of "software cost" growth.

The facts seem to show that software costs per unit of time are remarkably stable. It is not, therefore, the annual software cost as a percentage of annual expenditures that is taking more and more from the total budget, but rather it is cumulative cost of implementing specific applications as a function of a unit of computing capacity that is increasing — and this cost is stretched out over time and, hence, not readily discernible.

What is the explanation for the apparent stabilization and even decrease of the labor element in the cost picture of DP operations? There may be several reasons:

- The availability of standardized software products and outside data services offered by the computer services industry have done much to hold development costs down and extract more cost-effective results from shared software and hardware.

- The additional hardware capacity and system software sophistication (terminals, time-sharing, data base management systems, et al) supporting application implementations have led to a need for substantially more computer capacity, as well as peripheral and communications equipment, causing the hardware budget to remain the same or even increase, despite the fact that electronic components themselves are becoming more cost-effective.

- The application solutions have become increasingly complex, encompassing more functions and requiring more built-in safeguards. This has resulted in a more demanding hardware environment with a corresponding increase in costs. Digital Equipment

Corp. president Kenneth H. Olsen was quoted in the July 28, 1977 issue of *Minicomputer News* as saying, "The reason why there's a software problem is that people always want to do problems just slightly beyond the state-of-the-art."

"With all the prices going down, the average computer we sell has stayed the same price for 10 years, roughly,"

Olsen noted. "What happens is that even though the computer is cheaper and the memory is cheaper, people just want 10 to 50 times as much memory as they did 10 years ago. That means the problems they're trying to solve grow as fast as the cost goes down, and they still have the same trouble they had 10 or 15 years ago because they're trying to do a little bit more than they

can do."

- The dramatic shift to the minicomputer has also affected the traditional hardware/software split. At first glance, the hardware cost decreases would seem to affect the software cost factor. However, in actuality this does not appear to be the case for two reasons:

(Continued on Page 18)

USER DOCUMENTATION...

You know you need it. But do you know what it is?

Announcing a one-day workshop on the business impact of user documentation in three practical segments:

☐ **Documentation Needs Analysis**...user support during marketing, installation, conversion, training and system use varies depending on your system, your corporate objectives and your user's environment. We'll show you how to reconcile these variables.

☐ **Documentation Planning**...based on thorough needs analysis, a formal plan involves cataloging and outlining information units, identifying sources, assigning responsibilities and budgeting. We'll work through a sample plan together.

☐ **Executing the Plan**...good documentation is organized by user function; clearly presented; written in friendly, concise language; illustrated with meaningful graphics; and attractively packaged in durable, maintainable media. We'll show you how that's done.

Each segment is divided equally between lecture and small-group discussion to assure that ideas are delivered in application as well as concept. Lecture and discussions are

supported by exemplary handout material. So, you'll leave the workshop with a headful of ideas and a packet of useful tools to help you put your documentation back to work — educating, informing and selling your users.

Who's Behind The Workshop?
Unlike academic workshops, this one is based on business experience, not theory.

The workshop is designed and presented by Progressive Communications, Inc. (PCI), a national leader in Documentation consulting. Because we specialize in user documentation, we're confident your organization — and your users — will benefit from our experience. Our clients include such systems giants as Citibank, Hewlett-Packard, ITEL, and Western Union Teleprocessing, plus many software and applications companies throughout the U.S.

Our services include user reference/training packages, corporate documentation standards, system marketing programs and software documentation. Our management and staff have packed over 50 years of collective documentation consulting experience into a one-day program that converts the business problems of user documentation into bottom-line benefits. Larry Gress, president of PCI, will personally conduct the workshops, sharing our experience with your firm.

Who Should Attend?

Your documentation is the hardcopy representative of your systems. Shouldn't you do all you can to make it perform at least as well as your systems? Of course. If you represent one of these areas, this workshop will show you how:

- ☐ Design/development
- ☐ Installation/training/service
- ☐ Documentation/publications
- ☐ Marketing/sales

What Does It Cost?

Individual enrollment fee **\$185**
Multiple enrollments from same firm **\$160 each**

Amount includes workshop fee, lunch and refreshments. All applications must be accompanied by a check for the full amount and postmarked by March 30. You'll receive a written confirmation/receipt prior to the workshop.

Enroll Early, Space Is Limited

Because space is limited, applications will be processed on a first-come, first-served basis. Fill out the application blank now and mail it with a check to the address below. And if you can't attend, send someone else. It's the first step in converting your documentation problems into benefits — for you and your users.

Where and When Can I Attend?

We're bringing our experience to you in these cities:

Atlanta, Georgia World Congress Center, April 18
Baltimore/Washington, D.C., Northwest Sheraton Inn, April 20
Philadelphia, Philadelphia Marriott, April 24
New York, Marriott Essex House, April 26
Boston, Boston Park Plaza, April 28

Also watch for our May workshops in Dallas, Houston, Los Angeles and San Francisco, and our June workshops in Denver, Chicago and Minneapolis.



**PROGRESSIVE
COMMUNICATIONS
INCORPORATED**

The Alamo/310
128 South Tejon Street
Colorado Springs, Colorado 80903
303/471-9874

My firm needs your workshop. Please reserve _____ seats in the

_____ workshop to be held on April _____
(city)

My check is enclosed for \$_____

Registrants (name and title)

Company name and address

**3033
PROCESSOR**

- Walk away leases
- Your delivery position or ours in 1978

Comdisco Financial Services Inc. has arranged over \$200 million in financial leases

comdisco
312-698-3000

IN DEPTH

(Continued from Page 17)

The minicomputer applications remain simple and it seems less manpower per hardware unit is necessary to support such systems — a point which, at this time, is more conjecture than a result of good industry statistics.

Software for the minicomputer seems to be incredibly cheaper than for

the larger computers — again relating, perhaps, to simpler environments and fewer demands made by such installations.

Hence, the wide and often multiple-unit distribution of the mini, coupled with the less costly software, may actually have stemmed the tide of software cost.

In summary, perhaps one subtle in-

fluence in postponing the "software cost explosion" is the trade-off noted by Boehm in his May 1973 *Datamation* article: "There are numerous... ways in which cheaper hardware can be traded off to save on more expensive software development cost. This trade-off opportunity involves buying enough hardware capacity to keep away from the steep rise in

software costs occurring at about the 85% saturation point of CPU and memory capacity."

MYTH NO. 2

Software is (necessarily) expensive.

The cost of software depends upon how it is acquired and how costs are calculated. Certainly, if the classical elements of cost are counted, the software expenditure is dear. We include as components of cost the following:

- Requirements study.
- Feasibility analysis.
- Functional design.
- System specifications.
- Specifying and providing hardware.
- Programming.
- Testing.
- Acceptance.
- Documentation.
- Training.
- Conversion.
- Operation.
- Maintenance.

Not only is each of these activities a people-intensive process and, therefore, expensive, but the steps also take substantial time for completion.

There are additional costs typically not identified at the outset of a software project, such as:

- (1) Time and opportunity loss in not having the solution immediately.
- (2) Poor estimates leading to project overruns.
- (3) Nonmatching of the users' real requirements with what is actually delivered.
- (4) Change of the initial environment and requirements by the time the project is completed.

But there is an alternative — and software can be cheap. Certainly cheaper. It all depends upon who builds it and how it is paid for.

If a piece of software is available on the commercial marketplace and if it fits one's requirements — or even nearly fits — then current marketplace software prices are a bargain which the user can't ignore.

Not only is the purchaser of commercially available proprietary software able to buy the operating code, but he also gets documentation, training and continual maintenance. He is, there-

PDP-8 users: Now you can turn your computer into a multi-user system for far less than you think

No matter who handles your PDP-8, you can have Quodata's ETOS package installed on your computer to allow four people to share its up to 16 users at once.

ETOS runs on ET-1, with a dual 160K or 320K under COS-1. And it supports the full BASIC, FORTRAN, COBOL, and ALGOL languages. With ETOS, you can have a multi-user system for far less than you think.

At the time you purchase ETOS, you can have a complete multi-user system for far less than you think.

ETOS is the only multi-user system for PDP-8 that can be installed on any PDP-8.

For more information, contact Quodata.

Quodata, Inc., 196 Trumbull Street, Hartford, Connecticut 06103.

quodata
Specialists in DEC Software

196 TRUMBULL STREET, HARTFORD, CONNECTICUT 06103

FOR SALE Communication Terminals

- Teletypes - 28 32 33 35
 - TTY - TTY
 - DECwriters LA36
 - Acoustic Couplers & modems
 - TI 700 series
- DATA COMMUNICATION
EQUIPMENT BROKERS, INC.**
4915 Fernlee
Royal Oak, Mich. 48073
(313) 549-3400

IN DEPTH

fore, able to shortcut almost all of the tasks identified above and avoid the accompanying pitfalls in implementing software.

Even if the software product is not the ultimate solution, its lower cost makes it usable as a benchmark or test cell for identifying more specific and more customized needs.

Reflect for a moment on the internal manpower costs and displaced profits of an organization which allocates its own best resources in conceiving, defining and architecturally designing the external characteristics of a given computer application solution. The interaction of the in-house user and DP staff — conducting their interactive process of analysis (first three components of cost) over many months — would more often than not equal the purchase price of the off-the-shelf software from outside sources.

In fact, the price of available software can often be justified solely on the basis of the associated documentation which, in itself, can be the starting point, or straw man, for a subsequent internal development.

In other words, one can purchase the package, use the documentation and throw away the code — that's how cheap it really is.

But there is an even more valuable, although frequently overlooked, tangible benefit. By associating oneself in the marketplace with other users of the same software product, one becomes a participant in a community of interest — which, if there are a substantial number of users, will lead to a continually improved and responsive software product.

Application software maintenance has become a sizable — 60% — portion of the programming staff duties. Once again, this troublesome ongoing expense can, to a large extent, be displaced and the cost shared with many users.

Finally, of course, purchased software can mitigate, if not avoid, the downside risks already identified as hidden additional costs of custom implementation where time for completion and the end performance remain unknowns for too long a period.

And to the financially concerned, purchased software can be treated as a capital investment to help the income statement or it can often be leased, if it is a question of cash flow.

Indeed, software need not be expensive.

MYTH NO. 3

Software must follow hardware.

This myth is more often expressed as the hardware leading the software — software must be designed or rede-

signed to keep pace with the newest advancements in hardware.

The phenomenon is demonstrated by:

- Concern for hardware cost/performance criteria based on internal processing capacity and neglect of the impact on existing software.
- Readiness to upgrade, sidegrade or "downgrade" hardware and accept, as

a secondary effect, the need to redevelop existing software for the new environment.

- Acquiring the hardware and then worrying about the effect on the software.
- Allowing the software vendor to be second in line to the hardware vendor. Implicit in this myth is that standard-

(Continued on Page 20)

The world's best DBMS announces the end of the chain-pointer generation.

Adabas has broken the chain-pointer barrier. For the first time in history, an inverted list DBMS is No.1 in both throughput/efficiency and ease of use.

For years, others have said you could have *either* throughput *or* ease of use. Adabas has always said you can have *both*.

Datapro '77, conducted with *Datamation*, is the latest in a long series of surveys that proves our point. The user community also gave us the highest average rating for all categories. Who could ask for anything more?

Every day, more people realize that the rigid hierarchical structures of the past are giving way to

the relational approach of tomorrow.

The trend is clear. The future is here. It's Adabas. Combined with Com-plete, Software ag's teleprocessing system, Adabas is the most powerful DB/DC system available anywhere.

Seeing is believing.

We've just made a lot of claims, and we want to prove them. That's why we'd like to give you a free presentation at your convenience. Simply call us, or return the coupon below.

software ag
OF NORTH AMERICA, INC.

Reston International Center, 11800 Sunrise Valley Drive
Reston, Virginia 22091. Phone (703) 860-5050

1. ☐ I'd like more information on Adabas.
2. ☐ Please send more information on Com-plete.
3. ☐ Please call to arrange a free presentation.
- Name _____ Company name _____
Street _____ City _____
State _____ Zip _____ Phone _____
Type of computer _____ Operating system _____

Available Worldwide

1977
datapro
HONOR
ROLL

36

Member SIA Software Industry Association

158

System available
for lease.
Want to purchase.

COMDISCO
312-698-3000

IN DEPTH

(Continued from Page 19)

ization should be associated with hardware.

Given the well-recognized, critical path of software development, however, why shouldn't the latter be the standardization point?

Once a software system is implemented and large sums of money and amounts of time have been invested,

let it be the starting point for more cost-effective computing by building hardware to satisfy its operation.

In one situation at Informatics, Inc., a mature software system with a value of several millions was transported from one hardware environment to another by "forcing" the software of the first machine to operate on (emulate) the dissimilar second equipment

through the introduction of a special-purpose \$50,000 black box.

But we need not look for the exception. Amdahl Corp., with its 470V line, and Intel Corp., with the Advanced Systems (AS) family, have indeed recognized the myth and are now refuting it by building more cost-effective hardware systems on which to operate stable, existing software.



Werner L. Frank is a co-founder and executive vice-president of Informatics, Inc., an independent supplier of custom and proprietary computer software products and services based in Woodland Hills, Calif. He is the author or co-author of 19 published papers on the numerical analysis and development of on-line, terminal-oriented software.

A graduate of the Illinois Institute of Technology and holder of a master of science degree in mathematics from the University of Illinois, Frank spent the early years of his professional life at the Thompson Ramo Wooldridge Corp., where he directed the development of some of the first trajectory and orbit determination computer programs for space vehicles.

At Informatics, Frank has been responsible for the development of several major divisions engaged in implementing military and commercial information systems that emphasize on-line technologies employing communications, data management and terminal devices.

He also headed a team that investigated the feasibility of forming a joint venture enterprise with the Equitable Life Assurance Society to provide software and data services to the insurance industry. Equimatics, Inc., the result, later acquired Informatics and the two merged.

✓ Check what \$12 can buy!

Unbiased Datapro reports on EDP products. Characteristics, prices, users' ratings, comparisons, and much more.

Revised and expanded reports that include many new systems and models for 1978

All About 249 Small Business

Computers Report M11-050-201.

This comprehensive 64-page report is designed to help you select and apply low-cost business data processing systems. The characteristics, and prices of 249 current systems from over 89 vendors are reported in detailed comparison charts. Selected from Datapro 70. Includes user ratings. \$12.

All About 203 Minicomputers

Report M11-050-101.

This comprehensive report is designed to aid you in understanding the rapidly proliferating minicomputers and selecting the one that can best satisfy your requirements. You'll find detailed comparison charts covering the characteristics of 203 current minicomputers from 61 manufacturers. Selected from Datapro 70. Includes user ratings. \$12.

All About 144 Microcomputers

Report M09-050-201.

This 36-page report features detailed comparison charts that describe characteristics and pricing of current microcomputers from 57 vendors, plus new information on development systems and kits. Selected from Datapro Reports on Minicomputers. \$12.

All About 66 Microprocessors

Report M09-050-101.

This completely revised, 20-page report details characteristics of 66 current microprocessors from 25 manufacturers. You'll also find straightforward guidelines to help you understand and apply these compact, low-cost CPUs. Selected from Datapro Reports on Minicomputers. \$12.

User Ratings of Proprietary

Software Report 70E-010-40.

This 18-page report contains the results of Datapro's fifth annual survey of proprietary software users, conducted in cooperation with Datamation. You'll find extensive tables showing how thousands of users rated nearly 200 individual packages, plus financial insights and the 1977 Software Honor Roll. Selected from Datapro 70. Includes user ratings. \$12.

A Buyer's Guide to Data Base

Management Systems Report 70E-010-61.

This 36-page report presents useful guidelines to aid you in preparing, evaluating and selecting a data base management system. It compares the key characteristics of major systems and provides an in-depth evaluation of these systems: ADABAS, IDMS, IMS, SYSTEM 2000, TOTAL and DATACOM/DB. Selected from Datapro 70. \$12.

All About 135 Batch/RJE

Terminals. Report 700-010-25.

The path to high-volume transmission and reception of data at locations remote from your computer center is a confusing one. This 40-page comprehensive report provides detailed specifications of 135 remote batch terminals from 49 vendors, presents the results of an extensive user survey covering nearly 2,000 installed terminals, and offers practical guidelines for selecting a batch terminal that will meet your specific needs. Selected from Datapro 70. Includes user ratings. \$12.

All About 220 Alphanumeric Display

Terminals. Report 700-010-20.

This comprehensive 61-page report provides detailed specifications of 220 alphanumeric display terminals from 79 vendors, presents the results of an extensive user survey covering more than 18,000 terminals, and offers guidelines for selecting a display terminal to meet your specific needs. Selected from Datapro 70. Includes user ratings. \$12.

All About Data Communications

Facilities. Report 70G-100-01.

This unique 29-page report summarizes the communications facilities and rate structures for interstate data transmission over the public telephone network, private lines, TWX/Telex, satellite channels, and packet switching networks. You'll also find the results of a survey of user experience with about 10,000 communications links. Selected from Datapro 70. Includes user ratings. \$12.

All About 100 Time-Sharing and

Remote Computing Services. Report 70G-900-01.

This comprehensive 41-page report explains both interactive time-sharing and remote batch processing, discusses their advantages and drawbacks, summarizes the services offered by 100 remote computing companies, and provides guidelines for selecting a suitable supplier and getting started. Selected from Datapro 70. Includes user ratings. \$12.

All About 188 Minicomputer Disk

Storage Units Report M13-100-201.

This 46-page report provides minicomputer users and suppliers with a comprehensive survey of 188 disk storage units. The comparison charts describe the current product lines of 37 suppliers, and the accompanying text offers the reader an enlightening guide for evaluating disk and drum storage performance. Selected from Datapro Reports on Minicomputers. \$12.

All About 152 Teleprinter Terminals.

Report 70D-010-21.

This 43-page report provides detailed specifications of 152 teleprinter-style communications terminals from 57 vendors, presents the results of an extensive user survey covering more than 7,000 installed terminals, and provides guidance in selecting the most suitable terminals for your needs. Selected from Datapro 70. Includes user ratings. \$12.

All About 300 Modems

Report 70G-500-01.

Data communications users can select from an overwhelming variety of modems offered by dozens of independent vendors and by the telephone companies. This in-depth, 48-page report summarizes the characteristics of more than 300 current modems from 43 suppliers, provides useful selection guidance, and includes a unique survey of users' experience with over 16,500 modems. Selected from Datapro 70. Includes user ratings. \$12.

All About 100 Word Processors

Report M13-040-101.

This comprehensive 79-page survey summarizes the characteristics of over 100 models of automatic typing and text editing systems from 50 vendors. Detailed comparison charts describe each model's basic configuration, pricing, storage medium and capacity, editing features, printer characteristics and much more. Selected from Datapro Reports on Office Systems. Special Price: \$15.

Directory of 890 Suppliers

Report 70H-100-101.

This 182-page directory contains informative profiles of 890 companies that offer EDP products and services of all types, plus guidelines for interpreting the information and selecting qualified suppliers. You'll find entries describing each company's location, size, executives, financial status, ownership, sales and service organization, and product line. Selected from Datapro 70. Special price: \$15.

Please send me the Datapro reports which I have checked by number below.

☐ Enclosed is \$_____. ☐ Bill me for \$_____, adding \$2 handling.

- ☐ M09-050-101
- ☐ M09-050-201
- ☐ M11-050-101
- ☐ M11-050-201
- ☐ M13-100-201
- ☐ 70D-010-20
- ☐ 70D-010-21
- ☐ 70D-010-25
- ☐ 70E-010-40
- ☐ 70E-010-61
- ☐ 70G-100-01
- ☐ 70G-500-01
- ☐ 70G-900-01
- ☐ 70H-100-101
- ☐ M13-040-101

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

For those who value information.

datapro

For faster service, phone toll free 800-257-9406

Datapro Research Corporation □ 1805 Underwood Blvd □ Delran, NJ 08075 □ 609/764/0100

Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3

BEST PRICE
FAST DELIVERY
800-323-2288

CALL TOLL FREE
IN ILL. CALL 312-279-1960

Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60120



Digital introduces Datatrieve. Now anyone can get data from a PDP-11.

Anyone with a PDP-11 and an RMS-11K record management system can now achieve a new order of data accessibility. Digital's brand new query language and report generation software is here. It's called Datatrieve, and with it you could make just about anyone

Datatrieve-11.

Everything about it is easy to work with.

- Handles sequential, relative and multi-key ISAM and (RMS) files in COBOL, BASIC PLUS-2, DIBOL, RPGII, and MACRO.
- Interfaces with RMS-11 on major Digital operating systems including CTS-500, RSTS/E, RSX-11M, and IAS and uses COBOL-compatible record definitions. Reduces programming time consumed by traditional ad hoc reporting.
- Offers built-in file update and file security features.
- Gives user extensive control of report formats.

time of your programmers.

It's designed for file clerks, plant workers, secretaries and even the company president. That's why Datatrieve-11 is a distributed processing tool of real importance. And its features, including interactive file update, security control and report format flexibility, make it ideal for a broad range of applications from the warehouse to the boardroom.

Available now. With a liberal supply of "I'm a Datatriever"

**I'M A
DATATRIEVER**

buttons for all those people in your company who will no longer be cut off from your computer by a language barrier.

Write for full details.

Digital Equipment Corporation,
Commercial Products Group, MK2N38,
Merrimack, N.H. 03054.

European headquarters:

12, av. des Morgines,
1213 Petit-Lancy/Geneva.

In Canada: Digital Equipment
of Canada, Ltd.

digital

in your company a "Datatriever" practically overnight.

The key to Datatrieve is an instruction set that's literally as simple as "Help, ready, find, sort, select, print, modify, store, erase, report." Using these basic Datatrieve commands, virtually anyone can access data and generate reports without using the valuable

Digital Equipment Corporation, Commercial Products Group, MK2N38,
Merrimack, N.H. 03054.

Yes, I'd like to help our people become Datatrievers. Please send me the facts about Datatrieve-11.

☐ Please ask your salesperson to call. ☐ Please send product information.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

CW 368

Editorial

ACM and Soviet Union

The Association for Computing Machinery's (ACM) recent severance of relations with the Soviet Union "until the climate of intellectual freedom [there] clearly improves" has sparked a lively exchange of views between ACM President Herbert R.J. Grosch and one Peter Turk of Toronto that has been published in the February Communications of the ACM.

ACM's move was prompted by Soviet treatment of computer expert Anatole Sharansky — jailed since March 1977 without being formally charged with any crime, although ostensibly accused of treason [CW, Dec. 12].

Turk gave three reasons for his opposition to the ACM move. "First, I do not think that politics is a meaningful or useful consideration in science," he wrote in the journal's "ACM Forum" section. "Scientists should not even recognize the existence of politics, let alone enter the arena and become politicians."

Secondly, Turk suggested, the severance only adds to the troubles of persecuted Soviet colleagues, "proscribing them from sharing with us as scientists."

Finally, Turk asked whether the ACM Executive Committee was "qualified to act as judge and jury" in this matter, indicating it may not have had enough information to make a satisfactory decision. For example, Turk noted the U.S. also prosecutes foreign agents and said Sharansky "just may be guilty" of the accusations made against him.

"Unless these questions are analyzed and properly understood, any positive action is irresponsible," Turk said, calling on ACM to retract its decision.

Grosch responded to Turk in a letter in the journal's "ACM President's Letter" section. "Your first point is so unrealistic as to be ludicrous," Grosch told him, noting that scientists are involved in politics on a daily basis — within organizations, applying for budget support, trying to secure space in refereed publications — "precisely because science cannot exist in a

social vacuum."

Grosch met Turk's second point by asserting that dissidents who have left the USSR have applauded moves such as ACM's and that "a scientist who works for a government, an industrial concern, a research institute that does evil things must share the obloquy, the shame his organization earns."

"Of course we acted hastily," Grosch said in rising to the third point. Sharansky "is in danger of execution, of induced insanity, of a concentration camp..."

There are two ways to take the assertion that science should be divorced from politics. One way, perhaps the way Turk meant and surely a way that Grosch has ignored, is that scientific deliberations must be free of any political bias. Hence, short of a meteorological application, the study of thermodynamics does not entail a concern with hot air over the Potomac.

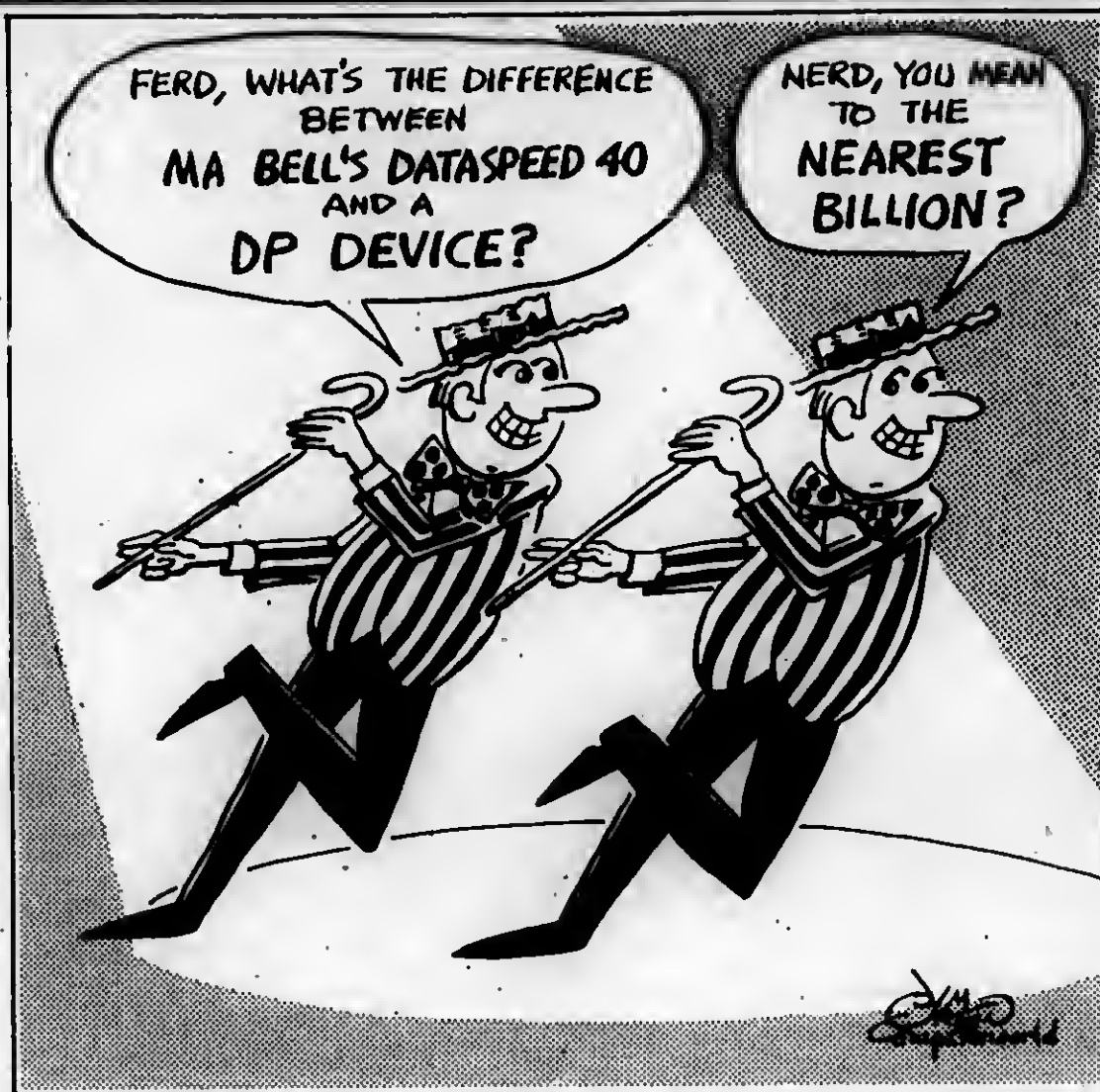
However, many scientists are liable to be tools for evil unless they consider the propriety of their work and the motivations of those who subsidize it, as Grosch is well aware. Many computing professionals, for example, work for organizations in the public and private sectors that are supportive of political regimes long associated with human rights violations.

Turk's second point does have merit and we stand by an earlier editorial [CW, Jan. 16] in support of the appraisal of this issue by the Association of Computer Programmers and Analysts (Acpa).

Acpa has called for keeping open the lines of communications and using them to protest human rights violations while retaining a supportive link with oppressed Soviet colleagues.

Turk's third point is also well-taken, although there seems no indication that ACM members did not take it into account as they voted to sever relations.

Soviet repression, particularly as it has been applied to Sharansky, requires urgent attention and swift action, as Grosch pointed out.



Letters to the Editor

What's a Company to Do?

Some observations:

- If IBM charges higher prices than its competition, the end-user is the victim of unfair monopoly practices.

- If IBM charges lower prices than its competition, it is engaging in restraint of trade.

- If IBM charges the same price as its competition, then they both go to jail for price-fixing.

Question: under law, what should IBM's prices be?

Question: Since when does the law dictate pricing policy?

Suggestion to IBM: Quit being so successful and everyone will leave you alone.

John J. Enright Jr.
Kew Gardens, N.Y.

Record Deserves Correction

In "New Body Urged for Regulation of Data Flow" [CW, Feb. 27] my remarks in Brussels were misreported. Among other minor deficiencies, the article concluded that I was urging international tariffs be based on "volume and not the cost of leased lines." Wrong.

What I specifically urged was that each nation's international rules and regulations, tariffs, standards and laws be harmonized; and that each state's tariffs be cost based — one nation with another. Of special significance, I said, "We need agreements that will preclude prohibitive tariffs which would subject shared private-line systems to cost schedules based not on the cost of the line but on a volume-sensitive per-message basis."

John M. Eger
Washington, D.C.

Missing Ingredient

Barry Starkman stated he graduated from a university with a DP degree ["Any Advice for DP Grad?"]

CW, Feb. 13], but failed to say whether his education including programming (in what languages), computer operating, system design, etc. The rest of his article showed, by his constant referral to "entry-level, beginning computer programmer, training programs for beginning programmers," etc. that he was defeated before he went in search of employment as a programmer.

My education in DP ended with a certificate from a technical school, showing I had completed the required courses in unit record, system design, Cobol, BAL and RPG. However, most importantly, I was taught that when I graduated I would be a programmer.

I sincerely believed that and within three months after graduation had received four job offers.

I suggest Starkman visit with some placement directors and look at their records. In my opinion, Starkman is the exception, but it may be that self-confidence is not included in a university education.

Fred Erdsieck Jr.
Orange, Calif.

Not Mutually Exclusive

The authors of "Once for Designers, DBMS Now Keyed to User" [CW, Feb. 6] implied that Codasyl data base systems and inverted indices within the data base management system are mutually exclusive.

Our IDMS implementation closely follows Codasyl specifications and contains full inversions for sequential processing and secondary indices.

We find the Codasyl specifications give Cullinane, as an implementor, broad freedom in the inclusion in our system of both list processing and pointer arrays or inversions.

Thomas F. Meurer
Senior Vice-President
Cullinane Corp.
Wellesley, Mass.

Data Past

Five Years Ago March 7, 1973

NEW YORK — Peat, Marwick, Mitchell & Co., a major auditing firm employed by several large third-party leasing firms, reappraised its policies on residual values of IBM 360s and related peripheral equipment, according to its Management Information Letter 1973.3. The letter said third-party lessors must reduce the asset value of 360 equipment and peripherals to zero not later than Dec. 31, 1978. At the same time, the value of all enhancements should also be totally recovered, the letter noted.

Eight Years Ago March 11, 1970

WASHINGTON, D.C. — The Patent Appeals Court ruled that software methods, rather than just a process, could be patented.

FT. HOLABIRD, Md. — With much fanfare, the U.S. Army abandoned its computerized data bank on lawful civilian political activity, but failed to report that a microfilm data bank with a computer-produced index, apparently containing much the same information, was still in use in the Pentagon.

COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

☐ Please enter my subscription
(details on back)

☐ I'm already a subscriber,
but I'd like you to
change my:
address
title
industry
other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

COMPUTER COMMUNITY THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
RATES: United States — \$18 Canada and PUAS — \$28
Europe and Middle East — \$50 All Other Foreign — \$65

- 10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other
- 11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/
Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg. Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other

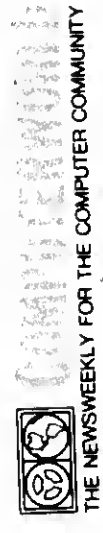
(MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial	Middle Initial	Surname										
Your Title												
Company Name												
Mail To:			State			Zip Code						
City												

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from Computerworld.
☐ Check here if you're interested in receiving information on Computerworld's Index.



Detach here, fold, and place in post-paid envelope attached through binding.

Masters at Obfuscation

Too Much Jargon Hurts DPer's Credibility

By Jack Stone
And Ida Mason

Special to CW

Mark Twain once said, "There are lies, damned lies and statistics!" If he were alive today and examined the human communications of the computer center, he'd probably comment, "There is data processing parlance, 'computerese' and jargon!"

Have you ever thought about how the excessive use of technical terminology not only tends to confuse the facts in the mind of the reader or listener, but, much worse, reduce the credibility of the DP writer or speaker?

A classic demonstration of just how ridiculous supposedly scientific people can become was recently analyzed by Theodore Levitt, writing for the San Francisco Chronicle. A professor of business administration in the Harvard Business School, he commented on a recent survey regarding the relative standing of his institution in the community — a subject of clear and present interest to him.

The survey, as reported in a prestigious business journal, polled 85 business school deans. It concluded that the Harvard MBA program, top of the line for more than 50 years, was toppled from its exalted throne by the upstart West Coast — if it can be imagined — Stanford University

Graduate School of Business.

Using an elaborate scoring system, the survey team calculated that Stanford trounced Harvard 4.9487 to 4.7692. Furthermore, reported standard deviations of 0.22200 and 0.55650 tried to add respectability to the findings, an action which, of course, could not influence the astute reader who knows one (1.0000) or two (2.0000) things about such matters.

Prof. Levitt is justifiably concerned about the impact of such absurdities on John Q. Public (you know him as the non-DP-oriented user) when they are couched in a glowing technical aura. He points out, "If something is literate, reads easily and makes obvious good sense, then obviously it's only pop. No substance. If it's written in the universal foreign language of integral calculus, that's high-quality substance."

The plain fact is that DPer's are masters at obfuscation, except when talking among themselves and, even there, I have some doubts. Are DPer's deliberately trying to cloud issues or bury facts, perhaps to shroud their ambitions or inadequacies? Personally, I don't think so. I truly believe our people are so busy trying to handle current workload they don't take the time to focus on their communications inadequacies.

But certain psychologists don't agree with me. They have written that the use of jargon is a basic and understandable human trait. They claim jargon is used as a means of succeeding by not simplifying. They also say there are two characteris-

The Human Connection

tics of human nature that cause people to be impressed with those who use specialized language, at least in the short run.

'Zeigarnick Effect'

The first of these traits is called the "Zeigarnick Effect" (after its discoverer) and it says people are more aware of unfinished or incomplete ideas or things or tasks than finished ones. (Note that we used the term "aware," not "understanding.") Thus, unanswered questions or voids in knowledge create a kind of mental tension which, according to this theory, causes such uncertainties to be remembered. (Note that we used the term "remembered," not "appreciated.")

The second characteristic is this one: Goals difficult to attain are more highly valued than goals that are less difficult — people want

what they can't get. This theory, when applied to the DP milieu, suggests that when access to the programmer and the computer is always something of a chore to the user, then computing services will be a highly prized commodity.

Unfortunately, these psychologists, assuming they're right, don't go far enough. They only address Stage 1 of what I call the "jargon jolt," the process by which John Q. User gradually loses respect for the computing department. In this first stage, young John is excited, if not bewildered, with the jargon which seems to imply a vast mental apparatus of the DPer: "That guy is so smart nobody can understand him!"

During Stage 2, maturing John becomes disenchanted and discouraged when he finds what appear to be evasive attitudes during questioning periods: "Do you know, I can't ever seem to get a straight answer from my programmer!" In Stage 3, aging John becomes bored with the technical terms and breaks off communications: "The only reason I see for having a DP organization is that our competition has one!"

Are you guilty of "jargon jolting"? Ida Mason, a professor of DP at Lehigh [Pa.] Community College, is currently on sabbatical doing research on women in monogamy.

To Layman's Advantage

DP Methods Would Produce Clearer Wills

In light of recent developments concerning malpractice and data processors, I have been looking at the way other professionals — particularly lawyers and doctors — operate and how DP could

change their practices. In future columns, I will discuss some aspects of my investigation. This week, I'll deal particularly with what may soon be in store for lawyers and their clients in drawing up wills.

Standard Wording

If there is anything standard in the law, it is the way certain phraseology survives, especially that used in wills. These documents obviously can, and often do, pose serious problems in clarification when the time comes to use them. In addition, they are often subject to many random changes over long periods of time.

The legal profession has

developed a number of standard forms, such as the one shown at the right intended to reduce the number of mistakes made in preparing a will.

For instance, many wills have caused confusion because more than one form of a name has been used to identify some party involved, so special wording has been introduced to avoid that confusion. Use of "the same," for instance, ties the first reference to Mary Smith to some later reference, without ambiguity. And designations such as "testator" and "executrix" prevent mistaken references that could result from copying errors.

Some portions of the form are included as optional paragraphs, such as the articles dealing with medical and funeral expenses and bonding of executors shown in the figure.

The result of these error avoidance techniques is a loss of understanding by the layman. People simply don't call each other testators or executrices. In addition, DPer's have learned that people respond better to forms in which information is requested by a direct

question, instead of through incomplete statements.

DP Improvements

While the old methods for avoiding copying errors result in loss of understanding (lawyers may be feathering their own nests), DP techniques would certainly provide more efficient copying. Really, the whole thing is like the personalization of a form letter after a series of parameterized inputs. Repeated use of name and address in the body of a computer-produced letter is easily understandable and effective. Similarly, the repeated and accurate use of a person's name would make wills more readable.

The figure at bottom right shows a questionnaire form that would permit a computer to produce an understandable will.

In fact, this technique could become standard as soon as the legal profession catches up with the computer — or will-makers catch up with and overtake the legal profession.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

LAST WILL AND TESTAMENT OF

I, _____ of _____ County, Pennsylvania, do make, publish and declare this instrument to be my Last Will and Testament. This instrument revokes all other Wills and Codicils heretofore made by me.

ARTICLE ONE

I direct that all the expenses resulting from my last illness and funeral be paid from my estate as soon as practicable after my death.

ARTICLE TWO

I bequeath all of my property, real and personal, to _____

ARTICLE THREE

In the event that my _____ should predecease me, or in the event of our mutual demise, I bequeath _____

ARTICLE FOUR

I appoint _____ as Executor of my estate. In the event that _____ is unable or unwilling to so serve, as Executor, I appoint _____ as Executor of my estate.

No Executor nor Executrix, serving my estate shall be required to post bond to so serve.

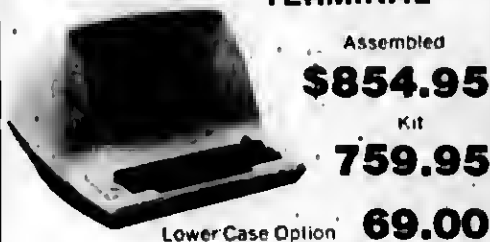
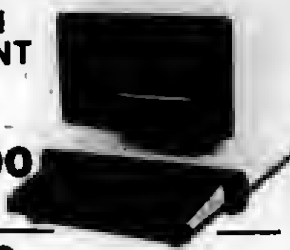
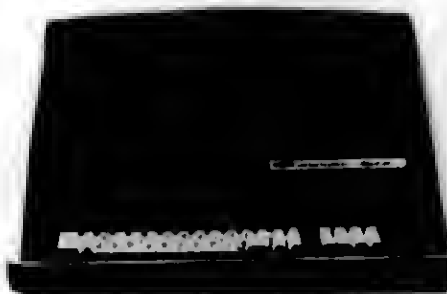
IN TESTIMONY WHEREOF, I _____ have hereunto subscribed my name to this will, this _____ day of _____ 19____.

Above: Standard format. Below: For computer input.

Name? _____
Address? _____
What previous wills have you made? _____
Medical bills in some accident cases can cost many thousands of dollars. Would you want such bills to just be paid, whether or not they are legally called for, before any of your property is distributed?
_____ Yes. Pay bills anyway.
_____ No. Let law decide if justified.
_____ Don't know.
If one person — your wife, husband, son, daughter or whatever — is to have all that you leave, who is it to be? _____
Relationship _____
If that person dies at the same time, or before, who should get it all? _____

SYNCHRO-SOUND

ENTERPRISES, INC.

Everything you need in
small computer systems!**LEAR SIEGLER ADM 3A
TERMINAL**Assembled
\$854.95Kit
759.95Lower Case Option **69.00****ADM 1 TERMINAL
\$1529.00****ADM 2A TERMINAL
\$1995.00****HAZELTINE
MODULAR 1
INTELLIGENT
TERMINAL****\$1659.00****1500 VIDEO
TERMINAL**Kit also available **\$1149.00****CENTRONICS 703 SERIAL
PRINTER \$2395.00****761 PRINTER**KSR with Keyboard **\$1695.00****700 PRINTER \$1266.00****OKIDATA MODEL 22 LINE
PRINTER**Tractor Feed **\$2249.00** RS 232C
Serial Interface **379.00****MODEL 110 LINE PRINTER
Friction Feed \$1149.00****NEW ADDS REGENCY 100
VIDEO TERMINAL
\$1325.00****IMSAI 8080 MICROCOMPUTER**With 22 Slot **\$649.00**Microcomputer based Business
Systems available

SYNCHRO-SOUND ENTERPRISES
The Computer People
193 25 Jamaica Avenue,
Jamaica, New York 11423
212-468-7067 TWX 710 582 5846
Hours 9-4 daily Visit our new showroom
and Saturday Working units on display
Dept. CW

Letters to the Editor

Facts in Some Articles Grossly Misrepresented

Computer Network Corp. (Comnet) must comment on "FBI Stands Behind Use of OS/MVT by NCIC," [CW, Jan. 16] and other previous Computerworld articles dealing with data security in which the facts are grossly misrepresented.

The article stated that regarding the Navy request for proposal for computer time-sharing services, "... The Controller General told the Navy it could not accept a [Comnet] proposal that OS/MVT be used as the basis for the time-shared personnel record system." In both his Jan. 13, 1977 and June 13, 1977 decisions, the Controller General clearly emphasized the real issue was not whether Comnet had the required security, but rather whether its proposal adequately described its security.

It should also be emphasized that Comnet's Alpha system is an extensively modified OS/MVT operating system, not to be confused with IBM's OS/MVT. It is well-known in the industry that an unmodified OS/MVT system does not satisfy government Privacy Act requirements.

CW further interpreted the Controller General to have concluded that with the Comnet system "The Navy would not have been able to prevent a user's program from accessing areas of main memory outside the user's assigned segment." However, on Jan. 23, 1976, the Controller General closed its file on the case and repeated its position:

"The central issue dealt with in our two previous decisions concerned the reasonableness of the Navy's evaluation of the Comnet proposal... This is a different issue from the question whether a contractor's performance of a contract complies with the requirements of the solicitation."

L.E. Johnson
President

Computer Network Corp.
Washington, D.C.

Firm Wasn't Bankrupt

"Bankrupt Key-to-Disk Maker CCI Rebounds" [CW, Dec. 5] was a reasonable reflection of our interview, except for the reference to bankruptcy and an incorrect and misleading headline.

Consolidated Computer, Inc. has never declared bankruptcy, but technically went into "interim receivership" six years ago, recovered with government support and has been in business ever since.

Peter C. Baines
Vice-President

Corporate Marketing

Consolidated Computer, Inc.
Don Mills, Ontario

Premise Was Unsound

The editorial "There Must Be a Better Way" [CW, Feb. 6] said "... standards are needed because ... users are spending more than is necessary ..."

I submit that neither that premise

nor the implied conclusion that government regulation could result in reduced user costs is sound. Support of the idea that government (a user) is entitled to mandate standards on the basis of saving taxpayer's dollars should follow careful factual observation.

If the first premise is a fallacy, then subsequent deductions are in danger and there would be no retreat.

Frederick C. Harwood
Great Barrington, Mass.

Ain't No Such Thing

In the Feb. 6th issue you were kind enough to publish my letter ["Poor Statistical Methods"] taking issue with your analysis of user preference among various vendors. Your editorial note states that the size of the sample responses represented the same percent of each firm's customer base, thereby validating the findings.

While I am not, and do not pretend to be, a statistician, I did receive a crash course in sampling from Dr. James Lorie of Chicago University's School of Business some years ago. One of the things he taught me first is that "there ain't no such thing as a percentage sample."

Permit me to illustrate. Given a dish containing 10 marbles, each of a different color, close your eyes and select at random, any one — e.g., a 10% sample. Can you now

say, with a clear conscience, "I have 95% confidence that every marble in the dish is identical to the color I selected?" Of course not — the universe is too small. For this problem, a 50% sample might give you 80% confidence (there are special means for arriving at the parameters of the problem).

On the other hand, it is theoretically possible to properly sample what is effectively an infinitely large universe, providing that a perfect random sample can be drawn. Since this is a practical impossibility, nothing being perfect, compromises are made. Yet Nielsen samples the TV viewing taste of the entire country with about 1,200 families in his sample.

If we pretend that the IBM computer customer base is 20,000, the sample "percentage" (1,291 units) is 6.46%, yet a properly drawn sample of the same size can represent the entire U.S. population. Conclusion: sample is large enough (no comments as to selection, no information given).

If we apply this same "sample percentage" to the Amdahl sample and calculate the size of the universe, we find slightly less than 109 customers. Seven respondents, no matter how carefully selected, cannot represent 109 elements of a universe. Try it with the colored marbles.

R.E. Kaufman

Saratoga, Calif.

TU-BE OR NOT TU-BE

Alas, poor Yorick, his program won't run.
It went down the tubes at a quarter to one.
When called to explain why his run had exploded,
He couldn't be sure they had run what he coded.
Did they mount the wrong file, or have bad JCL?
He needed hard copy in order to tell.

For although console messages flashed on the screen,
The one guy who needs them was far from the scene.
Alas, poor Yorick, faced another long wait.
They couldn't dump DOCS till a quarter past eight.

So if you, like poor Yorick, have known the futility
Of waiting around for that printlog utility;
Let Datachron's CONSOLOG be your salvation—
Make the printer your console at job termination.

CONSOLOG

- CONSOLOG:** Automatically logs partition console messages to the printer at end-of-job.
- CONSOLOG:** Eliminates printlog utility runs that interrupt normal processing.
- CONSOLOG:** Uses no core, installs in minutes on any IBM 370 DOS/VS with 125D/3277 support.
- CONSOLOG:** Only \$985 or \$75/mo. Free 30 Day Trial

☐ Send More Info

☐ Send CONSOLOG For 30 Days

Name _____ Co. _____

Title _____ Tel. _____

Address _____

City _____ State _____ Zip _____

Computer model _____ 125D or 3277

DATACHRON CORPORATION 174 FIFTH AVE. NEW YORK, N.Y. 10010 (212) 675-5333

RT-11 Updated

Model Finds DP Management Flawed

By Don Leavitt
CW Staff

PHOENIX — A growing awareness of the need for performance management within the DP environment has resulted in an expansion of the scope of performance-related activities, according to independent consultant Barry A. Stevens.

In the January issue of *EDP Performance Review* (EDP/PR), Stevens described a pragmatic model of a DP organization on which a workable performance management system can be based. He also described the results of applying the model in four different organizations and showed how practices were identified that had resulted in weakened control over data center performance.

Stevens' performance management system is a closed-loop process encompassing all the major DP functions; planning, development and operations. User requirements are the process' primary stimuli.

Planning translates those requirements into hardware and personnel resource requirements adequate to meet service levels on which the user agrees. Both development and operations provide feedback to the planning function — development on new applications and their projected workload impact, operations on current workload and service

levels, Stevens explained.

User Interface Weak

In recapping what happened when the model was fitted to a "live" situation, Stevens said he found the user interface, so critical to the whole process, was poorly handled. Agreements between users and DP were "usually incomplete," user contact points were "neither clearly nor completely defined" and reporting of performance to users was "inadequate."

In the planning function, although work plans existed, their creation and content could be improved, Stevens found. In general, service levels for operations were incompletely specified and, with poorly defined service

levels, users were relatively free to demand service without fear of financial consequence, he noted. Even more serious, service levels for development "were not specified at all," the consultant reported. This resulted in a set of unrealistic, implied service levels for development "in which 100% of all projects were expected to be on time and on budget," he continued.

Realistic Objectives Needed

Without realistic objectives for the development function, it is difficult to gauge its actual performance, he pointed out, "and a rational approach to its management is nearly impossible."

Stevens noted later that overcoming the technical problems

brought to light by a model-based review of an installation would be a serious but "not insurmountable" task. More difficult would be resolving the psychological problems inherent in changing almost any organization.

Changing management style, for instance, requires people to "fix the problem, not the blame" and to look at performance evaluation for "measurement, not punishment," he said.

Single issues of EDP/PR cost \$5; an annual subscription to the monthly newsletter is also available for \$48 from the publisher, Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

Software Boosts HIS Level 64

WALTHAM, Mass. — A broad sweep of software products was introduced by Honeywell Information Systems, Inc. as part of its introduction of the remodeled Level 64 line.

Multiprogramming support has been sharply increased in the enhanced Gcos operating system. It now can process up to 10 batch, 10 interactive and four output writer jobs concurrently, the earlier version could support five batch and/or communica-

tions jobs, a spokesman noted.

The Level 64's communications support has been enhanced to permit connection of IBM 3741 terminals and HIS Level 6 minicomputers operating in a data entry facility, he added.

Interactive Facility

The Interactive Text Editing and Operations Facility, adapted from the Level 66 environment, allows terminal users to create, update and maintain files con-

taining source programs, job control language, user data and job results. Unlike Gcos, whose cost is bundled into the hardware price tag, this facility costs

Details of HIS' Level 64 hardware offerings are on Page 39.

\$332/mo.

The Level 64 Cobol compiler (\$87/mo) has been enhanced by the availability of an implementation of the Report Writer module for an additional \$37/mo. Software supporting the Report Writer or Cobol in a communications environment costs still another \$91/mo, the spokesman reported.

Data Base Link

DM IV-Entry, another adaptation from Level 66, combines the capabilities of TDS/64 and IDS/II to permit access to a centralized data base in a transaction-driven environment. Cost? \$634/mo.

Application software for the Level 64 includes packages for the manufacturing and distribution industries as well as generalized Financial Management Systems that can be used in various industries, according to HIS.

Net Installs Its APL on User 370s

TORONTO — IBM 360 and 370 users faced with choosing between running all their APL work on a remote-computing network or using one of IBM's APL systems now have another alternative. They can install Sharp APL, from the I.P. Sharp Associates network, on their own in-house CPUs.

The Sharp system — including a language processor and a "highly modified" version of IBM's DOS — is being made available because the network recognizes the pressures, often economic, that makes users feel they have to leave a network and go in-house, a spokesman said.

The current packaging includes all the facilities available on the network implementation, he continued, citing large APL workspaces, file handling, output formatting and enhanced means of sharing variables.

Switch to Net

Continuous maintenance was another feature he emphasized. By keeping in-house Sharp APL users always current with the software installed on the network, the vendor enables them to switch work over to the network without change, whenever the need arises to have the system available to remote company

locations, the spokesman explained.

Sharp said it may develop comparable systems under IBM environments including VM, MVT and the SVS/MVS versions of OS/VS2. The current systems runs best in a dedicated CPU — "we recommend a minimum of a 1M-byte IBM 370/138 with DASD, two tapes and a 3705 communications controller."

the software package carries a \$100,000 installation fee plus \$300/mo as a license fee and \$2/hour connect time as a usage fee.

Sharp is at 145 King St. West, Toronto, Canada M5H 1JB.

You're in good company with the Johnson Job Accounting Report System used by more than 1,000 D.P. Managers.



SUPPORTS:

MVS-SVS-VS1-DOS/VS-POWER/VS-MVT-MFT-CICS/VS-IMS/VS-HASP

Tell us what areas you're interested in!

- | | | |
|---|---|--|
| ☐ Job Accounting | ☐ Budget Control | ☐ Resource Utilization |
| ☐ Cost Distribution | ☐ Thruput | ☐ Programmer Efficiency |
| ☐ Software Performance | ☐ Customer Billing | ☐ Job Scheduling |

Send for your FREE 30 page System Characteristics Manual

Name _____
 Title _____
 Company _____
 Address _____
 State _____ Zip _____ Phone (____) _____
 Computer _____ Operating System _____

CW306

Johnson Systems, Inc.

8400 Westpark Drive
 McLean, Virginia 22101
 (703) 893-8700



New Horizons in CICS Education

● CICS/VS INTERNALS

April 10-14 New York Area
June 12-16 Los Angeles

● RECOVERY/RESTART

April 19-20 New York Area
June 21-22 Los Angeles

● CICS/VS LOGIC & DEBUGGING

March 27-30 New York Area
May 22-25 Boston

● CICS/VS PERFORMANCE & TUNING

April 17-18 New York Area
June 19-20 Los Angeles

● CICS/VS APPLICATION PROGRAMMING (Macro Level)

March 20-24 Detroit
May 8-12 San Francisco

● CICS/VS APPLICATION PROGRAMMING (Command Level)

March 27-31 Detroit
May 1-5 San Francisco
June 26-30 Dallas

Also Available for In-House Presentations.

CALL NOW FOR COURSE DESCRIPTIONS
AND ENROLLMENT INFORMATION!

TOLL FREE
800-631-8374
or in N.J.
(201) 423-3200

SOFTWARE PLAZA ROUTE 208 HAWTHORNE, N.J. 07506

OSI offers a set of CICS courses that are unavailable anywhere else. We've structured six unique courses, covering initial exposure, detailed analysis of program logic, internals, and performance criteria.

Our instructors do not market CICS, they teach it. They are experts that have worked with CICS for years, resolving the problems that have brought you today's new enhancements. Their expertise allows you to fully utilize CICS and assures you the finest and most up to date education available.

Are you a user?

Sophisticated?
Becoming experienced?
First time? Or still thinking it over?

Whatever your level, one thing is certain: You'll be more of a computer user in the near future. And Computer Expo 78's Conference has vital information you can't afford to miss. At least one of these days should be a must on your calendar.

TUESDAY

You're on the executive level. You deal with data processing personnel, problems, payments, and plans. Today is yours.

The Executive Briefing

• Keynote speech: "Strategic Systems Planning: a View from the Top," by an official of the consulting firm, Booz, Allen & Hamilton • Case Studies: Data Base and the Executive: Potentials of Distributed Data Processing • Presentations: Trends and Opportunities in System Financing, The Computer Resource of the Future

WEDNESDAY

Double Conference Day

(Two simultaneous conferences)

You're bringing in a first computer system for a small company, you're involved in light, in-house use of computers (maybe about to trade up), or just thinking of your own system. You'll want to attend the Program on Small Business Systems.

You're interfacing with computer personnel on a day to day basis. The Program on Managing People Problems is designed just for you.

Here's your schedule:

Small Business Systems

• Keynote Speech: "Data Processing in Small Business Today," by an official of Arthur Andersen and Company • Case Studies: Computer Uses in Financial Reports; Computer Uses in Operations Planning & Reporting • Presentation: How to Negotiate with Vendors • Days-end panel that includes you, your questions, views and comments.

Managing People Problems

• Keynote Speech: Given by a recognized expert in data processing personnel management • Case Studies: Career Pathing for Operators and Programmers; Improving the User/DP Relationship • Presentations: Testing for DP Competence; Coping with Security/Privacy Regulations.

THURSDAY

You're a manager or technician, and your organization is thinking of distributing its computer resources to regional offices and plants. This is your can't-miss day.

Distributed Data Processing

• Keynote Speech: "Critical Issues in DDP" • Case Studies: Applications for DDP; Equipment Selection • Presentations: Networking Aspects of DDP; The Data Base Question

Anaheim

Southern California Computer Expo

San Francisco

Northwestern Computer Expo

Houston

Southwestern Computer Expo

Atlanta

Southeastern Computer Expo

St. Louis

Gateway Computer Expo

Chicago

Midwestern Computer Expo

New York

Mid Atlantic Computer Expo

Detroit

Great Lakes Computer Expo

Boston

New England Computer Expo

Each Conference day is just \$55. All three days only \$135. The Exposition is FREE.

Take one, two, or all three days. And send your key personnel to the days that will benefit them most. You'll profit! Now in its 7th successful year, Computer Expo 78 brings you a nationally respected Conference. No frills, all usable facts. Answers to critical questions you face now, designed for you to put to practical use now. You'll have the chance to talk with leading consultants and users from all over the U.S. Gain insight, trade ideas, learn the latest. At the free exhibitors' seminars every afternoon you'll talk with knowledgeable representatives from the nation's top manufacturers.

Come to Computer Expo 78's Conference and Exposition, and come away a smarter user.

*All conferences will be held from 9AM to 1PM

Register now! Space is truly limited.

How to register.

No advance registration is required for the Exposition. Your business card will admit you.

To register for the Conference, or for more information, call TOLL FREE (800) 225-4242. In Massachusetts call collect: (617) 964-4550.

COMPUTER CARAVAN'S

COMPUTER

COMPUTER

Enhanced 'Seed' Backs Dynamic Data Changes

PHILADELPHIA — An enhanced version of Seed, the "Cobol-type" data base management system (DBMS) from International Data Base Systems, Inc., supports physical data base expansion on a dynamic basis, according to a spokesman.

A utility program to provide statistics on data base use is also part of the Seed package, he added.

Seed's dynamic growth feature is said to permit each data base area to expand beyond its initially specified physical limits. Instead of overflowing onto the next storage page when one is filled, Seed allocates another page and chains it to the appropriate area.

The technique, the vendor claimed, has three primary benefits: design flexibility is increased as original parameters become "soft limits"; crowding is alleviated as the data base becomes data-determined rather than preset; and the system efficiency may improve as overflow accesses are re-

duced.

To provide the user with maximum flexibility, the Seed designers allow the dynamic growth feature to be specified in the schema data definition language on an area-by-area basis, the spokesman added.

The utility program that provides physical data base utilization statistics, DBSTAT, summarizes — for each area and for the entire data base — the percentage allocation for data, pointers, system overhead and free space.

Seed supports both Fortran and Cobol host language interfaces in addition to DBLook, an interactive data manipulation language. The DBMS has been installed on IBM 370, Control Data Corp. 6400 and Digital Equipment Corp. Decsystem-10 mainframes.

The package has a basic cost of \$8,750, the vendor said from the third floor at 3700 Market St., Philadelphia, Pa. 19104.

'OLP' Provides DOS User With On-Line Programming

LANHAM, Md. — The On-Line Programming (OLP) system, recently introduced by ABC Data, is said to be a general-purpose text-editing system that allows IBM 360s and 370s running under DOS to support local and remote on-line programming activities.

OLP consists of a combination of on-line application modules executing under a suitable teleprocessing monitor; batch application programs executing in stand-alone form; and system programs and procedures for initialization and maintenance of the system, a spokesman explained.

The on-line application modules control the entry, modification, deletion, verification, duplication, arrangement and replacement of text; communications with the computer operator; and manipulation of system files used during batch processing, he added.

Batch application programs are available to load and unload individual users' text files. Batch procedures for

executing job streams created by the on-line modules are provided.

In the on-line mode users may therefore create and alter text which may then be submitted to batch queues for compilation or execution, the spokesman said. Results of these jobs are directed to other batch queues from which they can be retrieved for review, modification and resubmission or processed as conventional batch output.

OLP is said to require minimal main memory — 45K real — to work with dial-up voice-grade lines, to use common file access methods and to support a comprehensive security system.

The package is distributed in source code or machine-readable form for a one-time license charge of \$1,800. Installation, customizing and education support is available at extra cost, ABC said from 8601 Brae Brook Drive, Lanham, Md. 20801.

'Psam' Outperforms Isam In DOS, DOS/VS Settings

BROCKFIELD, Conn. — Described as a replacement for IBM's Indexed Sequential Access Method (Isam) support, Psam from Universal Software, Inc. (USI) is said to provide IB, DOS and DOS/VS installations with improvements over the IBM software.

System throughput improvements ranging from 30% to 50%, depending on how heavily Isam is used in the system, are claimed for Psam by the vendor. Disk space savings in excess of 10% over Isam files and "significant reductions" in disk I/O activity are additional benefits, USI said.

Psam is said to incorporate all the facilities of Isam "and more." It includes a multipartition feature that supports "extreme" multiprogramming flexibility by allowing con-

current retrieval and updating of a file from several partitions with no danger of record or file destruction.

A "significant" design consideration of USI's access method is its simplicity of implementation and transparency of use; in most cases, it can be used without recoding, a spokesman stated.

An Isam-to-Psam interface module is included, allowing the user to create and access a Psam file with existing Isam-oriented application programs.

Psam is operational on all releases of DOS and DOS/VS, supports all Direct Access Storage Devices (DASD) and interfaces with all IBM-supported languages. It is available now on rental at \$350/mo.

USI is in Brookfield Office Park on Rt. 7, Brookfield, Conn. 06804.

JOIN THE IN Group

IN 1977, 247 ADVERTISERS PUT THEIR MONEY WHERE THE GROWTH IS.

Acco International
Advanced Electronics Design, Inc.
Alanthus Data Communications Corp.
Allan Services Corp.
American Medical International AT&T
*Ampex Memory Products
Anderson Jacobson, Inc.
*Applied Data Communications
Applied Data Research
Applied Digital Data Systems, Inc.
*Association of Time-Sharing Users, The
*Athene Inc.
Atlantic Research Corp.
*Atlantic Software Inc.

INFOSYSTEMS up 43 in display ad pages more than double the industry average for monthly publications.

Bankers Box
BASF Systems
*Basic/Four Corp.
Baemek Plastics
Ball & Howell
*Banafacts Inc.
Boeing Computer Services, Inc.
Bonded Services
Boorum & Paasa
*Bowma Time Shering
Bruning Div., Addressograph Multigraph Corp.
*Bunker Ramo
Burroughs Corp.
*Business Efficiency Aids, Inc.

INFOSYSTEMS 771 display ad pages in 1977 - 232 more than in 1976.

*Cable & Wireless
California Computer Products
*Canon USA, Inc.
Capex Corp.
*Cerdkey Systems Div., Graer Hydraulics, Inc.
*Ceterfone Communications
*CBS Educational
*CCC Leasing Corp.
*Cantronic Data Computer Corp.
Cincom Systems, Inc.
Clapp & Poilek, Inc.
*Clery Corp.
CMC Div. Pertec Computer Corp.
*Coastal Data Services Inc.
Codax Corp.
Computak Inc.
*Computer Associates
*Computer Communications, Inc.
*Computer Corp. of America
Computer Devices, Inc.
*Computer Enhancement Corp.
Computer Link Corp.
Computer Software Co., The
Computer Trencaver Corp.
*Computerworld
Comsarv Corp.
*Continental Information Systems
Control Data Corp.
Cordail Engineering, Inc.
*Creativa Strategies, Inc.
*C-S Computer Systems
Cullinane Corp.
Cummins-Allison Corp.
Curtis 1000
*C & W Technical Services
*DASD Corp.
Datechron Corp.
Datecorp.
*Date Dimensions, Inc.
Date General Corp.
*Datagraphix, Inc.

Infosystems

Detepoint Corp.
*Data Processing Power
*Datetech
Datotek, Inc.
*Detum Inc.
Daarborn Computer Co.
*Decision Data Computer Corp.
*Decision Strategy
Decolletors, Inc.
Delta Data Systems Corp.
A. B. Dick/Scott
Digi-Log Systems, Inc.
Digital Associates
Digital Equipment Corp.
*Documentation, Inc.
Doneuld, Inc.
*Dylakor Software
Eastern Specialties Co., Inc.
Eastman Kodak Co., Business Systems Market Div.
Eaton Allan Corp.
Edenbob Corp.
*Educational Data Systems

INFOSYSTEMS INDISPENSIBLE selling medium for a \$24 billion 1978 DP hardware, service, software and supplies market.

Electric Wastebasket Corp.
Electronic Memories & Magnetics
Elger Corp.
Emerson Electric Co.
Entrax, Inc.
*Fickled Thinking Aids
Floeting Floors, Inc.
*Formation Inc.
Fortax Data Corp.
*Foster, H. Dall, Co.
Four-Phase Systems, Inc.
Franklin Electric, Programmed Power Div.
*Frost & Sullivan, Inc.
GAF Corp.

INFOSYSTEMS In April MINI-MICRO show... NIA in May... NCC in June... INFO '78 in October. INSIDE information for the IN GROUP.

*Genarel Automation
General Binding Corp.
General Electric Corp.
Genesis One Computer Corp.
*Genisco Computers
Goodwood Data Systems
*Gould, Inc.
Graphic Controls Corp.
Graphic Sciences, Inc.
*Greyhound Computer Corp.
Grummen Data Systems Corp.
*Gulf Computer Sciences, Inc.
Harris Corp., Data Communications Div.
Hazeltime Corp.
*Hewlett-Packard
*Honeywell Information systems
*Houston Instrument
IBM - Data Processing Div.
IBM - Office Products Div.
*Imega Systems
Incoterm Corp.

Infodetics Corp.
Inforax, Inc.
*Information International, Inc.

INFOSYSTEMS as close as your Hitchcock sales representative.

Information Scianca Inc.
Information Tarminals Corp.
*Informer, Inc.
*InfoSci Inc.
*Inland Vital Records
Innovation Data Processing
Insyta Datacom Corp.
*Intel Corp.
Intelligent Systems
Intardate, Inc.
International Data Sciences
*International Resource Development Inc.
*International Systems, Inc.
*Intartal Inc.
Johnson Systems, Inc.
*KW Controls Systems, Inc.
Kyba Corp.
Library of Computer Information & Sciences (MacMillan Publishing)
*McCormack & Dodge Corp.
Magnetic Aids, Inc.
*Managment Information Corp.
Management Scianca America, Inc.
*Martin Mariatta Data Systems
Martin Yale Business Machines
*Mathematica
*MDB Systems, Inc.
*Megadata Corp.
*Memorex
Methods Research Corp.
MFE Corp.
*Micobra Corp.
*Microdata Corp.
Micro Design
*Microfilm Products Inc.
Minicomputer Accessories
*MCS Info Devices, Inc.
*MiniComputer Technology
Mitron Systems Corp.
*Modular Computer Systems, Inc.
*Mohawk Data Sciences
Monerch Marking Systems, Inc.
*Moore Business Forms, Inc.
*Motorola Inc., Government Electronics Div.
MSI Data Corporation
National Blank Book Co.
NCR-Peper, Appleton Paper, Inc.
NCR Corp.
Nichols Co., Inc.
Northwest Microfilm, Inc.
*OCR Users Association
*Omnitec Data
Ona Time Carbon Paper Council
On-Line Software, Inc.
Optical Business Machines
*Optical Scanning Corp.

*Panfil Corp.
Personnel Data Systems, Inc.
Power Systems & Controls
Prime Computer, Inc.
Quantor
RCA Service Co.
Randomex Inc.
Rapifex Corp.
Reytheon Data Systems
Research, Inc.
Robins Industries Corp.
Scen Optics, Inc.
*Schlege Electronics
Scope Data, Inc.
Security Engineered Machinery
Shew-Welker
Software AG of North America, Inc.
*Software Consulting Services
*Software Design, Inc.
Software International
*Sorbus Inc.
*Source System, Inc.
*Sperry Univac
Standard Duplicating Machines
*Standard Memories
*Sun Information Services
Swade International, OEM Products Div.
*Swingline, Inc.
Sycor, Inc.
*Sykes Datatronics, Inc.
Syncom, Inc.
*Systems Financing, Inc.
Systematics, Inc.
Tab Products
*Tandam Computers, Inc.
*TEC, Inc.
Tektronix
Taledyna Inet
*Telefile Computer Products, Inc.
Teletype
Texas Instruments Inc.
*3M Company
Topaz Electronics
Trencom
*TransNat Corp.
Trendata
*TSI Sales & Marketing
*Unitech, Inc.
United Airlines
University Computing Co.
Vydec, Inc.
*Ware Associates
*Western Telematic Inc.
Western Union Data Services
Whitlow Computer Systems, Inc.
Wilson Jones Co.
Woodward Associates, Inc.
Wright Line Inc.
Xerox Corp.
*Xylogics
Yourdon, Inc.
*Zata Research

INFOSYSTEMS, the next time the IN GROUP meets, be there.

*New advertiser

Infosystems

America's Leading Systems Magazine for Management

Hitchcock Publishing Co.
Hitchcock Building
Whitewater, Illinois 60152
(312) 665-1000

New York, NY 10022
964 Third Avenue,
Room 2302
(212) 486-9300

Los Angeles, CA 90026
1910 Sunset Blvd.
Suite 475
(213) 466-6444

Sunnyvale, CA 94086
465 S. Mathilda Ave.
(408) 738-3660

Infosystems



Nets to Link

KANSAS CITY, Mo. — United Computing Systems, Inc. (UCS) has signed agreements with Fides Computer Center of Zurich, Switzerland, that will link the data communications networks of the two companies by year-end.

The linkage will provide users in major Swiss cities, as well as those in Frankfurt, Dusseldorf, Munich and Stuttgart, West Germany and Madrid, Spain, access to UCS data centers here and in London.

Fides will support UCS clients in Switzerland, West Germany and Spain, while the American firm will reciprocate for Fides customers in the U.S., Canada and the UK, UCS noted from 2525 Washington, Kansas City, Mo. 64108.

On-Line Monitor Packages Bow

• 'Tolar' Shows CICS Usage

ATLANTA — The Terminal On-Line Availability Reporting (Tolar) package from Trusco Data Systems is a data gathering system designed to operate with IBM's CICS/VS communications software, according to a spokesman.

The data gathered is processed in a batch environment to produce reports showing, for example, the amount of uptime and how the system capacity is being used and by whom. Peaks affecting response time and "bottleneck" transactions are also highlighted in the Tolar output, he said.

The system can also show how CICS costs are allocated to on-line users. Touching on all these areas, the reports will show areas that need to be addressed to overcome any availability problems, the spokesman continued.

Tolar reports on a maximum of 24 CICS applications. For each terminal-oriented task, it captures elapsed task time, task CPU time and task start and stop time. It also marks each record with operator, transaction and terminal identifiers, Trusco said.

Tolar also has an on-line response time monitor, an Assembler program that functions as a CICS transaction. It is activated every five minutes and compares the average transaction life of all departments with a table of predetermined standards of acceptable response times.

If a department is experiencing less than acceptable times, a message is generated on the CPU console warning of the degradation, the spokesman said.

Tolar is designed to operate in a 24-hour-a-day production environment with automatic file switching at midnight, he added.

The package — including Cobol and Assembler source code — is available under a perpetual license agreement for \$5,000.

Trusco Data Systems can be reached through P.O. Drawer 4418, Atlanta, Ga. 30302.

• 'Control/IMS' Goes 'Live'

SUNNYVALE, Calif. — Maintenance personnel no longer have to wait for users to report a slowdown before they are aware of a problem under IBM's Information Management System (IMS). Performance information about various IMS services is available on-line with the Control/IMS Realtime software from Boole & Babbage, Inc.

Accessed from a CRT terminal, the package is said to provide data on 23 informational and five functional services that are useful in finding and isolating problems as they occur; and to provide statistics on IMS activity since restart.

Activity in up to eight dependent regions can be concurrently displayed, enabling personnel to see which regions are idle or being scheduled, which application programs are active, how much work they have done and what they still have to do, according to a spokesman.

This helps isolate such problems as program loops, scheduling failures, response time degradation and multiple-virtual storage (MVS) swapping, he added.

Control/IMS Realtime can also investigate all functions and resources of the IMS that might develop bottlenecks, displaying the address of such major IMS functions as MFS, queuing, scheduling, dependent region activity, data base access and MVS activity, the spokesman continued.

The package operates in the IMS control region of the memory, requiring no changes to IMS modules, he said.

Control/IMS Realtime costs \$7,500 when purchased with the firm's batch-oriented Control/IMS; or \$9,000 stand-alone, from 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Logistics Systems Modeled With 'DLS'

HOUSTON — The Dynamic Logistics Simulator (DLS) from Lowell-Welter Associates models the operation of storage, transportation, supply or "any other type" of logistics system which incorporates movement of materials that may be switched or components that may serve multiple purposes at different times, a spokesman said.

Written in Fortran for use in interactive or batch modes, the package enables its users to develop a logistics facility from the basic design step to the expansion stage. It also helps to plan for expansions, contingencies or for the effects of surges in supply or demand on the facility by developing operating scenarios, he said.

Through the DLS capabilities, the user can operate the logistics facility, tuning it and determining component sizing, bottlenecks and danger conditions by testing the effects of different policies, designs, demands, supplies and operations.

No DP experience is required to use DLS, which can be acquired for \$9,775 or \$375/mo for six months.

The vendor can be reached through Box 1597, Houston, Texas 77001.

Announcing CONTROL IMS REALTIME™

You can't solve *today's* IMS response problems with *yesterday's* performance data.

CONTROL/IMS REALTIME provides the only *immediate* IMS performance analysis, right from your IMS terminal.

A NEW PRODUCT FROM



510 Oakmead Parkway, Sunnyvale, CA 94087

Call us Toll Free: 800/523-1872

In California, dial 408/735-9550



Gentlemen:

I need immediate IMS response answers to my IMS problems.

☐ Call me immediately for a detailed discussion on CONTROL/IMS REALTIME.

☐ Send me information on CONTROL/IMS REALTIME.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

Computer System _____

Comments _____

Interdata Users Reach 'Summit'

TUCSON, Ariz. — The multiterminal manufacturing control system called Summit, from Diversified Data Systems, Inc. (DDS) is said to provide support for small- to medium-sized companies equipped with Interdata, Inc. 7/32 or 8/32 computers.

The basic package supports 32 terminals with optional support available for another 32, a spokesman said. He added that the system provides on-line order entry, editing, processing and inquiry for customer orders, purchase orders, repair orders and internal sub-assembly manufacturing orders.

Categorized as "especially well suited" to electronics manufacturing companies, Summit provides a bill of materials module and a flexible system for determining inventory requirements for production scheduling, the spokesman added.

The system also provides comprehensive inventory control and management, he claimed, adding that cost accounting by individual order is also available from the package.

The Summit software provides an interface with DDS' Integrated Business Accounting System (Ibas) for such applications as accounts receivable, accounts payable, payroll, fixed asset accounting and general ledger. The Ibas package is supplied as part of the Summit system, DDS noted.

Cost of the Summit package — which is written in Cobol — starts at \$49,500 and includes the vendor's Ibas/32-Oasis software, on-site training, installation and implementation supervision and the Ibas routines.

DDS is at 2601 N. Fairview Ave., Tucson, Ariz. 85705.

Introducing Cullinane's Integrated Data Dictionary:

already proven in more than 60 locations

With more than 60 satisfied users already, IDD has proven to be an easy answer to problems and questions resulting from data change. Because, by actively monitoring the flow of data through your organization, the IDD provides readily available information to answer such questions.

Questions? Suppose your organization wants to alter its most important application system. What programs will the change affect? Which users will be impacted by the change? How much extra work will the change require? How quickly can the change be made?

The answers to these and many other questions are easily and uniquely available with the IDD. Uniquely available because the IDD automatically captures the information to answer questions and requires minimum effort to do so.

As a result, each user department receives a complete and accurate "business

study" of the organization. It's a simple, easy, and economical tool to evaluate data change, standardize data use, monitor data flow and maintain data consistency.

Let us prove to you how easy it is to control your Data Resource. Sign up now for a free introductory seminar. Use the coupon or phone (617) 237-6600.

Cities	Dates
Los Angeles, CA	Apr. 11
San Francisco, CA	Apr. 13
Hartford, CT	Apr. 25
Toronto, ONT	Apr. 27
Washington, DC	May 2
Houston, TX	May 9
Atlanta, GA	May 16
Philadelphia, PA	May 18
New York, NY	June 6
Chicago, IL	June 8
Boston, MA	June 13

**Think twice. You'll use
the dictionary.
system users rate #1.**

Name _____

Title _____

Co. _____

Address _____

City _____ State _____

Zip _____

Tel. () _____

My computer is _____



Cullinane Corporation

Wellesley Office Park, 20 William St., Wellesley, Mass. 02181 (617) 237-6600

Seminars Stress People's Role in Systems Work

NEW YORK — "People: The Secret to Effective Systems Analysis" is the title of a seminar to be presented in three cities later this spring under the sponsorship of the Institute for Professional Education.

This seminar provides pragmatic methods of performing the analysis portion of a systems study, according to an institute spokesman,

who noted that many systems fail because they provide efficient solutions to the wrong problems.

Three-Day Course

The focus of the seminar is on the development of interpersonal abilities for the systems professional to enable him to perform more effective analysis. The three-day course is taught by Ken Burroughs,

senior systems analyst with the U.S. Chamber of Commerce.

Specific topics to be covered by Burroughs include a review of the interviewing process, leadership in the analysis function and creativity in the analysis process. Discussions of systems presentations and the makeup of a successful systems person will be fol-

lowed by sessions on speaking, listening and writing effectively.

The course is intended for analysts, DP managers, project managers and other professionals involved in the design and implementation of information systems. Current involvement should be considered a prerequisite for attendees, Burroughs noted.

The \$425 seminar will be presented in Washington, D.C., on April 24-26; San Francisco on May 24-26; and New York City on June 21-23.

More information is available from TSI Sales and Marketing, Inc., 19 W. 44th St., New York, N.Y. 10036 or from the registrar at the institute, 1901 N. Ft. Myer Drive, Arlington, Va. 22209.

**Mom
will never amount
to much.**

**MOM'S
WAREHOUSE**
WE MOTHER YOU BY MAIL

Need CICS Design Information?

CICS APPLICATIONS DESIGN GUIDE

The TelTech CICS Applications Design Guide is the first, comprehensive document to address, in detail, the elements of proper design and successful installation of a CICS Applications System from project planning through project implementation.

TelTech, a leader in the field of CICS consulting and on-line, state-of-the-art innovations, having recognized the basic lack of design information in the field of CICS, has compiled and released the best information available today on this subject.

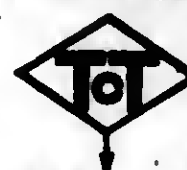
The invaluable information contained in this guide makes it a practical necessity for both Project Management and highly technical personnel.

The Design Guide provides detailed descriptions, analyses and commentaries on:

- CICS PROJECT PLANNING
- PROJECT CONTROLS
- PLANNING AND SELECTING A FILE ORGANIZATION
- DL/1 AS A DATA BASE MANAGER
- SELECTING A PROGRAMMING LANGUAGE
- COMMAND LEVEL PROGRAMMING
- IBM/3270 DESIGN CONSIDERATIONS
- PROJECT DOCUMENTS
- USER RELATIONS
- VIRTUAL STORAGE CONSIDERATIONS
- RECOVERY AND RE-START PLANNING
- CICS PROGRAMMING STANDARDS
- INSTALLATION NAMING CONVENTIONS
- PRODUCTIVITY AIDS
- ETC.

The guide is in updateable format and manual owners will be informed of subsequent page replacement/additions and expansions, as they are released by TelTech.

Each guide is priced at \$45.00 plus \$2.00 for postage and handling. If check is sent with order, TelTech will pay postage and handling fee.



**TELECOMMUNICATIONS
TECHNOLOGY CORP.**

200 Park Avenue—Suite 303 East—New York, N.Y. 10017
(212) 682-4140

Package Generates Lists or Labels

BRIDGEWATER, N.J. — A package allowing users of Digital Equipment Corp. PDP-11/V03s to build and maintain name/address-type files and to assign codes to individual entries on the file is now available from Unitronix Corp.

The Label software also enables the user to select entries from the file based on the as-

signed codes and to print them as lists or labels for mailing or personal identification.

Unitronix suggested a number of possible applications, including coding clients by purchased product type; geographic coding of clients; sales prospect status coding — such as "long term" or "waiting for a new product"; and alphanumeric listing of clients/

clients' addresses.

Label runs under DEC's RT-11 environment and requires 20K words of main memory, DEC's LA36 or LA180 line printer and the VT52 display terminal. The software sells for \$500, according to Unitronix, which can be reached through P.O. Box 6515, Bridgewater, N.J. 08807.

'Micos' Updated for DG Novas

ELMSFORD, N.Y. — Just announced by Mini-Computer Systems, Inc., Release Level 10 of the Micos business-oriented operating system for Data General Corp. Novas is said to include a variety of enhancements.

The update includes, for example, support for remote program development through a command that can connect Micos-controlled terminals with a source program stored in the CPU. Other features improve execution of programs and the spooling of

printed output, a spokeswoman said.

An asynchronous version of the Mtam communications package allows telephone ties between two Micos-based systems.

A newly implemented command gives the Micos user a more detailed accounting of how memory is employed.

Mini-Computer Systems is at 525 Executive Blvd., Elmsford, N.Y. 10523.

Upgrade to IBM 6250 BPI tape drives now!

SAVE IBM RENT ELIMINATE DOWN-TIME
caused by field conversion

We will purchase your IBM 800 1600 BPI drives now &
install 3420 4 3420 6 drives immediately from inventory

Call Nick Dibari
312-698-3000
or your nearest Comdisco office

COMDISCO

'Design Only' Chops Price Of Scheduler

DALLAS — Although Data Index, Inc. still distributes the source code of its Scheduler package, to any IBM 360 or 370 installation that pays the appropriate license fee, the vendor now says it will provide the detail design and instructions in theory behind the package — leaving the coding to the user — at a much lower cost.

Scheduler is basically a project management system, maintaining files on projects that are underway and generating detail and summary reports showing project progress. A complete audit trail of development decisions is provided.

License fees for ANS Cobol are \$3,300 (DOS) or \$3,800 (OS), while the "design only" alternative — which includes all layouts and cross-referenced discussions — is available for \$299, the company said from 11300 N. Central Expressway, Dallas, Texas 75243.

the Computer Store™

Offers

A Unique

Profit Opportunity

For

Software Companies

Systems Houses

Computer Retailers

The Computer Store's Dealer Affiliate Program features the Data General microNOVA® product line and established professional business applications software for resale to the explosive small business computer market. Sales and technical training included. Call for details:

Paul Conover

the Computer Store, Inc.

120 Cambridge Street

Burlington, MA 01803

(617) 272-8770

NOVA is a registered trademark of the
Data General Corporation

IBMer: Equipment Mix the Goal of SNA

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — The primary purpose of IBM's Systems Network Architecture (SNA) is to ensure that a range of terminals and cluster controllers can be intermixed in a network, according to Paul Lindfors, manager of communications systems architecture at IBM.

Speaking at a session on networks at the recent DataComm 78 conference here, Lindfors said such intermixed nets will be driven by common support programs in multiplexers and host IBM 370 CPUs.

"It is recognized that there are many operational networks based on older, non-SNA equipment which are and will remain cost-effective for many years. The ability to allow such networks to coexist with an SNA network is an important requirement satisfied by emulation," Lindfors said.

As customers add applications or make major modifications, it is hoped this will be done using SNA, he added.

Concentrate on Interfaces

Another speaker, Anthony Lauck, chief architect of distributed computing at Digital Equipment Corp., noted the layered concepts used in today's communications architectures have been made possible with the use of microprocessors. But, Lauck contended, there has been too much emphasis on protocols; more attention should be given to interfaces.

One of the difficult tasks still facing designers is to translate communications architectures into CPU environments to allow for compatibility, he added.

In the standards area, the lower levels of the architectures have been defined, but work is just now starting on standards for

higher levels, Lauck said. Among these higher level implementations are support for data base functions.

Work is under way to tie Decnet into other protocols and architectures such as the X.25 standard now being used by several public packet networks, he said.

Touching on the emergency of public data networks, Lauck said "each of these new data networks presents a challenge to network architectures in terms of adaptability to specific interface requirements. It is clear that without a solid architectural base on which to proceed, adaptation to these new services would be difficult."

While it would be desirable to have SNA interface to public data network standards and other architectures, IBM's Lindfors said, he gave no further indication of what interface capabilities will be provided for SNA users.

Stores Tied Into Network

POS Keeps Colonel's Chickens Counted

LOUISVILLE, Ky. — If you buy a drumstick from a Kentucky Fried Chicken (KFC) store in Des Moines, Iowa, KFC's computer here is going to know about it before morning.

In fact, when anybody buys anything from any one of the 800 company-owned outlets, that information will be relayed from minicomputers in each of the stores to the main computer during the night.

KFC is equipping all its company-owned stores with Addressograph-Multigraph Corp. Documentor point-of-sale (POS) systems that combine the cash drawer function with a computer-controlled management information system. "The system will provide us with the information to do a better job of managing our business," according to Edward Chambers, KFC vice-president of finance. "It will provide us with immediate information that isn't available from conventional systems for days or even weeks."

"Effectiveness of advertising or promotions, for instance, can be monitored on a daily or weekly basis. If a campaign is working well, management will know to extend it. If one isn't working, changes can be made quickly," Chambers noted.

While the system won't provide KFC with any information it doesn't already have, "it

gives us the data on a more timely basis," he said. "In the fast-moving retail food service business, the ability to be able to react immediately to consumer shifts in preferences is critical."

Aid, Not Authority

The Documentor system can collect data for a variety of management, marketing and accounting reports. For example, it will keep a running store-level inventory of chicken and other raw materials.

Store managers will find their paperwork eased by the POS system, which automatically generates all the daily operating control reports they now have to do manually. This includes a record of exactly what was sold each hour, including the exact number of soft drinks, pieces of chicken and containers of potatoes or salads and which sizes.

"The terminal system also performs employee timekeeping, enabling the manager

(Continued on Page 32)

Prentice Modem Needs No DAA

PALO ALTO, Calif. — Prentice Corp. has introduced a two-wire, half-and full-duplex Bell-compatible modem for automatic answer applications.

The modem, called the P-113D, is a direct-connect unit; it interfaces to the two-wire dial up network through a 97A or 97B jack. A Data Access Arrangement (DAA) is not required, a spokesman noted.

Users can connect the P-113D to the switched network in any of the three standard modes: programmable, fixed loss or permissive, he added.

Specifications of the P-113 include a 0- to

300 bit/sec serial binary asynchronous data format.

Unlike most competitive units — which have either limited diagnostics or which require a separate switch-selectable diagnostic module — the P-113D features full built-in "at-a-glance" diagnostics, the spokesman said. The front panel has nine LED indicators that automatically and continuously report operating status.

The card version of the P-113D costs \$250. A stand-alone version (card and power supply) costs \$370. Prentice Corp. is at 795 San Antonio Road, Palo Alto, Calif. 94303.

CLIP AND RETURN FOR FAST RESPONSE

ComData

☐ Series 200 frequency division multiplexer

Data rates: Mixture of asynchronous channels up to 300 baud
Channels: Maximum of 18 channels
Diagnostics: Remote and local loopback, test, busy-out, indicators
Multi-drop: Drop one or more channels at a number of locations
Multiple access: Multi-drop channels have equal opportunity for processor channel
Line: Dial or dedicated
Options: Voice-plus-data, data regeneration



\$465 basic unit
\$325 channel end

codex

☐ Series 900 time division multiplexer

Data rates: Mixture of synchronous or asynchronous up to the high speed modem aggregate
Channels: Up to 64 channels
Diagnostics: Remote and local loopback, busy-out
Line conditioning: C2 conditioning recommended
Options: Auto speed detection, multi-drop



\$1283 base unit
\$152 async channel end

☐ Acoustic Couplers ☐ Modems ☐ Terminals ☐ Accessories

Check circle of interest and return to us for additional information

ComData

6715 Monticello
Shelton, N. 06076
203-277-1000

New York
212-677-1000

Los Angeles
213-277-1000

name _____
company _____
street _____
city _____ state _____ zip _____
telephone _____

~multiplexers~

Syfa Programming Speeded

IRVINE, Calif. — A screen management system that interactively generates terminal screen layouts for application programs has been announced by Computer Automation's Commercial Systems Division for its Syfa network processing system.

Called Panel Manager, the software relieves the programmer from coding time-consuming screen-handling routines, according to a spokesman. As part of an ongoing effort to simplify application programming on the Syfa system, the Panel Manager reportedly allows the programmer to define terminal screen panels used to receive operator input or to display application program output.

By using the Panel Manager, the development of screen-handling routines is "virtually eliminated" and the programmer is freed for other aspects of the program, the spokesman said.

Standard or Custom

Syfa users can utilize Panel Manager in the standard format offered by CA, or the Panel Manager can be tailored to individual user requirements. The package may be executed concurrently on any or all of the 24 terminals that can be attached to a Syfa.

The Panel Manager is available free to Syfa users CA said from 18651 Von Karman, Irvine, Calif. 92713.

POS Network Keeps Colonel's Chickens Counted

(Continued from Page 31)

and his supervisor to measure labor effectiveness," Chambers said, adding "this has become far more important since the minimum wage was increased. We are now able to schedule more effectively, keeping labor costs down."

When the system is fully operational, it will help the manager decide how much chicken to order daily and how much to cook each hour. It will also help him schedule his employees and order everything from soft drinks to shortening. But Chambers emphasized, it will only help.

"No machine can substitute for the manager's knowing that a nearby

shopping center is running a sale or that the weatherman is forecasting two feet of snow," he commented.

To customers and employees, the system will look like an ordinary electronic cash register. Each key has a menu item instead of a number so that the customer service worker punches a button that reads "2-piece dinner," for instance, not the price, which is already programmed into the machine. It automatically rings up the right price and computes the sales tax automatically.

When the sale is completed, information about each transaction automatically goes into the memory in the register. During the night, the minicomputer will transmit data to the central computer in Louisville via a built-in teleprocessing link.

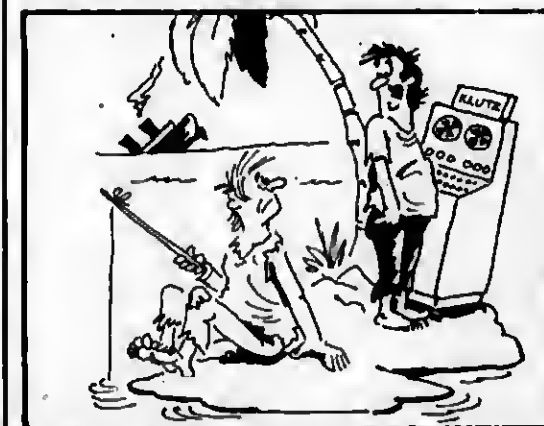
"What happens," Chambers explained, "is that the central computer calls each of the stores and 'interrogates' the minicomputer. It responds by transmitting all of the data it collected throughout the day. That will take about a minute." The hard-copy daily record is also retained on a standard register tape.

Because the computers communicate directly with each other, the opportunity for errors creeping in through manual keypunching is eliminated.

It's also a lot faster, Chambers pointed out. It takes less than four hours for the central KFC computer to gather the day's information from all 800 company-owned stores. By morning, selected management reports will be available when corporate executives arrive at their desks.

The first 110 systems have already been installed, the KFC executive said, and all stores will have them within a year. Customer service workers are being trained in the operation of the units.

"KFC data processing personnel worked with Addressograph-Multigraph's programmers to tailor a system that would fit our system exactly," Chambers said, "and that includes being flexible enough to accommodate a number of changes."



'The Probability of Our Rescue Is 83.165% Negative ...'

Texas Instruments Portable Data Terminals FOR SALE



• 743
• 745

BEST-PRICE
FAST DELIVERY

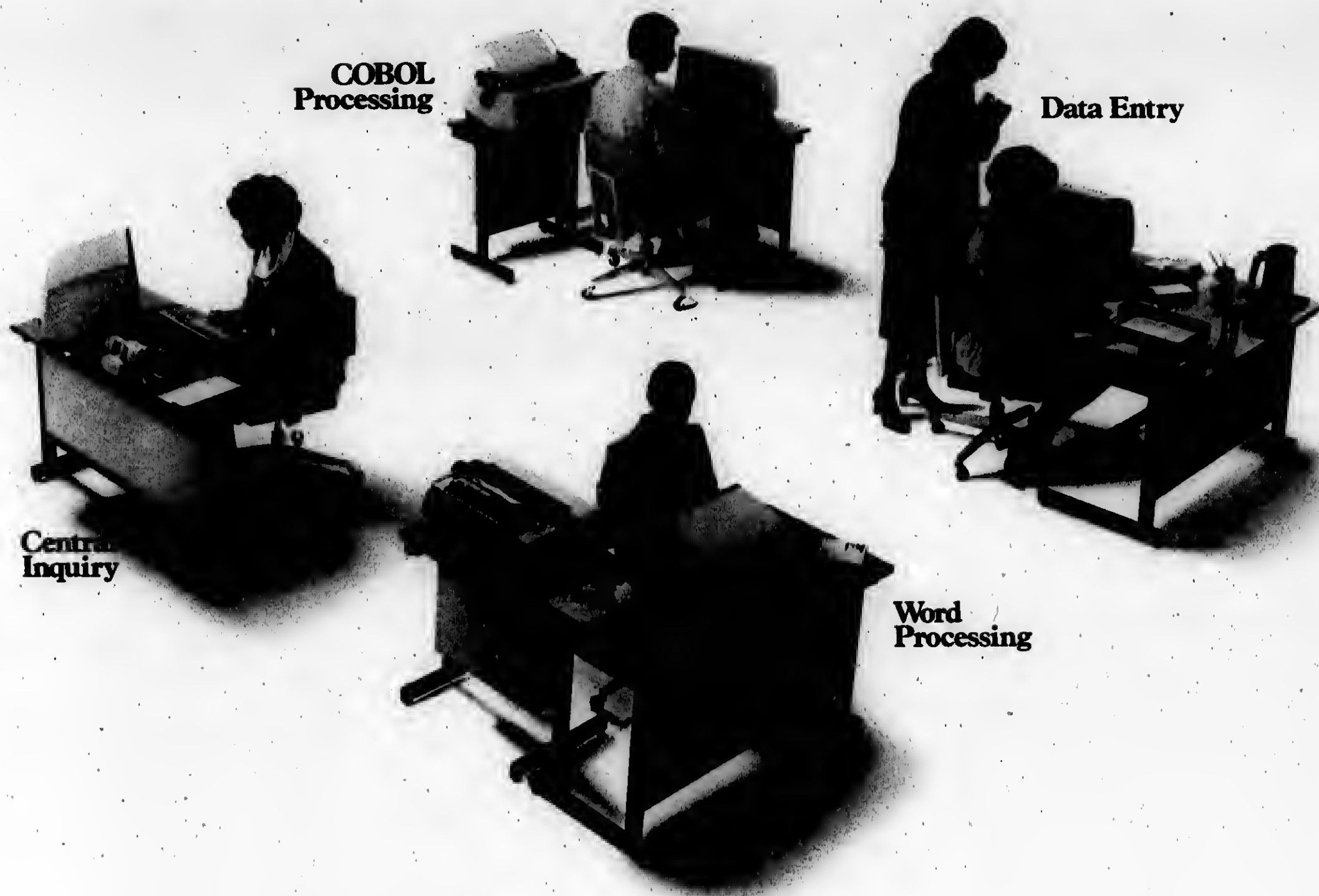
CALL TOLL FREE 800-323-2288
IN ILL. CALL 312-279-1980

Data Equipment Group

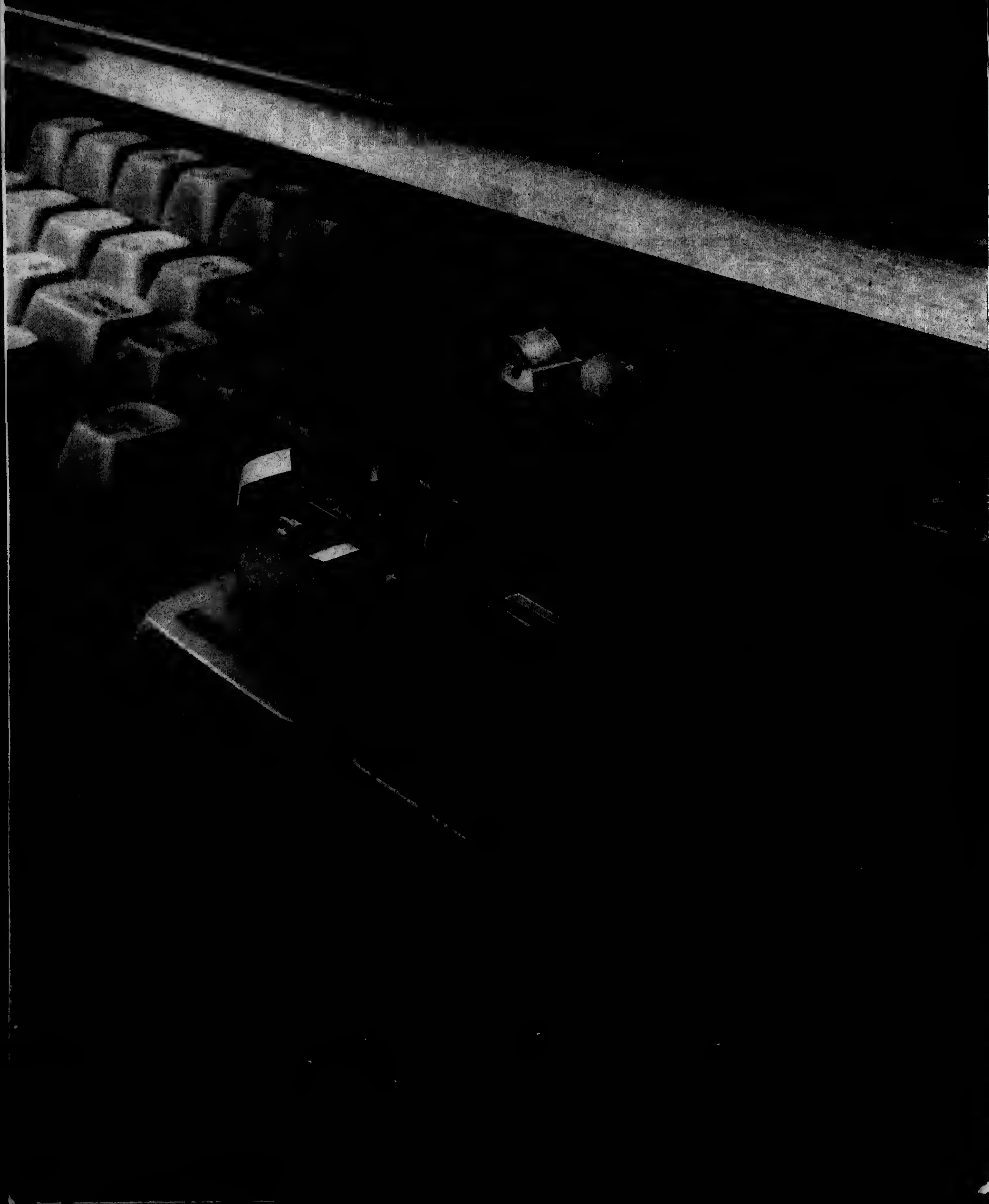
ICE, INC.

772 N. Church St.
Evanston, IL 60120

**You may need
more than one
computer function...**



**...but you don't need
more than one
computer system.**



You can do all four functions at the same station with our



new Multifunction Executive.

For the first time, you can perform the four primary office computing activities on a single distributed processing system. Our new MFE/IV Multifunction Executive lets operators independently handle data entry, COBOL processing, word processing, and interactive 3270 inquiry to your central mainframe. And every function is instantly available at up to 16 System IV/90 display stations with the touch of a key.

The Multifunction Executive allocates CPU and I/O resources for optimum system performance, and allows our field proven software packages to operate concurrently and independently.

Save Money.

Multifunction means bottom-line savings for your organization. No more special-purpose systems sitting idle . . . no redundant and underutilized peripherals . . . no users struggling to crossstrain on dissimilar equipment. And because each Four-Phase display replaces several dedicated terminals, you should need fewer of them.

Save Effort.

As the balance of your workload changes, your multifunction system keeps up with it . . . automatically.

In a branch office, for example, an operator using the word processing mode to generate proposals can check current product availability by transferring to inquiry mode and accessing the headquarters data base. Or while new orders are keyed in fill-in-the-blanks formats, the system can independently retrieve and enter customer data from local files . . . price and delivery data from central files . . . and print an invoice. All while other activities proceed at other displays.

Grow Step-by-Step.

Begin now to benefit from multifunction distributed processing. Start by installing an economical system, combining data entry and file management. Or word processing and batch communications. Or data entry, central inquiry, and local processing.

Then add memory—up to 384K bytes for your local applications. Add discs—up to 270M bytes of online storage. Add printers—one for each display. And add software—with the Multifunction Executive for concurrent operation. Our family of systems lets you grow at your own rate, saving time and money at each step.

For more information, call your local Four-Phase Systems office. Or write for our new brochure.



Four-Phase Systems

10700 North DeAnza Blvd., Cupertino, CA 95014



The reason Epoch 4 stands unequaled in Canada is because it deserves to.

Quality. It's the same all over the world

In Canada, quality is a tradition. And any product that tries to make it there had better be long on quality. Because without it, it won't be accepted very long.

Producing quality products is

the philosophy our company is based on, and we still stake our future on it. It's a commitment that's paid off. For our customers.

The result is that millions of reels of Epoch 4 are in use —

around the world. And its reliability has been proven through billions of error-free passes.

Epoch 4 is the patented one. The one that's proven itself in a business where you have to:



GRAHAM MAGNETICS *Proven around the world.*

Graham, Texas 76048



Canadian Service to Access Telenet, Tymnet

OTTAWA — Rates have been filed for the connection of Canada's Datapac network with two packet networks in the U.S.

Datapac/Telenet and Datapac/Tymnet are the first international packet-switched services to be offered in Canada by The Computer Communications Group of the TransCanada Telephone System.

Interconnection with Tymnet, Inc. and Telenet Communications Corp. will allow subscribers in more than 100 cities in the U.S. to access host computers and terminals in 5 Canadian Datapac Serving Exchanges (DSE).

Rates for these two Datapac international services are based primarily on the volume of data transmitted, with distance a secondary factor. The

following factors determine the total charges for a call:

- Number of kilopacs transmitted (a kilopac is 1,000 packets, each containing up to 128 characters).
- Holding time in minutes for low-speed asynchronous terminal connections for terminals accessing Datapac in Canada. One rate applies to connections in any of the 55 DSEs. Connect charges for

Telenet or Tymnet vary, depending on the U.S. city in which the call originated.

- The Canadian city (DSE) involved with the call. The existing 55 DSEs have been assigned to bands for rating purposes for Canada-U.S. calls. Usage charges (per kilopac) are the same for all cities in a particular band regardless of which U.S. city is involved with the call.

To illustrate the application of the above charges, a computer located in any Canadian "Band 1" city and subscribing to Datapac 3000 access service may communicate with:

- Terminals operating at 300 bit/sec in 81 U.S. cities with access to Telenet public dial facilities for \$1.10 per kilopac plus a holding time charge ranging from \$1.80 to \$4.20 an hour.

- Terminals operating at 300 bit/sec in 113 U.S. cities with access to Tymnet public dial facilities for \$2.50 per kilopac plus a holding time charge ranging from \$1.20 to \$5.40 an hour.

Details of the Canadian service are available from the Computer Communications Group, 160 Elgin St., Ottawa, Canada.

On-Line Catalog for Libraries Uses Touch-Sensitive CRT Screen

NEWTONVILLE, Mass. — The Libs 100 Public Access Catalog — which can replace a library's card, book or microform catalog — has been introduced by CLSI.

The system communicates with the patron via the Libs 100 Browsing Terminal, which has a CRT with a touch-sensitive screen.

The display screen of the

Terminal is divided into 32 distinct areas by a grid of horizontal and vertical lines. Twenty-two of the areas are used to display the library-specified contents of the on-line bibliographic and holdings files which are selected by the patron.

The remaining 10 areas are used as control areas where the patron can request special

instructions such as "next page," "previous page," "more details" and "start over," CLSI said.

By touching the screen of the terminal, patrons can see the bibliographic description of any title and the location and circulation status of any copy in the library's collection.

The system, which is scheduled to be available in August, will be integrated into CLSI's existing Normal Circulation Control System, which runs on a PDP-11/04. Prices for the complete system start at \$75,000, depending on the library's size, number of branches and functions.

CLSI is located at 81 Norwood Ave., Newtonville, Mass. 02160.

Seminar to Cover Packet Switching And Alternatives

CAMBRIDGE, Mass. — The Yankee Group is sponsoring a two-day seminar entitled "Implementing Transparent and Intelligent Networks: Packet Switching and Its Alternatives," to be held March 22-23 in New York City.

The featured speakers will include Dr. Howard Frank of Network Analysis Corp., who will discuss how to test the viability of building an internal intelligent network and the step-by-step implementation procedures for such a network.

Moody and Doll

J. Roger Moody, Teletype Corp., will discuss Teletype's and AT&T's insights into the future needs of specific industry groups, and Dr. Dixon Doll, the DMW Group, will compare packet switching with other methods of getting intelligence into the network.

The seminar fee of \$550 (\$450 for additional attendees from the same company) covers attendance at all sessions, a copy of the Yankee Group Research Manual and two lunches, the group said. The firm can be reached through P.O. Box 43, Cambridge, Mass. 02138.

PROFESSIONALS WANTED

Our rapid success in implementing Data Terminal Management Programs at Fortune 500 companies necessitates additional personnel in our Boston, New York/New Jersey, Philadelphia and Washington offices.

Eighty percent of our business is generated from our existing customer base and we need Area Managers, Account Managers, Sales Persons and Electronic Technicians. Qualified Computer Professionals are invited to join in our success — We double revenues every other year, and earn 10%+ profits. Contact Eric S. Taylor, Personnel Manager.

SELECTERM, INC.

2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300
AN EQUAL OPPORTUNITY EMPLOYER M/F

TERMINALS FROM TRANSNET

FULL OWNERSHIP	
100% EQUITY RENTAL PLAN	
FULL OWNERSHIP AFTER 24 MONTHS	
DECwriter II	DECwriter III
LA36 PRINTER TERMINAL	LS120 TELEPRINTER
\$75 mo.	\$145 mo.
DECprinter I	VT52 DECscope
LA180 HIGH SPEED PRINTER	VIDEO DISPLAY TERMINAL
\$125 mo.	\$85 mo.
VT55 DECscope	\$137 mo.
ADM 3A CRT	45 mo.
TI 745 Portable	94 mo.
ADDS Regent 100 ...	67 mo.
DATA PROD. 2230 ...	395 mo.
TECHTRAN 8400	93 mo.

PURCHASE, 12 MONTH FULL OWNERSHIP AND LEASE PLANS AVAILABLE FOR ABOVE AND OTHER EQUIPMENT



TRANSNET CORPORATION
2005 ROUTE 22, UNION, N.J. 07083
201-688-7800

DEC® Data System Owners Need new reports within minutes?

DEC® OEM's Having trouble speaking English?

SYMBOLIC SYSTEMS® INC.

(DEC's first and foremost business OEM)

PRINT IV™

a user-oriented, query type report writer

To print a report, simply:

- select data desired
- select order desired
- enter selection criteria and required totals.
- watch report appear on printer

No programming skills required!

License price includes 1-yr. warranty

For free demo and further information call, write or telex

FRANK J. PONZIO, JR.

SYMBOLIC® SYSTEMS

25 Chatham Road Summit, NJ 07901
(201) 277-6100/Telex No. 13-6476

NCE

LEASE • RENT PURCHASE

- DIABLO 1620, 1641, 1660
- ACOUSTIC COUPLERS
- DECWRITERS LA 36, 120, 180
- ADDS CRT's
- TRI DATA FLOPPY DISC
- TELETYPES—TWX/TELEX 32, 33, 35, 43

*SEE US AT INTERFACE '78



NCE

Call or write for more information...

NCE TERMINALS & COMMUNICATIONS, INC.

Regional Office—East
300 Raritan Ctr. Pkwy.
Bldg. 808
Edison, NJ
201-225-0872
Toll free #
800-831-5368

Headquarters Office
Midwest
1536 Brook Drive
Downers Grove IL 60515
312-629-7810
Toll free #
800-323-1780

Regional Office—South
1110 Busch Blvd.
Tampa, FL
813-932-2666

Fujitsu's 50megabyte M2201



Finally!

A reliable, low cost, front loading SMD-interface-compatible disk drive

In the world of SMD-compatible disk drives, the OEM offers a fresh new alternative for disk drive requirements. And the M2201 disk cartridge drive offers high reliability and low off-line storage cost in a technically superior disk drive.

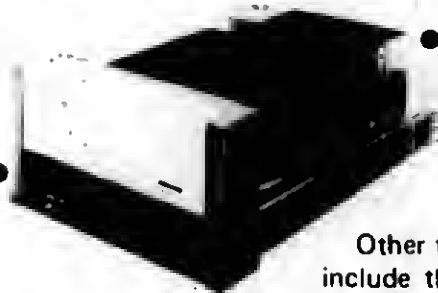
The M2201 features high reliability by virtue of a lower part count and our strong quality control.

In addition, online reliability, where it really counts, is ensured by a 0.3 micron dual filtration system that removes 99.97% of disk environment contaminants.

Moreover, with the M2201's front loading disk cartridge, off-line storage cost is lower than that of top loading storage module media. Yet the SMD-compatible interface of the M2201 connects directly into a storage module drive controller.

A close look at the drive will readily bear out the technical superiority of the M2201:

- A linear motor actuator produces 6-ms track-to-track and 30-ms average access times
- A track following servo system with servo track recorded on cartridge ensures cartridge interchangeability
- A 6,000 POH mean time between failure (MTBF)
- No data staging requirement since all data is on cartridge
- A small and lightweight chassis; drive easily mounts into a standard 19" rack



M225x series fixed type disk drives

Other technically innovative products include the M2251, M2252 and M2253 fixed media storage drives with memory

capacities of 12.7/25.4/50.8 megabytes, respectively.

These models feature Winchester technology heads and rotary actuators which offer 10-ms track-to-track and 40-ms average access times. Optionally, these units provide head-per-track unformatted storage capacities of 327.7 or 655.4 kilobytes.

For fresh, innovative solutions to your disk drive problems, contact Fujitsu America, Inc.

2945 Oakmead Village Court, Santa Clara, CA 95051.
Phone: (408) 985-2300, TWX: 910-338-0047, Telex: 357402

FUJITSU LIMITED
Communications and Electronics

WU Smarts Controller Now Concurrently Accesses Telephone, TWX Networks

MAHWAH, N.J. — The communications capability of Western Union (WU) Data Services' Smarts controller has been expanded to offer terminal users concurrent access to the public telephone and TWX networks via Bell 202, 103 and TWX protocols.

A multiple microprocessor-based controller with floppy disk storage, the Smarts controller has a microprocessor dedicated exclusively to communications, a WU spokesman said, making it possible for the company to program in additional communications protocols to its existing 202 operation — 103 and TWX being the first in a series to be announced. These protocols are available in a variety of combinations.

The stand-alone Smarts controller provides general-purpose communications terminals with communications control, text-editing and file management capabilities. It can be employed with any terminal in the company's product line, the spokesman noted.

The controller provides users with four levels of concurrency. Terminal operators can enter messages into the controller via the terminal console while it prints out a lengthy report on an associated printer; at the same time, the controller can be polled by a CPU while transmitting messages to the TWX network — all four activities taking place concurrently.

The controller employs two communications ports, either of which may be assigned to operate with a 202 or 103 modem or TWX or both 103 and TWX on an alternate basis, the company said.

Access to the TWX network enables users to reach Mailgram and Telegram services, international communications networks and the WU Telegraph Co.'s Infomaster switching center for a variety of computerized services.

Operators can enter messages into the Smarts controller either free-form or with prompts. Header message formats and even standard paragraphs can be stored on the floppy disk and called up when required to facilitate message handling and composition.

To correct errors in a message, the controller permits operators to search within a message's contents. Then they can text edit — adding, deleting or changing information while making revisions, according to the spokesman.

Floppy Storage

All messages can be stored on the floppy disk, which has a capacity of over 270,000 characters in up to 60 operator-named message files. Operators can access at random any message by file name through the controller's file directory.

For example, the spokesman said, all messages created during the day that are directed to a single location can be set in a file segregated from all other messages and later linked for transmission, requiring only a single phone call. Alternately, all sales orders can be segregated from a day's traffic and printed out or transmitted to the computer.

Stored messages reportedly can be accessed in a variety of ways — by sub-

ject, date, location or other reference. This capability provides users with an electronic filing system, eliminating the need for duplicate filing or multiple listings, WU said. This feature also permits an audit trail of related messages.

In addition to operating in the batch mode, terminals with the Smarts controller can interact with the computer to retrieve computer-based data for insertion in messages.

The controller provides operators with the status of its send and receive files. In this way, the spokesman noted, the operator knows what has been transmitted, what remains for transmission and which ports are in use or free.

The Smarts controller equips terminals for automatic answering, so that either regular dial-up or TWX transmissions can be received when the terminal is unattended. A single answerback is used for both dial-up and TWX use.

A speed restraint feature enables the terminal to communicate with slower international networks, WU said.

The enhanced system is available in a variety of configurations which include 10-, 30-, and 120 char./sec teleprinters, with or without the company's CRT terminal.

A typical configuration consisting of an EDT 33 teleprinter and a Smarts controller programmed for 1,200 bit/sec communications on one port and TWX services on the other port leases for \$240/mo on a three-year basis including maintenance.

Deliveries will begin in the second quarter, WU Data Services noted from 70 McKee Drive, Mahwah, N.J. 07430.

Intertec Board Enhances LA36

GAITHERSBURG, Md. — Intertec Data Systems has announced the Superdec Throughput Optimizer, a printed circuit board designed to replace the existing digital electronics in Digital Equipment Corp.'s LA36 Decwriter II teleprinter.

The Superdec upgrades the Decwriter II for 1,200 bit/sec operation, and furnishes automatic and manual top-of-form, full horizontal and vertical tabs (addressable and absolute), adjustable right and left margins and an RS-32C interface, according to a spokesman.

Features not previously offered to Decwriter users include a double-wide character set, bidirectional printing and 32 user programmable characters, he added.

An APL character set, selective addressing and an answer-back feature are options that can be installed by plugging additional IC chips into the board, the firm said. Installation of the plug-compatible Superdec can reportedly be completed in a few minutes.

Price of the unit is \$395 through Intertec's Eastern Regional Marketing Office, 19530 Club House Road, Gaithersburg, Md. 20760.

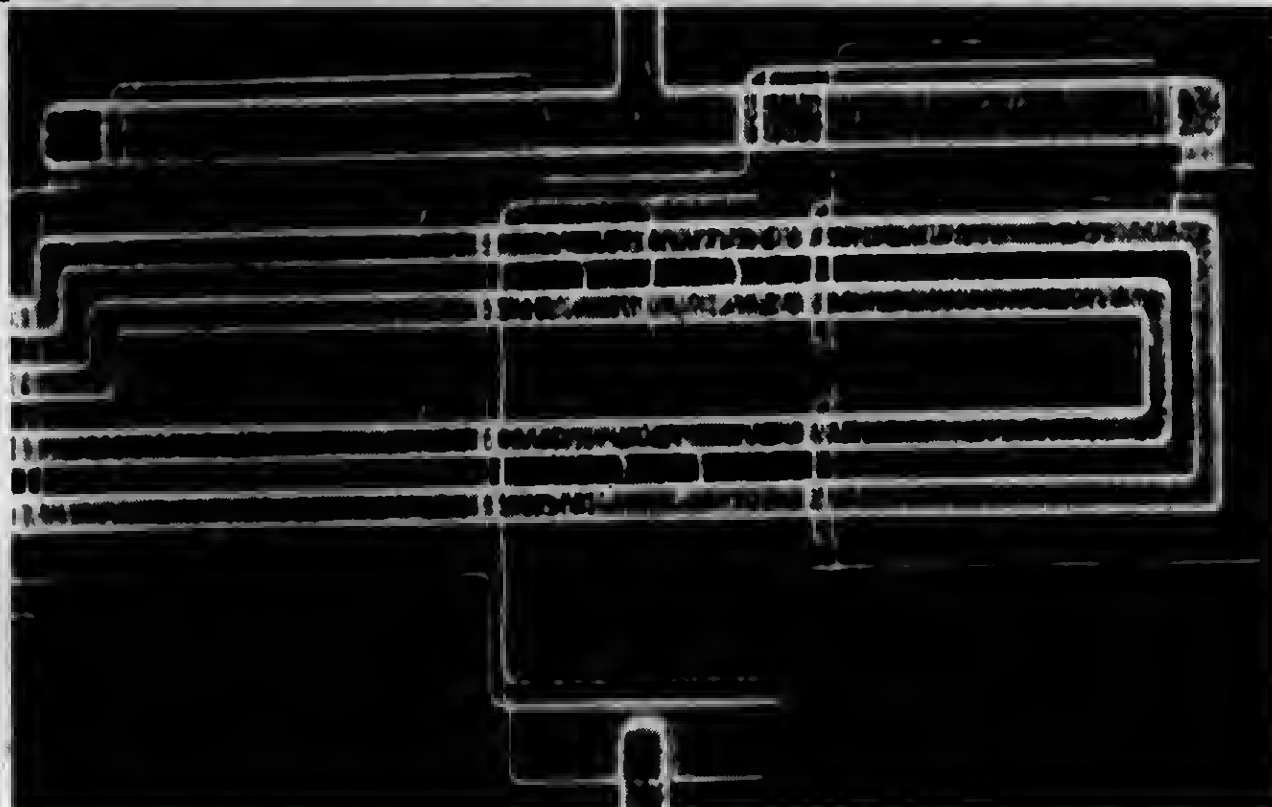
Very High Switching Speeds

Josephson Superconductor Has Promise

SAN FRANCISCO — Whenever computer scientists gather and the discussion turns to the possible technologies of the future, IBM's Josephson junctions are bound to come up.

Josephson junction devices — superconductors still in the experimental stage — operate on principles entirely different from those of the silicon transistor circuits used in all of today's computers. Experimental logic circuits made of Josephson junctions switch in 50 to 100 picosec (trillionths of a second) and the memory cells have an access time of 7 nsec (billionths of a second), according to IBM. This permits them to be packed very closely together, an essential quality because with such high switching speeds the time an electrical impulse takes to move from one circuit to the next becomes the major limitation on a computer's speed. In 100 picosec, for example, an electrical signal moves about half an inch.

These most recent results of a long-range exploration of Josephson technology by IBM's Research Division were reported at the recent International Solid-State Circuits (Continued on Page 42).



Shown above is a scanning electron photograph of a Josephson OR gate, which contains four Josephson junctions. The junctions are the small circular regions near the center of the picture; the horizontal lines are control lines that switch the junctions. This circuit switches in less than 50 picoseconds.

HIS Remodels Level 64 Into One Unit

WALTHAM, Mass.— Honeywell Information Systems, Inc. has remodeled its Level 64 line of medium-scale systems, replacing the five previous models with a single multiconfiguration model it said spans its "entire range of medium-scale systems and exceeds the configurability range of the former Level 64 models."

HIS also introduced systems and application software features and peripheral devices, enhanced communications capabilities and announced an expanded field marketing and service organization to support the Level 64.

With the single-model Level 64 system, a user can enter at any point and, as his requirements change, reconfigure a system in any of four dimensions — CPU performance, memory capacity, peripherals mix or communications processing, a spokesman claimed.

A remote maintenance system, for use with new or currently installed Level 64 systems, RMS/64, allows engineers to diagnose problems from remote support centers.

A new contract approach offers Level 64 hardware on one-, five-, six- or seven-year leases on a multiterm contract. Selected peripherals have an additional three-year term as an option.

A 300 card/min reader, 70M-byte disk and both 600- and 800 line/min line printers were introduced for the Level 64.

'An Advanced Concept'

By Frank Vaughan
CW Staff

WALTHAM, Mass.— Honeywell Information Systems, Inc. claimed its remodeled Level 64 medium-scale system represents "an advanced concept: a system designed to meet present information processing needs while accommodating future expansion through on-site upgrades to increase memory size, peripheral capacity and processor performance."

The entry-level system is "roughly

equivalent" to an IBM 370/115; a fully configured system is "roughly equivalent" to an IBM 370/138, a spokesman suggested.

In trying to meet these claims, HIS offered five levels of instruction speed, with internal clock cycle times ranging from 500 nsec at the entry level down to 370 nsec with the most powerful processor configuration.

System memory options range from a minimum 64K bytes up to 768K bytes. (Continued on Page 40)

CMC XL40 Gains Enhancements

LOS ANGELES — Pertec Computer Corp.'s CMC Division has expanded the multitasking power of its XL40 distributed processing system with a series of hardware and software enhancements.

The enhancements, which a spokesman said will "broaden user capabilities in the areas of interactive communications and transaction processing," include IBM 3270 emulation mode, station printers, remote subsystem, a 2,000-character CRT, in-

creased disk capacity and expanded random-access memory (RAM).

The 3270 mode compatibility extends the XL40's existing Cobol Shared Access Method (Cosam) information retrieval package. With 3270 mode, requests for information not resident in the XL40's local data base can be automatically passed to the host CPU in a mode completely transparent to the operator, a spokeswoman said. (Continued on Page 44)



- 1 Year Lease
- Complete On-Site Maint. Included
- No Automatic Renewals
- No Tricks - No Gimmicks
- No Joke

Give Us a Call!!

TI - 745



- Portable
- Self Contained
- 13½ Pounds with Paper
- True 30 C.P.S.

NATIONAL COMPUTER
The Greatest Name in Terminals

26 Sixth Street • Stamford, CT 06905

Call 800-243-9006 TOLL FREE

IN CONN	203-325-3831	(Stamford)
NEW YORK	212-354-9866	(42nd Street)
BOSTON	617-235-7055	(Wellesley)
NEW JERSEY	201-766-4662	(Bernardsville)
CHICAGO	312-296-0830	(Des Plaines)

OTHER PRODUCTS

DEC LA-36 ASR

ADM 3A

DIABLO



TECHTRAN

ANDERSON JACOBSON

DIABLO

MIC to Explore Data Entry

CHERRY HILL, N.J. — Management Information Corp. (MIC) is sponsoring a three-day seminar at the Cherry Hill Inn here that deals with the practical world of data entry.

Discussions with instructors and other participants will provide users with problem-solving techniques that can be implemented immediately, MIC claimed.

The course includes instruction in data entry system concepts, organization of the data entry department, data entry control techniques and getting the most out of keyboard equipment.

It will also cover personnel communications, personnel motivation, establishing keying standards, operator ratings, improving data entry productivity and operator training.

MIC will hold the course on May 22-24, Sept. 11-13 and Nov. 13-15.

Registration fees are \$395 for subscribers of MIC publications and \$425 for nonsubscribers. The price includes all luncheons, meeting materials and a get-together cocktail hour. For more information, contact MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Binder Holds Cards

NEW YORK — A self-standing, easel-backed binder designed to store magnetic cards was unveiled by Printcraft Systems, Inc.

The unit includes a vinyl-covered three-ring binder, five storage panels, title cards and index strips, a spokesman said. Each storage panel has a capacity for up to 34 cards.

The unit sells for \$27.50 from the firm at 11-17 Beach St., New York, N.Y. 10013.

'Advanced Concept' Touted

(Continued from Page 39)

and expansion comes in both 64K-byte and 128K-byte increments.

Memory read time ranges from 1 microsec down to 740 nsec for 4 bytes of main storage; write time ranges from 1 microsec to 940 nsec, also for 4 bytes of main storage. Memory access time is 175- to 145 nsec, the spokesman claimed.

Two independent I/O channels are standard; an option offers up to 10 channels. Each channel has a 1.25G byte transfer rate with a 4.0 to 4.25 aggregate I/O transfer rate.

Up to three data communications controllers can be installed with up to 14 lines per controller. Synchronous, asynchronous and/or binary synchronous lines are supported with speeds from 100 bit/sec through 19.2

bit/sec.

A 64K entry-level system with a 600 line/min printer, 300 card/min reader (with PM200/0 instruction set) and two 70M-byte disks sells for \$221,780 or leases for \$4,891/mo on a five-year lease. Maintenance costs \$826/mo.

A "typical" 512K full-range system with a 1,200 line/min printer, 1,050 card/min reader, six 100M-byte disks and six 200K-byte tape drives costs \$872,959 or leases for \$18,521/mo on a five-year plan. Maintenance costs \$2,786/mo.

The newly introduced 300 card/min reader is a counter-top device that can be equipped to sense marks encoded in either HIS or IBM format and can be upgraded on-site to read at 500 card/min. The reader sells for \$9,060 and leases for \$225/mo.

With the introduction of the 70M-byte disk, HIS said it "functionally eliminated" the 29M-byte unit previously available with the Level 64. The disk can be upgraded on-site to the 100M-byte capacity; it costs \$13,500 and leases for \$370/mo. HIS also added two medium-speed line printers for the Level 64, both featuring interchangeable belt cartridges with 120 print positions upgradable to 136 print positions. A variety of 48-, 64-, and 96-character belt cartridges are available, according to the spokesman.

The 600 line/min printer sells for \$32,060 and leases for \$812/mo while the 800 line/min unit sells for \$37,720 and leases for \$951/mo.

HIS' Remote Maintenance System/64 (RMS/64) reportedly allows field engineers to monitor, control and diagnose Level 64 installations as well as take some corrective action.

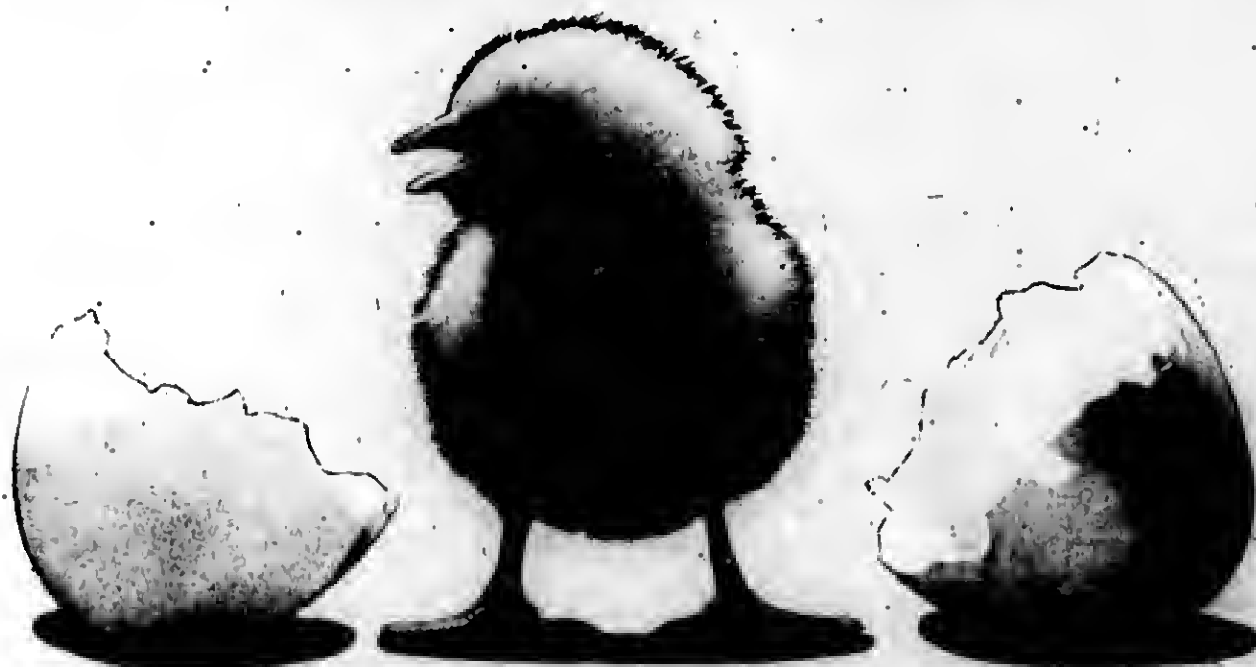
User benefits with RMS/64, HIS claimed, include immediate access to a systems support specialist; remote access to error logs for threshold analysis; remote hardware tests and diagnostics initiated in conjunction with user operations; improved maintenance diagnostics for remote sites; and immediate backup availability for an on-site engineer with a particularly difficult problem.



SIM-14TM



It'll give your 1401* programs a new lease on life.



• IBM 303X, AMDAHL, CDC, ITTEL users...SIM-14 means no re-programming!

• IBM 360/370 users...SIM-14 means running multiple programs simultaneously!

If your new whizzer has made your 1400 series program old before its time, our simulator can give it instant new life with features like...

...a self-relocating problem program that's completely interruptable; no hardware restrictions other than decimal arithmetic set; no control storage or

micro codes; full tape and disc support; support for 1400 utilities and sort replacements included...

And more. Enough, in fact, to fill its own manual. To get your copy—and to find out how "cheep" SIM-14 can be—call your nearest Dearborn office.

*Includes 1440 and 1460 programs



dearborn
computer company

dealer-IBM computers
systems software
leasing

1460 renaissance drive/suite 400/park ridge, Illinois 60066 (chicago)/(312) 827-9200
toronto (416) 621-7080 • st. louis (314) 727-7277 • houston (713) 965-0788

member, CLA; ADAPSO; SIA



'Your Tape Cleaner Is Here, Mr. G.'

DECwriter II's & III's
For Sale

•LA36
•LS120

BEST PRICE

FAST DELIVERY

800-323-2288

CALL
TOLL FREE

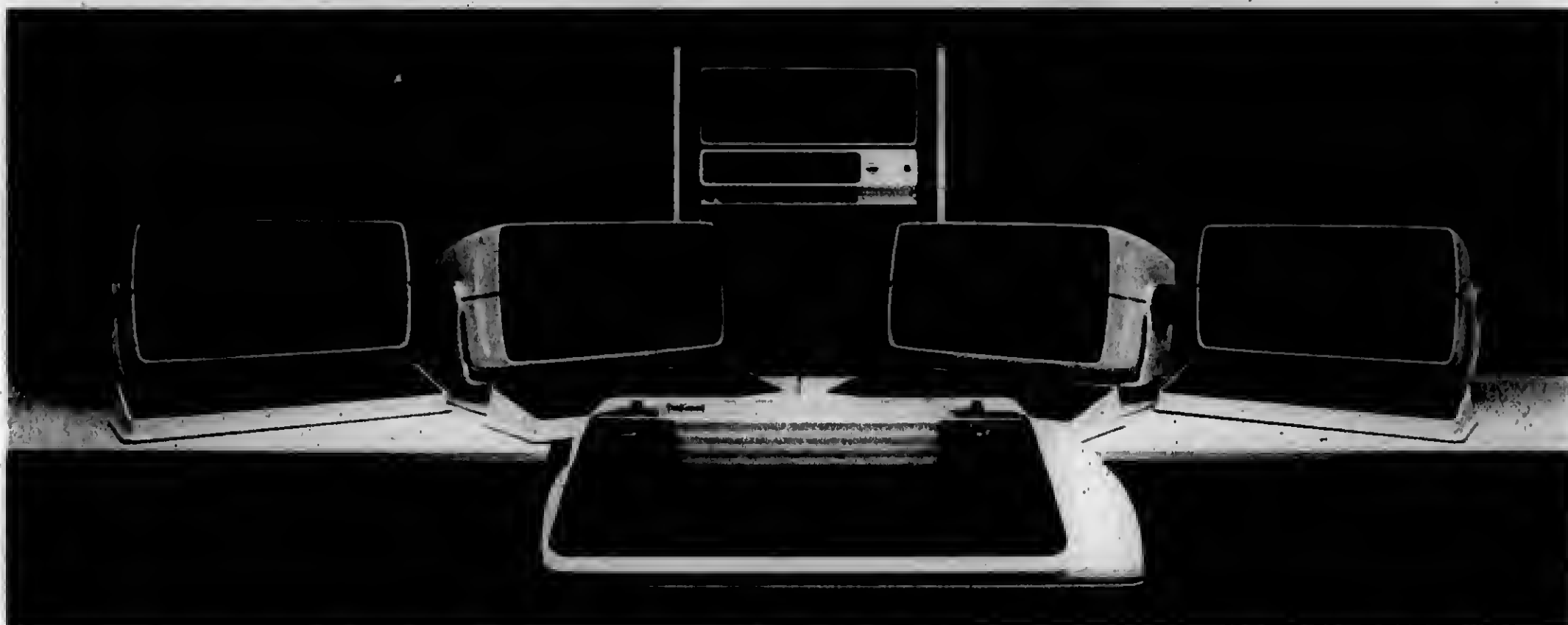
IN ILL. CALL 312-279-1960

Data Equipment Group

ICE, INC.

772 N. Church Rd.
Elmhurst, Ill. 60126

At last. The small business systems nobody's waiting for.



Data General's new Commercial Systems CS/40 models. They don't keep you waiting because they work the way business works. Interactively.

Multiterminals, no waiting. CS/40 puts data processing power right where your people need it, when they need it. In a distributed network or as a stand-alone system handling multiterminal applications or multiple single terminal applications or both. So some users could be updating inventory, while others enter orders, check payables, and process the payroll. All at the same time. And managers can still access the system any time.

It speaks your language. Interactive ANSI '74 COBOL, the standard business computer language and the language of large computers. With its COBOL, CS/40 has interactive debugging and workstation management, which makes it easier to use from the start.

Small doesn't mean limited. Three compatible models assure that as your company grows, CS/40 can grow along with you. And CS/40 can communicate with other popular commercial systems including our own. With features like up to 40 million bytes of online disc storage. And enough memory for

large applications. Plus utility software you wouldn't expect on a small system. And a smart spooler that frees up terminals so your system can do more work.

And everything else you'd expect from Data General. Like innovation, because we put a larger share of our revenues into R & D than any other major computer manufacturer. Like reliability, because we make virtually everything we sell. Add attractive quantity discounts, solid systems engineering, field service and our superior price/performance and you'll understand why there are already over 39,000 systems installed worldwide.

Why wait any longer?

Mail to: Data General, Westboro, MA 01581

- ☐ Send me your Commercial Systems CS/40 series brochure.
- ☐ Send me your brochure and have your sales representative call.
- ☐ Quick, I'm getting ready to purchase. Call me pronto.

Name _____

Title _____

Company _____

Address _____

Tel. _____

City _____

State _____

Zip _____

© Data General Corporation, 1977

CW 36

 **Data General**
It's smart business.

Data General, Westboro, MA 01581, (617) 366-8911. Data General (Canada) Ltd., Ontario.
Data General Europe, 15 Rue Le Sueur, Paris 75116, France. Data General Australia, Melbourne (03) 82-1361.

Josephson Units Hold Promise for Faster CPUs

(Continued from Page 39)

Conference here. The work was done at IBM laboratories in Yorktown, N.Y., and Zurich, Switzerland.

Although Josephson circuits require refrigeration to temperatures near absolute zero (-459°F, or -273°C), they are attractive for fast computers because of their very fast switching speed — about 10 picosec for individual devices — and their very small power requirements. The product of power and delay time is a generally used figure-of-merit for switching circuits.

The Josephson circuits have a power delay product of about 100 attojoules (100 by 10^{-18} joules), a thousand times or more better than that of transistor circuits, IBM said.

The logic circuits fabricated at the Yorktown laboratory include AND, OR, INVERT and LATCH functions. The circuits are built with what are called Josephson interferometers, each consisting of three Josephson junctions coupled to each other via a common conductor and an inductance. This configuration permits a reduction in capacitance as compared with a single, larger junction and thus increased switching speed.

Measured delays per stage, which correspond closely to calculated values, are 40 picosec for the OR circuits, which consist of one interferometer with two control lines, and an average of 70 picosec for the AND gate.

The AND gate consists of two interferometers, and its speed of operation depends on the sequence of its input signals. In one case, it operates in 40 picosec; in the other, it takes slightly less than 100 picosec.

These figures are for a fan-out of one. Additional fan-outs introduce a delay of 14 picosec each. Because the circuits are superconducting, the fan-out ratio is unlimited for all practical purposes, IBM said.

The smallest lines used in the circuits are 2.5 microns wide. The actual Josephson junctions are circular, with a diameter of 5 microns.

The Josephson electrodes are fabricated of an alloy of lead, indium and gold, with an insulating layer of oxide, 30 to 50 angstroms thick providing the Josephson tunneling region.

Josephson Memory

The experimental memory model described by researchers from the Zurich laboratory is the most complex Josephson chip yet fabricated, containing nearly 4,500 Josephson junctions. The array was built to test feasibility of the elements of a 16,000-bit Josephson main memory chip.

The memory cells in the chip are called "single flux-quantum" cells, since a bit of information is represented by a single quantum of magnetic flux — the ultimate economy in magnetic memory. Each cell consists of two Josephson junctions connected by an inductance, an interferometer

similar in principle to the three-junction interferometers used for logic circuits.

A persistent current can flow in this structure, with a magnitude set by the quantization of magnetic flux.

Because the memory cells are superconducting, storage is nonvolatile and no power is required in the quiescent state. Projected power dissipation for a fully populated 16K chip at maximum repetition rate is only 40 microwatts, IBM said.

Illustrating the extremely low power dissipation of Josephson circuits, a 2M-byte memory would dissipate a maximum of 40 milliwatts, the firm noted.

The minimum line width in the memory chip is 2.5 microns, and the memory cell size is 1,500 square microns, giving a density of about 400,000 bit/sq in. A double of storage density seems possible with the same line width, according to the Zurich researchers.

Since the single flux-quantum memory is envisioned as the main memory for a Josephson computer in which a high-speed cache memory would also be provided, its performance has been optimized for low power dissipation rather than maximum speed. Nevertheless, the measured access time is only 7 nsec.

A conservative projection is that the full 16K bit chip should have an access time of 15 nsec and a read/write cycle time of 30 nsec, IBM claimed.

An important issue in exploration of a new technology is the reproducibility of device characteristics from run to run. The Zurich group found the spread in maximum Josephson current among several chips was about 10%, a figure close to what would be required to build a full-sized memory.

History of Devices

Josephson devices exploit an effect in superconductors originally predicted by the British physicist Brian Josephson and soon confirmed experimentally. The prediction was that a supercurrent could flow through an extremely thin insulating barrier between superconductors.

The insulator, if it is thin enough, acts as a weak superconductor itself, as there is no voltage drop across it.

A second effect, explored earlier by Ivar Giaever of General Electric, is normal electron tunneling through an insulator separating superconductors. In this case, there is a voltage drop across the insulator corresponding to the energy gap between superconducting and normal electrons, analogous to the energy gap in semiconductors.

Josephson tunneling is quite sensitive to current density and the presence of a magnetic field. When either exceeds a critical value, the insulating layer reverts to the normal, voltage drop state.

Soon after Josephson's theory was confirmed, an IBM scientist, Juri Matisoo, recognized the two kinds of tunneling provide the basis for a switch. A small current in a control line can generate a magnetic field which switches the device from the zero voltage Josephson state to the few millivolt voltage drop of the normal tunneling state explored by Giaever. Matisoo succeeded in building and testing such switches in 1965.

From the outset, Josephson tunneling



An experimental Josephson memory chip is lowered into a bath of liquid helium for testing. The devices operate only at the low temperature provided by liquid helium, which boils at 4.2°C above absolute zero.

devices appeared highly attractive for two reasons. First, the transition is a quantum-mechanical one and thus is inherently very fast.

Recent experiments at the Zurich laboratory have borne this out, showing that individual devices switch in probably less than 10 picosec.

Second, voltage and current levels are in the millivolt and milliamperage range, leading to power dissipation in the microwatt range. The power-delay product of logic circuits built at the IBM Yorktown laboratory is less than 100 attojoules (100 by 10^{-18} joules) — 1,000 or more times smaller than that of silicon circuits.

Initial progress with Josephson junctions was slow because they require insulating layers only about 50 angstroms thick. Such layers could not be grown reliably until fairly recently.

In addition, Josephson switches consist of several layers of metal and oxide films which must withstand the stress of temperature cycling between near-absolute zero and room temperature.

The most challenging engineering problem in exploiting the high performance of Josephson devices, according to IBM, is packaging. Because of their low power dissipation, Josephson devices can be packed as closely as can be managed technologically.

In principle, this permits them to overcome the signal propagation delays that ultimately limit the performance of high-speed transistor circuits which require relatively large heat-removal structures.



'Who's the Fairest One of All?'

WINNING COMBINATION THE TEL-TEX PEP PLAN AND THE TELETYPE MODEL 43

Not everyone responsible for peripheral data communications equipment purchase can keep up with the latest in terminal capabilities. That's why Tel-Tex developed its new PEP Plan. One phone call will bring the Tel-Tex PEP Squad right to your place of business to add PEP to your data communications system. Objective **PRODUCT** evaluation to produce maximum **EFFICIENCY** to achieve greater **PROFITS** for you!

Tel-Tex distributes only quality brand products such as Teletype's® new Model 43 Teleprinter.

PEP up your purchasing power with a call to Tel-Tex, it's a winning combination. Attractive rental, lease, lease/purchase and outright purchase plans available.

PHONE: (713) 526-8326

TELEX: 77-5613

TWX: 910-881-5757

Product Features: Model 43
• 30 CPS throughput — KSR
• 132 column format — upper/lower case
• 9-wire matrix impact printing
• Time-sharing, data inquiry/response, and data collection applications



Rents for
as low as \$49/mo.

tel-tex

3203 Audley Street • Houston, Texas 77098

**US
LEASING**



The price you pay for success just went down. Way down.

You pay a price to be successful with computers. A very high price.

But you don't pay in cash. You pay in aggravation. Lots of it. Late nights. Plenty of them. And pains in your gut. Sharp ones.

At Perkin-Elmer we're working to bring down that price. Here's how.

Tell us what you want in computer products.

We build computers and peripherals for people who've been there before. People who have had enough aggravation. People who know what they want. And aren't afraid to tell us.

In fact, we encourage our customers to tell us what they want. Not the other way around. Which, if you think for a minute, is a terrific first step on the road to success.

But, the real secret to success is service. The old-fashioned kind. The kind where we go to great lengths to make sure you succeed. The kind that only a Fortune 500 company can provide.

We'll do everything we can to make you successful.

For us, service begins with building computer products for people to use comfortably. Invariably, that pays big dividends in less operator fatigue and more usable work over the life of the product.

But, we don't stop there. We test every product. For two reasons: to make sure you get exactly what you order and to prove to ourselves that our product meets our own exacting specifications.

We provide training, too. At your place

or ours. And if you need customer service, one toll-free call gets it. Days. Nights. Weekends. We're there.

Think about that when you're buying your next computer, peripheral, or system. Then call Perkin-Elmer. And pay less for success.

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free (800) 631-2154.

Here is my business card. Tell me how to be more successful with ☐ computers or ☐ peripherals in
☐ business ☐ scientific ☐ simulation ☐ OEM
applications.

PERKIN-ELMER
Data Systems

ADD RACING STRIPES TO YOUR CENTURY



Now Available For Your

NCR 101 & 151

Computer Enhancement Corporation

Memory For: 101 151 200 201 251 300 Criterion

☐ Urgent! Please Phone Me Ext.

☐ Have Your Rep Contact Me

☐ I Want A Demonstration

☐ Send Me All Literature

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone () _____

Ext. _____

For further information call or write:
COMPUTER ENHANCEMENT CORPORATION • 3188 E. Airway Ave., Costa Mesa, California 92626 • 714/754-0521

CMC Boosts XL40 System

(Continued from Page 39)

As a result, operators may interrogate either local XL40 disk files or a central data base at a remote location with little delay and no change of operator procedure, she added.

Station printers nominally rated at 60- to 120 char./sec may now be combined with XL40 terminals. The printers are logically associated with specific terminals through dynamic assignment and are designed to be located separately from terminals if required by the application, CMC said.

In addition to providing CRT terminal hard copy, these printers will also provide hard copy for keyed data under program control, which is combined with previously stored disk file information.

Remote Subsystem

The remote subsystem capability allows all XL40 terminals and station printers to be connected to dial-up or leased telephone lines. Remote operation is essentially the same as if the station were directly connected, according to the spokeswoman.

Users can locally cluster XL40 terminals and printers at sites requiring characters for application information, or locate them separately as satellite terminals where transactions "may be limited in volume but essential to timely business operations," she added.

The 2,000-character CRTs augment the XL40's flexibility in multitasking applications, CMC said. With more than four times the display of the

XL40's standard 480-character CRT, the latest terminal reserves its two top display lines of 80 characters each for status data and operator guidance, retaining below a full page of 1,840 characters for application information.

Mixed Terminals

The 2,000-character CRT can be intermixed with 480-character terminals.

Disk memory expansion doubles disk capacity from a total of 35M-bytes to 70M bytes of formatted data. Up to four disk drives of 17.6M bytes each can be attached to an XL40 to store large-scale indexed files as well as user's data, application programs and the XL40's multitask operating system.

RAM expansion quadruples the XL40's addressable memory from 128K bytes to 512K bytes.

Initial installations of the enhancements will be made in fourth quarter. A basic XL40 with 64K bytes of memory, five 480-character CRTs and 4.4M bytes of disk leases for \$975/mo and sells for \$32,200.

A configuration consisting of 256K bytes of memory, 35.2M bytes of disk, eight 480-character CRTs, a 300 line/min printer, 360/20 Hasp communications, 3270 mode and a remote subsystem which also includes two 2,000-character CRTs and two station printers leases for \$3,315/mo and can be purchased for \$113,050.

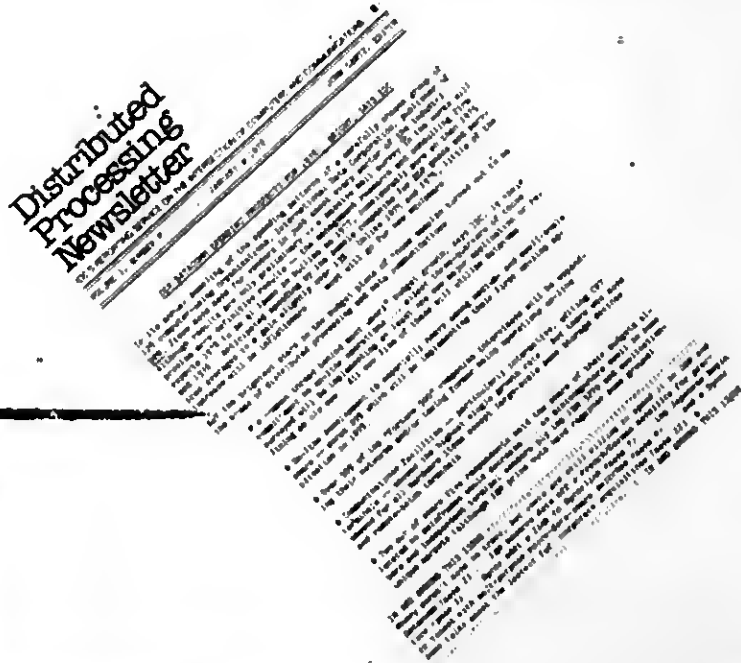
XL40 lease rates are based on a three-year lease and include maintenance and the complete software package from the firm at 12910 Culver Blvd., Los Angeles, Calif. 90066.

Making Sense of DDP

Look at the pages around this ad. DDP — whatever it is — is bus-tin' out all over. New products, new services, and a cacaphony of conflicting claims. All the confusion of a boomtown.

NOW ... IDC, the world's largest gatherer of computer industry statistics, has a new service to help users and vendors reach a consensus on what DDP is all about. This Distributed Processing Reporting Service features a monthly newsletter, 4-6 Special Reports a year, and news memos as events dictate ... written in a concise, sprightly style that stresses facts and figures woven into a web of typical IDC analysis.

The DPRS is just what the user or vendor planner, marketer, manager, or top exec needs to keep abreast of this whirlwind industry. Act now and we'll start you off as of the first of the year ... so you'll get fifteen month's service for the price of twelve (\$250).



Send to: IDC, Dept JG, 214 Third Avenue, Waltham, MA 02154

Yes, I do feel it's important to keep abreast of the wild and woolly DDP industry. Please start my subscription as of the first of the year and sign me up for 15 months at the regular 12 month price of \$250. I understand that I can cancel at any time and receive a prorated refund (full refund up to April).

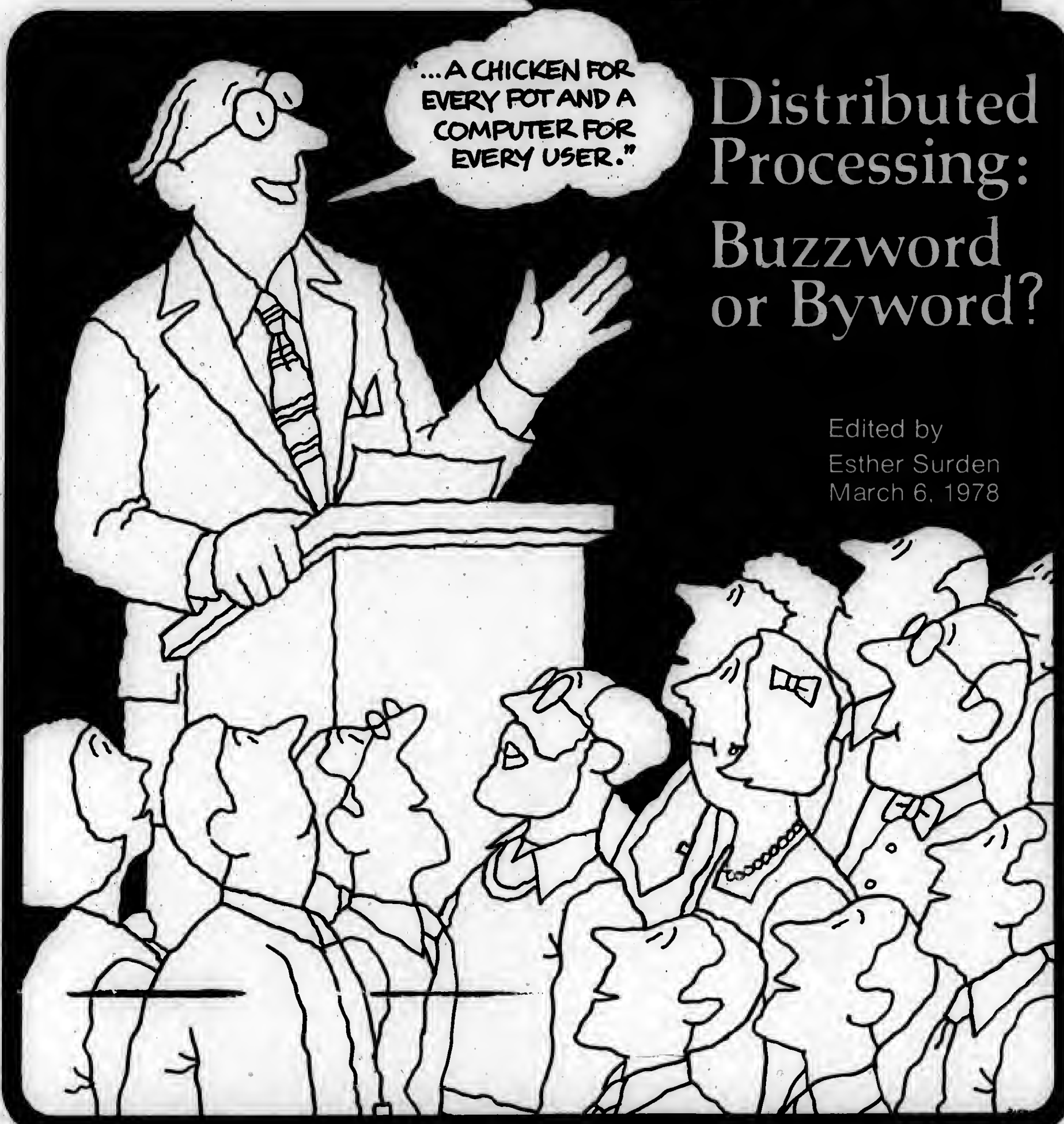
Name _____ Title _____

Company _____

Address _____

() Bill Company () Bill Me () Check Enclosed

Computerworld Special Report



...A CHICKEN FOR
EVERY POT AND A
COMPUTER FOR
EVERY USER."

Distributed Processing: Buzzword or Byword?

Edited by
Esther Surden
March 6, 1978

Flexibility, Ease of Use Top List

IBM User Group Details 'Ideal' DDP System

High on most users' lists of priorities for an ideal distributed data processing (DDP) system are flexibility and ease of use, according to a paper by the Distributed Computing Task Force of Share, Inc., the IBM large systems users group.

Simplicity is "critical," the report noted, "because 'hardware costs per unit of work have been falling while the costs for people have been rising.' As this trend continues, 'it becomes increasingly important to reduce the human effort required to solve the problems.'"

In addition, people who are not DP professionals tend to use distributed systems, so "all possible complexities that might be added by distribution should be taken over by the system, thus making the distributed nature of the system transparent to its users."

Flexibility is important because the systems must run a number of applications with differing requirements. "A wide range of upward- and down-

ward-compatible hardware and software configurations must be provided," according to the report.

"In a distributed environment, sys-

Share, Inc., the IBM large systems users group, issued a white paper in August 1977 on "Requirements for Distributed Computing Systems, 1980 and Beyond," Prepared by the Distributed Computing Task Force, the paper presented IBM with an "unadorned list of requirements" for a distributed data processing solution that would be in the users' best interests.

tems operations and maintenance must allow for the casual, nonsophisticated user," the task force pointed out. To support the need of nonsophisticated users to operate the system, diagnose certain failures and make certain repairs, systems should have the capac-

ity to run a job in such a way that "portions can be run concurrently in different nodes," Share's report stated.

While jobs should run in different nodes, job segmentation, distribution and run assignments should take place without requiring user knowledge. "The enterprise must have optional override facilities on a job-by-job basis," the report said.

With systems that maintain a uniform but acceptable degree of responsiveness across a broad range of workloads, a single interchange medium should be uniformly supported across all nodes, including a uniform file structure and access method.

Redundancy Requisite

Each component of a DDP system should permit redundancy. The user, at his option, must be able to select the level of redundancy. "Where possible, the failure of any component within a node [must] not take the node out of service," the report said. Nor should

failure of any one or more nodes cause the system to become inoperative. Each surviving node must continue to be fully operational and able to interact with all other surviving nodes.

"When a failure occurs, the operating nodes must recognize a failure occurred and take appropriate actions. Records and logs of failures must be automatically kept and made available on request," the task force added.

Easy Upkeep Essential

For end users, "hardware and software maintenance should be made as simple as possible," with "isolation of the failing card, component or software module easily accomplished by the user."

"Removal and replacement of the failing component or module should be such that the user can do it in a non-disruptive manner," and "actual repair of cards or components should be performed by maintenance personnel, off the system, after replacement has been made."

The vendor should supply "uniform and simple-to-use tools ... to aid in configuration planning, performance analysis and diagnosis and problem diagnosis" so that any node can use these tools to analyze any or all node(s), as authorized.

"Diagnostics must specify the failing software unit or hardware component at the lowest replaceable level or module," the task force noted, and "it must be possible to construct a diagnostic test environment that is isolated from other test and production environment."

Another "must," according to the task force, is that the hardware accept and properly handle variations in the

(Continued on Page S/40)

As Important as Throughput

Security: Plan It Now or Pay for It Later

By John J. Hunter

Special to CW

With the growing interest in distributed data processing (DDP), system designers and evaluators would be wise to look beyond throughput and capacity as the primary measures of a "good network." If you don't place security on the same footing, you'll pay dearly later on.

What is a secure system? It's a collection of hardware and software, which ensures that once a message is entered, it will be delivered without unauthorized alteration, detection or delay.

To attain such security, the system must be reliable; capable of securely storing data which cannot be immediately delivered; able to detect and foil unauthorized access; and capable of continued — albeit limited — operation while recovering from hardware/software failures.

A good number of people think of a secure system as one that protects data from unauthorized eyes. While this is certainly an important factor, it isn't the only one — or for that matter the most important. What is important is whether the message is delivered.

It is folly to assume that once a message enters the network, it will, barring a major component failure, reach its destination. But it doesn't take a major component failure — or a minor one for that matter — to lose a message.

It can easily happen if the receiving terminal is unavailable at the time of transmission or if the message's priority calls for deferred delivery.

If the system is designed so messages are transmitted from a single site, keeping track of them is as simple as assigning an incremental reference number or code to each message. Messages received out of sequence are easily identified, as are missing or duplicate messages.

The problem gets a bit tougher when there are multiple sending sites. Employing only reference numbers won't work, since it's almost impossible to

guard against duplicate numbers.

A way around this is to assign an identifier code to each terminal and prefix this code along with an incremental numerical identifier to each message.

Undelivered Messages

The highest incidence of lost messages occurs when delivery is deferred and the message is routed to a hold file. A number of steps can be employed to ensure that all messages reach their final destination.

For example, the receiving station could be required to issue a confirmation message when the message is received. If messages are held in files for long periods, an aging procedure could be instituted to periodically flush them. In both cases, the identification code is used to check for missing or duplicate messages.

If the system is prone to errors or failures, copies of the messages should be stored on a secure device that can be queried during the recovery process.

(Continued on Page S/38)

On the Inside

IBM User Group Details 'Ideal' DDP System	S/2
Security: Plan Now or Pay for It Later	S/2
User Mixes Doubles: Centralization, Dispersal	S/3
Chemical Firm Gets Real-Time Inventory Help	S/4
Top Firms Adopting DDP in Variety of Guises	S/5
DDP Helping Raleigh Pedal Toward Inventory Control	S/6
DDP Offers Prospects for Data Entry Manager	S/7
Farah Takes Up Slack in System Control	S/8
Smart Terminals Improve Fabric Operations	S/9
Data Dictionary the Answer to Network Woes	S/10
Equipment Vendors Offer Best Bet for Service	S/21
DDP: Make It a Byword and Not a Buzzword	S/27
If DDP Is So Great, Why Isn't It Everywhere?	S/33
Distributed Processing: Weighing Pros, Cons	S/35
Smart Terminals Cc Hand in Hand With DDP	S/39
Thesis Explores Motivations for Going to DDP	S/45
DDP Can Be Seen as Spectrum of Possibilities	S/47
DDP Should Be Seen as Evolutionary Process	S/49
DDP Architecture Makes Less Vulnerable System	S/53
DDP Genesis Owed to Electronic Revolution	S/57

User Mixes Doubles: Centralization, Dispersal

By Joe Mitchell
Special to CW

CHICOPEE, Mass. — Spalding, a division of the Questor Corp., is a major sporting goods company with manufacturing, sales and distribution facilities worldwide. A detailed analysis made of Spalding's entire corporate information system inventory and computer processing capability last year resulted in a decision to overhaul the DP environment from the bottom up.

Information systems, computing equipment and system development/programming techniques would all be upgraded following an aggressive, two-year plan that called for the use of packaged systems wherever feasible and the use of computer configurations that worked, in the broadcast sense, "out of the box."

In developing the detailed plan, one of the principle guidelines was to avoid pioneering, but to target an industry leadership position while keeping a close eye on price/performance. This concern for good price/performance ratios proved to be challenging.

In a noncompute-bound environment, cost considerations pointed to minicomputers but, in Spalding's case, not to dispersed minis — Spalding is accustomed to centralized, batch computing.

An on-line environment that processes critical programs calls for high processing power and provisions for backup; performance is of greater importance than price to Spalding. Peripheral equipment is costly and should be minimized, but multiple data bases are needed that call for large amounts of on-line disk space.

With these and other considerations in mind, a detailed request for proposal (RFP) was prepared to evaluate large-scale minicomputers supported by proven, comprehensive system software. The system selected would answer price/performance considerations via network software (for peripheral equipment sharing, on-site redundancy, etc.) and would support on-line operations concurrently with batch processing, support a data base management system (DBMS) and provide a number of other capabilities/features.

In addition, it would be desirable if a selection of materials planning and financial information packages were available and operational on similar, installed equipment at customer sites.

Line Items Weighted

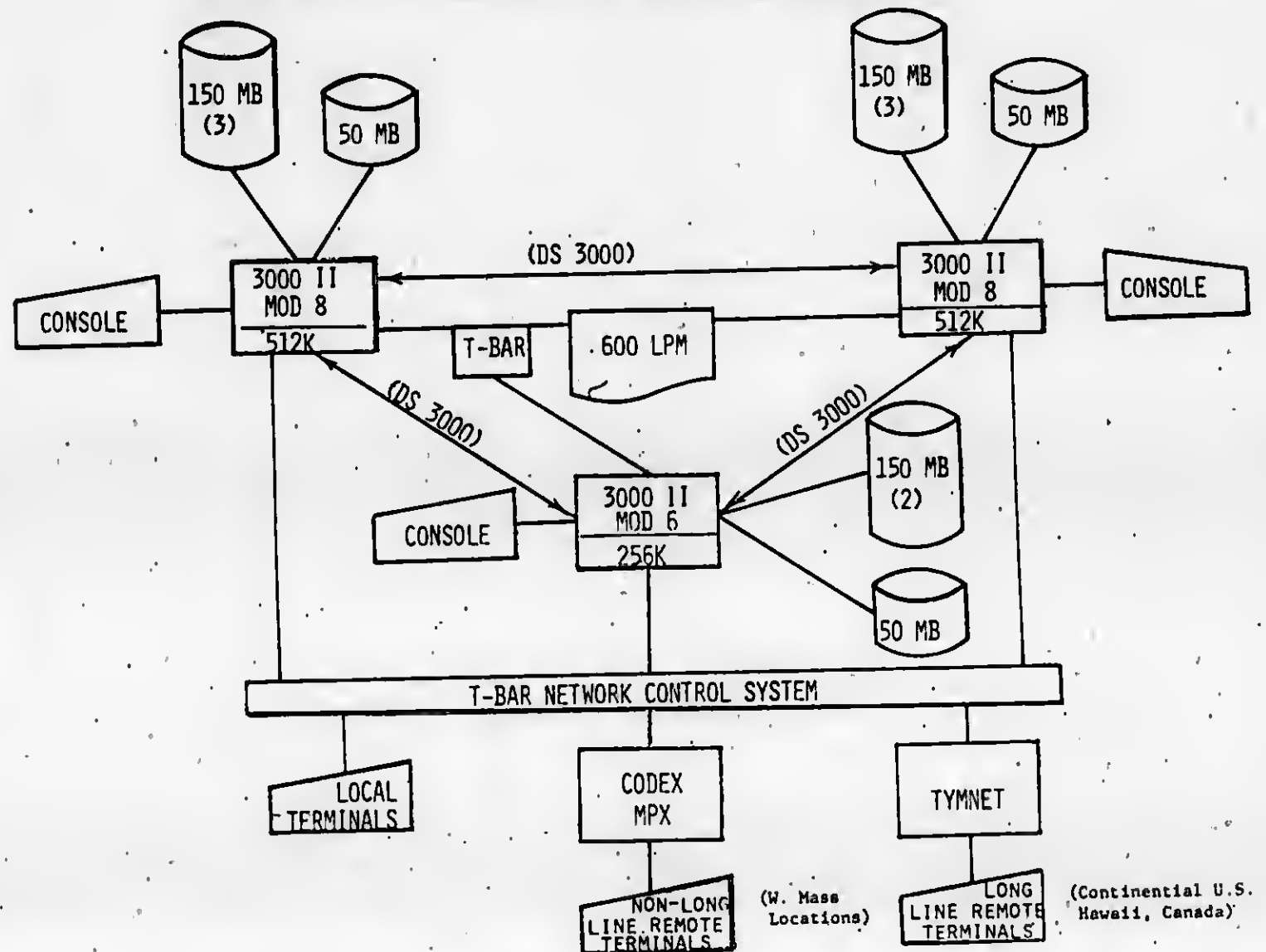
The vendors answering in the RFP included Data General Corp., Digital Equipment Corp., Hewlett-Packard Co. and Honeywell Information Systems, Inc. A weighted point system was employed in evaluating each line item. The categories were system facilities, weighted at 40%; hardware features/capabilities, 40%; and other, 20%.

The rating scheme categorized all items to be evaluated as "required" or "desirable." Each item was scored as "yes" or no. One point was awarded for each yes, zero points for a no. The "required" total had a 75% weight, the "desirable" total had a 25% weight.

The ratings for overall quality were excellent, 91-100; good, 81-90; average, 71-80; poor, 61-70; and un-

(Continued on Page 5/46)

SPALDING COMPUTER CONFIGURATION



150 MB	Memorex 677 150M-Byte Disk Drives With (1) Microcomputer System, 1677 Disk Controller Per Central Processor	TERMINALS	Various Hewlett-Packard Terminals, Connected Directly, Multidropped and Via Modems
50 MB	Hewlett-Packard 7920 50M-Byte Disk Drive	CODEX MPX	A Number of Codex Corp. LSI 4800 Modems With Multiplexer Option
T-BAR NETWORK CONTROL SYSTEM	Switches All Terminals Among Processors, Individually or by Group Function	TYMNET	Tymnet, Tymcom CP-62A Network Computer for Interfacing to the Tymnet Data Communications Network

Puzzled About Your Data Entry Needs? CUSTOMIZE!

with Custom Terminals Corp.
We design & manufacture products to solve specific needs. Operational flexibility, simplicity, ruggedness & low cost are built-in! Let us design a terminal/peripheral system just for you. Point-of-sale; back room (inventory); factory floors; or any special application.

CUSTOM TERMINALS CORP.
225 OSER AVENUE, HAUPPAUGE, N.Y. 11787 • (516) 231-3111

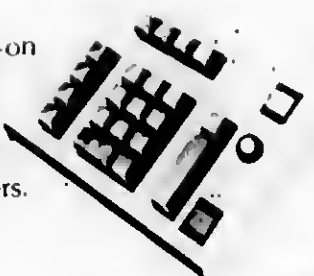
TR-10

Low cost, reliable, factory floor type data entry terminal... **around \$900**. Available with badge readers, journal printers, customizable keyboards, and displays, etc.



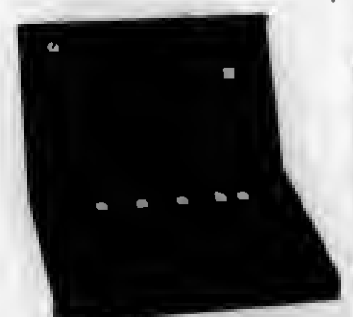
KB-8

Numeric Pad add-on for all peripherals and terminals... **around \$300**. Interfaces with all CRT's and printers. (Customizable keyboards)



TR/B

Special purpose multi display data entry terminal... **around \$2000**. Used with mini computerized conveyor systems, etc.



*Typical, small quantity, end user prices

With DDP, Automatic Picking

Chemical Firm Gets Real-Time Inventory Help

By Robert St. John

Special to CW

GREENSBORO, N.C. — The Dyestuffs and Chemicals Division of Ciba-Geigy Corp. here began the operation of a new order entry, order processing and inventory management system in June 1976.

While the previous system satisfied the division's order processing needs, it was deficient in the inventory infor-

mation and file maintenance areas. In addition, it was a batch-oriented system designed for centralized processing on a large IBM 370 with orders and inventories handled manually at the local distribution center level.

The new system makes use of real-time technology and is both an order processing and inventory management application. The division has been able to completely centralize these func-

tions at its Greensboro headquarters and effect a considerable reduction of personnel at the remote branches.

Key to the application is the concept of a distributed processing system combined with an automatic picking algorithm. Product, customer and inventory files are maintained on an IBM System/3. This permits inventories at the distribution centers to be centrally monitored on an individual drum basis. It also permits orders to be entered or altered on-line. The IBM 3 then transmits information as required to a central corporate system for billing, sales processing and corporate file maintenance.

Chemical products for the dyestuffs and chemicals division are manufactured at Ciba-Geigy plants in McIntosh, Ala., Cranston, R.I., and the

Charles S. Tanner Co. in South Carolina. Some dyestuffs are manufactured at the Toms River Chemical Co. in New Jersey and some are imported from Ciba-Geigy Ltd. of Basle, Switzerland. Marketing is organized so that concentration is focused on the textile, detergent, cosmetic, paper and leather industries.

Customers place orders (usually by telephone) to the centralized order processing department in Greensboro, N.C. Goods are mainly shipped through two major distribution centers — in Charlotte, N.C. and in Toms River, N.J. However, especially in the case of chemicals, shipments can be made directly from one of the five manufacturing plants or from public warehouse locations throughout the

(Continued on Page S/22)

Adage. Your best buy in 2250-type graphics.

Let's face it. The first orders we got a year ago for GT/2250 interactive graphics display systems came from people who couldn't wait for delivery of the IBM 2250/3.

That began to change when users discovered the price/performance advantages of our plug-to-plug, key-for-key alternative. Faster graphics order processing. More complex screen images. Flicker-free refresh rates. Remoting up to 3 miles. All at lower cost.

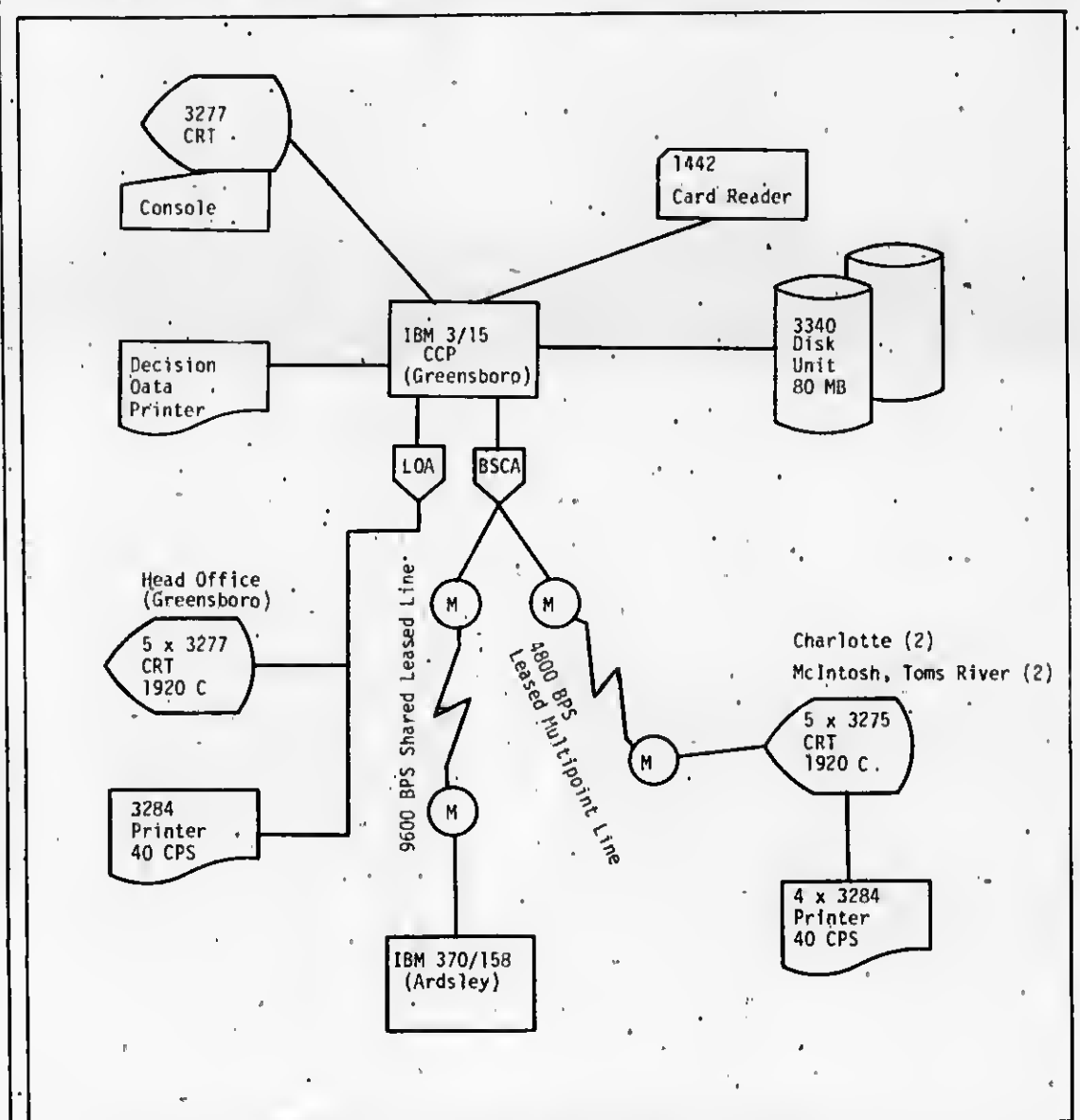
Now all of the systems installed worldwide are there because the users needed the advanced features that only Adage can supply. So there's no need to wait until late this year for delivery of IBM's 3250.

Quick delivery and choice of lease or purchase are still important pluses in dealing with Adage. But the major benefit is in having a vendor who can keep pace with your needs — with the best in 2250-type graphics or with the more powerful Adage GP400 Series systems designed to interface with any host minicomputer system.

ADAGE
INCORPORATED

U.S. 1079 Commonwealth Ave. • Boston, MA 02215 • 617-783-1100 • TWX 710-330-0141
Europe 3308 Koenigsplatz, Am Elm • Braunschweig, Strasse 22 • West Germany •
Phone 05353/3626 • Telex 095528

World leader in interactive computer graphics.



Ciba-Geigy System

This is a
Dumb Bumper Sticker.

Dumb Terminal™ is a trademark of Lear Siegler, Inc.

Top Firms Adopting DDP in Variety of Guises

By John Gantz
And John Callahan
Special to CW

Is distributed data processing (DDP) a myth? Is the conventional wisdom out of whack and DDP just a passing fad? Or is there some fire behind all the smoke coming from vendors, pundits, consultants and seminar savants?

In service to its subscribers (and curious over its own reason for existence), International Data Corp.'s *Distributed Processing Newsletter* set about recently to find out. In a telephone survey of 40 of the Fortune Top 100 firms, DP and data communications managers were contacted regarding their network planning methods and the application of DDP within their companies.

The results? DDP is passing its entrance tests. Although definitions remain foggy — and may always be — almost 40% of those polled currently have some sort of DDP involving local data bases, primarily distributed data entry/local inquiry. Most of these applications went up within the last two years.

Furthermore, close to three-quarters of the respondents had plans for future DDP applications — including those with current DDP applications — and over two-thirds of those had specific applications in mind.

(The caveats: For one thing, 40 users don't comprise a statistically representative sample — although this particular group accounts for 38,360 remote terminals in use. For another, the degree of distribution of the applications varied from distributed data entry with intelligent terminals to distributed processing and local maintenance and updating of the data base. Still, if you're going to work with an unstatistical sample, 40 of the Fortune Top 100 isn't a bad place to start.)

As of the fourth quarter of 1977, the respondents reported 38,360 terminals, ranging from 38 to 6,000 per respondent; and estimates of December 1978 terminal populations led to a compound annual growth rate just over 20%. By December 1980, the number of terminals will double.

But that's just terminal growth. What about DDP? First, we asked about the

(Continued on Page S/52)

CURRENT DISTRIBUTED APPLICATIONS

Type	Year Implemented	Equipment Used
Selsmic Data Bases	1976	"Phoenix"
Bulk Terminal Application	1977	Datapoint Corp. 5500
Data Collection & Inquiry — Manufacturing Billing	1973	IBM System/7
Shipment Information	1965	IBM 380/30
Special — Bill of Materials/Inventory	1975	Datapoint
Data Entry	1977	Digital Equipment Corp. PDP-11/34
Personnel	1974	Four-Phase Systems, Inc.
Order Entry and Payroll	1976	Datapoint 2200
Data Collection	1973	Datapoint 1100 (60)
Logistics Application	—	—
Data Entry, Editing, Validation	—	Philips Doc Writer
Stores & Maintenance (Inventory Control)	1976	Datapoint, Data General Corp.
Factory Floor Data Collection & Tool Inventory	1977	Texas Instruments, Inc. DXS (three)
Inventory, Customer File & Inquiry	1970	Datapoint DPI
Scheduling at Construction Sites	1976	TI 990/10 (130)
Order Processing	—	mini-based
Regional Sales Office Inventory	—	Four-Phase, DG, Data 100
	1960s	IBM 1130

FUTURE DISTRIBUTED APPLICATIONS

Type	Year Implemented	Equipment Used
Sales Accounting	1977	—
Bulk Terminal Application*	1977	IBM 3790 (two installed/14 on order)
Well Production, Stats, & Control*	1978	—
Purchasing	1978	Mini vendor not selected
Warehouse Inventory	1978	Vendor not selected
Sales Order Entry	1978	Four-Phase Systems, Inc.
Credit Checking, Data Entry	1978	IBM 3790 (slx)
Local Inventory and Customer Credit for Distributors	—	IBM 3790 (15-20)
Hospital System — Personnel Information, Claims Processing*	—	Four-Phase IV-70
Envelope Division	1978	IBM System 3 (replaces 3741)
Ordering & Billing	1978	Datapoint Corp.
Specification — Bill of Materials/Inventory	1978-9	Add DEC PDP-11/34s (10)
Machine Efficiency for Plants*	1978	DEC PDP-11/34s
General Accounting for Regions*	1979	DEC PDP-11/34s
Financial and Manufacturing	1977	IBM 3790s (30)
Credit Reporting System*	1978	Mini vendor not selected
Order Entry/Customer Inquiry	1977	Datapoint 5500
Billing and Purchase Orders	1977-8	IBM 3790 (four, two with 3760)
Order Billing*	1978	Mini vendor not selected
Production Scheduling	1978	Mini vendor not selected
Teletype-28 Replacement*	—	Texas Instruments, Inc. 770s

* Company currently has a DDP application.

DDP plans reported by some Fortune Top 100 firms.

And that means the people in this car are pretty intelligent. Because they realize that the world's most popular video terminal is a steal at its new low sticker price of \$895.

With a 24-line screen and 1920 bright, easy-to-read characters included as standard equipment, the Dumb Terminal™ makes you wonder why anyone would settle for second best. Especially when it's an asynchronous terminal with 69 data entry keys. And 38 positive action switches that let you activate functions like 1 of 11 different baud rates, an RS232C interface, or a 20mA current loop.



DDP Helping Raleigh Pedal Toward Inventory Control

Special to CW

BOSTON — Raleigh Industries of America, Inc. is racing toward better control of its business with the installation of five distributed minicomputers that are "bringing computing right where it's needed," according to John McEvoy, DP manager.

Raleigh distributes bicycles and cycling-related parts and accessories through five combined sales office-warehouse locations in Westwood, Mass.; Secaucus, N.J.; New Orleans, La.; Bensonville, Ill.; and Long Beach, Calif.

Each warehouse maintains an inventory of many different bicycle models and approximately 5,000 parts and ac-

cessory items, which are sold primarily through local dealers throughout the country.

"When money was freer, dealers would carry large inventories of bicycles and parts," according to John Baggett, president.

"Now, they're relying on the bicycle suppliers to carry the inventory for them. That left us with two options: increase our inventories to meet dealers' needs quickly or adopt more sophisticated inventory management techniques to keep our investment down and still meet dealer needs. We felt we could save in the long run by improving management techniques."

An expanded DP system was at the



Keyed information is available at Raleigh's warehouse almost immediately.

core of the improvement. Raleigh's old system, an IBM 1130, was not only

limited in capacity, but was also becoming obsolete. All data from the warehouses, such as sales orders, receiving reports, stock transfers and cash receipts, were mailed daily to the Boston office, where processing was done on that system.

"The system was becoming ineffective," McEvoy recalled. "All operations at the warehouses were manual. After an order was shipped, it was mailed to us. Because of mail as well as operational delays, we would not get an invoice to the dealer until seven to 12 days after shipment."

Four RFPs Issued

Based on discussions with Raleigh's management, requests for DP proposals were issued to four computer manufacturers and to a company offering remote computing services. All of these companies had the potential of providing Raleigh with a viable solution to its DP problems.

Each firm was asked to provide Raleigh with an approach that would most effectively satisfy the bicycle supplier's requirements for the next four to six years. In addition, they were all requested to demonstrate their systems and submit the names of other companies that were successfully using the system proposed. Each proposal was analyzed in terms of relative advantages and disadvantages.

Raleigh chose a mixed-vendor system consisting of a Burroughs Corp. B1830 host system for the Boston office and five NCR Corp. 8230 minicomputers at the warehouses. The host computer was chosen because the vendor was designing an interpreter that would allow existing programs to be run without any modification, thus protecting the company's programming investment.

"Our objective was to concentrate our efforts on getting the warehouse computers installed and rewrite the Boston office systems in Cobol later," McEvoy stated. "Programming of the minicomputers was an important factor. We wanted Raleigh's participation in the development of any proposed system to be minimal in the initial conversion stage."

Minimal Changes Necessary

NCR proposed its Interactive Wholesale Distribution System (IWDS) program package, which could be installed on the minicomputers immediately and would closely match Raleigh's needs. The only changes required were modifications in invoice, credit memo and statement formats and a change in the pricing structure.

(Continued on Page S/44)

WE COULDN'T KEEP THE LIDS ON ANY LONGER!

The XL40 delivers powerful, concurrent, transaction-oriented distributed processing for your management network. With a series of new features specifically designed to solve your long-range needs.

More accessibility, with 3270-mode host interactivity to permit retrieval of data not available on local XL40 files.

More expandability, with up to 512K bytes of memory and 70 megabytes of disk, combined with our turnkey software, to offer an exceptional application range.

More versatility, with terminals and station printers that can be local or remote, and operate just as if they were XL40 cable-connected, wherever phone lines can be installed.

More flexibility, with both 480-character production screens and 2000-character large document screens, so we can configure the optimum mix for your requirements.

More source capability, with station printers under user program control that combine keyed data with disk file information to provide hard copy at local or remote sites.

XL40 DELIVERS DDP FASTER, FURTHER, EASIER



Remote Subsystem enables XL40 terminals and station printers to operate at remote locations

Large Disk increases disk capacity to a total of 70 megabytes for large-scale indexed file storage

3270 Mode offers user-transparent host interactivity for access to information not locally stored

Prints and displays at local or remote sites

Large screen allows complex image display for large, complex documents

PCC

PRIVATE
COMPUTER
CORPORATION

More Good Jobs Predicted

DDP Offers Prospects for Data Entry Manager

By William G. Moore Jr.
Special to CW

Distributed data processing (DDP) will make top management dependent upon the knowledge and expertise of today's data entry managers. As a result, the movement to DDP over the next dozen years will create within corporations more good jobs for data entry experts than there will be good people to fill them.

DDP came along just as the key-to-disk marketplace reached its ultimate maturity. If the rate of change experienced in the data entry field continues unabated, precisely what does DDP mean to the data entry manager? It is apparent DDP is barely in its infancy. We are not seeing any rush to take well-functioning centralized data entry operations and distribute them piecemeal to user organizations.

About 60% to 70% of all applications currently being considered for distributed processing involve jobs that have not previously been automated. This means the vast majority of applications for distributed processing will require knowledge of manual procedures as they exist today, knowledge of error control methods and the ability to design jobs around computer equipment.

There will also be a tremendous data conversion load. Literally hundreds of thousands of manual records must be purged, cleaned up and converted to machine-readable input. This will be a huge data entry job.

Who in the typical computer-using organization is more qualified than the data entry manager to assist in the design of new applications which were previously manual? Who in most organizations is more capable than the data entry manager of implementing tremendous conversions of data? Who in a company knows more about the problems of operator interface with terminal devices? Who knows more about error control and reentry of corrected information?

Internal Consultants

The much heralded office of the future will break down traditional lines of reporting responsibility, especially as they relate to the collection and processing of everyday business data. Many data entry managers will be cast in the role of internal consultants to their corporations. This can be a very substantial opportunity, but will also place tremendous demands upon them.

Most data entry managers have proven in the past to have had the courage and determination to adjust to a changing data entry environment. They will require that same amount of dedication as their companies move into DDP. They will have to deal with new and challenging organizational issues.

Most users are approaching DDP with a great deal of caution, especially the segmenting and partitioning of data bases across remote user areas. That said, literally everybody is talking about DDP and most companies of any size have appointed committees to begin to determine what their approach to this new phenomenon should be.

The consensus forecasted growth of

the marketplace through 1985 is approximately 40% compounded annually. It is the fastest growing marketplace, more so than mainframe

shakeout is likely in DDP. That impending shakeout is something to keep in mind because it presents a particular set of problems for someone selecting

terminals, modems and long-haul telephone costs come down, the distribution of computing power is no longer constrained by communications costs.

Those trends mean DDP systems involve fewer and fewer hardware dollars as a percentage of the whole. More and more dollars are going into the software and services area, especially for programming personnel.

Data communications will be a key issue in the ability of the data entry manager to grow within his organization. While data entry managers need not have tremendous technical knowledge, they must be able to understand

(Continued on Page 5/28)

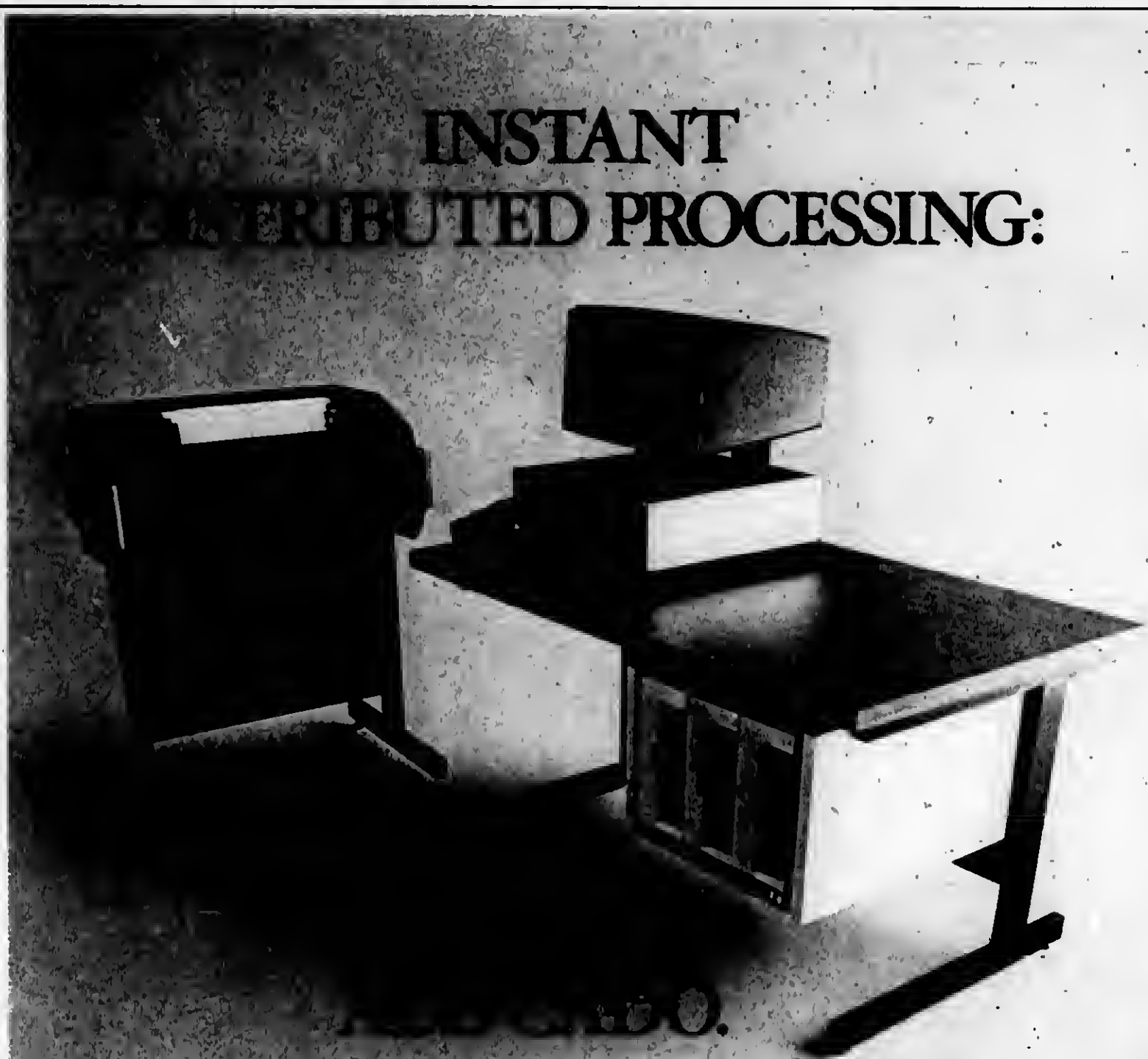
... The movement to DDP over the next dozen years will create within corporations more good jobs for data entry experts than there will be good people to fill them.

business, and that's why it's attracted so much vendor attention.

There has been a shakeout in the data entry systems industry over the past seven years, and the same kind of

equipment.

Labor costs are rising about 10% per year. At the same time, the costs of computers and communications have been coming down dramatically. As



It's the only system that combines computing power and disk storage with terminals made by the Bell System.

It processes data at the source of that data.

It communicates with your mainframe.

It keeps track of things—like orders and inventories.

It has a unique file management method that squeezes data onto diskettes three times more efficiently than IBM does.

It gives you inquiry responses in under half a second... no matter how big the file.

It marries full text editing with data processing so you can merge data base information with everyday letters.

It's now being used in over 50 U.S. cities.

It's called the CADO DATABASE 40—the most effective turnkey distributed processor in the business. And you can learn all about it by sending in the coupon... instantly.

CADOSYSTEMS

2730 Monterey Street, Torrance, CA 90503
(213) 320-9660

I'm interested in Instant Distributed Processing.

- ☐ Send me free full color brochures on the subject.
☐ Have my local CADO Representative call on me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

Farah Takes Up Slack in Its System Control

By Robert Bohannon
Special to CW

EL PASO, Texas — At Farah Manufacturing Co. here, we have developed a distributed data processing (DDP) system to handle manufacturing control. The system includes our IBM mainframe, one Hewlett-Packard Co. 3000 and four HP 1000s.

The mainframe interfaces with the smaller systems via magnetic tape. The HP 3000 serves as the central system in the small system network and serves both as a central program storage site and data collection point. The HP 1000 systems reside in each of our three plants here, with one HP 1000 serving as a programmable network controller.

Production orders enter through the HP 3000, which breaks them down into cut orders (the apparel industry term for production orders) and assigns cut orders to each plant through communications with the resident HP 1000. Along with the assignment, the bill of materials for each part of the order is transmitted to and exploded by the HP 1000 to issue the production control materials necessary to keep track of progress on the order.

Each of the small systems transmits updated production data to the central HP 3000 daily. From the collected data, a report of production by order, part and operation is generated every day. Using the Image data base management system and Query language inquiries, operators at the central site extract information on any order or operation at any time.

Manufacturing Control

We call the development our Manufacturing Control System (MCS). In the men's clothing industry in which Farah competes, production information has to be processed in a timely fashion if management is to be effective. Distributed processing at Farah increases timeliness by 300% to 700%.

When every order involves numerous fabric, as many as 40 different sizes, up to 10 parts in every size of slacks and 125 operations in putting a pair of slacks together, we have a formidable information task.

On top of all the operations comes the statistical effort to calculate standard costs by operation and compare with actual costs, in order to locate problems. We have to pass summaries of this information along for setting finished product prices and determining our financial position day by day.

The MCS gives us more up-to-date information on what happens within our plants and

also a high-speed means of transmitting orders and break cut orders into convenient bundles for processing.

We get detailed daily reports on work in process (down to individual operations and operators) from which managers pinpoint developing difficulties and project delivery schedules.

The information makes operational management easier by focusing on specific

problems. We can supply the marketing department with cost data so it can adjust prices. And we supply manufacturing personnel with data they need to find ways of reducing costs.

Used Kimball System

For several years, production at Farah used the well-known Kimball system for production control. The tag used is about an inch wide and has a

pattern of small holes punched in it. That small tag began as a four- or five-section strip of tags.

As bundles were cut, sewn, pressed and so on, one section of the strip was removed. The punched holes in the torn-off section were read as part of a batch process to keep track of the work.

Only major operations could be tracked under the system. None of the information was

detailed. We could not compute costs before an order was finished or spot snarls involving small parts or individual operations.

The system did provide enough data to project approximate delivery dates.

The turnaround time for data from the older system ranged from two to three days to a week.

As a consequence, we
(Continued on Page 5/50)

How can you tell if distributed

Look at the job it's done for us.



Knitter Finds Financial Salvation

Smart Terminals Improve Fabric of Operations

Special to CW
LANCASTER, S.C.— When the installation of dumb card-oriented terminals in remote locations nearly ruined the fabric of this company, the knit division of Spring Mills, Inc. began installing intelligent terminals at its mills and stayed solvent.

Since that time, the division has added more and more

capabilities to the systems in the remote locations, showing that distributing processing that allows management to obtain up-to-date information works, according to Richard C. Jordan, systems coordinator.

Four years ago, the management of this firm was ready to scrap the DP equipment installed at the division's two re-

mote manufacturing facilities. Aghast at astronomical DP and consultancy costs, they fully intended to forego further work toward computerization in favor of resuming former manual information handling procedures, Jordan explained.

Today, however, DP plays a critical role in day-to-day business operations.

Two key factors explain the psychological and operational turnabout. First, a new DP team was assigned to the division, a group that understood management's concerns and that could translate management needs into sound DP plans. The other deciding influence was the selection of the right equipment installed at the critical point in 1974.

"The marriage between man and machine has spawned improvements in all phases of our business," according to Thomas Rowell, controller for the knit division.

"In effect," he continued, "we have consolidated reporting responsibilities for all administrative functions within our customer service center, which in turn has enabled our marketing, sales and manufacturing people to concentrate on what they do best."

"Furthermore, it has enabled us as a company to institute better management controls and thereby improve service to our customers as well as to our own field sales organization."

Early Misapplications

"Early problems with the DP function in the knit division were the result, in part, of equipment misapplications," Jordan noted. "Non-intelligent terminals installed at our manufacturing facilities in Monroe, N.C., and Mullins, S.C., with all the attendant keypunch equipment and card readers, were being used primarily as communications terminals to transmit production-type information to one of two IBM mainframes in our customer service center in Lancaster."

"What was needed was equipment that could still handle data preprocessing and communications functions, but which was also less expensive," he added.

After division management agreed to investigate alternative hardware and software approaches, selection criteria was drawn up by Jordan and Leon Boss, systems project manager assigned to the knit division. These included high reliability (since equipment was situated at remote plant locations and backup systems were considered to be prohibitively expensive), ease of programming, ease of training and operation, compatibility with the IBM mainframe and overall system flexibility.

Sycor, Inc. 340s were ultimately selected over other hardware, according to Jordan, because, in addition to meeting performance needs, (Continued on Page 5/54)

processing will work for you?

At Hewlett-Packard, we began distributing the computer workload around our factories in 1967. Then, in 1971, we instituted a worldwide systems network that has helped us grow to \$1.36 billion in shipments, with 42 percent of our business in computational products.

Today we make 4000 different products at 40 divisions around the world and have offices in 65 countries. This rapid financial and geographical expansion in a highly technical field made the distribution of our data processing an absolute necessity.

We began with the basics.

Small systems went to work in our factories, automating the testing of circuit boards and, later, hand-held calculators. The next step was linking these minicomputers with other factory systems so they could relay data and programs. The obvious need then was to tie these computers into an information network so that key managers could make decisions based on accurate, up-to-the-minute data.

As we continued to grow, we connected our widespread sales offices with the factories. Today we have 130 high-speed communications systems in 94 locations, sending compressed data via satellite and phone lines. About 12 million words a day come into our California headquarters. Yet the cost is phenomenally low. For example, we can send a ten thousand word message to Toronto in one minute for 85 cents. On a teleprinter, it would take 16 hours and cost \$800.

We need a system that can change. So do you.

One major reason our distributed processing approach works so well for us is the same reason it will work for you. It's extremely flexible.

You don't have to choose between a star network, or a circle, or a string. Our way, you can have any or all of them. And you can hook up an HP network for as little as \$5,000. You won't have to throw out your old equipment, either. Some non-HP computers and peripherals are still carrying a share of our workload. There's no reason why your present systems can't do the same for you.

The keystone of our system is the HP 3000, a powerful general business system. It communicates with the HP 1000, a computer generally dedicated to design, test and control applications in the factory. (Both can also link directly with an IBM mainframe.)

Most long-distance communications between sales office and corporate headquarters are handled by the HP 2026, which can also take care of on-site editing. This keeps information (much of it off-loaded from the central computer) on-hand for local use, shrinking the amount of unusable data funneled to headquarters.

We've just introduced new software for the HP 3000 that makes it an even more powerful management information tool. You can, for instance, sit down at your computer in New York and use all the processing power and data base of your Los Angeles computer—or any other HP 3000 in your network. Software is also available to tie HP 1000 systems together in a plant-wide information sharing network. So you can find out exactly what's going on in your business—from the ground up.

Protecting the biggest investment of all.

Programming—that's where you really spend money. We know that from experience, too. We spent hundreds of man-years developing the operating software for the HP 3000. So we're just as interested in protecting that enormous investment as you are. We do it by designing our new systems to use existing software. They'll run your programs faster and more efficiently. Otherwise, you'll hardly notice the difference.

There's not much point in building good computers unless the peripherals are just as good. That's why we make our own printers, video terminals, disc and tape drives, and data entry devices.

If any part of the system does need servicing, we can fix it. With so many Hewlett-Packard offices around, we can respond quickly when you call.

The moral of our story.

It's simply this. If you need to distribute your computer workload across oceans or in your plant, you don't have to go out on a limb. The Hewlett-Packard system has a bright future as well as a pretty impressive past. You can find out all about it by calling your local Hewlett-Packard office listed in the White Pages. Or write to Doug Chance, Hewlett-Packard, Dept. 316, 11000 Wolfe Road, Cupertino CA 95014. We'll send you information on Hewlett-Packard Distributed Processing. It could make a big difference in your company's planning.

HEWLETT  PACKARD

BLIS/COBOL
MULTIUSER OPERATING SYSTEM

NOVA/ECLIPSE
BLISSFUL

For information call today
 Phone (305) 647-2200 USA
1 WK/Telex 810-853-5033
1850 Lee Rd., Winter Park
(Orlando), Florida 32789

Data Dictionary the Answer to Network Woes

By Esther Surden
CW Staff

LEXINGTON, Mass. — Using a data dictionary on systems in a distributed processing network may help solve some of the problems of data integrity, security, representation and characteristics that users confront, according to David da Costa, president, and David Thomas, vice-president of MSP, Inc. here.

A data dictionary defines the characteristics of the data items that appear or are likely to appear in the network and the relationships between those characteristics, da Costa explained. In a dictionary, the same items can be called by many different names, but different items cannot have the same name.

A dictionary therefore delineates the "language" to be used by those in the corporation, he noted.

Assuming a distributed DP (DDP) environment consisting of a host system and several satellite systems that can communicate both to the host and with each other, an immediate problem arises, da Costa continued. The characteristics of the data received at one end must match the characteristics of the data sent.

Because different types of systems represent data in different ways, users could stream transmissions through a data dictionary and use the dictionary to dynamically represent and convert the data to a form the receiving system can recognize.

The data dictionary acts as an "en-

vironmental control tool," taking the data and reformatting it to meet the requirements of the satellite acting as the receiver.

The dictionary can also be used to maintain the security of data within the network. In some situations, management would like to make certain pieces of data off limits to certain users.

With a dictionary resident in a host system, that also acts as the network controller, a request for information or to update information could be sent to the host for verification and permission to access, da Costa said.

The dictionary can then dynamically allocate passwords to users. The passwords could be time-limited and purged from the dictionary at a given

point, he added.

Using a dictionary in this way "does carry a certain operational overhead," da Costa admitted, but the sensitivity of data in the network may warrant that overhead. An added benefit is the creation of a log file that monitors every inquiry into sensitive data, which may be important for both statistical and auditing reasons.

Data Representation

Because people at satellite systems may not be trained in data processing, they only want to see data by one representation. A data dictionary resident on the host or satellite allows these people to "look at the logical representation of data" without having to know the physical representation, da Costa said.

A data base I/O controller makes physical access to data independent of the program requesting the I/O access; a program can "think" it is retrieving "A" or "B" with certain characteristics, but whether "A" or "B" actually has those characteristics makes no difference to the programmers, Thomas said.

In a typical DDP network, data is both physically and geographically distributed among satellites. The host usually takes summary data from the satellites and produces management reports.

"As we see a growth in the use of distributed processing, we are also seeing a potential for enormous growth in the cost of development of applications," da Costa warned. This leads to management's developing applications at one site and installing them at other areas later.

A problem develops when corporate headquarters needs to change characteristics of the data it wishes to receive, according to da Costa. Management must therefore make sure everyone affected by the change in the characteristics of the data is notified and the change can be made in time to meet corporate deadlines.

One way to do this, da Costa suggested, is to use the data dictionary to check on the impact of the change by determining how many files, systems or programs will be affected. The dictionary can then "send out" the turn-around documents that allow the distributed system to convert the characteristics of its data.

"It's all well and good to tell everybody a week before, 'Change this,' but if management doesn't know how many things will need changing, the satellites are likely to miss their deadlines," he cautioned.

In many distributed processing networks, the satellite points may develop their own systems with a high degree of autonomy from the host. In these cases, it may be possible for each satellite as well as the host to have its own dictionary.

The dictionaries can then be modified at predetermined intervals to reflect changes in the characteristics of the data or files on which they are both working.

Using a dictionary in this manner may be necessary because if the remote site is realigning its definitions of data and the host is changing its, they may be transmitting noncompatible data from one moment to the next, da Costa explained.

Introducing Basic/Four distributed data processing. Right system, right price!

The right system should make each remote location an independent data processing center. That's what Basic/Four computers do. And at the right price. Because there's a model to meet the exact needs of each location.

Powerful stand-alone computers

The key factor is how much each satellite computer can do.

Basic/Four computers are interactive, for instant transaction processing. Each is powerful enough to handle all accounting and payroll for each location, plus its specialized function—manufacturing, distribution, warehousing, whatever.

No more costly time-drains on the host computer. No more waiting for processing.

Easy to install, program, use

The data processing needs of your remote locations are like those of an independent business. And that's our specialty!

We offer proven software packages, with special application modules that are easily adapted to your particular needs. The language is BUSINESS BASIC, so programming is a snap. So is operation: we can teach a clerk to run a system in less than a day.

After 6 years experience, with some 4000 installations, we can put in Basic/Four systems fast.

We talk to IBM all the time

Our tie-in capability means your network of powerful, self-sufficient satellite systems can communicate with each other, and with most large, host computers. That adds up to the ideal distributed data processing system.

Basic/Four systems are up and running in the U.S. and abroad.

For full information, call our nearest office. Or write: Basic/Four Corporation, P.O. Box C-11921, Santa Ana, CA 92711

basic / four corporation
an **MAI** company



Albuquerque • Anchorage • Atlanta • Baltimore/Washington • Birmingham • Boise • Boston • Buffalo • Charlotte • Chattanooga • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fresno • Grand Rapids • Hartford • Honolulu • Houston • Kansas City • Indianapolis • Las Vegas • Los Angeles • Lubbock • Madison • Memphis • Miami • Milwaukee • Minneapolis/St. Paul • Nashville • New Jersey • New Orleans • New York • Orange County • Philadelphia • Phoenix/Tucson • Pittsburgh • Portland • Richmond • Sacramento • Salt Lake City • San Antonio • San Diego • San Francisco • San Juan • Seattle/Tacoma • St. Louis • Syracuse

Basic/Four Systems are also marketed in more than 30 foreign countries.



Focus
on distributed
processing

Experiments in
satellite
communications

Distributed Processing:

An idea that works

Some consider distributed processing a revolution. Others view it as the next phase in the evolution of dispersing data. Whatever the position, the trend is clear. We are entering an era where data bases and time critical processing are moving to the source of the data.

If you have a task to do, isn't the most logical approach to put the resources where the job is? This is the concept of distributed processing. Move the processing logically closer to the source and user of the data... parallel your existing organization with your computing power. With this approach, small computers can respond to local needs, and the mainframe can do what it does best — repetitive, batch oriented processing.

Distributed processing makes sense, because problems in the real world are interrelated, not isolated

by department nor restricted to a central location. What happens on your manufacturing floor does, after all, affect your financial accounting.

Networks offer advantages beyond this kind of responsiveness to the user — dependability, for instance. If one computer system of the network is down, the organization can continue to function. You can even handle that system failure by routing around it.

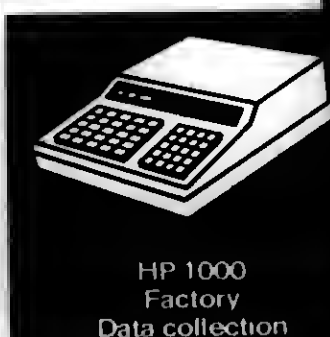
Hewlett-Packard was one of the first computer manufacturers to market products for distributed computer networks. In fact, several hundred of our worldwide customers are already using distributed networks.

Today, we have further committed ourselves and future computer

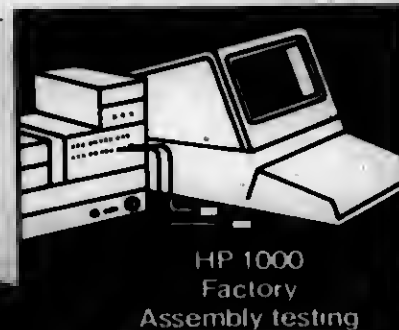
products to networks with "HP-DSN" — Hewlett-Packard's Distributed Systems Network. This is a sophisticated plan for interconnecting various computer systems. We are building a line of products with a wide range of processing power, communication speeds, and capabilities. Our goal is to map our computing products onto customers' organizations and network needs.

Since not everyone in your organization is a computer specialist, a primary goal of HP-DSN is that it be useful to operating managers and professionals. The high-level network capabilities are accessed with simple, English-like commands. So the user can concentrate on the solution of a problem and not on the internal workings of the network system.

This ease of use is achieved, in part, by a layered architectural



HP 1000
Factory
Engineering design
R&D production



◀ Cover

The 1980's may bring distributed processing via satellite communications.

An innovative experiment to evaluate advanced business equipment and new satellite communications techniques is underway today. See page four.

design of both hardware and software. Only the top layer, which provides high-level system services, is visible to network users. The other layers, which provide network communication services, and necessary electrical interfaces, are handled automatically by HP-DSN hardware and software and are transparent to the user.

Flexibility is another advantage of the layered approach. Each functionally independent layer can accommodate new technologies without affecting the rest of the layers. For example, HP plans to interface to packet switching networks using CCITT x.25 compatible protocols. As developments like this occur, they will be implemented in the appropriate layers with no disruption to user programs that communicate across the network.

HP-DSN assumes intelligence at each node. Every member of the

Full implementation of a distributed information network for a company will likely be an on-going process. Networks map onto existing organizational structures which, of course, flow and change. HP-DSN is a strategy that accommodates these changes by redefining, when necessary, the use of the equipment.

Hewlett-Packard is committed to a partnership with its customers to provide the on-going products, consulting, support, and service needed as their distributed processing demands evolve and grow.

DS/1000- The latest link

HP is not new to networking. We have been delivering reliable networks — 200, in fact — for the last

ware, and firmware which supports HP 1000 and HP 21MX systems as network nodes which communicate not only with each other, but also with a directly-connected HP 3000 Series II computer.

Users can strategically disperse computing power where it's really needed while readily sharing data and application programs. With DS/1000, a remote HP 1000 can be just across the room, hardwired up to 10,000 feet, or across a continent — as far away as data communications facilities reach. All this happens with no significant increase in complexity for the applications programmer. The network information flow is handled entirely by DS/1000.

Both disc-based, RTE-III HP 1000s, and memory-based, RTE-M HP 1000s may be mixed freely in a single DS/1000 network. The same set of network program



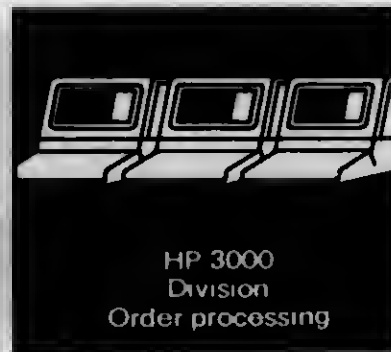
Central Mainframe



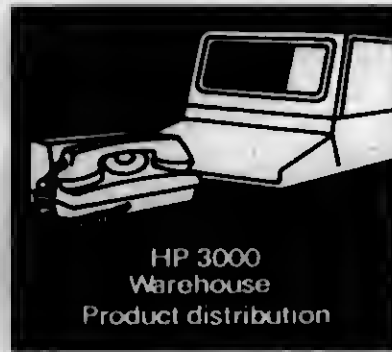
HP 3000 Division
Finance/accounting



HP 3000 Division
Marketing information



HP 3000 Division
Order processing



HP 3000 Warehouse
Product distribution



HP 2026
Field sales office
Remote order entry
and communications

network stands by itself and performs a specific processing task — be it an HP 3000 for batch and terminal-oriented data processing, an HP 1000 for real-time applications in the lab or on the factory floor, or an HP 2026 for data entry and communication. Yet, for many applications, the resources of all other members of the network are readily available through that node.

half decade. HP started with small star networks with fixed command relationships, and moved toward more capable star networks with flexible command relationships.

Now, with DS/1000, we have a truly generalized nodal network which supports a variety of configurations — stars, strings, rings, and combinations.

DS/1000 is a set of hardware, soft-

requests and operator commands are available on upward-compatible RTE-III and RTE-M. To use DS/1000, then, the user does not need to learn more than one operating system.

With a powerful remote command processing capability, users at terminals on one HP 1000 node can access any other HP 1000 in the

Continued on page 8

Distributed Processing: Systems that work together

Talk, talk, talk

Today, an infinite number of network configurations are available with Hewlett-Packard's Distributed Systems Network.



HP to HP
HP 1000s and 3000s can communicate with each other

and with themselves via standard cabling. The connection between HP 1000s, between HP 3000s, and between HP 2026s can also be synchronous modems. The HP 2026 can communicate with HP 3000s with synchronous modems. Plus, the HP-IB interface* simplifies system connections to single or clustered instruments, calculators, or terminals.

HP to IBM

RJE/1000, for the HP 1000 and HP 21MX, emulates an IBM 2780 remote batch terminal to many IBM 360 and 370 systems. Communication between the HP 3000 and IBM hosts is provided by a 2780/3780 Workstation Emulator.



HP to Terminals

HP networks support local terminals via a

standard cable; remote connections are provided by full duplex modems, and also by half duplex modems for the HP 3000. These connections can also accommodate special purpose terminals such as calculators, data entry devices, and badge readers.

Tomorrow promises even more exciting communication possibilities. Computers, thousands of earth miles apart, will be able to share resources via satellite communication.

Imagine these scenes in which the information needed travels nearly 50,000 miles, to and from a satellite, in only a few seconds:

Personnel at an Eastern site instantaneously view a financial graph stored on disc at a Western site.

Two people, at two different host sites, call for a contract stored on disc at one of their sites. They simultaneously view and discuss its provisions.

A high speed file transfer from a remote computer system backs up and restores a lost data base on the local system.

These transactions are being tested and evaluated today by Project Prelude—an innovative business communications experiment which adds high-speed satellite communications capability to business equipment. The overall coordinator of the project is Satellite Business Systems (SBS), a partnership formed by wholly-owned subsidiaries of COMSAT, IBM, and Aetna Life and Casualty. SBS has been authorized by the FCC to establish a domestic satellite system

to serve business, government agencies and other communications users.

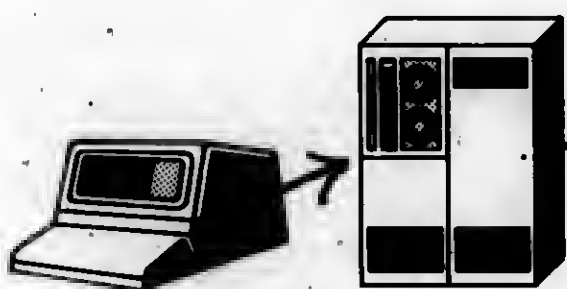
Three companies are hosting this series of experiments: Rockwell International Corp., Texaco Inc. and Montgomery Ward & Co., Inc. The HP 3000, with DS/3000, was selected by Prelude as the computer system to be used in the project. It is one of the few computers available today with vendor supplied network communication software.

In addition to the data processing experiment, other tests feature the use of television in a two-site business conference, and the rapid transfer and broadcast of documents using facsimile equipment. Again, HP 3000 computers and DS/3000, the network services software, are being used to demonstrate the data processing aspects of each experiment. Network data base management, and network information transmission, storage and retrieval are done interactively between two HP 3000s.

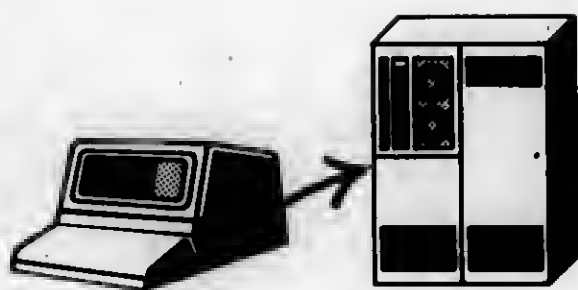
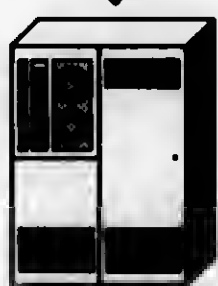
*HP-IB is Hewlett-Packard's implementation of IEEE Standard 488-1975—"Digital Interface for Programmable Instrumentation."

Remote possibilities

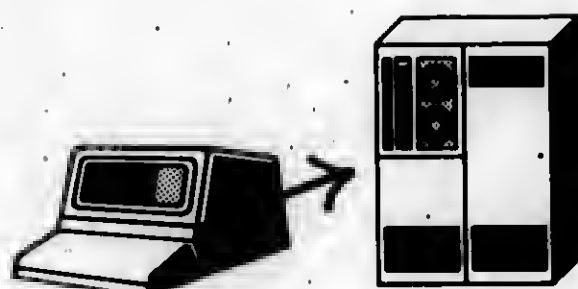
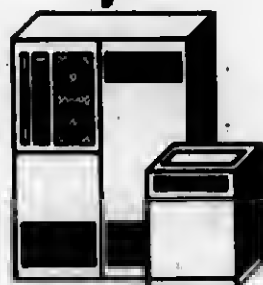
Four high-level capabilities of HP-DSN dramatically increase resources available to HP 1000 and HP 3000 users. They can execute local system commands remotely, have access to data files residing on remote systems, communicate between programs, and share expensive peripherals. These capabilities lever the effectiveness of any programmer on any system in the HP Distributed Systems Network.



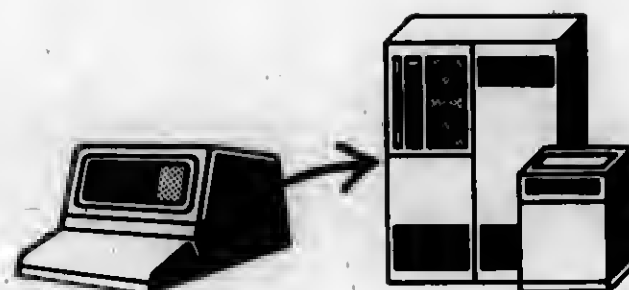
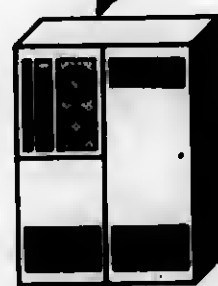
Remote command processing enables users to execute local commands remotely via the network interface, thus accessing the full processing power of a remote system. HP-DSN users have access to operating system commands, programming languages, and application programs on systems in other locations. They can also access special network-oriented commands to create files remotely or to copy files between systems.



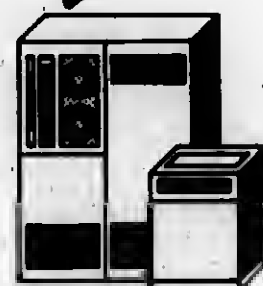
Remote file access makes it possible to share data files; application programs can access files at another system almost as if those files were local. Smaller systems can utilize file management capabilities of larger ones. Both local and remote file operations can be done concurrently — users need only identify the remote system in their remote file access request.



Resource sharing means that peripherals on remote systems can be used by others via network interconnections. This includes I/O devices such as printers and plotters, which can be accessed with the same read/write statements used for local devices. Resource sharing maximizes use of expensive peripherals and makes the power of a single, large system available to smaller, dedicated systems.



Program to program communication (PTOP) enables application programs running at separate systems to directly and efficiently exchange data and control information with one another. PTOPT lets one program dynamically initiate named programs on other systems in the network. With PTOPT, data processing loads can be shared between two programs, each on a separate system. Also, large blocks of data can be transferred between systems with a simple call sequence in the application program. Programmers, for example, can pre-process data before transmitting it to a remote program.



Distributed Processing: It's working for our customers

“The only way a computer system will become a true success is for it to be totally integrated into the operations of the user area.”

*Patrick Daniel
Automated Systems Superintendent
Hudson's Bay Oil & Gas Co. Ltd.*

“It seems to me it is always more logical to provide a facility where it's needed rather than centralizing it. Before, due to costs, this wasn't feasible. The economics have definitely changed.”

Patrick Daniel—HBOG

“It's really very basic... we split up the information handling function to reflect the way the organization operates.”

*C. Guruprasad—Supply & Services,
Canada*

“We saw some real advantages to the user having essentially his own machine. He can run and schedule it according to his own needs, and not fit into a complex, large system schedule where his priority may not always be what he'd like it to be.”

Gary Specker—General Mills, Inc.

“Our concept is to push more and more of what is useful to the user, back towards the user. By distributing the data bases closer to the action, users can manipulate the

information at their own timings and frequencies.”

*C. Guruprasad—Supply & Services,
Canada*

“This makes the computer responsive to the manager, rather than the manager responsive to the computer.”

Al Viste—Boeing Co.

“It used to be that you had to have highly experienced computer experts wherever you had a computer. That's no longer so.”

Gary Specker—General Mills, Inc.

“One of the reasons I picked the HP system is because it is “docile”—it's teachable, and can be managed by non-EDP professionals.”

Al Viste, Boeing Co.

“People tend to accept computers more when they are located within their own grasp. It's a lot like the hand held calculators. In previous years you had a few calculators located centrally. Now just about every engineer, scientist, or accountant has one sitting on his or her desk.”

Patrick Daniel—HBOG

“I'm not one who believes you can plan the whole thing out for five years and then implement a piece at a time. But you can set a direction and control the evolutionary development.”

Gary Specker—General Mills, Inc.

“The beauty of a distributed system is that you don't have to tackle the entire, huge complex job all at once. You can break it up into manageable bits.”

Patrick Daniel, HBOG

“There are ways to do the job today that weren't there even two or three years ago. You have to ask yourself: Is there a better way to do this than just increasing the size of the large central computer?”

Gary Specker—General Mills, Inc.

“You select your equipment according to the job. You wouldn't send a semi-truck out to pick up 100 pounds in an alley. A general purpose mainframe is trying to satisfy all problems. To make a great big semi work like a pickup, you have to spend a lot of time programming it.”

Al Viste—Boeing Co.

“You really don't need a computer that's any larger than the largest job you have to do.”

Gary Specker—General Mills, Inc.

“The dynamics of a living organization tend to cut across simplistic organizational boundaries. Organizations don't operate in a centralized, monolithic fashion. Data processing must be able to change in order to represent the reality of the operation. Otherwise, you can't survive.”

*C. Guruprasad—Supply & Services,
Canada*

“A distributed system gives us the flexibility to change as business needs change.”

*Gary Specker—Director of Systems &
Data Processing, General Mills, Inc.*

Hewlett Packard

"If we are wholly dependent on the mainframe for the more dynamic parts of the system, it takes us a long time to make changes and to respond to changing management requirements." *Al Viste—Boeing Co.*

"We chose a distributed network, rather than a large central batch machine, to have a completely fail safe system. If any one element failed, another part could take over." *Alain Faveau, CAMIF Co., France*

"When you're tied centrally and your machine's down, everybody's down."

Dennis Eickhoff—Vice President, Systems & Data Processing, Nationwide Financial Services Corp.

"EDP capacity of the corporation is less vulnerable with the distributed arrangement... multiple boxes allow for a higher degree of backup." *Gary Specker—General Mills, Inc.*

"With HP's DSN software, the user merely declares himself a remote user and he can access the data in any of the other network nodes—that is, as long as he's legally authorized to get access. You get the feeling you're working on a large mainframe because you're able to easily switch from one machine to another. The fact that you're switching is transparent." *C. Guruprasad—Supply & Services, Canada*

"With DS/3000, any one of our four HP 3000s can communicate with any other in the network."

Alain Faveau, EDP Manager, CAMIF Co., France

"I don't have to worry about protocol; I depend upon HP's DS/3000 software to talk to IBM, and to talk to other 3000s." *Al Viste, Boeing Co.*

"What we saw in HP was a company with a very clearly defined growth pattern for their computer systems and distributed processing networks. The kinds of things we were wanting to do with the computer were exactly the kinds of things HP was selling their computers to do." *Gary Specker—General Mills, Inc.*

"Any company looking into distributed processing should very strongly consider the vendor's commitment to the concept." *Patrick Daniel—HBOG*

"I played it conservative in selecting a vendor. HP is moving ahead in the technology and they have a reputation for not playing on futures... you know, like giving me a bunch of promises that may or may not come true." *Al Viste—Boeing Co.*

"It's important to realize distributed processing is a two-way street. You should determine whether the vendor is going in the direction you want to go."

C. Guruprasad—Director, Corporate Systems Branch, Supply & Services, Canada

"We're not leaving the IBM fold since we still use it as the central system."

Al Viste—Finance Systems Manager, Boeing Co.

"If you're going to enter a fairly new area such as distributed processing, you should have vendors who you have some faith in that they'll be around in say three years." *Dennis Eickhoff—Nationwide Financial Services Corp.*

"The more you satisfy people, the more they demand. I think, customers will continue to expect HP to provide more and more of the systems, and software necessary for distributed processing." *C. Guruprasad—Supply & Services, Canada*

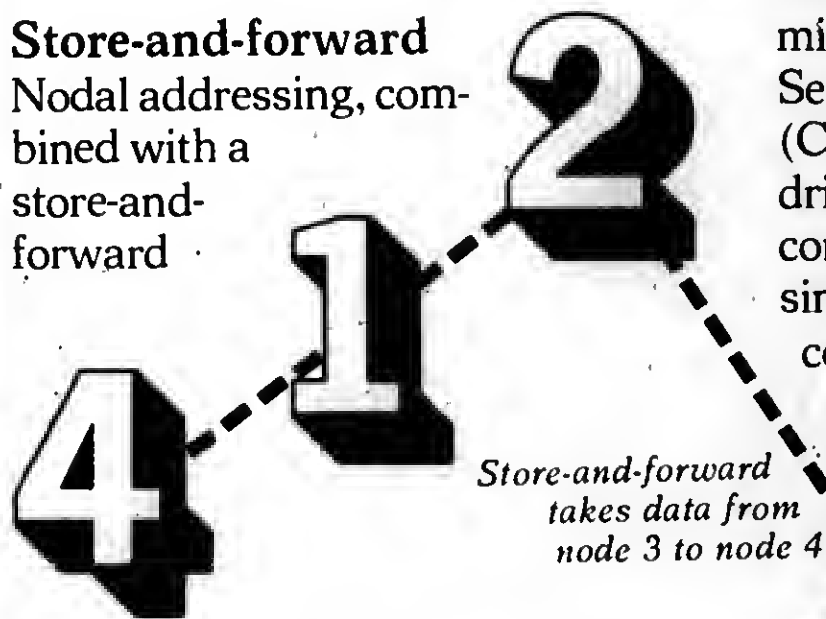
"People are really talking about Hewlett-Packard's Distributed Processing. Isn't it time you talked to us about it?"

DS/1000- The latest link (continued)

network, local or remote. These users can easily utilize files, programs, and peripherals on other nodes, even when they are unattended. Individual HP 1000 nodes can be connected in any manner that suits the material flow of a plant or geography of a region — a star arrangement surrounding a central node, a ring, a string, or any combination of these. Nodes are connected with either a single four-wire cable or by full-duplex modems.

DS/1000 is particularly well-suited for instrumentation, computation, and operations management tasks in functional areas such as manufacturing, R&D, quality control, and distribution. Moreover, DS/1000 to DS/3000 communication facilitates the integration of these tasks with commercial data processing functions available on the HP 3000 Series II, such as production scheduling, order processing, and accounting.

Store-and-forward Nodal addressing, combined with a store-and-forward



technique, enables users to access any DS/1000 node from any other node, and allows them to transport programs freely within the network.

A user at a node in New York, for example, can write to a line printer at a node in Boston. If the user later transports the program from New York to a node in Atlanta, the same line printer in Boston would be accessed, without change to the user's program.

The application programmer need only identify the node where the printer is located, and DS/1000 forwards the information from node-to-node until it reaches that address. The DS/1000 software only needs an organizational chart of the network, the "Network Description Table," to define the inter-connections between the nodes. That's forward.

"Store" indicates that the data stops briefly at each node. This store-and-forward routing is completely handled by the DS/1000 software, relieving the programmer of the need to write communications.

Microcoded Driver

DS/1000 takes advantage of the microcodability of the HP 21MX Series computers in its CAM/1000 (Communications Access Method) driver. This software/firmware combination is fast enough to allow simultaneous requests on multiple communications lines between HP 1000s to be serviced concurrently. For example, a DS/1000 node can handle four concurrently active 9600 baud lines, or two active hard-wired lines with a combined effective throughput of up to 20K-bytes/second.

Tri-Directional Error Check

To ensure data transmission integrity, DS/1000 incorporates a powerful error checking method. Data blocks, when received, are checked simultaneously for vertical, longitudinal,

and diagonal parity. This block error checking scheme can be done

while maintaining high-speed communications because it is implemented in microcode.

An initial DS connection between HP 1000's is \$6200; subsequent connections are \$3700. A DS/1000 node can connect with a DS/3000 system for \$1250*. For more information on Hewlett-Packard's Distributed Systems Networks, return the attached reply card.

*Domestic U. S. prices only

Computer Advances is written to inform professionals of the latest technical contributions from Hewlett-Packard. You are invited to receive issues at your place of residence or business. Write Carol Scheifele, Computer Advances, Editor, Hewlett-Packard, 11000 Wolfe Rd., Cupertino, CA 95014.

HEWLETT  PACKARD

Hewlett-Packard Computer Advances

Direct Response Card

HP is pleased to provide you with literature or answer specific questions regarding any computer advances which intrigue you.

- ☐ Please send me more information on HP's Distributed Networks.
- ☐ Please have an HP representative contact me.

Name _____ Computerworld _____
Title _____ Company _____
Address _____
City _____ State or Province _____
Zip or Postal Code _____ Country _____ Telephone _____

CW 1/78

Hewlett-Packard Computer Advances

Direct Response Card

HP is pleased to provide you with literature or answer specific questions regarding any computer advances which intrigue you.

- ☐ Please send me more information on HP's Distributed Networks.
- ☐ Please have an HP representative contact me.

Name _____ Computerworld _____
Title _____ Company _____
Address _____
City _____ State or Province _____
Zip or Postal Code _____ Country _____ Telephone _____

CW 1/78

First Class
Permit No. 141
Cupertino,
California

Business Reply Mail

No Postage necessary if mailed in the United States

Postage will be paid by

Hewlett-Packard
11000 Wolfe Road
Cupertino, CA 95014

Attn: Computer Advances

First Class
Permit No. 141
Cupertino,
California

Business Reply Mail

No Postage necessary if mailed in the United States

Postage will be paid by

Hewlett-Packard
11000 Wolfe Road
Cupertino, CA 95014

Attn: Computer Advances

Hewlett-Packard Computer Advances/March 1978

More Engineers, More Locations

Equipment Vendors Offer Best Bet for Service

By Fred Valfer
Special to CW

The term "distributed data processing" (DDP) could have been invented by Humpty-Dumpty. It was Mr. Dumpty, as one may recall, who said, "When I use a word, it means just what I choose it to mean, neither more nor less."

DDP vendors all use the term exactly the way they choose it to mean. However, one thing is clear — users are getting more responsibility, and more power, to do their local processing.

With this new freedom goes an obligation — to maintain the equipment at a level equal to that of the mainframe. Most users of such equipment are finding out that DDP systems are as important to remote operations as the CPU is to headquarters.

Before making an investment in multifunction systems for dispersed locations, therefore, a user should not only carefully examine a vendor's equipment, but its field engineering organizations as well.

A prime consideration in selecting a multifunction vendor is whether its service organization can keep pace with the user's network growth. That capability is dependent on two factors — the number of field engineers and their geographic location.

The former is largely a function of the number and sophistication of the systems installed; the latter, of the vendor's market penetration.

The important thing is for the user to match his needs to a vendor's capabilities. If the user has systems in cities like Detroit, Cleveland and Dallas, he doesn't need a vendor with 200 service centers.

If, on the other hand, he has a network that spans the continent, he's probably not going to be satisfied with a vendor who only has a regional service capability.

Other Options

Some users have tried to get around this problem — because of their investment in a particular piece of equipment — by using third-party maintenance vendors. In some cases, it has worked. In others, the lack of trained personnel and their unclear commitment to a user's needs have inhibited the success of the operation.

As a practical matter, it seems prudent to use third-party vendors only when they are trained by a DDP vendor which finds it economically unfeasible to station its own people in places like Moose Jaw, Saskatchewan.

Other users have opted to maintain their own equipment. In the case of centralized or highly technical organizations like engineering or aerospace firms or some government agencies, the project has succeeded.

As companies have become geographically dispersed, however, the distance places added burdens on the company's resources, burdens which are more easily satisfied by DDP vendors.

In general, well-established vendors will have their own field engineers to maintain their equipment. This approach offers several advantages: users get the assistance of experienced company employees who are well-trained on the company's equipment (in some cases for as many as 20 weeks of in-class training) and represent the

company's commitment to DDP. On the other hand, vendors gain better control over their own equipment and

world where everybody's hardware is beginning to look alarmingly alike, it's no longer enough for a field engineer

A prime consideration in selecting a multifunction vendor is whether its service organization can keep pace with the user's network growth. That capability is dependent on two factors — the number of field engineers and their geographic location.

resources, thereby allowing greater utilization of them.

Another advantage, often overlooked, is that a vendor's own field engineering force can and does offer total support, providing software as well as hardware capabilities. In a

to be able to just fix a hardware problem or replace a board; software makes the difference. Yet software problems are usually much more difficult to detect.

When a piece of hardware is shipped from a factory, it is usually well tested.

The only unusual problems of difficulties encountered are design ones which can be field-adapted and later engineered.

Software, however, although it may be totally debugged by the vendor, is always subject to adaptation by the user — adaptations which can bring down the whole system.

Unless the field engineer can provide both hardware and software support, therefore, users only get half of their problem solved — a situation analogous to throwing a 50-foot rope to someone drowning 100 feet away.

Minimizing Downtime

Once the user has identified the
(Continued on Page S/34)

"THE DATA TERMINAL PEOPLE"

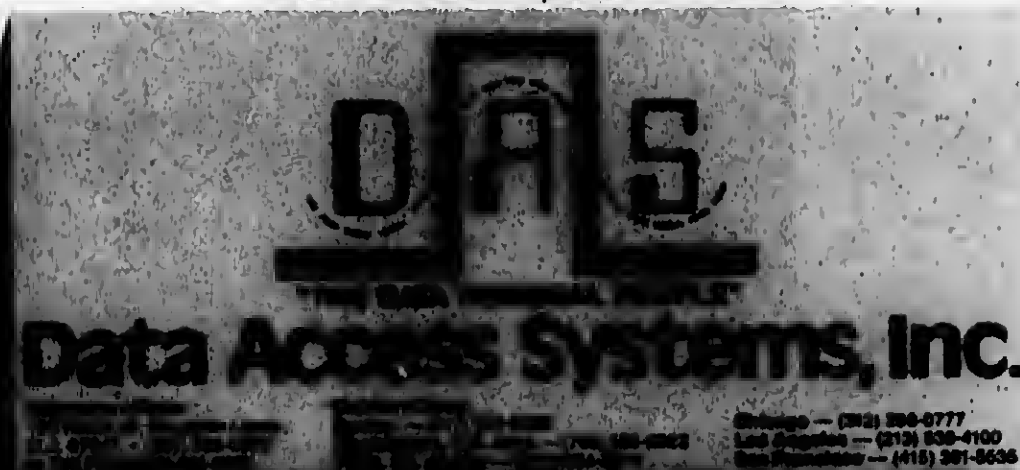
Data Access Systems and International Computer Equipment have merged to create one of the largest national sales and service organizations for state of the art data terminals. Now you can forget the bother of searching and collecting details on prices, maintenance, specs, delivery schedules, and the like. We have it all for you, all in one place — and in many locations coast-to-coast. Better still, we can supply your order quickly in any quantity required, at substantial cost savings. No doubt about it, our single source capability will save you valuable time and money.

Purchase or lease:

- DEC LA-36—wide carriage 30 CPS
- DEC LS-120—120 CPS KSR
- DEC LA 180—180 CPS RO
- TI 745 & 743—portable thermal
- TI 745/APL—portable thermal APL

- TI 733ASR & KSR—30 CPS quiet
- TI 765 & 763—bubble memory portable
- LSI ADM/3A/2/1—CRT
- Diablo 1620/1641—wide carriage/2741
- Teletype 43—new KSR wide carriage

Call your local district office, or toll free numbers:
East 800-631-9804 West 800-227-4406



Single Source... Coast-to-Coast

ICE

Chemical Firm Gets Real-Time Inventory Boost

(Continued from Page S/4)

U.S.

Customers are invoiced daily and remit payments through the corporate accounts receivable system on the System 370 in Ardsley, N.Y., which has been updated by information from the System 3.

The system was designed to work through a centralized division order processing department and to use an on-line approach to inventory management while leaving back-end processing on the large mainframe.

Benefits Accrued

This distributed processing system has improved customer service by providing an immediate response on order status. In addition, it has improved in-

ventory management by reducing inventory investment, providing central control of stock replenishment and allowing immediate access to information regarding inventory status.

Other major benefits include a rationalized staff, automated picking lists for warehouse personnel, reserving of drums or batches, good system reliability and a flexible operating schedule.

The system has processed over two million transactions and contains 120 on-line programs. It serves several thousand customers and contains approximately 40,000 drums of inventory representing 1,300 products.

All orders, regardless of source, are entered on an order entry form and input to the system. Inventory is not

normally checked before order entry; however, inventory information is available through file interrogation (on-line) or a stock status report if the customer requires such information when placing his order. Required entries on this form are customer number, product number and quantity ordered.

Additional override facilities available at this stage of order processing include such things as price, FOB etc.

All customers orders successfully entered to the system create an order confirmation form on the terminal printer in the order entry area. A shipping paper print record for subsequent printing at the remote distribution center is also produced. These forms contain all appropriate shipping informa-

tion including drum numbers and warehouse locations where applicable.

It is during this phase of processing that the customer and product numbers are validated and each item of the order is priced. Inventory is checked and selected by the system at this time.

Orders that fail inventory checking are routed to the customer service area for further processing. Through on-line interrogation of nationwide inventory levels and communication with appropriate inventory management personnel, determination of order disposition is made.

Orders can be referred, either totally or partially, to other shipping locations by direct entry into the CRT.

Distribution Functions

All orders successfully entered into the system at Greensboro and which have passed the inventory checking and picking phases of the system, are held in the system print queues to await action by the distribution center. The terminal print program is initiated by the distribution center through CRT entry. This causes all orders to print on the six-part shipping form.

The warehouse picks the order based on information printed (drums and locations), labels the drums with appropriate customer information and arranges for pickup by carriers.

Upon completion of the shipment, remaining paperwork is routed back to the distribution center office for matching to the control document and CRT entry of notification of shipment. This entry updates the drum inventory and creates a computer record for invoicing.

Daily Report

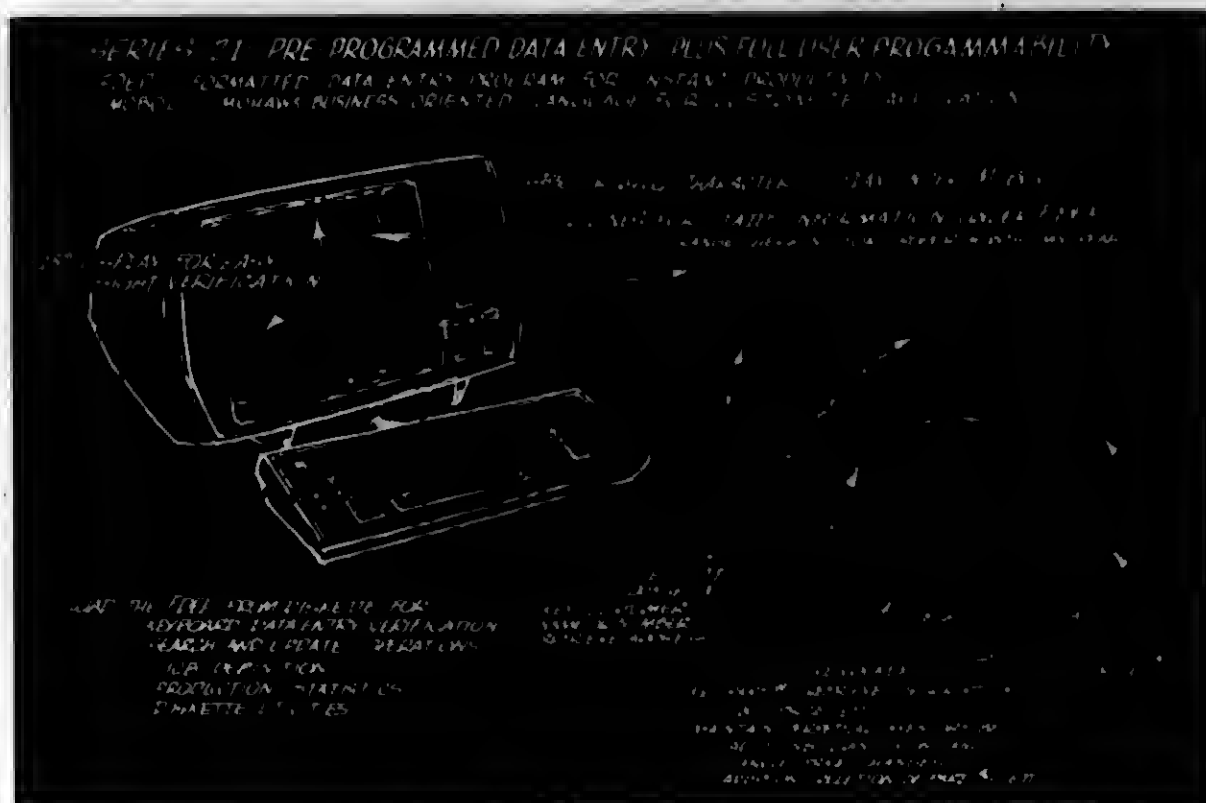
Each day the system generates a "below minimum inventory" report which indicates potential replenishment situations. In addition, a preliminary stock order is also generated in the system for each entry on the report. After reviewing the report and other related information, the inventory control group activates or rejects these preliminary stock orders by direct entry through the CRT. Purchase orders are maintained by the system and may be modified, added or deleted on-line. Having all purchase order and inventory information in the system gives a total picture of product availability.

All master files necessary for order processing as well as the open order file and the location transaction file are maintained on the IBM 3 using on-line programs. Throughout the day, while order entry is on-line, orders are flagged for processing. When required, the multileaving remote job entry program is loaded.

The orders which were flagged and the applicable maintenance to other files are formatted and transmitted to the corporate data center in Ardsley, N.Y. Upon receipt of the data, it is merged with appropriate data from the other Ciba-Geigy sales divisions and input to the system that generates invoices or maintains corporate files. The data is then passed to the accounts receivable, sales reporting and financial inventory systems.

Robert St. John is a group leader in management services at Ciba-Geigy Corp., Greensboro, N.C.

MDS Series 21. Engineered for distributed processing with or without programming.



Today, the cost of programming a distributed processing system can easily exceed the cost of the equipment. Series 21™ from Mohawk Data Sciences solves that problem by eliminating the necessity for programming in many of those applications most common today — those requiring from one to four operator stations for use in source data entry/verification, and remote batch communications.

The MDS™ Series 21 eliminates the programming requirement through its unique Formatted Data Entry Program (FDEP). FDEP consists of

pre-programmed software routines that allow formats currently used on keypunches, key-tapes or key-disk systems to be quickly and easily converted for use on Series 21.

Within hours after installation of Series 21, remote site personnel with no previous computing experience can become productive data entry operators. When your application requires more sophisticated editing capabilities, or file management, or local transaction processing, you can upgrade from FDEP to full

programmability under MOBOL™ (Mohawk's Business-Oriented Language) without replacing any hardware.

MDS is now conducting seminars on distributed data processing in major cities throughout the country. For an invitation to a seminar and a demonstration of Series 21, call our headquarters, 1599 Littleton Road, Parsippany, N.J. 07054, (201)540-9080, and ask for James J. Byrne, VP, U. S. Sales.

™Trademarks of Mohawk Data Sciences Corp.



Mohawk Data Sciences
1599 Littleton Road
Parsippany, New Jersey 07054
(201)540-9080

- Please send further information on Series 21.
- Have a salesperson call.
- Send a schedule for the next free DDP seminar in my locale.

CW 03068

My application is _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip Code _____

Phone _____



Mohawk Data Sciences

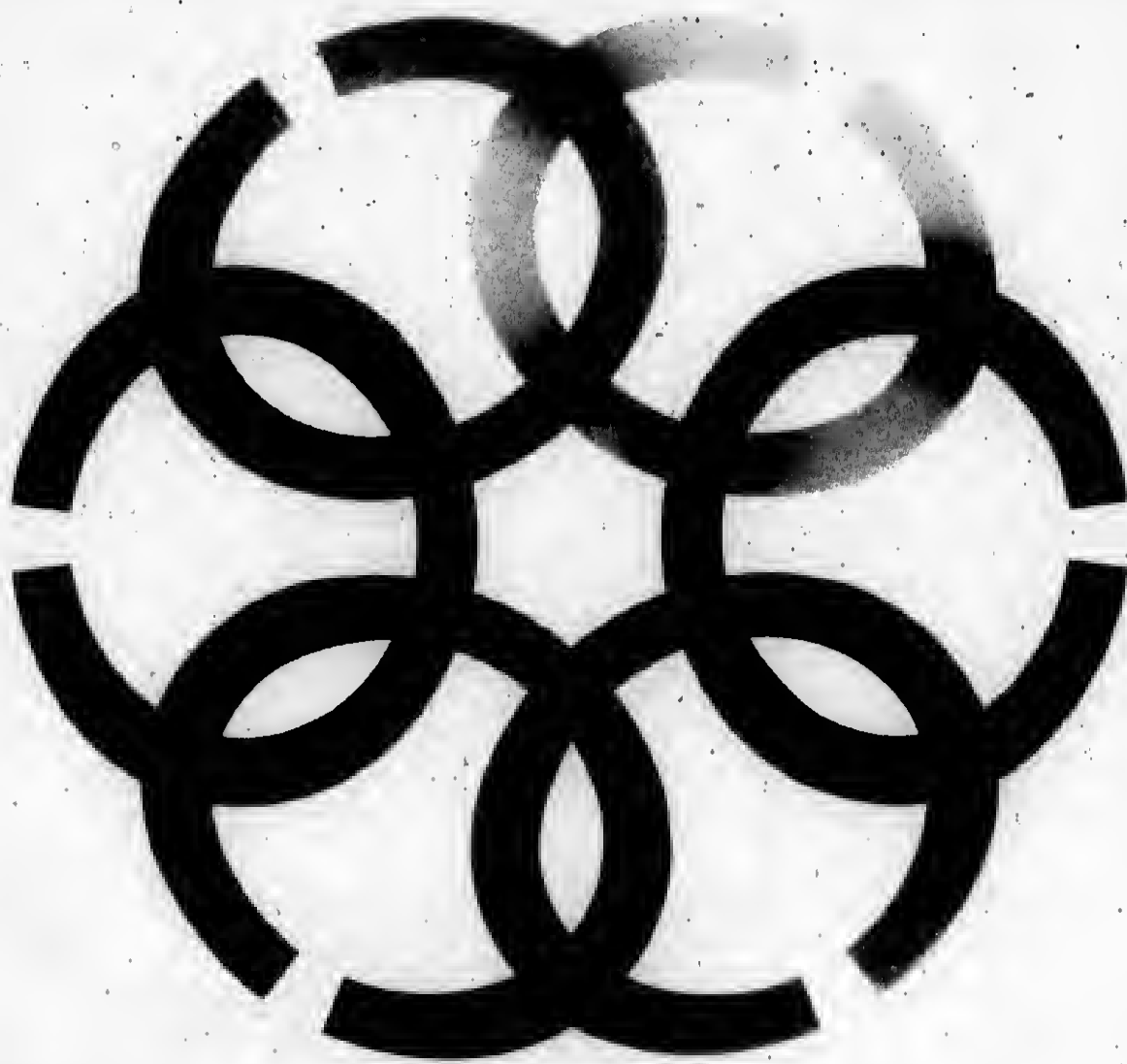
Imagine:

A large-scale computer system.

Functionally dispersed data processing.

A common, integrated data base.

Unlimited growth without economic penalty.



The ARC[™] System
from Datapoint.

Put
Your
Imagination
to
work.

Turn
the
page.

Imagine. A large-scale computer system that would solve all of the problems that system planners have complained about in conventional computer architecture. That would work and grow without interruption, without extensive operator re-training, and without endless new model upgrades. A system that will adapt itself to your budget, and not the other way around.

The Attached Resource Computer™ System is Datapoint Corporation's solution to the inherent problems of conventional computer system architecture. It will eliminate the headaches which until now have seemed inevitable. Like updating several data bases, costly programming changes, and complete system failure. Not to mention the huge expenditures involved in hardware upgrades.

The ARC™ System is an *attached processing* system — based upon the idea of functionally dispersed processing resources, located in a company's offices, stockrooms, transaction counters, and warehouses. Operating independently, and yet as parts of a whole.

Because ARC allows all of these task-oriented processing stations access to the common data base, in as large (or small) a capacity as each company's needs dictate.

A unique modular architecture

How can ARC combine the effective throughput of a large traditional computer with the flexibility and convenience of a small computer?

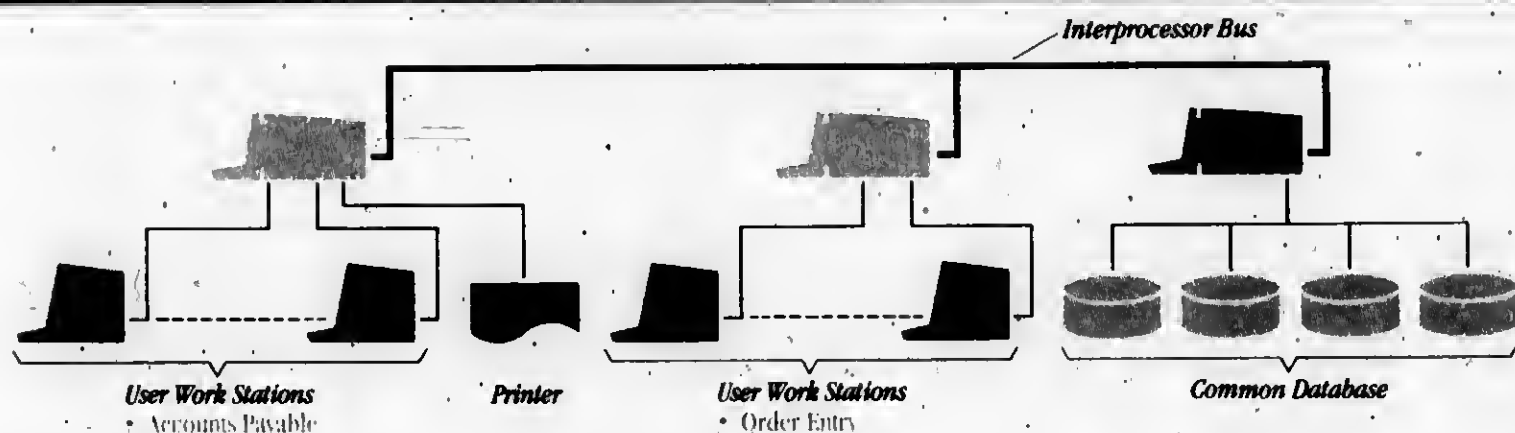
Because it takes the two basic functions of any conventional computer — applications program execution and data file management — and distributes them among two or more specialized computers: the applications processor and the file processor.

By attaching these two types of functionally specialized processors to an ARC System, each company can select just the right amount of processing power and on-line data storage that it needs. Without over-buying to stave off some future requirements. Or over-burdening an existing, insufficient computer.

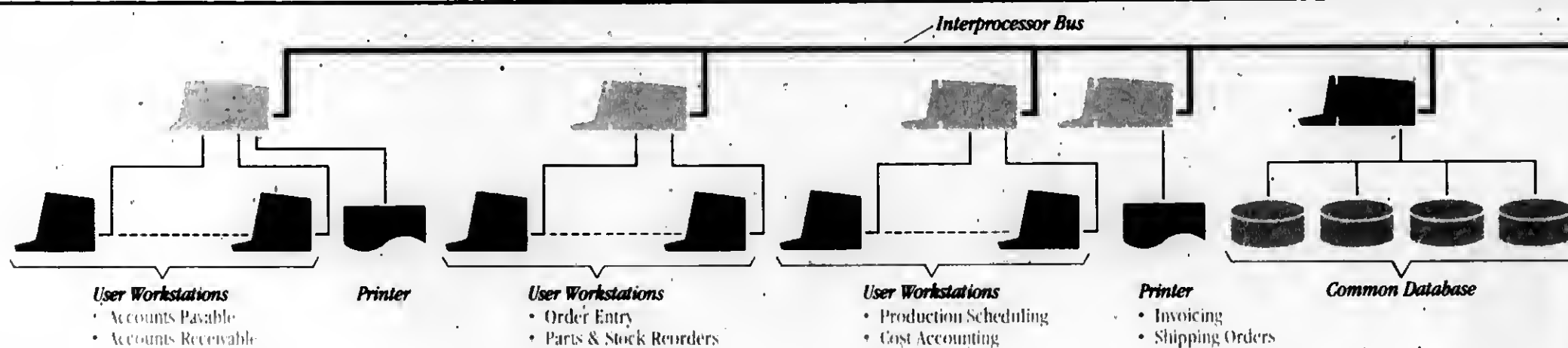
Unlimited growth without economic penalty

If more processing muscle becomes necessary as time passes, just add another Datapoint applications processor. Right where the work gets done. And if data

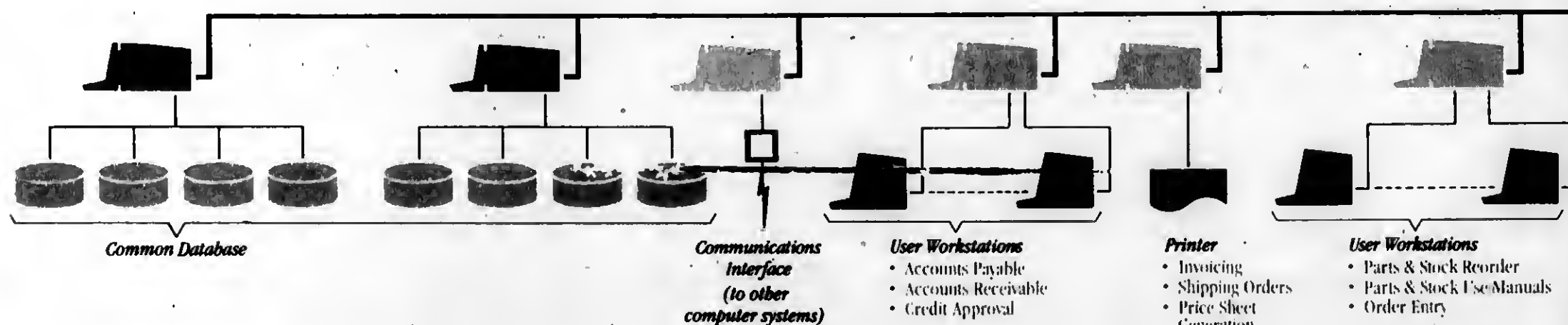
A small ARC system.



A medium ARC system.



A large ARC system.



handling capacity (or speed) needs to be boosted, additional file processors will each provide up to 200 megabytes more disk storage. While preserving the commonality of the data base. And at predictable, economical costs.

Every ARC system comes equipped with user-definable security software that allows each company to restrict access to the data base in several ways.

But the best news is that there is no central processing unit to get bogged down. No single component that will drag the whole system under if it fails. With the Attached Resource Computer, adding (or removing) any attached component requires no system downtime, no re-programming, and no re-training.

Functionally dispersed resources

The ARC System uses an electronic pathway called the Interprocessor Bus to communicate requests and data from one attached resource to another. This communication takes place at such high speeds that applications processors can get the data they need faster than if it were on their local disks. Even though the source of the data may be in another department.

Any number of applications and file processors may be connected to the Interprocessor Bus and located in the offices where they're needed. Each applications processor can have the printers, card readers, magnetic tape, or local disk storage that a traditional computer would have. And each applications processor can be dedicated

to its own function, using any of the software in Datapoint's extensive library:

- DATASHARE® for multi-user, on-line transaction processing;
- COBOL for industry-standard batch processing;
- DATABUS®, RPG, SCRIBE®, and BASIC for other business needs;
- Telecommunications to other computer systems with Datapoint's networking software.

In fact, ARC even enables an existing IBM 360/370 mainframe to come on-line as an applications processor, using Datapoint's Direct Channel Interface Option.

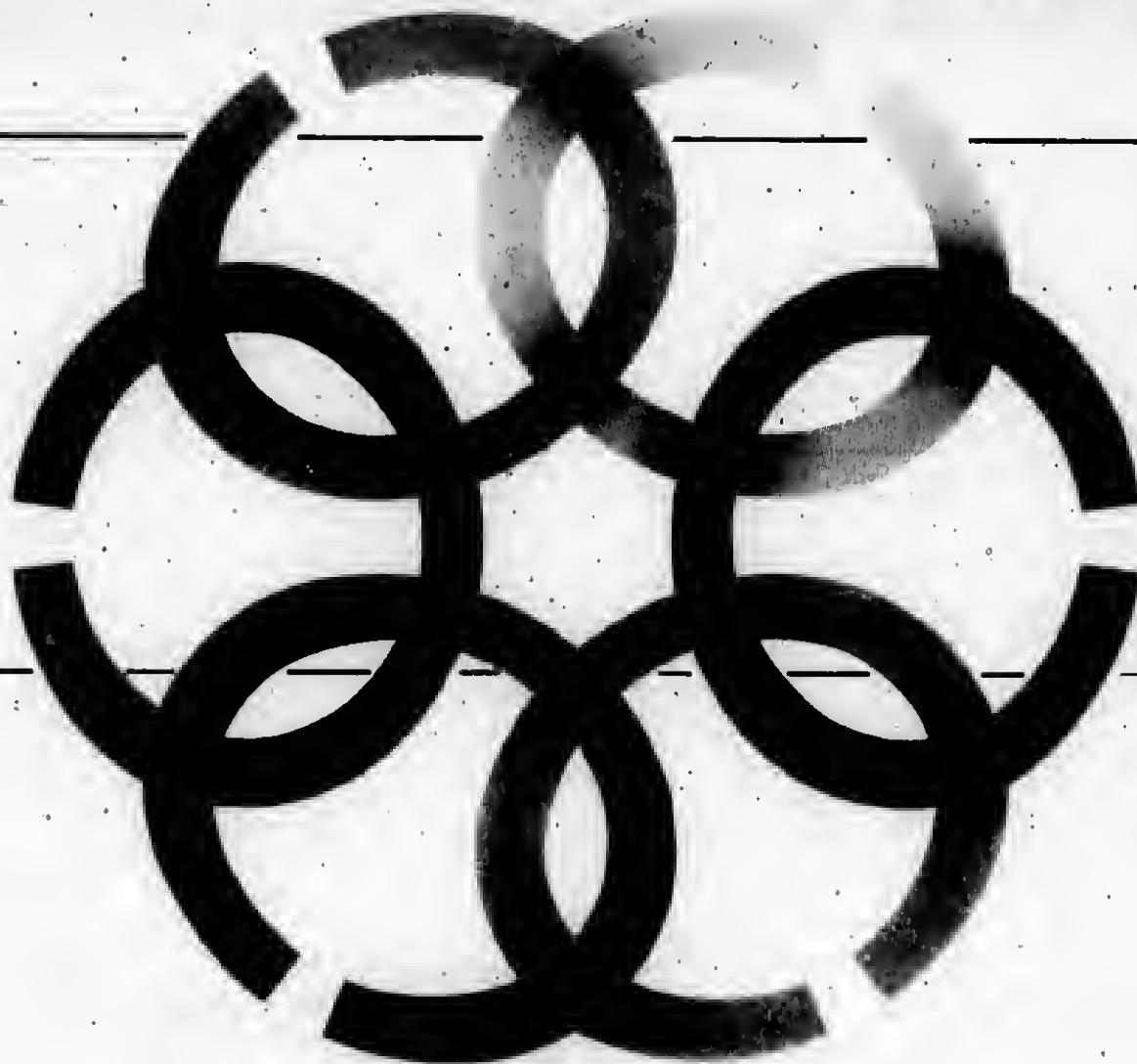
ARC supports all of the functionally dispersed tasks to be carried out at the same time — all on the common data base of the file processors.

Use your imagination.

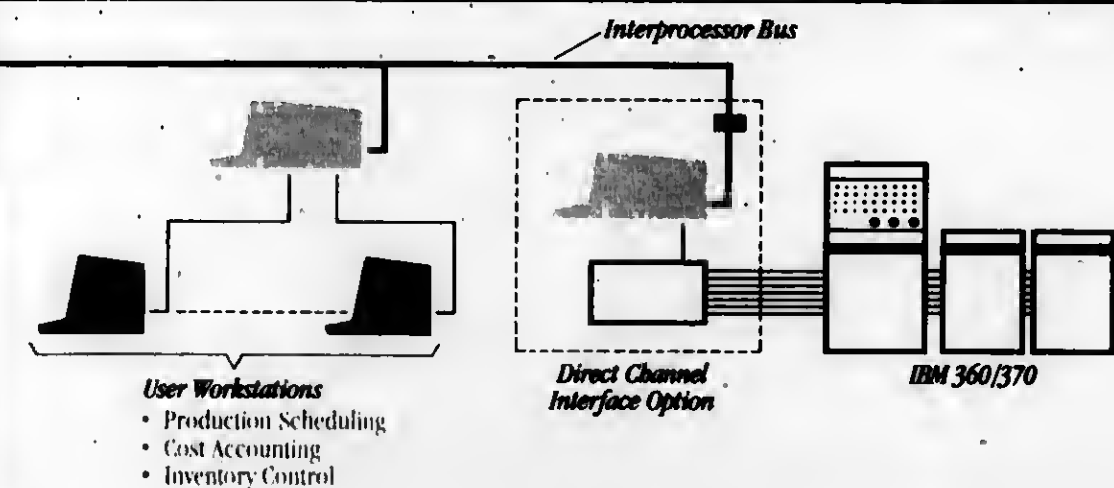
Take a look at some typical ARC Systems. And just imagine how they could be put to work for you.

Application Processor

File Processor



The ARC™ System



ARC™ system components

Datapoint provides you with all the building blocks necessary to construct an Attached Resource Computer™ System to meet your needs.

Processors



6600 Advanced Business Processor, 120K user memory, supports all Datapoint peripherals and up to 24 user workstations.

5500 Advanced Business Processor, 48K user memory, supports all Datapoint peripherals and up to 16 user workstations.

6000 Series Attached Processors, 60K or 120K user memory, supports all Datapoint peripherals and 16 or 24 user workstations.

3800 Series Attached Processors, 60K and 120K user memory, for single-user data processing, data entry, and telecommunications.

1170 Dispersed Processor, 48K user memory, supports Datapoint peripherals and up to 4 user workstations.

1150 Dispersed Processor, 24K user memory, supports all Datapoint peripherals.

Peripherals



Disks:

25MB Mass Storage Disk drive, up to 200MB per processor as a local or common database

20MB Cartridge Disk drive, up to 160MB per processor as a local or common database

5MB Cartridge Disk drive, up to 40MB per processor as a local database



Printers:

30 cps Servo printer

80 or 160 cps Freedom Printer

120 LPM printer

240 LPM printer

300/600 LPM printers



Magnetic Tape Drives:

7 and 9 track

556, 800, and 1600 bpi recording densities

Software:

COBOL: industry standard business programming language

BASIC: general purpose business programming language

RPG: report-oriented business programming language

DATABUS/DATASHARE®: Datapoint's high-level business programming language for single or multiple users

DATAFORM/MULTIFORM®: Datapoint's two-level data entry and checking language

DOS: powerful operating system with comprehensive utilities

SCRIBE®: Datapoint's powerful yet easy-to-use text processing language

DATAPOLL®: Datapoint's automatic polling and data communications program

Communications: IBM, Honeywell, Burroughs, Univac, and other disciplines

Use your imagination.

Mail this coupon today and find out more about the most important development in data processing since the minicomputer: the Attached Resource Computer. From Datapoint.

DATAPoint CORPORATION



The leader in dispersed data processing™

Datapoint Corporation
Attn. Marketing Communications
9725 Datapoint Drive
San Antonio, TX 78284

Tell me more about the ARC System!

Name _____

Title _____

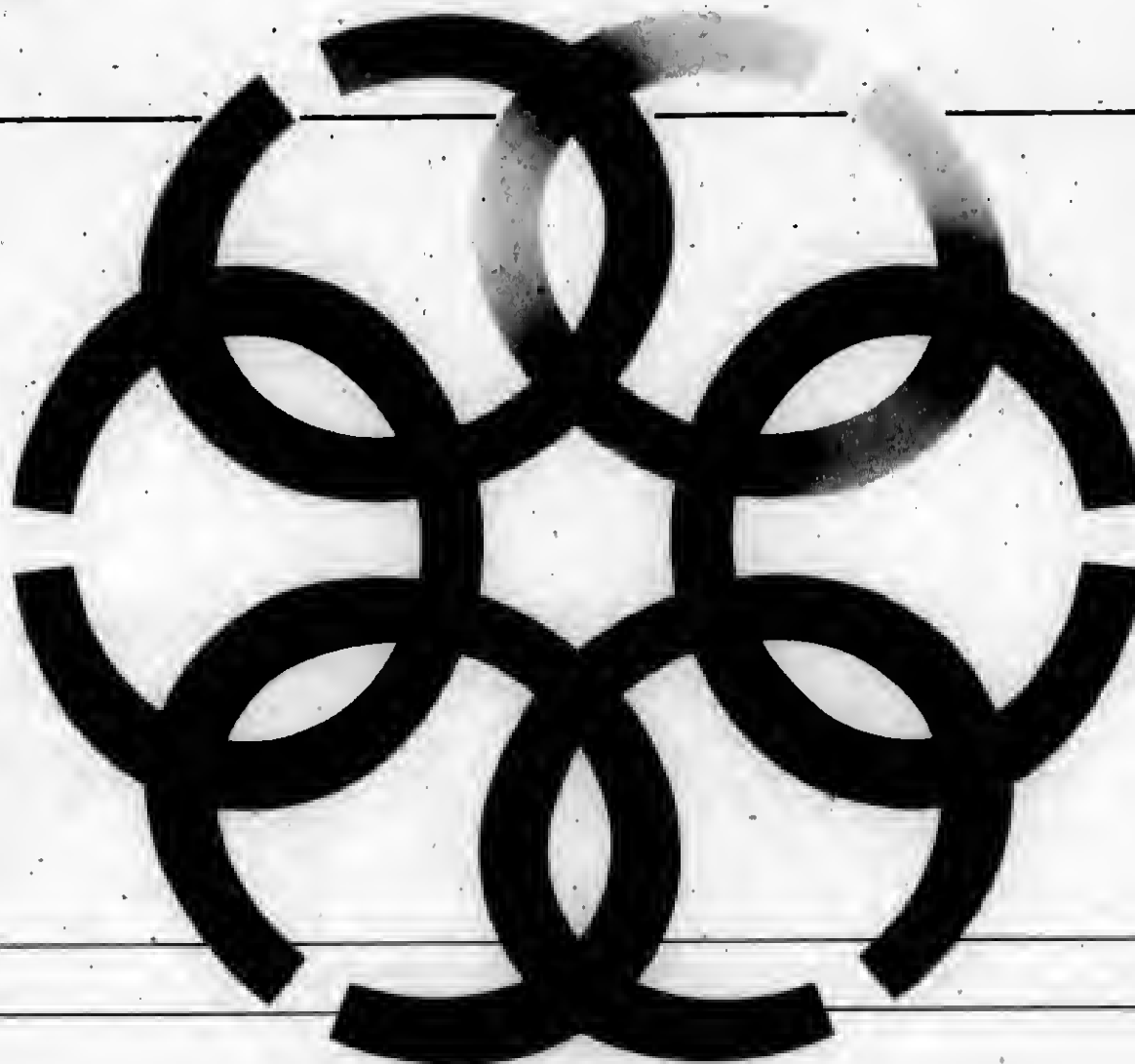
Company _____

Address _____

City _____

State, Zip _____

Do you presently use Datapoint equipment? _____



Do Your Homework, Users Advised

DDP: Make It a Byword and Not a Buzzword

By Leonard J. Hawkins
Special to CW

If a trip into the Land of Distributed Data Processing (DDP) is undertaken as a giant leap, uncharted and loose ended, DDP will surely end up as only a buzzword.

We have seen many such leaps occur through the years which were reasonably successful, even though accomplished in just that manner. You had better forget those successes in any effort you mount to install DDP.

You may recall the DP community took such a leap from unit record gear to computers. We had a built-in advantage that time in that we really had everything to gain and nothing to lose.

DP was not then having any large impact on the way a business was being run. DP budgets were a mere speck on overall costs of running the business.

We were handling some fairly large volumes of number-crunching applications, which in some cases freed people up to do more productive work, but applications were simple in nature.

At that time, there existed no instances of a management information system (MIS) as we know it today. So we just jumped right in and converted the punched card applications to computer programs. We were thereby able to speed calculations and print times and make DP an even greater mystery to management and the user.

We came out smelling like the proverbial rose because we saved some time and money. We didn't, however, improve what we did for the business management area.

Much at Risk

Now, however, we have seen and lived through a tremendous upswing in technology, education and forced recognition of DP. In many companies, DP and MIS have had a great impact on the growth of companies throughout the world.

We are now moving into an era where a major change in systems technology can lose millions if improperly handled. It is even conceivable that a move to Data Base and DDP technologies could lose a company. Such a move will cost large sums of money to initiate and must be made with care.

Successful implementation of DDP requires involvement not only of DP people, but also the full understanding and support of upper management, followed closely by the support and involvement of the user community.

As a DP venture, DDP will die without those ingredients. DDP must be user-oriented.

No leap, in this case, is possible. It requires careful planning on a much greater scale than we have ever previously undertaken. A detailed study of each application by both the DP department and users must be made to determine which of them should be distributed.

The first question should certainly be cost effectiveness. In each case, will the application require real time, or will shadow files be sufficient?

The cost of distributed networks and of data base technology makes it imperative to omit noncost-effective jobs. The effect of off-loading main-

frames must also be considered. Main memory is decreasing rapidly in cost, and off-loading a center could prove to be a bad move.

A good tool for making the decisions on which applications to distribute could be the preparation of a matrix. One side of the matrix might represent all the data elements contained in a data base; the other would represent each existing application.

Taking each matrix-matching block of the entire chart, one at a time, an in-depth study can then be made of all the effects of data on a particular application. From that study, a final, clean decision can be made as to whether the application is a viable one for conver-

sion to distributed processing.

Completely independent of but following the above selection process, each application selected for conversion must answer the criteria for being off-loaded from the mainframe. If it is highly manipulative and heavily processing-oriented with minor input/output involved, it should be crossed off the list. As previously mentioned, main memory technology is advancing by leaps and bounds with dramatic cost reductions.

If, however, the application consists of fairly large amounts of input, a small quantity of processing and large output, it becomes a very good candidate for DDP. The cost of telecom-

munications is higher than that for main memory.

At this point, when you have put all applications to the test as outlined, you should have a viable list of your potential application candidates for conversion. A review of the remaining list will immediately point out whether you continue with the planning and implementation.

If this seems a long and costly exercise, it will be, but the resulting DDP system will be good, and it will be cost-effective.

Once the application review is complete, it is necessary to choose the one systems application which will act as

(Continued on Page 5/38)

CommFile makes any dummy smart, even intelligent.

You can cut line costs, lower computer time, plus eliminate errors in data entry and editing on your computer terminal.

CommFile converts your free-standing display or printer terminal into a high speed data entry, editing and transmission station.

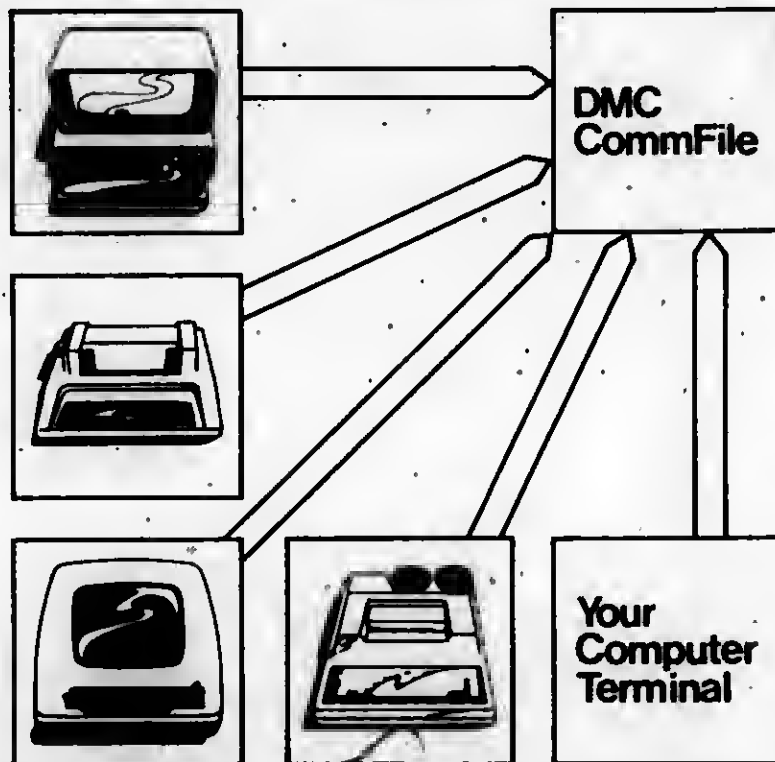
Plug any dumb terminal into the DMC CommFile.

You immediately get a powerful text storage, processing and communication system that is uniquely simple to use.

With CommFile, you can:

- Collect and store text from your terminal or timesharing system;
- Do comprehensive text editing and file management;
- Communicate these files to your timesharing system.

You can easily expand the basic turnkey system to a complete programmable CPU system with any or all of these features:



- Up to 60K of memory;
- Up to four floppies;
- Text editor;
- BASIC-Plus;
- Assembly language software;
- Word processing software for complex text formatting.

The CommFile is compatible with almost any data comm system.

Nationwide service (even for terminals you add on) through central dispatch, toll free.

For full information, contact Tom Bowden at DMC, or see us at Interface '78, Booth 962.



Send to: Tom Bowden
DMC a Division of Celer Corporation
2300 Owen St., Santa Clara, CA 95051
Phone: (408) 249-1111 Telex 357428

Name/Title _____
Company _____
Phone _____
Address _____
City _____ State _____ Zip _____

DDP Holds Promise for Data Entry Managers

(Continued from Page 5/7)

the jargon and interpret what is going on around them. It is also likely they may have to learn a programming language, perhaps Cobol.

There are three fundamentals data entry managers planning for DDP should consider. These include, first and foremost, productivity.

Most experienced managers have found themselves at one time or other trying to take a poorly designed manual system and mechanizing it in the hopes of increasing productivity. Those who have done so have seen the disaster than can result. There is a parallel situation in DDP. A poorly functioning centralized system cannot be effectively "distributed."

In addition, the productivity of dis-

tributed systems must be measured by different criteria than, perhaps, those which data entry managers have previously used. Productivity in a distributed system might be measured in cash flow or in terms of order turn-around or inventory levels. It will not be measured in keystrokes per hour, but it will nonetheless have to be measured.

Second, product potency is key. There are a lot of products in the marketplace that look very good, but they are quite simply out of gas in terms of their ability to support future applications.

Not every vendor has good hardware. If you look at where we're going with hardware architecture, you'll know that 8-bit architecture is old,

16-bit machines are "in" and 32-bit processors are coming. Those facts should be considered by users looking at potential equipment acquisition.

The third fundamental consideration for data entry managers is product life expectancy. As noted, approximately 70% of the applications under consideration for distributed systems have never been mechanized. Will the systems selected and implemented for those jobs be able to support the eight-to ten-year life expectancy necessary to justify even the initial cut at distributed processing? Or will they be designed to handle only that first application?

About 80% of all activities that can be expected to go on in a distributed proc-

essing network involve the following kinds of things: data entry, the ability to take data in an English language form and convert it to some form of machine-readable input; the validation of that data, from the most simple edits to the most elaborate checking and extensions currently handled on the mainframe; and, finally the control of data flow.

Users should consider how the equipment they select helps them perform data entry and do the kinds of validations and editing they want to do on the data and how the equipment can help them control what is on the network.

Transaction Mentality

It is important to realize distributed processing talks to transaction processing. It does not talk to batch processing.

Perhaps an example will help. Take 10 orders that come for processing. In a batch mentality, those 10 orders would be batched, a control document might be affixed to them and they would be sent to a central site for input to a computer. After processing, reports, bills of lading and shipping documents would be generated.

In distributed processing, the emphasis is on transaction processing. Taking those same 10 orders, each would be fully processed in and of itself at a local site and update information would be sent forward to a central data bank.

The transaction mentality is vital to DDP, and procedures are necessary whether batch or transaction work is performed. DDP equipment vendors must bolster the user's ability to develop those procedures.

The productivity of DDP systems will not occur unless it is planned beforehand. It will not happen as a natural by-product of distributing. We are already seeing sites that are "undistributed," sites that were centralized, went distributed and are now recentralized.

Part of the problem was productivity — they achieved no productivity increases. The hardware and software costs went up and management perceived that after a valiant try at being at the leading edge of distributed processing, they were going back to the way they did it before.

When data entry managers begin to plan for DDP, they must begin to plan the productivity associated with their networks. Data entry managers are well equipped by experience to handle much of those planning tasks, and it is the responsibility of system vendors to help them in that effort.

Moore is vice-president of domestic operations at Inforex, Inc. of Burlington, Mass.

Does 85% commonality make Centronics' line printer family the best? NO.

Centronics 6000 series band printers have much more to offer than just high parts commonality; technical features like an operator-changeable print band with a choice of EBCDIC character sets and microprocessor control, for example. Four models — providing superior print quality and a range of print speeds — 75, 150, 300 and 600 lpm, plus design simplicity that provides exceptional reliability and makes the 6000 series a true family of low priced, fully formed character line printers.

And, as with Centronics' matrix printers and teleprinters, the 6000 series is backed by the largest worldwide service organization of any printer company, and Centronics' reputation for reliability.

Write or call for complete 6000 series information. Centronics Data Computer Corp., Hudson, NH 03051, Tel. (603) 883-0111.



CENTRONICS
Simply Better



'I Never Should Have Let Him See Star Wars.'

**Want to see
tomorrow's
distributed
processing
systems
at work
right now?**



See Raytheon's

See it this week at INTERFACE 78

The new PTS/1200 MARK-I and MARK-II systems bring the second generation of distributed processing to computer users.

What is the second generation? Four things: multi-function concurrency on a single system; greater network productivity at lower cost; availability of advanced technology **with no change to host hardware, software or applications investment**, and more local processing capability than you thought possible.

Raytheon's new MARK-I and MARK-II systems bring all four advantages in a single family of distributed processing products that is substantially below the cost of most alternatives.

Today you can see most of these advantages at work at INTERFACE 78, the international data communications conference in Las Vegas from March 6th to March 9th.

Look at what you get with the new systems.

1. BISYNC or SDLC

Raytheon now offers the industry's most complete line of communications protocols, including 2780 and 3780 batch, 3270 interactive and HASP multi-leaving—plus SDLC, which will be available in the fourth quarter this year.

That means you can select a PTS/1200 and run it under your existing protocols immediately, with no redefining of process methods or central software. Change from where you are today to where you may want to go tomorrow.

2. Large capacity peripherals

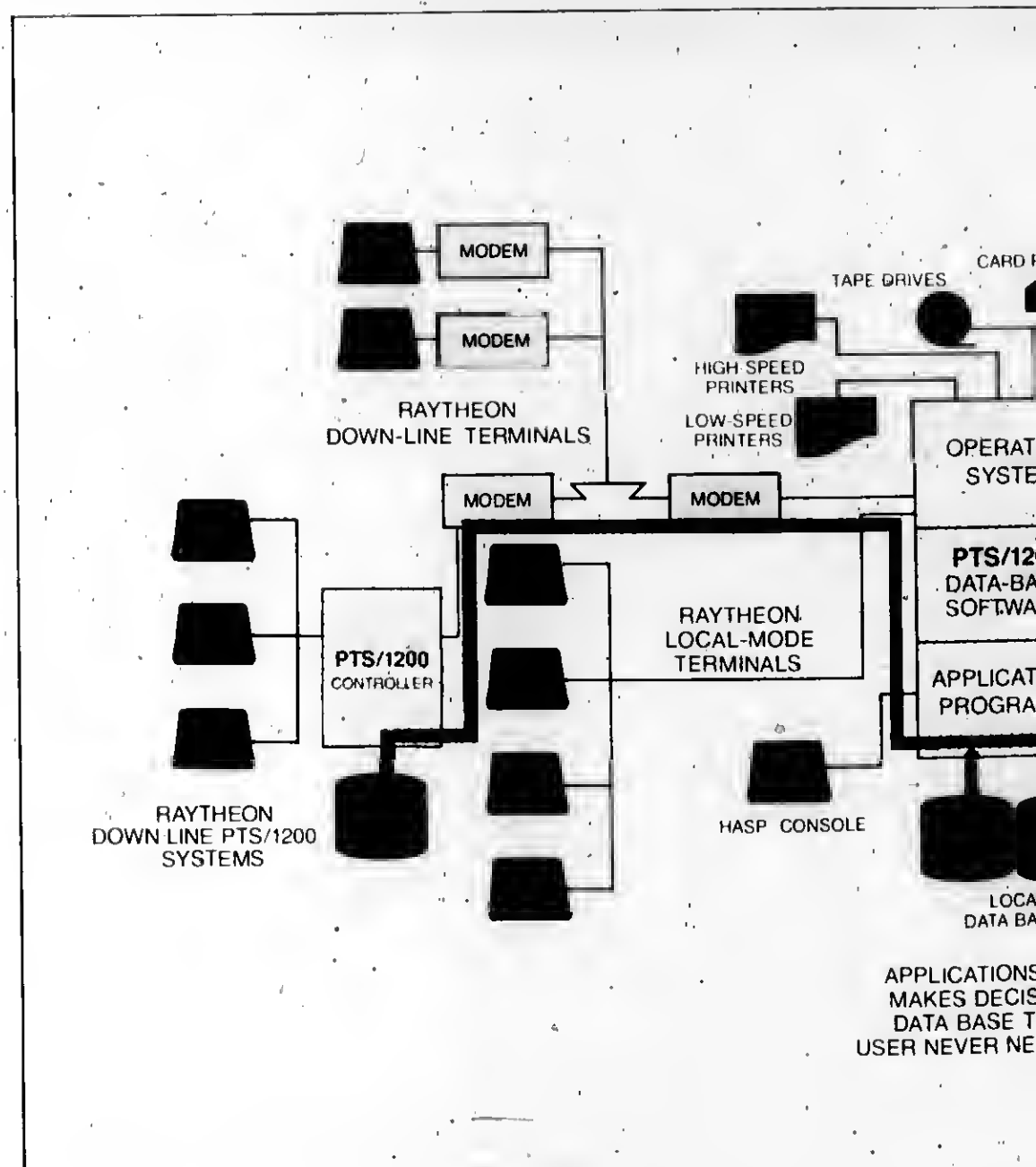
With the MARK-II system, Raytheon has added a seven-chip peripheral power equivalent to many mainframe configurations: 80-megabyte disk drives—up to four per MARK-II for a total capacity of 320 megabytes per system; higher speed magnetic tape drives with recording densities of 1600 bpi and a new 600 line-per-minute printer. Add that to the 26 other peripherals available on the PTS/1200, and you can configure a system to meet almost any requirement.

3. Advanced source data entry capability

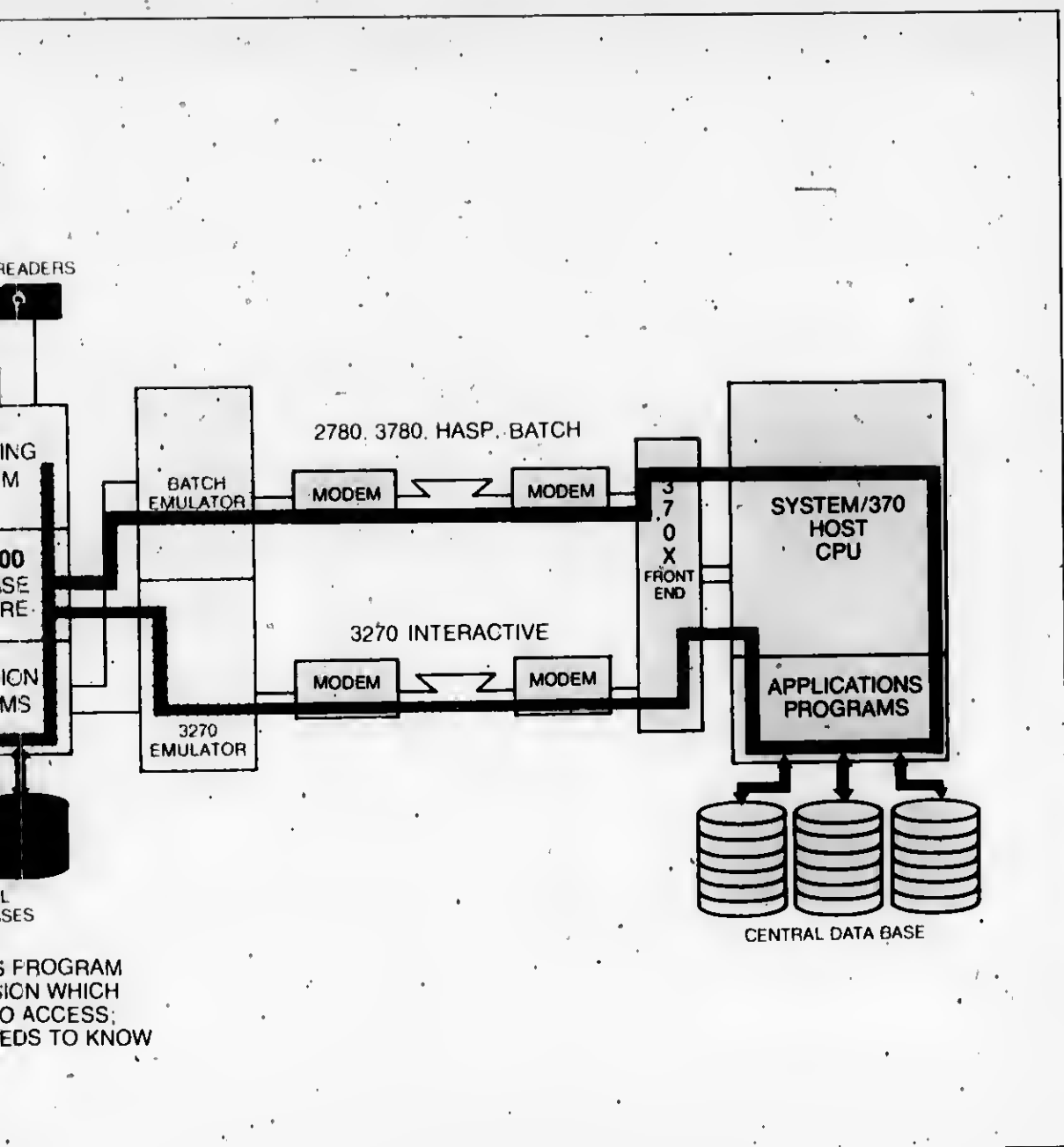
A new parameter-driven source data entry package permits non-programmers to set up data entry jobs. It incorporates a full range of edit, arithmetic and logical functions. The package lets users apply standard PTS/1200 equipment to many document conversions, editing, local storage and batch control tasks. The source data entry system, while not intended for high-volume keypunch room usage, can, with minimum user procedural change, be adapted to handle more easily a substantial amount of the source data entry and conversion work now done by assorted other devices. All concurrently with the batch and interactive communications that makes the PTS/1200 the first of the new generation distributed processing systems.

4. Five unique network productivity features

Raytheon takes the time, the effort and the complexity out of large data networks with a series of



new ^{PTS/1200} MARK I & II



five novel network support aids.

- A **downline terminal facility** lets your PTS/1200 run a multipoint network of PTS-100 and PTS/1200 systems under 3270 protocol independent of a host mainframe. This allows further distribution of processing power to even your smallest sites.
- A **teleprinter concentrator** lets your PTS/1200 control a downline TTY network and process it locally—or pass it upstream on the same lines—at the same time as your 3270-type terminal, or HASP, or RJE, or remote batch work is being performed. It's a little extra that can cut your communications costs for teleprinter networks by more than half.
- An **enhanced software editor** incorporates significant facilities of IBM TSO software. It assists users to develop programs for their host computers by pre-editing on PTS/1200 systems. As code is developed and stored locally, it can be batched and sent to the host for analysis, editing and debugging—thus eliminating a high percentage of the message traffic and host overhead support now needed under TSO to support remote program development tasks.
- A **remote debug facility**. With it, operators at the host PTS/1200 site can patch or debug programs operating on downline systems or terminals. In just minutes, not days. And without having to send staff personnel into the field.
- And **downline program loading**. A facility that permits transmission of programs from central to remote sites. A nice extra that saves time and money.

5. Intelligent 3270 operations

Raytheon built its data systems business by emulating, and then by extending, the capabilities of 3270-type products. Within the PTS/1200 family, you can grow from basic 3270 type devices to intelligent 3270-type products, to completely concurrent on-line interactive and batch systems, to powerful tree-standing local processing systems. Only Raytheon offers users a single migration path far into the future.

6. Soon, the PTS/1200 will support COBOL and word processing

Coming as part of the future of MARK I and MARK II is the addition of interactive COBOL to supplement our easy-to-use MACROL language, and the addition of our new Videotype word processors as peripherals in a shared data base system. By the time you are ready for those capabilities, you'll be able to get them all from Raytheon.

7. Next, 3274/3276 features

In addition to the enhanced 3270-type capabilities Raytheon now offers, shortly we will be supporting 3274/3276 features on our PTS-100 and PTS/1200 product lines.

Raytheon's MARK I & II - Part of the quiet Raytheon Revolution in data communications productivity

Did you know...

- ✓ ...The PTS-100 is the most popular intelligent terminal in the world?

There are more than 50,000 PTS-100 terminals in use right now—all intelligent and all working directly with a variety of host protocols, including **SDLC**. The PTS-100 emulates more than 20 protocols, costs less than almost any other intelligent terminal, and is supported by one of the industry's largest field maintenance organizations.

- ✓ ...The PTS/1200 was the industry's first distributed processing system with 3270 concurrency?

It was announced initially in 1975, when the term distributed processing was just coming into being. Today hundreds of PTS/1200's are installed at leading-edge user sites performing multiple tasks concurrently in network environments. Our new MARK-I and MARK-II systems add many more capabilities to the pioneering PTS/1200 system.

If you don't make INTERFACE...

To find out more about the MARK-I & II or other Raytheon systems, please send us the coupon below, or call our local sales office.

- ☐ Tell me more about MARK-I & II distributed processing systems. I currently plan to establish a _____ site network with _____ operator stations under _____ protocol linked to _____ host mainframes.
- ☐ Tell me more about:
 - ☐ PTS-100 intelligent terminals
 - ☐ Other: _____

Name: _____
Title: _____
Company: _____
Street: _____
City: _____ State: _____ Zip: _____
Telephone: _____

Send coupons to:
Marketing Department
Raytheon Data Systems Company
1415 Boston-Providence Turnpike
Needham Heights, Massachusetts 02462

- ✓ ...That Raytheon Data Systems is one of the world's largest manufacturers of digital telecommunications systems?

Computer users rarely see the non-terminal ends of Raytheon Data Systems. But we built an entire line of work—first digital, now wave radios for the defense industry, and are one of the largest suppliers of terminal equipment throughout the world. Few terminal equipment suppliers today have the total knowledge of networks that Raytheon has.

- ✓ ...That Raytheon was the first U.S. company to link 3270-type terminals to public packet networks?

Packet networks are rapidly coming into use worldwide. They employ the X.25 standard and HDLC as link access protocols, instead of bisync or SDLC protocols. Last year, Raytheon introduced RayPACK and DMEP software packages to allow PTS-100 terminals to attach to X.25 packet networks and still appear to the host as 3270-type devices. Another example of Raytheon's commitment to lead in data communications networking.

- ✓ ...That Raytheon is now in the word processing business?

Soon, the VisiText™ CRT-based word processing products will be added to Raytheon's distributed processing system as peripheral units that share large common data bases. Another step in improving your data handling productivity.

Raytheon is continuously bringing enhanced benefits to computer and communications network users around the world. When we make a commitment to a user, we back it up with state-of-the-art based technical know-how, our own lease financing, and worldwide support capability. You should expect nothing less from your information systems supplier.

Intelligent

RAYTHEON DATA SYSTEMS

1415 Boston-Providence Turnpike

Needham Heights, MA 02462

Circle 10 on Reader Service Card

RAYTHEON

RAYTHEON

RAYTHEON

RAYTHEON

RAYTHEON

Gap Between Idea and Use

If DDP Is So Great, Why Isn't It Everywhere?

By Lawrence Feidelman
Special to CW

The system design concept known as distributed data processing (DDP) is on everyone's lips, but has been implemented by only a few companies.

Conceptually speaking, DDP represents a new generation of DP that will be more oriented to individual users' needs than are centralized systems. Specifically, distributed processing pertains to the division of logically related processing functions among multiple geographical computer systems.

That mouthful simply means multiple computer systems are placed at various physical locations, each doing its own processing.

But it isn't only the processing function that is being distributed; it is the whole manner of interacting with the DP system. Distribution of processing capability also infers the performance of data entry, the availability of data base inquiry to departmental personnel and the presentation of specific management reports at each location.

The end user, not a DP professional, takes responsibility for the system.

For the system designer, DDP also has significant value. It permits both equipment and software to be designed in a modular form (i.e., building blocks). Such modularity clearly improves scheduling and application completeness and permits expandability in clearly defined steps.

In addition, the overall system reliability is enhanced by "system degraded" modes in lieu of total system failure.

If it is everything everyone dreamed about and more, then why hasn't DDP gained widespread usage?

Many problems must be solved before DDP is used as much as it is discussed. In fact, DDP, while heralded by manufacturers, has strained relations between the excited user departments and the protective DP manager — the users see freedom from DP control and the DP manager envisions havoc.

Program Development

Both parties have a point expressed in the following concerns:

Within a central location, the programming staff exists to develop application software. What happens when the computer is placed in the user department and the user can develop his own programs?

The ability to develop programs at widely dispersed locations with any semblance of efficiency and commonality must be a worry. In many cases, the DP department has stated its intention to develop the application programs and transmit them to the remote sites.

But can the creative user destroy his programs as well as the system? Existing programs as well as the data base must be protected from destruction.

On the other hand, new clerically oriented business languages must be implemented to make programming at remote locations relatively troublefree.

System Usage

Since use of the distributed system is now in the hands of non-DP people, a new breed of DP personnel are needed

to train these people and monitor operations at remote locations.

Control

A key element of the DDP system controversy is system control over equipment and personnel. Data processing management must deal effectively with the outside world. System operation procedures must be developed and understood by each user.

Beyond these procedures, the system operations must be monitored and that is the crux of the problem. DP people fear a rash of system failures because of misuse. For that reason, each system to be selected must reduce user errors, while it provides clear information on

the cause of problems.

Most system problems will have to be fixed remotely. This means manage-

'... DDP, while heralded by the manufacturers, has strained relations between the excited user departments and the protective DP manager — the users see freedom from DP control and the DP manager envisions havoc.'

ment terminals will be tied into the various systems and intelligent people will be required to operate them.

Computer security has been a major concern in DP. However, problems found in a central computer are magnified in a distributed processing environment. When a large number of people at many remote locations use a system, data transmission between sites and multiple file accesses become a problem. Many opportunities for security breaches exist. For example, wiretapping and stealing of access passwords must be considered by the potential user.

Password Protection

Protection by simple passwords is insufficient. The need exists for low-cost
(Continued on Page S/58)

Your data is not interterminalable!

Whether your data is bar-coded, written, fast, slow, continuous or intermittent; there's a terminal that can handle it. And our March 27th Special Report will help you find just the right one for you.

Edited by Ron Frank, *Data Communications Terminals* will focus on the choice and selection of special terminal equipment for specific types of data communications networks, such as point-of-sale or EFTS. It will include topics like these:

- The use of terminals in private line, dial-up and public packet networks.
- General-and special-purpose terminals in dedicated networks.
- Characteristics of terminals that help to improve the man-machine interface and make them easier to use.
- Fitting the terminal to the job instead of making management rearrange itself to fit the equipment.

Whatever kind of data communications you're involved in, you need terminals. So dial up this special report and stay ahead of this rapidly changing field.

If you're marketing terminal products or services, your ad should be there on March 27th. Closing date is March 10th. For more details, contact your *Computerworld* sales representative. Or call Terry Williams at (617)965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486

Vendors Offer Edge in Providing DDP Service

(Continued from Page S/21)

maintenance approach, he should know how the individual field engineer assigned to him goes about solving his maintenance problems and what the user can do to help.

When the field engineer arrives, the user should give him a clear picture of the problem — whether it happened before, whether it happens often (or under the same condition each time), whether the problem recurs in relation to something else.

For instance, if the outlets feed into the same lines as the elevator, the user will get his share of ups and downs (and don't laugh, it has happened).

If the problem can be diagnosed on the telephone, the user can sometimes avoid the expensive downtime involved when the field engineer has to come out.

If the problem is hardware-related, the field engineer has a wide assortment of tools to help define and isolate the problem. These might include portable oscilloscopes to trace logic signals, communications testers, line analyzers, digital voltmeters and devices to check the temperature of heat-sensitive components.

If it's a software problem, the field engineer may use the system's built-in diagnostics to help solve the problem or, in some cases, determine whether it's systems- or mainframe-related.

As backup, the vendor's field engineer can call the company's stable of troubleshooters who specialize in out-of-the-ordinary problems or access a central diagnostic facility which duplicates and monitors a user's configuration in a controlled environment to help minimize downtime.

Feedback from the field engineers, when combined with reports on nationwide parts usage, failure analyses and trends, can then be used by the vendor's research and development staff to help make the equipment as reliable as possible.

Spare Parts

With the problem isolated and defined, the field engineer needs immediate access to spare parts — many of which he brings along — to fix the problem. This is possible only if the vendor has strategically located spare parts depots; a prospective customer should find out whether the vendor in fact has them.

By maintaining detailed records of comparative failure frequencies and usage, moreover, a vendor can supply its own field engineers with sufficient spares to sustain normal operations and use the depots to replenish the service force or maintain inventories in emergency situations.

If a system has been designed with a modular concept, much of the repair work can be done on a replacement basis with the spare parts. The modular approach not only helps identify the defective parts that can be replaced, but also allows technologically improved assemblies to be retrofitted more easily and efficiently.

Equipment Reliability

The reliability of the vendor's equipment is, of course, of paramount consideration and cannot be stressed too strongly. It's important for several reasons: DDP requires equipment that

is sufficiently durable to accommodate constant use.

Used by Non-DP People

The equipment is usually in the hands of non-DP personnel and if something goes wrong, the whole office's operations may be jeopardized.

The best field engineer in the world cannot satisfy a user whose machine is down every day.

One of the best measures of the inherent reliability of a machine is reflected in its mean time between failure (MTBF) as well as its mean time to repair (MTTR). Historically, electromechanical devices which receive a lot of wear and tear, such as line printers, card readers and punches, cassette and flexible disk drives, have a lower

MTBF (or are more apt to fail) than do electronics devices like CRTs. They therefore carry a higher maintenance charge.

Lower Failure Rates

The failure rate on electromechanical devices can be minimized, however, by routine preventive maintenance procedures including checking various components, calibrating to compensate for mechanical wear, lubricating moving parts, running diagnostics and cleaning of parts.

Activities such as these can range from once a month for electromechanical devices to twice a year for electronic components, depending, of course, on customer usage.

DDP, by almost everyone's defini-

tion, is here to stay. It represents a significant new tool for both users and management to help manage their business more effectively and, in many cases, less expensively. It is not only a vital link between headquarters and remote offices, it is an essential ingredient for remote offices to handle their own applications.

To realize its benefits, however, DDP equipment must be maintained. Selecting a vendor and its field engineering organization which will grow with the user — both geographically and technologically — will help the user reap the rewards.

Valfer is Data 100 Corp.'s general manager of field engineering operations.

SYSTEM 70

The Intelligent Network Terminal that does it all.

You need intelligent source data entry. System 70's got it. System 70 reduces keypunching costs and increases reliability. And, it's got ADDS*PLUS, the special data entry language that makes customizing data entry forms a breeze.

You need communications capability. System 70's got it. System 70 provides remote sites with immediate information access to the central data base. And, it fits simply and easily into almost any new or existing network using any of several communication protocols including Teletypewriter, IBM 3780 and Burroughs. System 70 makes it all easy.

You need local processing. System 70's got it. Powerful programming languages such as ADDS*BASIC and ADDS*FORTRAN make it easy to accomplish local data processing functions on System 70.

You need a remote print station. System 70's got it. Distant offices generate hard copy using any of several ADDS printers ranging in speed from 30 cps to 340 lines per minute. No network terminal does it all like System 70.

Because you need quality and reliability, you've got it. ADDS reputation for designing and building the finest equipment available is unsurpassed. **Quality, Reliability and Integrity. It all adds up to ADDS.**

ADDS

Applied Digital Data Systems Inc.
100 Marcus Blvd., Hauppauge, N.Y. 11787
Telephone: (516) 231-5400

I need more information on the System 70.

Name _____

Firm _____

Title _____

Address _____

City _____

State _____

Zip _____

Phone _____

Don't Underestimate Impact

Distributed Processing: Weighing Pros, Cons

By Esther Surden
CW Staff

Distributed processing is applicable to many organizational structures and management styles, and it could have a greater impact on companies than may be readily apparent, according to a report by Kenneth G. Docter, partner-in-charge of San Francisco Bay Area Management Advisory Services at Price Waterhouse & Co.

"Though there is no common definition of distributed data processing [DDP] there appears to be a key conceptual thread which runs through most definitions — the functional distribution of certain data processing activities along logical organizational

lines," the report issued by the consulting firm said.

As DDP develops, both data base and DP activities will migrate to remote sites. "With local data structures and processing capability, the local distributed computer will be integrated with and interact with operation control computers," Docter predicted, adding "distributed processing will really 'come of age' as the loop is closed from the operational control system back to the management information system."

Distributed processing fits in with both centralized and decentralized management structures, Docter contended. Because users have local con-

trol, a cooperative environment can be assured.

Another advantage of distributed processing, according to the report, is that costs are "generally lower than for comparable capability in a centralized environment" and "are significantly lower" than replacing unique systems. In addition, expansion can be handled at the local site, increasing flexibility.

The "proper" use of specialized software for specific needs can also provide economies in a distributed environment. Because of replicated hardware, backup of existing systems can take place without duplication of costs.

"Downtime becomes a matter of de-

graded performance or reduced capability rather than a total loss of processing," the report noted.

DDP Negatives

DDP does present some limitations, considerations and challenges, Docter pointed out. For example, "technology has out-distanced management control" and manufacturers can deliver elements of DDP systems now.

With distributed processing, a "potential loss of consistency in the data and the controls and security exercised over the data" is possible and there is also a "potential for redundancy of data."

Furthermore, additional technical personnel may be needed at the remote locations, he said.

In addition, Docter warned, DDP demands cooperation throughout the DP organizations within a company or management may lose control over the DP function.

Among other such possible problems are the accumulation of "an unmanageable collection of incompatible computers and application systems," a "temporary increase in total DP costs as the centralized functions are off-loaded from the 'fixed-cost' central computer," and "ineffective or inefficient applications as inexperienced users attempt to directly utilize the new local computing power."

Overall development costs could also rise "if users fail to build on prior efforts or if there is no central catalog and repository of these efforts." Misuse of resources could result if "users are not required to justify new equipment applications," the report warned.

Minimizing Problems

In order to minimize the problems and assure control over data and data bases, several techniques have been developed, the consultant stated. Standards, policies and procedures could be developed and controlled centrally, he said, and centralized application development would allow no local access or ability to change programs.

Another method would be "joint local and central staff programming task forces" designed to provide "standardization in development." Alternatively, users could appoint an internal consulting staff "to guide the local organizations through projects" or to serve as a programming services resource.

(Continued on Page S/44)

The full-year 1977
Computerworld Index
will be available soon.

For subscription details,
call Maureen Burke at
(617) 965-5800.



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

When minis are hooked up,

Sperry Univac's minis now solve the problems that curse other distributed data processing systems.

Such as the aggravating throughput problems you get from inadequate network design, limited CPU performance, and insufficient data base management capabilities.

Our PRONTO minicomputer systems have been designed to tie together simply. You can tailor your specific distributed data processing requirements to solve problems more quickly than ever before.

There's no slow down on your application — whether you're tying in one PRONTO system. Or twenty.

You can continue using the tools you already know. Like COBOL, FORTRAN, and industry standard communications protocols. What's more, our data base management system will allow you to implement efficient and user-tailored data bases.

And as your communication and data processing needs increase, you simply add more PRONTO systems. After all, they're

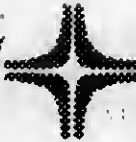
traffic shouldn't slow down.

designed to keep pace with your growth.

For more information, write Sperry Univac Mini-Computer Operations, 2722 Michelson Drive, Irvine, California 92713. Or call (714) 833-2400.

In Europe, write Headquarters, Mini-Computer Operations, London NW10 8LS, England.

Ask about our PRONTO system, a complete package of software and minicomputer hardware that can keep your traffic flowing smoothly.

SPERRY  **UNIVAC**
SPERRY UNIVAC IS A DIVISION OF
SPERRY RAND CORPORATION

Plan for DDP Security Now or Pay for It Later

(Continued from Page S/2)

cedure. Again, the identifiers can be used to check that all messages are recovered.

It's impossible to design a totally secure system. There are too many factors that can't be totally controlled — like human interaction and complex transmission facilities. Anytime data is transmitted, switched, concentrated, etc., there are a myriad of ways it can be illegally monitored.

When designing or specifying security features, however, there are three areas where different levels of security can be implemented. These are network accessing; intrusion detection; and data transmission techniques.

Limiting access to the network can be handled fairly easily and inexpensively. Some of the tried and proven methods include passwords and authorization codes, which indicate if the requester and his request are "legal."

Such security can be implemented by verification tables. Since the security is being handled by the software, it's both easy and inexpensive to change passwords and transaction authorization codes on a regular basis, thus providing another level of security.

If merely locking out unauthorized users or requests isn't enough, it's not too difficult or expensive to design routines that will shut down the offending terminal. Messages could also be sent to supervisors identifying the terminal, the user password and the

time of the violation. Such security is often enough to discourage all but the pros.

Once data is in the line, it's vulnerable to unauthorized monitoring via different kinds of scanners. The crude devices attach to the line; the sophisticated ones do not.

Some steps can be taken to neutralize such scanners. Users can multiplex transmissions, use synchronous data streams, employ alternate path or rotary line transmissions or resort to data encryption.

Multiplexing messages is not a bad protection ploy, for it makes it fairly difficult to discern what's being transmitted. Synchronous transmission, on the other hand, merely lets the user know when the monitor is attached.

(When a monitor is connected, synchronization is upset and errors occur.) What he does about it is another matter.

Halting transmission is not the answer, especially when the numerous reasons that trigger such errors are considered. Designing hardware or software to distinguish error types is a possible solution — but a very expensive one.

Cheapest Security

The key to high-level security — and point for point the cheapest to implement — is data encryption.

With the encryption available today, users can choose from packages which scramble data for storage and transmission; many sophisticated data base

management systems, also provide encryption which can be used locally and on-line.

Encryption allows almost limitless encoding/decoding schemes. Keys can be changed as often as desired; the encoding algorithms and schemes can be modified; and decoding can be done via pure software; hardware or a combination of both.

In a distributed network, these encoding/decoding schemes could be selectively placed in different terminals at remote sites, thus providing a high level of data selectivity and security.

Hunter is project editor for *Auerbach Software Reports*, published by Auerbach Publishers, Inc. of Pennsylvania, N.J. 08109.

DDP a Byword, Not Buzzword

(Continued from Page S/27)

the pilot. Under no circumstance should more than one area be undertaken until a successful track record has been established. It is important that the pilot project is undertaken with a user group which is enthusiastic and eager to work to make it happen.

A move to distributed data base technology holds massive potential for profit, but it requires a well-planned effort, along with an educational thrust on the part of everyone.

The answer to the question, "is DDP a buzzword or byword?" is purely up to the people involved, and everyone from upper management to the data entry people must be involved. If everyone does his homework, DDP will be a byword.

The technology is here, are you ready for it?

Hawkins is a systems engineer on the management systems staff of Rockwell International, Automotive Operations, in Troy, Mich.



'I Don't Care What Your Computer Says ... My Computer Says ...'



Need Each Other to Succeed

Smart Terminals Go Hand in Hand With DDP

By Gary Sharpe
Special to CW

NORWOOD, Mass. — Just a few years ago, terminals were dedicated devices that performed simple I/O jobs, made no decisions and pretty much left the processing to the host computer. Along with advanced minicomputer and microprocessor technology, however, came the era of the "intelligent" terminal and the potential for distributed data processing (DDP).

Today, terminal intelligence and DDP are tied together in symbiotic fashion: each needs the other to succeed. The more processing responsibility that can be distributed to and handled by the local terminal, the more

effective the distributed network as a whole, because the host can spend its time on what it does best — central batch processing and overall network maintenance and information control.

To oversimplify, there is little room for dedicated, or "dumb" terminals as primary nodes in modern distributed networks. The greater the functionality of a terminal, generally speaking, the greater its potential contribution to the efficiency and effectiveness of the distributed network it serves.

Areas of Functionality

For primary-node distributed terminals, functionality can be evaluated in two areas — stand-alone (local proc-

essing) power and remote (local-to-host) capability.

Specifically, a powerful stand-alone terminal should be capable of source purification (editing, validation) of data entered locally, so that extraneous or inaccurate data will not be passed along to the host. It should be able to handle concurrent local interactive and batch processing and be able to drive high-performance local peripherals such as large disks and high-speed line printers. In addition, it should allow significant local programming flexibility for storing local data base files and screen-formatting programs.

Not every intelligent terminal needs all these features for a given applica-

tion, but the greater the functionality range, the better the terminal's capacity for later growth — another important criterion for selecting intelligent terminals for use in distributed systems.

Typical local processing applications for distributed terminals include source data entry, data editing and validation, local file access, personnel and payroll recordkeeping and, of course, local batch processing.

For data entry, editing and validation, the terminal system should allow user-programmed screen-format generation so data can be organized and "automatically" edited, according to system-wide standards, at the time it is being originally entered.

For local file access, the terminal system should be capable of constructing, maintaining and accessing files stored on multiple local disks, and it should be able to output the results by CRT, low or high-speed printer.

For additional local applications, the terminal should offer an efficient, easy-to-use high-level programming language. Cobol is most widely used, but some distributed system vendors offer more efficient languages that are said to do the job of a Cobol program but without the main memory waste associated with its general verbosity.

For local batch processing, the terminal should be capable of automatically scheduling (and performing) unattended batch operations at a time when the terminal's interactive processing activity is at a minimum — typically at night.

Remote Processing

Remote processing applications for intelligent terminals in distributed networks include remote job entry and emulation of various large-computer terminal-device functions. Emulation is important to users who have large central mainframes because a typical emulator terminal will look to the host exactly like the real thing, but will add to the limited processing capabilities of the original device being emulated.

As an example, IBM's 3270 CRT terminal is not user-programmable for multiple applications, nor can it drive a high-speed line printer. Some competing products that emulate the 3270 have a lower price and added features, such as user programming, line-printer interfacing and local editing of source data.

Inherent to effective terminal emulation, as well as to remote processing in general, is the intelligent terminal's ability to communicate using the appropriate communications protocol for the application. Used as a 3270 emulator, an intelligent terminal must communicate via 3270 protocol; in a 360/20 Hasp workstation application, the remote terminal must use 360/20 Hasp protocol to communicate with the host. Synchronous Data Link Control (SDLC) and Pars/lpars are two other protocols used — and emulated.

A remotely controlled intelligent terminal should additionally be as "controllable" by the host as possible. It should be capable of remote (host) program loading and debugging, and it should provide adequate security "hooks" so terminal access is available

(Continued on Page 5/58)

DATAPRODUCTS' NEW ERA T-80 THERMAL PRINTER: 80 CPS FOR THE PRICE OF 30.



Dataproducts' New Era T-80 thermal printer is nearly three times faster than other thermal printers.

Yet it costs about the same.

What's more, the T-80 offers you Dataproducts dependability,

assured by a smartly conservative design, a unique solid-state print head, and a minimum of moving parts.

Noise, too, has been minimized.

The quiet T-80 hums at 80 cps, so it can be seen but barely heard.

And head changing is a snap.

Any operator can put in one of our incredibly small, self-cooling heads in a snappy 10 seconds.

Our New Era T-80 thermal printer, with its parallel or optional RS-232-C interface, is ready to tie into your CRT, your terminal, or your processor.

The T-80: fast, inexpensive, quiet, and reliable.

Altogether, an unbeatable combination.



THE PRINTER COMPANY

NORTH AMERICAN SALES HQ: 6219 De Soto Avenue, Woodland Hills, CA 91365, (213) 887-8451; Telex 69-8492.
EUROPEAN SALES HQ: Darmstaedter Landstrasse 199, Frankfurt, W. Germany, Phone 681034; Telex 841-416344.

IBM User Group Describes 'Ideal' DDP System

(Continued from Page S/2)
primary power source.

Given that DDP systems will operate, access and generate system control programs (SCP) in an environment controlled by non-DP personnel, "the SCP must become much simpler than it is today," the report noted. "The present forms of Job Control Language and system generation are unacceptable for use in distributed systems.

Integral Functions

"All functions required for systems control, data base manager, networking, programming languages, utilities, etc., must be integral to the SCP. Functions included in the SCP must be selectable at the option of the en-

terprise," the report stated.

Further, the SCP "should permit running a job mix where the physical requirements of a job may exceed the size of physical memory and other resources at a given node, and each system module must be both locally and remotely loadable at the option of the enterprise."

Users also require a command language that "is made up of simple and common words, is the same for all users at all nodes, is executable through all terminals and programs" and "has selected commands prohibited to specified users or programs at the option of the enterprise."

The ideal system generation process should be "simple, consisting of specifying minimum information con-

cerning configuration and desired functions" with "flexible generation, loading and testing procedures which can be performed at/for any node/terminal, as authorized."

The system generation process should provide the facility to modify segments without the need to regenerate the entire system.

Communication Requirements

Since DDP systems use a communications facility that "includes all hardware and software required to support the transmission of data and messages between nodes," users require several functions of such a facility.

For example, the report noted, peer-to-peer and hierarchical relationships

should be permitted. In addition, "a facility to establish communication paths between nodes must exist."

Among other features the communications facility should have are paths concurrently between nodes ... a single uniform standard for communications data descriptions and interprocessor control [and] the capability for a node to initiate communications with any other node in a contention network."

The task force found "encryption, scrambling and other security techniques must be the responsibility of the communications facility and transparent to all users," should "support the transmission of large data sets" and "control the transmission process including any necessary format changes, blocking, buffering, error recovery, etc., resident in the communications facility."

Lastly, the system would optimize "data transfers and prevent overloading on any individual path," the Share unit noted.

Data Base Needs

A distributed data base manager (DBM) has components which are distributed among multiple nodes. In support of this environment, the task force said, "the distributed nature of the files and system must be transparent to the user."

The appearance of "one logical DBM" should be maintained.

Thus, "regardless of where issued, all calls made to the DBM should be in a common data sublanguage and therefore compatible and transportable; parameters specified for a given request should be identical regardless of the environment in which the request is issued" and "the data sublanguage must be provided in all available languages."

Authorized users must have the "option to generate a nondistributed or distributed data base and/or DBM."

"Selectable features of the DBM must allow the DBM to be tailored to specific applications. When less complex options are selected for the system, performance must be improved," the task force said.

One Machine

Since most users of DDP systems will have few data processing skills, users cannot be "expected to develop sophisticated technical skills to program the applications and operate the system," the white paper warned.

To this end, the programmer must perceive a program as though it were in a single machine. Programming languages should be "capable across all nodes" and source code compilation and execution "must be compatible with all machines."

Since this implies the same language capabilities available at all nodes, "all languages should access the data base manager and the operating system in a uniform manner."

The task force determined that APL, Basic, Cobol, Fortran and PL/I should be supported.

In addition, the report noted, user-oriented languages should be developed to support the distributed environment with migration paths provided "through system bridges or sift programs from current [languages] to the new language."

DON'T THROW THEM AWAY!!

We realize your first impulse will be drastic when you see our 700/UETS (Universal Emulating Terminal System) in action—but remember that other less demanding terminal users may have an application for your outdated machines. And why should you have so many different terminals when ONE UETS can do all the work—and do it better and more economically.

IF PARTING WITH OLD FRIENDS IS PAINFUL, JUST THINK WHAT THE UETS WILL DO FOR YOU.



- Communicate with numerous different host computers.
- Replace any number of different terminals with ONE machine, greatly reducing overall equipment expenditures.
- Reduce training time and enhance operator efficiency; no jumping from machine to machine and procedure to procedure.
- Reduce down time and maintenance complexity; you deal with only ONE service organization, and all spares are provided by ONE source.

No matter what your application, the MEGADATA UETS—with its 15-inch diagonal display, full-scale 12-bit microprocessor, and 126-station keyboard—will provide the right hardware plus the complete software to meet all your requirements TODAY and in the FUTURE.

Forget your old machines, and find out more about the programmable intelligent UETS terminal.

MEGADATA CORPORATION

35 Orville Drive • Bohemia, New York 11716 / Tel. 516-569-6800 • Telex 14-4659

Central Regional Office • 2200 E. Devon Avenue • Suite 217 • Des Plaines, Illinois 60018 • Tel. 312-296-1900
Western Regional Office • 15910 Ventura Boulevard • Suite 800 • Encino, California 91316 • Tel. 213-990-9777

KEY-EDIT[®] Series 2
takes care of today and tomorrow ...
we built it that way!

Yes, I want more information on:

- Data Entry -- KEY-EDIT 2000
- Data Communications -- KEY-EDIT 2022
- File Management -- KEY-EDIT 2024

Please send me a copy of "People Side of
Data Entry".

Number of terminals installed _____

Name _____

Title _____

Company _____

Address _____

Phone (____) _____

City _____

State _____

Zip _____

Complete and
mail to:

**Business
Reply Mail**

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

Permit
No. 42555
Waltham, MA
02154

Postage will be paid by

Manager, Product Marketing
Consolidated Computer International, Inc.
275 Wyman St
Waltham, Mass 02154

Install the new **SERIES 2** **KEY-EDIT[®]** distributed data entry system today, and take care of tomorrow, too.

NEW 1920 CHARACTER DISPLAY TERMINALS
FROM 24,000,000 TO ALMOST ONE BILLION
BYTES OF DISK STORAGE . . . PERFORMS
DATA ENQUIRY, ENTRY, UPDATING, EDITING,
PRINTING, COMMUNICATIONS AND MORE
ALL SIMULTANEOUSLY!



2000

2022

2024

2000
2022 2024

We built it that way!



Raleigh Pedaling Toward Control With DDP

(Continued from Page S/6)

The programming and the minicomputers allow many processing functions to be performed daily at the local level. For example, sales orders are entered into the computer and picking tickets printed for the warehouse. As orders are entered, the accounts receivable data is updated, the stock is automatically reserved and the invoice is printed. The price is set at the order entry time.

Menu-Driven System

The system is menu-driven. This, combined with the full 1,920-char. CRTs, literally leads the operator through each step. NCR trained two operators at each warehouse in an on-site training program and taught general managers and administrative personnel how to inquire into the data base.

Information concerning accounts receivable, inventory and sales orders is available upon inquiry through another terminal at the warehouse. The IWDS system was designed for multiprogramming; inquiries can be made through one terminal while data is being entered through another.

Present configuration of the systems includes three terminals in the

Weighing Pros, Cons of DDP

(Continued from Page S/35)

Users could also develop a centralized library of "skeleton applications using data base concepts," Doctor recommended. This library would "carry structured programming to [its] logical conclusions," provide a base of "required management information and program code to maintain it" and allow "local installations to expand data elements and implement 'unique' code as desired."

In addition, the corporation could develop a data dictionary to be included in various applications during local development efforts.

Hybrid Style

The development of a hybrid management style, termed "business systems planning," "will apparently hold the key to the success or failure of the distributed data processing concept," the Price Waterhouse study suggested. "The concept combines the responsiveness of the 'bottom-up' approach with the control and structure of the 'top-down' approach."

Using business systems planning, the relationships between business processing, information and the organization are defined; the architecture of the systems is then designed to manage and report the data and the controls to assure integrity and consistency are developed.

Upper management delineates the structure, the objectives and the control processes to ensure the quality and consistency of information from the top down. Systems and information modules are constructed from the bottom up, allowing local management to set its own priorities, allocate its own resources, set time tables and allow local unique applications.

The report was prepared for the Hewlett-Packard Co.

Secaucus warehouse and two in the other four. The systems can be expanded to seven terminals each, and all could be operating simultaneously without changing either the processor or the programming.

The Westwood system is an NCR 8250 processor with 128K of memory. This additional capacity is necessary to handle the programming development work that will be performed there. With the exception of the Westwood warehouse, each warehouse's system includes the NCR 8230 processor with 80K of memory, 20M-byte disk capacity, terminals and a 125 line/min printer.

The distributed processing system is well controlled. Data is entered into the minicomputers throughout the day

and reports are printed for the general managers as needed. Every morning, the host computer in Boston queries each warehouse's minicomputer over switched voice-grade lines and receives the previous day's transactions. Each warehouse will hold up to five days' transactions as backup in case of transmission difficulties.

All data is integrated into the host computer's data base, and consolidated reports for the entire company are prepared for Boston office management.

Three-Year Data Base

A three-year data base of sales information is also being built on the last computer and should be useful as a forecasting tool for manufacturing and inventory planning.

Future plans include a broader communications capability over the network. Today the communication flows from the local minicomputer to the host in Boston. With the additional minimal programming, the possibility of communicating from the host computer back to the minicomputers and between minicomputers will be available.

"We could create records for new parts, for example, and have the information available at the warehouses the next morning," McEvoy predicted. "Or we could process some data and then send it back and have it printed on the warehouse's printers. It is a very flexible system and one we expect to grow with for a minimum of five years without significant changes."



Series/1. One of the most efficient processing systems.

Today more and more companies are benefiting from distributed processing. They're putting the power of the computer to work in warehouses, plants, branch offices and distribution centers. In fact, wherever there's work to be done.

Distributed processing can extend the capabilities of your data processing system and reduce the workload on your cen-

tral computer by utilizing smaller, versatile and lower cost systems located where key data is generated. Systems capable of providing timely, accurate information to the people who need it most. IBM Series/1 is just such a system.

Series/1 has been designed to function as a standalone system or online with your host computer. Software packages

are available to assist you in the development of your distributed processing system. And, because Series/1 is modular, it can grow with your business, providing remarkable flexibility at a reasonable cost.

All in all, Series/1 offers data processing users the opportunity to develop an efficient, effective distributed processing system closely tailored to their specific needs.

Naturally, Series/1 is supported by IBM's extensive serv-

Urges Top-Level Guidance

Thesis Explores Motivations for Going to DDP

By Esther Surden

CW Staff

CAMBRIDGE, Mass. — Strong psychological, functional and economic forces are behind management decisions to decentralize DP operations, according to a recently published thesis entitled "An Analysis of Computer Decentralization."

Prepared by Cecilia R. d'Oliveira, a student in computer science and engineering at MIT, the thesis also noted that a drop in hardware costs allows decentralization to occur at the initiative of lower level managers.

The consequences of lower level managers making decentralization decisions could include "disintegration

of the organization's information system," d'Oliveira who is now at MIT's Sloan School of Management, contends. "Decisions by lower level managers may overlook the technological constraints of decentralization, especially the problems of networking loosely coupled computers."

"This could result in a future inability to share data or programs among organizational units," she warned.

The report is based on her research of over 40 case studies and points out that top level management needs to guide the organization through the decentralization process.

The forces toward decentralization

have been "held in check until recently by economic and technological constraints," the report noted. But economic constraints are "vanishing" as hardware costs come down.

According to the report, flexibility is the best word to describe the functional forces involved in choosing to decentralize. "Local control of operations gives the user the flexibility to regulate response time and time or availability, set priorities and schedule system upgrades. It also allows easy accessibility to the system."

Economic forces can be summed up in the argument over economy of scale. Supporters of large computers use Grosch's law — the power of a

computer system increases with the square of the cost of the systems — to justify centralized systems. But in recent years, the economy-of-scale arguments have "been increasingly opposed," the report continued.

Part of the reason is high overhead found in most large systems resulting from multiprogramming and security support, the thesis continued.

Other arguments against the economy-of-scale position include "decentralized systems composed of uncomplex dedicated computers can be supported by fewer experts, thereby decreasing operating costs, and development time of a smaller (therefore less complex) function will be shorter and therefore more economic," d'Oliveira continued.

Other economic forces found to be significant in user decisions about decentralizing their operation include the low entry cost of installing a system and the low initial investment. According to the thesis, many organizations find it difficult to obtain the capital required to acquire mainframes.

Management may be hesitant to invest that much money in a system that will not be functioning for some time and will not accommodate step-by-step analysis to determine if the system will be effective.

Lower entry costs remove the economic constraints that once presented decentralization decisions and also enable these decisions to be made at lower managerial levels, the report noted.

Fixed Cost

The fixed cost of acquiring a mini system seems to be preferable to paying out variable service charges, the thesis continued. And installing a mini can lead to lower communications costs since not all data processed must be transferred back to the host. In many cases, the thesis pointed out, upgrading a mainframe for a new application is difficult to do and may cause interference problems.

"As hardware costs continue to drop and as technological advances allow sophisticated networking of computers, psychological forces may be the deciding factor in decentralization decisions," d'Oliveira conjectured. Possible psychological forces at work include bad experiences with a central system, the hope of greater user acceptance, fewer political and priority conflicts and conformance with the philosophy of the organization, the report noted.

Decentralization decisions can result from dissatisfaction with the existing large system. Communications barriers between the users and suppliers of DP expertise, long and frustrating waits for simple information or reports, development efforts so complex that "functions were often obsolete by the time they were developed," were pointed to by users as reasons they chose to decentralize.

Decentralized systems often ensure a greater degree of user acceptance because the system can be tailored to the user's needs. The user takes final responsibility and can be assured that DP performance is measured by how well his business is run.

(Continued on Page S/46)

Series/1

Approximately \$29,000 as shown.

Includes a 48K Model 3 processor with programmer's console, disk/diskette storage unit, 120 character per-second bi-directional matrix printer, rack enclosure and two 1,920 character display stations.



ways to build your distributed

ice organization, backed by a sophisticated parts inventory system and a variety of portable diagnostic tools to supplement

special diagnostic features built into the system.

What's more, on site installation by IBM customer engineers

plus a three months parts and labor warranty are included in the Series/1 purchase price.

To find out more about how your company can benefit from a distributed processing system using Series/1, get in touch with your IBM Series/1 Marketing representative or write the IBM General Systems Division, P.O. Box 2068, Atlanta, Georgia 30301.

Hardware and Software

Series/1 offers a choice of eight rack-mountable processor units featuring both 16K and 32K byte storage cards, matrix and line printers, standard and customized display stations and a variety of I/O devices.

In addition, there's a full function, disk-based operating system that includes multi-programming and multi-tasking capability in either batch or realtime modes: a Program Preparation Subsystem, two high level languages (PL/I and FORTRAN IV) plus a Mathematical and Functional Subroutine Library, Control Program Support and extensions.

IBM

User Plays Mixed Doubles on In-House System

(Continued from Page S/3)

acceptable, 60 or below.

The system selected was HP's 3000 Series II under the MPE II operating system. The configuration is shown in the accompanying chart (on Page S/3).

Note the emphasis on reconfiguration flexibility via switches and HP's network software, Distributed Systems 3000 (DS 3000). A good name for this type of configuration, since it is located in one room, would be "decentralized, co-located."

The three HP 3000 systems shown in the diagram will replace a Univac 1050 and a Honeywell 2040 computer by the first quarter of 1980. There are a number of reasons why replacement is necessary, but lease expirations and the need to convert to on-line processing using minicomputers were key in that decision.

The feeling at Spalding is that this type of minicomputer-based, loosely coupled, multiprocessor configuration represents one of the ultimate facilities for central computing in a non-scientific environment. Its cost is relatively low, it is responsive, its throughput is high, it is flexible and it provides its own backup during periods of machine outage.

By taking advantage of DS 3000, such things as central technical support and central applications programming support to remote sites is operationally feasible. On-line reviews of screen masks and report layouts, for example, can be made between a user at a remote site and the central site programmer using a telephone and a terminal at each end.

Large batch job throughput beyond the capabilities of one machine can be accommodated. A job can be initiated in one machine, retrieve its data using another, do computations on another and print using another.

If one system fails, processing can be resumed with a number of recon-

figuration alternatives. These and other possibilities within the configuration attack a recurring criticism of central computing facilities: lack of responsiveness by the management information system (MIS) development staff and processing interruption.

The applications planned for on the system include a complete set of information systems of the type typically found in a manufacturing environment with a distribution responsibility. Software packages will be employed for the materials planning, payroll and general ledger systems. The remaining systems do not lend themselves to packages and will be written in-house.

The materials planning system will be Comserv's Amaps/3000 from Far-

West Data Systems, which contains modules for bill of material, materials control, materials planning, process and routings and standard costing.

Selection of the remaining packages is in progress. The various software development and implementation schedules will extend through 1979, and all systems will employ source data and varying degrees of on-line capability.

T/S Service Picked

A total of 152 CRTs, graphics terminals, printers and plotters will be attached to the configuration. Initially, CRTs and printers will be utilized on-line in eight warehouse and seven sales locations nationwide. Other locations outside the continental U.S. will be

added later this year.

All long line communications will be provided at 300- or 1,200 bit/sec asynchronously, using the Tymnet network. The Tymnet service was chosen instead of developing an in-house network primarily because of its ease and speed of implementation, the low cost of high reliability, the range of coverage provided and its low operational impact on the Spalding staff.

Other data communications will be handled via leased line and Codex Corp. LSI 4800 modems. Locally, on-site data communications is direct connect via three-wire shielded cable (now successfully operating at distances up to 1,000 feet).

Mitchell is Spalding's director of MIS.

Motives Behind DDP Decision

(Continued from Page S/45)

"There seems to be a certain amount of power related to control of information in organizations," the thesis continued.

When other departments require the information DP provides, the other departments compete with each other for priority, the report explained. "Avoidance of the politics of the centralized data processing function" was mentioned in one of the report's case studies.

Centralized DP in a decentralized management environment can be "contradictory and dangerous," the report continued. "A decentralized management philosophy gives profit and loss responsibility to organizational units and provides unit managers with all the resources required to accomplish the task. To overlay a central DP facility on an organization of this sort may result in conflicts and confusion," the thesis said.

In some cases examined in the work, organizations opted for a distributed facility because it was "more in line" with the way management viewed the organization.



Using Measurement as Definition

DDP Can Be Seen as Spectrum of Possibilities

Special to CW

Distributed data processing (DDP) is one of those open-minded subjects that has been around for a long time and, as a result, everyone has had an opportunity to devise his own definition.

However, since measuring the impact of distributed processing has so much to do with its definition, it is impossible to escape one more definition attempt.

Let's assume for the moment that for any given computer system consisting of a CPU and remote sites of any type, the percent of distributed processing content ranges within the following parameters:

- **Zero percent** — This describes an environment where all processing is performed in a central site. There is no telecommunications at any remote business locations to bring data to the central site for processing. Any transportation of data is via courier, mail, etc.

- **One hundred percent** — Here, all processing is performed in remote sites, each of which has its own computing system. There is no relevant central processor and no telecommunication ties exist.

With the above parameters established, let us now look at scenarios of various points within the above range:

- **Twenty-five percent** — At this level, relatively unintelligent or "dumb" terminals are tied to a CPU. This would be a situation, for example, with stock quotation systems or an insurance company that needs to inquire to a central base containing policy status data.

- **Fifty percent** — Here, important parts of applications are performed routinely at remote locations, but the CPU still maintains control over the entire processing environment. In this situation, key application parts might include data entry, remote printing or generation of reports using daily data. Summaries of transaction information could be performed at the remote site

without access to the central computer.

Typical equipment at a remote site would be an intelligent terminal or a minicomputer/microcomputer that could be programmed independent of the mainframe. Insurance claims processing, not just inquiry, would be an example of this level. Another such situation would be a warehouse which, in addition to transactions reported to the corporation, would have large numbers of vendor deliveries and customer shipments to manage each day, detailed information on which would be required by local management but not at the central computer site.

- **Seventy-five percent** — At this level, full-scale computer systems of all types and sizes are set in remote locations and operate independently of the central site computer for local processing. These systems adhere to a minimum protocol for submitting key operational information to the CPU for overall corporate control. Otherwise, these systems are independent and serve local requirements. In addition, whole parts of a data base application may be shifted to the remote location.

No Specific Threshold

Thus, distributed processing can be viewed as a range of possibilities rather than a specific threshold that is crossed. At a minimum level (0%-5%) there is no processing through telecommunications at a remote site. In an extreme example (90%-95%) all processing has shifted to the remote site with no central processing at all.

The latter case is actually being implemented today at First National City Bank, where key applications that are separable from the mainstream of the bank's activities, such as trust management and securities handling, are being shifted completely out of the central computer to remote sites with no connection at all to the bank's existing large-scale central computer center operations.

Given this array of possible distributed processing environments, why is anyone interested in distributed processing, other than because it is the latest state-of-the-art computing environment being promoted by vendors?

The answer is simple: There has to be a good economic reason providing an acceptable return on investment. The kinds of payback from distributed processing might consist of one or more of the following:

- Labor Savings.
- Higher revenues because of faster turnaround of orders.
- Improved cash flow.
- Material cost savings and lower inventory investment.
- Improved reliability, such as the ability of a remote site to keep operating in a highly distributed environment even though the mainframe computer may be down.

This article is adapted from a report entitled "High Value Added Product Strategies — Potential and Pitfalls," published by Small Business Systems, 4320 Stevens Creek Blvd., Suite 230, San Jose, Calif. 95129. The firm specializes in market research reports in the small business system area.

"Our Sycor system gives our salesmen a lot more time to do what they love to do. Sell."

Floyd Harris, VP
Data Processing

Life Insurance Company of Georgia is the largest insurance company in Georgia. With over \$6 billion of life insurance in force, the company ranks among the top five percent of all life insurance companies in the United States and Canada. Approximately 2300 agents serve the southeastern U.S. from 128 local offices.

"The problem we faced was bookkeeping."

"Many of our agents were spending up to one day per week on bookkeeping," points out Floyd Harris. "Human errors were inevitable, and agents would spend frustrating hours tracking them down. Account reports would arrive at the home office only once a month. And they were really not providing us with all needed information."

"Our Sycor system helped change all that."

"Now our accounts come in every day. And they're complete. Agents are furnished with daily route lists under our new Field Accounting system. This 'fill-in-the-blanks' approach makes data gathering quick and easy. It really helps our agents organize

and manage their work on a daily basis. It also provides us at the home office with complete, accurate information on the status of each policy.

An extra six hours of selling time every week.

"Today every agent is plugged into our Field Accounting system through Sycor distributed processing equipment. And they have more time for selling and training than ever before. One agent in Statesboro, Georgia reports having an extra six hours every week for selling."

"Another thing that really impressed us about the Sycor distributed processing system was

the way it helped boost our agents' morale. Freed from the drudgery of accumulated paperwork and the worry about bookkeeping errors, every agent I've spoken to feels a lot better about his work.

A Sycor system is at work in every branch.

"We're so impressed with Sycor that we've installed a system in every one of our 128 branch offices."

"We also plan to utilize more fully each system's capabilities. Like having it handle a branch's accounting functions. And preparing insurance proposals for individual agents where they're needed most. Right at the branch sites."

Call Sycor toll-free at
800-521-2838.

For more information on why a Sycor system is good insurance for productivity and profit, call Tony Fazio, VP Sales, at our toll-free number: 800-521-2838. Or write us at Sycor, Inc., Corporate Offices, Ann Arbor, MI 48104.

Better yet, contact a nearby sales office. We're in the Yellow Pages under "Data Processing Equipment."

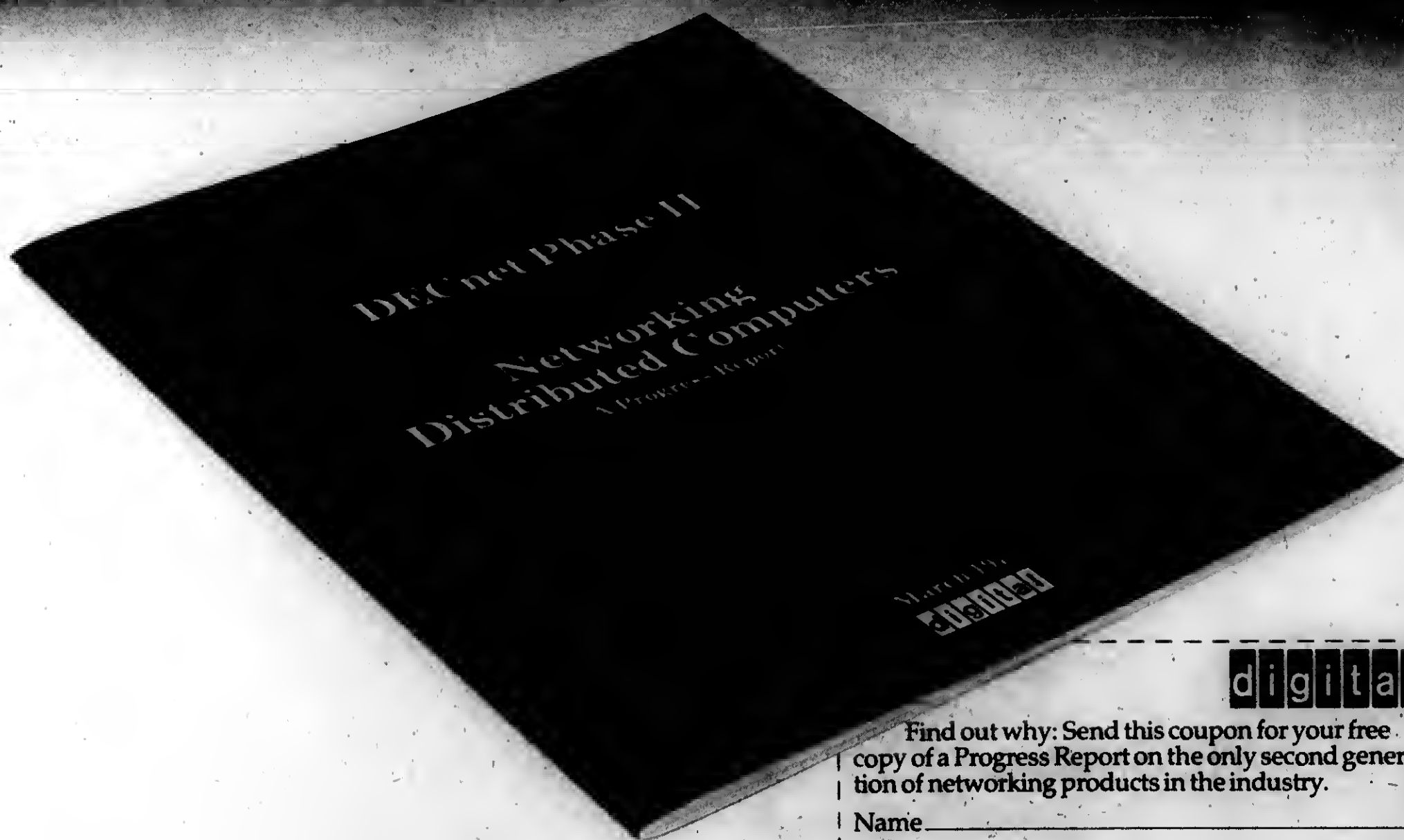


One of the Sycor systems that help save time and organize work for Life of Georgia agents.

Sycor puts computer power where the work is.™

SYCOR®

DECnet and
Digital's
computers make
the best and
least expensive
distributed
computing
networks
in the world.



digital

Find out why: Send this coupon for your free copy of a Progress Report on the only second generation of networking products in the industry.

Name _____

Title _____

Company _____

City _____ State _____ Zip _____

Mail to: Digital Equipment Corporation, 129 Parker Street (PK 3-2/M18), Maynard, MA 01754

CW368

To Avoid Bottlenecks

DDP Should Be Seen as Evolutionary Process

By Ivan Socher
Special to CW

The distribution of DP power in networks, while relieving a large bottleneck at the mainframe, may lead to a number of small bottlenecks at remote sites, if Parkinson's Law and the Law of Diminishing Returns are to be believed.

For that reason, distributed data processing (DDP) should be viewed as an evolutionary process with continued delegation of functional authority that parallels in many respects the development of business organizations or political systems.

This evolution began before the 1950s when DP was characterized by manual operations and total decentralization. Businesses were smaller and the Washington bureaucracy was not yet in existence.

During the decade of the 1960s, the buzzwords became "economies of scale" and "centralized control." The benefits of centralization were warmly accepted by business and government, and computer technology tracked right along, in many ways accelerating the process of centralization.

But we forgot about Parkinson's Law: Work tends to expand to fill the time available. And we forgot about the Law of Diminishing Returns, which states we eventually will require more input to obtain a unit of output until the cost exceeds the benefit.

Thus, in the 1970s, users began to hear that bigness also means inflexibility, complexity and a declining marginal return on investment. In the EDP industry, monolithic centralized computer complexes had been established. In government, a monolithic centralized bureaucracy had been created. In business, there was a monolithic centralized head office. The point of diminishing returns had been reached.

First Move

The computer industry moved first by introducing remote batch terminals that relieved the CPU by allowing remote data capture. In government, more responsibility for such needs as health and environmental management was returned to local authorities. Businesses began to regionalize and divisionalize.

DP managers were again quick to realize that batch terminals were not enough, so the rapid diffusion of intelligent terminals occurred. Unfortunately, technology had not yet caught up with the movement in organizational structures, and the best the industry had to offer was data entry, minimal local job processing and limited local storage.

The technological challenge of the 1970s has been to create the systems that make it possible for information processing to catch up with political and business trends.

Today we have networks of distributed minicomputers that allow for multifunction, multiterminal systems, powerful local processing, pull-sized peripherals and concurrent operations.

But the most intriguing question today for users and vendors alike is: "Are we near to achieving an end or are we near to achieving a new beginning?"

If the laws that seem to govern people and organizations prevail, it is likely that network minicomputers will absorb more and more functions until their capacity is taxed to both technical and economic limits. It is interesting to note that as mainframe-oriented DP managers have come to accept the minicomputer as their own, their expectations for minicomputer performance is accelerating at a rapid rate.

Cost justifications, once the driving force in launching new DP projects, are inherent in the minicomputer, and the driving force has become technology.

For once in the evolution of data

processing, the technology is available concurrently with the trend.

The innovation most likely to stimulate further distribution of processing is the microprocessor. Its implementation in a network will take many forms: It will help make dumb terminal intelligent; will permit development of programmable, intelligent controllers; and will be used as a front-end communications processor.

All of these utilizations have the same net effect — eliminating bottlenecks at the minicomputer CPU. Thus, we see distribution follow an iterative process that began at the mainframe:

- The intelligent terminal relieved the

mainframe.

- The programmable controller relieved the mainframe.

- The minicomputer relieved the mainframe.

- The intelligent terminal will relieve the minicomputer.

- The programmable controller will relieve the minicomputer.

- The front-end microprocessor will relieve the minicomputer.

Process Begun

The iterative process has already begun. The complexities of network communications are beginning to be felt by the minicomputers. Many DP

(Continued on Page S/59)

Powerful new way to write interactive data entry programs:



ITEMS.™

ITEMS — the INCOTERM Transaction Entry Management System — is a virtual storage operating system for distributed data processing. A powerful software development tool that can dramatically reduce the time required to create and implement versatile application programs.

ITEMS gives the system designer such operating advantages as extensive local editing, local screen format and data storage, local data entry control, interactive and stand-alone processing options, as well as security procedures. Implementation is greatly simplified. Mainframe application programs continue without workflow interruption.

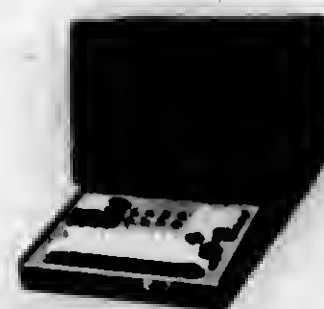
User experience shows that 20% to 30% of all interactively entered data results in error. ITEMS offers an efficient solution to this costly problem while enhancing data entry throughput and reducing mainframe overhead.

ITEMS operates on standard INCOTERM Series 30 or Series 40 Intelligent Termi-

nals with diskette or rigid disk storage. Up to eight display stations and eight printers can be operated independently under sixteen concurrent programs. Operators are guided by editing attributes for each input field; 25th line messages prompt accurate keying.

Why not discover how you can use the full power of ITEMS on your existing network without extensive conversion procedures. Call or write for complete details.

More power
to your
terminal.



INCOTERM®
CORPORATION

A Subsidiary of Honeywell Inc.
65 Walnut Street, Wellesley Hills, Massachusetts 02181
Telephone: (617) 237-2100

User Finds DDP Takes Up Slack in Control

(Continued from Page S/8) planned and installed the MCS network. By using magnetic tapes, we can use the MCS without sacrificing the central financial control provided by our IBM mainframe. The central HP 3000 system was recently upgraded from 128K bytes of memory to 512K bytes to enable handling more program simultaneously. The smaller HP 1000 systems each have 128K-byte

memories for running smaller programs locally.

The central installation includes a dozen interactive CRT display terminals, two high-speed line printers and MPE-C multiprogramming executive software. Communications software provides remote access to files stored centrally with the HP 3000.

Farah programmers developed the manufacturing

control software for the HP 3000 central system. Camco, Inc. of Richardson, Texas, wrote the software for the satellites.

The MCS functions in cooperation with a complete order entry package implemented on our IBM 370/158. There is no direct interconnection of the mainframe with the distributed network. There is insufficient need to continuously update the large

system to justify the cost of software development and maintenance.

The 370 supplies order information via magnetic tapes for the HP 3000, and the 3000 handles actual cut order assignments. The 3000 transmits cut orders to the designated plants, depending on their workloads, fabric inventory, machinery, etc. Communication is by modem link through the HP network con-

troller to the HP 1000 system in each plant.

Bills of Materials

All bills of materials are stored on disk at the central installation. A correct bill of materials is transmitted to a satellite along with the cut order assignment.

The satellites explode the bill of materials into "bundles," or smaller portions of the job. By fabric and size, the job is further broken down into individual parts necessary to make one size of a pair of slacks. A "bundle" includes every operation needed to make one part of that pair of slacks.

The satellites print out a stack of small 96-column punch cards for each "bundle," identifying the order and all required operations. These cards are put in zip-lock bags and accompany the cut order to the cutting room floor.

In the cutting room, employees called pattern makers, cutters, spreaders and shade markers take over.

Using Camco Markamatic Systems, pattern makers lay out the optimum "fit" of pattern pieces on a layer of fabric. An X-Y plotter included with the Markamatic systems plots the arrangement full-scale on paper to form the pattern the cutters will follow.

Spreaders, meanwhile, have carefully stacked or "spread" piles of identical layers of fabric for the cut.

As the bundles of cut parts are separated, the punched cards accompany each bundle to the next work location.

Once an operation at each new location has been completed, the operator removes an appropriate punched card, enters his or her operator number on it and places it in a pickup bin.

Punched cards are picked up daily and run through a card reader, which inputs the data on the plant's HP 1000. Production data stored at the satellite are transmitted daily to the 3000.

Daily reports are prepared to show every operation completed on every cut order in process. The central system also compares actual performance data with standard performance figures to determine if any adverse cost variances have developed requiring correction.

In addition, the 3000 prepares a summary production report which is logged onto magnetic tape for processing by the 370. The 370 uses the data in preparing larger corporate financial and management reports of which production reports are only part.

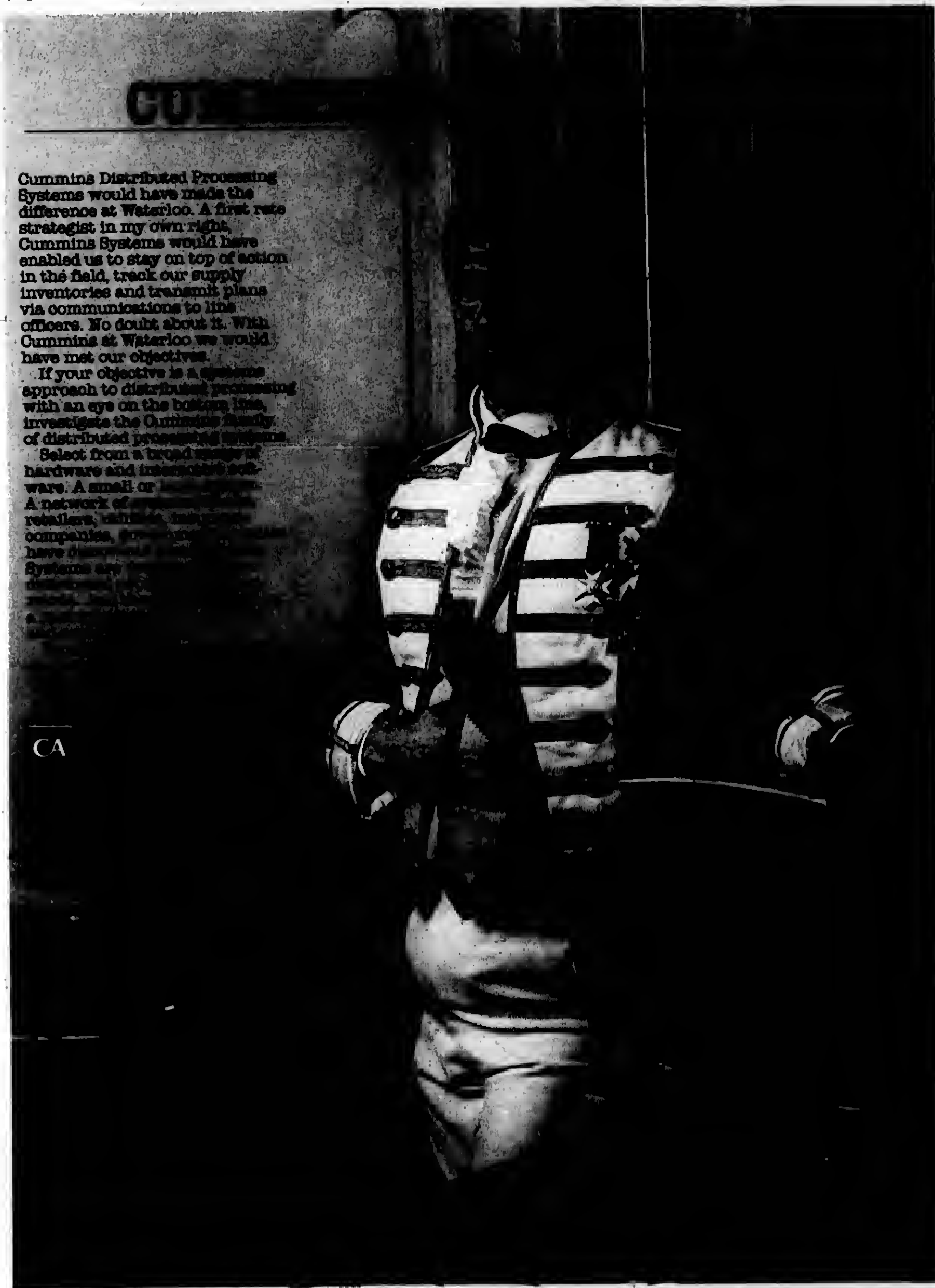
Bohannon is director of information services at Farah Manufacturing Co.

Cummins Distributed Processing Systems would have made the difference at Waterloo. A first rate strategist in my own right, Cummins Systems would have enabled us to stay on top of action in the field, track our supply inventories and transmit plans via communications to line officers. No doubt about it. With Cummins at Waterloo we would have met our objectives.

If your objective is a systems approach to distributed processing with an eye on the bottom line, investigate the Cummins family of distributed processing systems.

Select from a broad range of hardware and interactive software. A small or large system. A network of systems. Retailers, dealers, integrators, companies, consultants, have discovered that Cummins Systems are the answer.

CA



A multiple choice quiz on Keybatch.

A multifunction data entry system from Data 100.

(WARNING: there may be more than one right answer to each question)

1. Keybatch is:

- (a) a multifunction intelligent key-to-disk data entry system.
- (b) a brand new multifunction system from Data 100.
- (c) a multifunction system which supports high volume concurrent batch capabilities.

2. Keybatch is also:

- (a) a multifunction system offering stand-alone RPG for expanded user flexibility.
- (b) a multifunction system that can operate with on-line file inquiry capabilities (3271 compatible) via common key-stations for both data entry and on-line file inquiry.
- (c) a system capable of handling mail sorting and other office tasks.

3. As a data entry system:

- (a) Keybatch has up to 20 megabyte disk storage capacity.
- (b) Keybatch is proven with approximately 900 units now in use.
- (c) Keybatch can be configured with 2 to 16 keystations.

4. For the end user:

- (a) Keybatch meets short range goals such as appreciable dollar savings.
- (b) Keybatch provides for long range system growth.
- (c) Keybatch offers both of the above.

5. For more information on Keybatch, you should:

- (a) search frantically through your EDP literature files.
- (b) write Data 100 at 6110 Blue Circle Drive, Minnetonka, MN 55343.
- (c) call your nearest Data 100 sales office or one of the numbers we've listed.



**Are you a multifunction expert?
Check these correct answers.**

All answers but four are correct.

1b: Keybatch isn't brand new, was introduced in 1974.

2c: Sorry, Keybatch can't do everything.

3b: There are actually 1500 Keybatch systems on the job worldwide.

5a: No need to search when we're so easy to write or phone. Do it now.

DATA 100
CORPORATION
multifunction data processing

LOS ANGELES 213/645-4300 • SAN FRANCISCO 415/546-6000 • CHICAGO 312/992-0850 • BOSTON 617/848-6100 • DETROIT 313/358-5065 • MINNEAPOLIS 612/941-6500 • NEW YORK 212/867-6200 • PITTSBURGH 412/391-5425 • HOUSTON 713/777-4413 • WASHINGTON D.C. 703/790-5560 • WOODBRIDGE N.J. 201/634-7800 • ATLANTA 404/455-3895 • ST. LOUIS 314/878-4911 • TORONTO 416/494-0434 • MONTREAL 514/761-5894 • LONDON ENGLAND (0442) 69161 • MELBOURNE AUSTRALIA 267-3544 • FRANKFURT GERMANY 72-04-71 • PARIS FRANCE 630-2144

DDP Passing Its Entrance Tests, Survey Finds

(Continued from Page S/5)
current setup: "Do you currently have distributed data bases or distributed processing within your network?" The answers tabulated as follows:

Data base used only for editing and validation of data entry operation	5	13%
Data base available for local inquiry, update and processing	10	25%
No distributed data base	25	62%

The users polled reported a gamut of DDP applications, as noted in the accompanying chart. However, many of the "distributed" data bases were actually replications of portions of the master files kept at the host sites. According to some books, the existence of such redundant master files at host

sites means the processing is not truly "distributed." Nevertheless, processing power is being taken to the source, generally on the strength of minicomputers.

Further, many of the data entry applications listed will add more substantial processing functions in the future.

This leads to the next question we asked our sample: "Do you plan on having distributed data bases or distributed processing within your network in the future?"

Here the answer looked like a vote of confidence on the results of current DDP experiments. The applications listed by respondents were less data entry and more data processing oriented as the chart notes. The hardware selections were more powerful, too,

with IBM's 3790 getting a lot of attention.

Only one user now doing DDP said his company did not plan any future applications, and that was a qualified negative, brought about by the problem of keeping local and remote files in synchronization. The tabulation:

Have plans for specific applications	18	45%
Plan to have DDP, no specifics yet	11	27.5%
No plans for DDP	11	27.5%

Somewhat surprising — for someone who has read the press reports and heard competitors claim that IBM is "dogging it" in DDP — was interest in the giant's anomalous DDP solution, the 3790. We found 85 systems in place or on order at just five companies.

"We had a problem with service and finally trained one of our own people. He quit and we're back to Square One," one user said, voicing one of the worries that wrinkle the brows of DDP boosters: training. In fact, our survey showed that when it came to networking and DDP implementation, bottlenecks were about equally divided between "hard" and "soft" varieties. "Hard" problems resulted from equipment shortcomings, dealing with multiple vendors, not having enough capacity, software bugs, etc. The "soft" problems centered on such areas as training, management control, long-range planning and resistance to change.

Inextricably linked to DDP is data communications — a whole bunch of new headaches for DP managers wrestling with DDP implementation. In general, control of network growth did not seem particularly iron-fisted, and managers coped with costs on an item-by-item basis. But to help combat network growth, most companies were either following a master plan or devising one at the time.

Long-range (10-year) planning and technology forecasts were beginning to find their way into these plans. Most master plans for network implementation had multiple horizons, where the short-term plan (1-year) is very specific, the midterm plan less so, etc. Regardless of whether or not they had a master plan, most companies approved of network applications on a case-by-case basis at the corporate management level.

A picture emerges from the nature of the comments of the respondents and the numbers they offered. That picture shows:

- DP and telecommunications managers grappling daily with the nitty gritty of network maintenance — and beginning to worry over the lack of time to plan adequately for the (fast-approaching) future.

- DDP — evolving through distributed data entry or preprocessing, with fully distributed data bases and summary files only at the host — still more envisioned than real.

- Network planning getting more formalized, meaning more long-range commitment from vendors, more high-level management involvement from users.

- Control, not hardware (or even software), becoming the real nut of DDP implementation.

It appears, then, that there is some fire behind all that DDP smoke, but implementation will be step-by-step.

One user gave this insight into why: "Our company is going through a major philosophical argument now, which will probably not be decided until year-end 1978. We lean now toward centralized system and network development. But we have a lot of minis out there in independent special applications, and even if we use only 10% to 20% of their capacity, they're cost-justified.

"People who have these minis at their sites want to put new applications on them to tap that excess — but without central control. This is a big issue," he said.

Gantz is the editor of International Data Corp.'s Distributed Processing Reporting Service and Callahan is a freelance researcher/consultant.

SARA...for fast, effective relief.

SARA (Systems Analysis and Resource)

Accounting, inventory, production, sales, and other business systems. SARA is a comprehensive system for analyzing and managing resources. It is designed to help you make better decisions faster. SARA is a powerful tool for managing your business. It is a system that can help you to improve your productivity and reduce your costs. SARA is a system that can help you to manage your business more effectively. It is a system that can help you to make better decisions faster. SARA is a powerful tool for managing your business. It is a system that can help you to improve your productivity and reduce your costs. SARA is a system that can help you to manage your business more effectively. It is a system that can help you to make better decisions faster.

Call (800) 368-7000 for more information. Toll free.

Send me more information. Name _____

Address _____

City _____

State _____

Zip _____

Signature _____

Date _____

Enclosed is a coupon for a free trial of SARA. Please return this coupon to:

SARA, Inc., P.O. Box 1000, San Jose, CA 95128

Thank you for your interest in SARA.

SARA is a Division of The Boeing Company.

For more information, call (800) 368-7000.

SARA is a powerful tool for managing your business. It is a system that can help you to improve your productivity and reduce your costs. SARA is a system that can help you to manage your business more effectively. It is a system that can help you to make better decisions faster.

SARA is a powerful tool for managing your business. It is a system that can help you to improve your productivity and reduce your costs. SARA is a system that can help you to manage your business more effectively. It is a system that can help you to make better decisions faster.

SARA is a powerful tool for managing your business. It is a system that can help you to improve your productivity and reduce your costs. SARA is a system that can help you to manage your business more effectively. It is a system that can help you to make better decisions faster.

Compared With Centralized Design

DDP Architecture Gives Less Vulnerability

By Steven W. Oxman
Special to CW

Distributed data processing (DDP) is not a new concept in the DP arena. The peculiar requirements of weather information-gathering systems, utility control systems and airline reservation systems could not be met by centralized DP system designs.

These systems have the advantages of local control, low system impact in the event of a hardware failure and instant response time that DDP can provide.

In the past, DDP systems were very expensive because each computing location had more computing machinery than was necessary. In addition to cost, size and weight are sometimes important considerations. A multiprocessor system was usually larger and heavier than a centralized system.

Many departments within the U.S. government are performing studies to ascertain if the concept of DDP would better fit certain DP needs than conventional, centralized processing. The main impetus in these studies is exactly the same as that in similar studies undertaken by industry — the emergence of the minimally capable DP units, the mini-computer and the microcomputer. The cost, size and weight of these components make multiprocessor configurations feasible.

Target Application

Command and control is one computer application whose unique needs might be best met by DDP, regardless of whether it is for the operations of a submarine or a manufacturing plant. Operational inputs received by a command and control center are integrated with command objectives to produce real-time control outputs.

The most important aspect of a command and control system is that it must be operational when the process it is controlling is active. Since degraded operations are always better than a total system failure, lessening the system's failure vulnerability is always a forethought.

To distribute means to divide, to disperse in portions, to spread through a range. The traditional computing design for command and control has been centralized. Should central command and control computing systems be redesigned to distributed configurations? Will the distribution decrease system vulnerability? Will the distribution yield effective degraded modes of operation?

To answer these questions, a typical command and control

system will be used as an illustrative example.

The loss of the central computer in the traditional command and control configuration usually meant total loss of the computing machinery. To decrease the vulnerability of the central computer, a modular computer design was developed.

The modular central com-

puter typically included two or more CPUs, multiple I/O controllers (IOC), multiple power supplies and a set of independent memory modules, all interconnected on a backplane. As long as one CPU, one IOC, one power supply and a subset of the memory modules were operational, the central computer could continue to service the command

and control functions, even if in a somewhat degraded fashion.

In addition to the central computer, our example will include CRT consoles, disk data storage, a master console and a complement of sensors and control devices connected to a data multiplexer.

If the data multiplexer had a digital processor incorporated

within, it would be an intelligent device; the loss of the central computer would not then preclude sensor information being sent to control devices. The data multiplexer could decide which control devices could utilize sensor data that would not be filtered by the central computer.

Important historical sensor
(Continued on Page S/55)



The Outer Limits of Distributed Data Processing.

Portable terminals are expanding direct computer access to source data in all kinds of businesses all over the world. Humble, handheld, battery-powered terminals like the new MSI/77 can be operated by any regular employee already working at the data's source. Yet these simple, little portable terminals are performing big data entry jobs like accounting data input, retail sales reporting, merchandise tracking and replenishment, inventory management and salesman order entry. And with the MSI/77's all-CMOS solid state memory, programmability, self-contained throwaway "AA" batteries and ultra-low cost, it's easy to see how MSI's going to expand those outer limits a whole lot further.

For further information please write to
William B. Patton, Vice President-Marketing.

MSI
DATA CORPORATION

THE LEADER IN PORTABLE DATA TERMINALS
340 Fischer Avenue, Costa Mesa, CA 92627 (714) 549-6000

Atlanta (404) 881-7307 • Boston (617) 848-6450 • Charlotte (704) 555-2130 • Chicago (312) 992-6900 • Dallas (214) 270-8535 • Denver (303) 750-3223 • Detroit (313) 942-1870 • Honolulu (808) 855-1198
Houston (713) 684-4244 • Los Angeles (213) 692-0874 • Memphis (901) 798-1200 • Milwaukee (414) 251-1774 • Minneapolis (612) 941-4838 • New York (212) 967-3780 • Ohio (216) 486-1500 • Orlando (305) 834-5334
Philadelphia (609) 778-8840 • Pittsburgh (412) 941-8020 • St. Louis (314) 291-3080 • San Francisco (415) 944-0850 • Seattle (206) 454-2932 • Toronto (416) 836-0034 • Vancouver (604) 696-3611 • Washington D.C. (703) 960-5500
Canton, Vermont 781-8888 • Enkhovim, Netherlands 040-433684/TELEX 61166 • Johannesburg, South Africa 768-2280/TELEX 6-3382
London, United Kingdom 0822-33121/TELEX 861-847-889 • Melbourne, Australia (03) 211-1022/TELEX AA31804 • Milan, Italy 02-679248 • Karlsruhe, West Germany (49 721) 306725
Oslo, Norway 01/704030/TELEX 18418 • Paris, France 696-5412/TELEX 84-242-01 • Tokyo, Japan 03 (543) 7811/TELEX (L.A.) 67-4436

Knitter Finds Psychological, Financial Salvation

(Continued from Page S/9) they provided the most cost effective approach.

In fact, Jordan said, Springs' knit division was able to cost justify installation of 340s not only at the Monroe and Mullins manufacturing facilities, but at corporate sales and marketing headquarters in New York City and at the customer service center as well.

First Installation

Though the 340s were primarily selected as replacement units for use at the two production facilities, the first 340 was installed at sales and marketing headquarters. Approximately 100 new orders and order revisions were being transacted there daily.

"In the past, all orders were hand-written, processed by a team of clerical personnel, then mailed to Lancaster for production scheduling purposes," Jordan noted. "Six to 10 working days would frequently elapse by the time the order reached its final destination. Since most of Springs' products are manufactured upon receipt of order, rather than for inventory, production scheduling timetables would also slip accordingly.

"With the Systems, we were able to enter orders on the same day they were received. CPU processing completed, production scheduling began immediately. As a result, delivery leadtimes on orders have been cut by at least one week," he explained.

Order status reporting presented another difficult-to-control situation under the old system.

"Customers or salesmen inquiring about the status of their orders would commonly have to wait for clerks at each of the plants to check out the necessary information," Jordan recalled. "Latest order status information is now transmitted nightly over telephone lines to New York and printed out on a 300 line/min printer, so the 22 salesmen in New York have current information every morning.

"Introduction of the system into customer service center operations streamlined transmission of shipping instruction to the Monroe and Mullins plants," Jordan continued. "Bills of lading keyed into the terminal before 1 p.m. are processed through the IBM 370 and transmitted to the appropriate plant for same-day order shipment. Orders covered by bills of lading received after the 1 p.m. deadline are shipped the following morning."

Upgrade in '76

So as not to tax the 340s beyond their capability, the knit division's DP management team decided to upgrade

to Sycor 440s in the summer of 1976. The system had its own CPU; multiple CRTs; 64K of memory; 10M bytes of disk storage for handling files and inquiries; larger screens; and faster display response time.

The knit division now has a total of six systems in operation, one at the customer service center and New York marketing headquarters and two at each of the manufac-

turing facilities.

"One of the initial reasons behind system development and implementation," division controller Rowell said, "was to put rigid controls on production reporting and inventory control systems that were getting away from us. Decision-makers would come to planning meetings with different sets of numbers, and consequently, time would be wasted deciding whose figures were

accurate. Now that all reports are standardized, business decisions can be made on fact."

"Physical inventories were conducted one weekend a month," Rowell added. "Despite the regularity with which inventory was taken, there would still be discrepancies between our records and actual stock."

"With the system, we have achieved a variance of less than .5%. And physical inven-

tories are now conducted only once a year. Savings in this area obviously have been substantial."

At the two manufacturing operations, the systems and associated printers are used to receive knit tickets, dye orders, quality reports and bills of lading, and to enter information relative to raw materials received, knit tickets, greige goods (unfinished

(Continued on Page S/56)

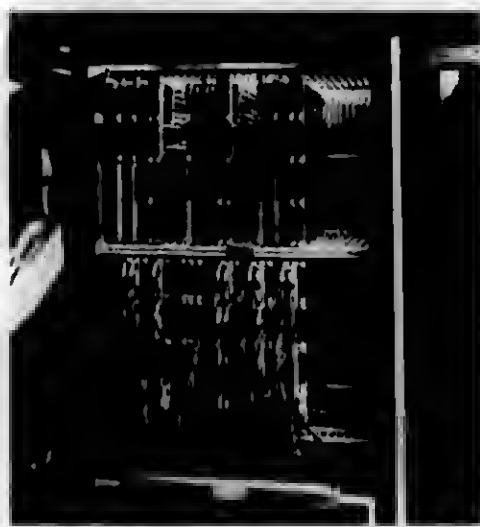
There's only one thing non-It's non-stop.

Where others fail. It's simple. You must have a non-stop system to have non-stop COBOL. And only Tandem has it. A unique multiple processor on-line system which ensures protection of the data base, and that no transactions are lost or duplicated, even if a processor, I/O channel, disk controller or disk should fail. Best of all, the system keeps running.

Multiple Processor COBOL Easy.

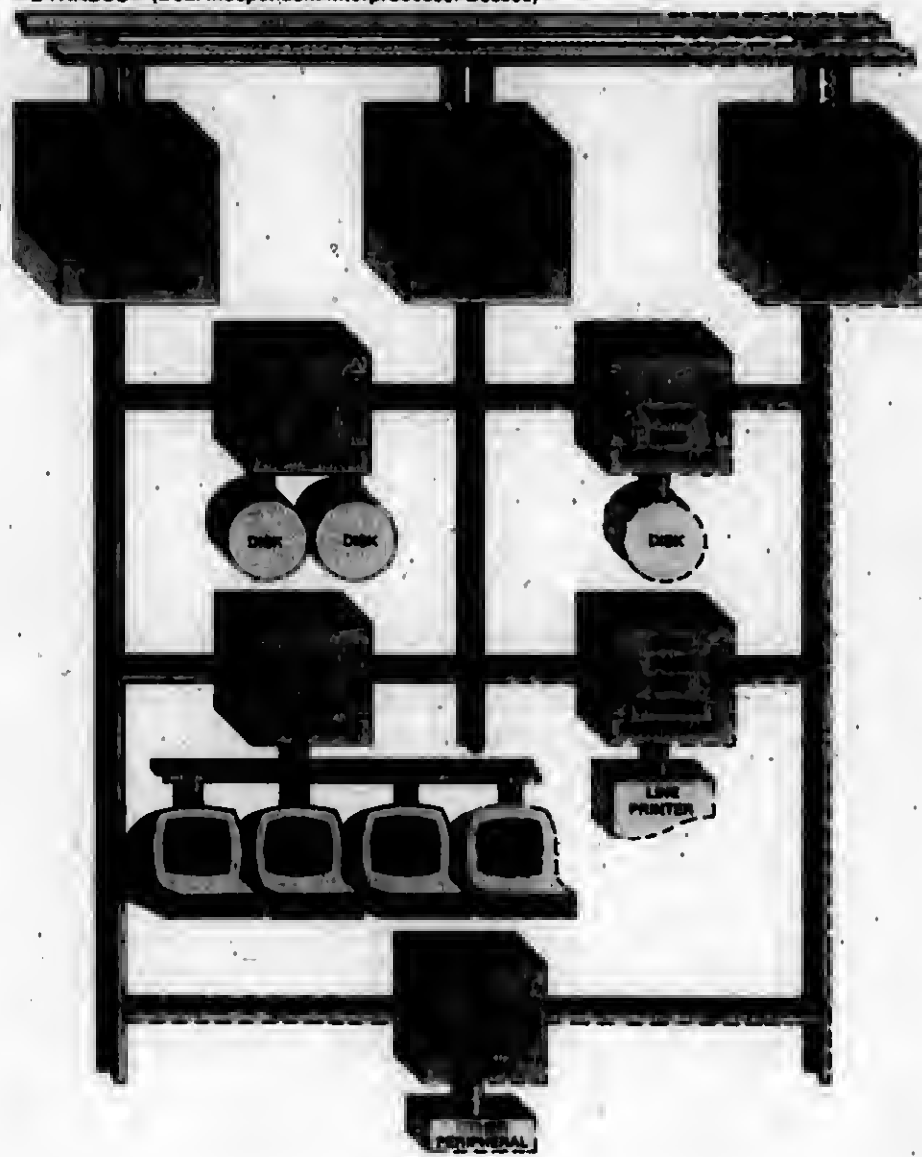
Bearding the Lion. You'd think that programming for a multiple processor on-line system would put you in a jungle, but Tandem COBOL puts. Completely standard.

Because Tandem COBOL runs under our Guardian Multiple Processor Operating System, no custom system software is required. No special development tools are required. None. Our COBOL program development is standard. Our run-time software is standard. Everything you've always liked about COBOL, easy to use and trouble-free. And COBOL programs can run concurrent with other languages.



Four BILLION bytes per file. With no limit on the total data base size. Key sequenced, entry sequenced or relative file structures. With up to 255 alternate keys per file. And optional mirror copy by disk volume. It's incredible storage and tremendous flexibility in a mini-based system. And of course, it's non-stop.

DYNABUS™ (Dual Independent Interprocessor Buses)



The Tandem NonStop System is composed of up to 16 multiple, independent processors with dual communications paths between all system modules. The result is not only continuous operation, but throughput unmatched by any other system of comparable cost.

Sharing a common data base. Three new verbs, LOCKFILE, UNLOCKFILE, and UNLOCKRECORD have been introduced to the Tandem COBOL I/O facility to permit the use of corresponding system file and record locking routines, and allow separate processes to share a common data base. READ and REWRITE verbs have been extended to allow specification of LOCK or UNLOCK operation. OPEN syntax has been

extended to specify the file access, EXCLUSIVE, SHARED, or PROTECTED, and to permit the SYNCDEPTH for files opened in the OUTPUT, I/O or EXTEND mode.

With STARTBACKUP and CHECKPOINT. These are logical extensions of Tandem COBOL which implement the NonStop™ features of Guardian Multiple Processor Operating System. STARTBACKUP is called once at the

DDP Architecture Provides More Reliable System

(Continued from Page S/53) data could be received, tagged and stored by the data multiplexer's processor. The sensor and control device data processing would now be hardware distributed, the work would be shared between the multiplexer processor and the central CPU.

The software would also be distributed; the multiplexer processor would house the local software functions for the

sensors and control devices and constantly check the health of the central computer.

The central computer could have most sensor and control device software off-loaded, but would take on the new job of checking the multiplexer processor's health. The sensor and control device data would be duplexed to both the data multiplexer and the central

computer, so if the multiplexer's processor had suffered a casualty, then the central computer would load the total sensor and control device software package and perform the necessary work.

If the central computer had a fatality, the multiplexer software would automatically switch the multiplexer processor into an independent mode.

When the data management functions are distributed from the central computer to a

processor dedicated to a disk unit, the processor is commonly referred to as a back-end processor. The data storage and access algorithms and hardware-dependent algorithms are off-loaded from the central computer to the disk processor, with the central computer ready to perform the data management functions should the back-end processor fail.

The central computer's mas-

ter console is normally used for bootstrap and diagnostic purposes. Since a failure of the master console does not affect a healthy operational system, the master console will not be altered.

The CRT consoles are the only man-machine interfaces. All command information will, at some time, arrive at one of these consoles, and all nonautomated control signals (operator actions) will originate from these consoles. The data bandwidth between the consoles and the computer is very high.

The console-dedicated software to support the consoles' high bandwidth, the graphics and efficient man-machine interfacing could be as much as 40% of the total system software. If the computer fails, the consoles are totally inoperable, so there is no such thing as degraded console operations.

The consoles would not be able to monitor the sensor-control device data transfers that would occur during the computer downtime. The CRTs would not be able to display historical data from the disk. To distribute console-related operations from the computer to the consoles is referred to as a front-end operation.

Front-End Suggestion

The front-end processor would provide an intelligent link between the operator consoles, the data multiplexer and the disk in the event of a total computer failure. Instead of building a new enclosure for the front-end processor, designing a new power supply and providing interconnections from the front-end processor to the consoles, embedding the front-end equipment into each console might be a better approach.

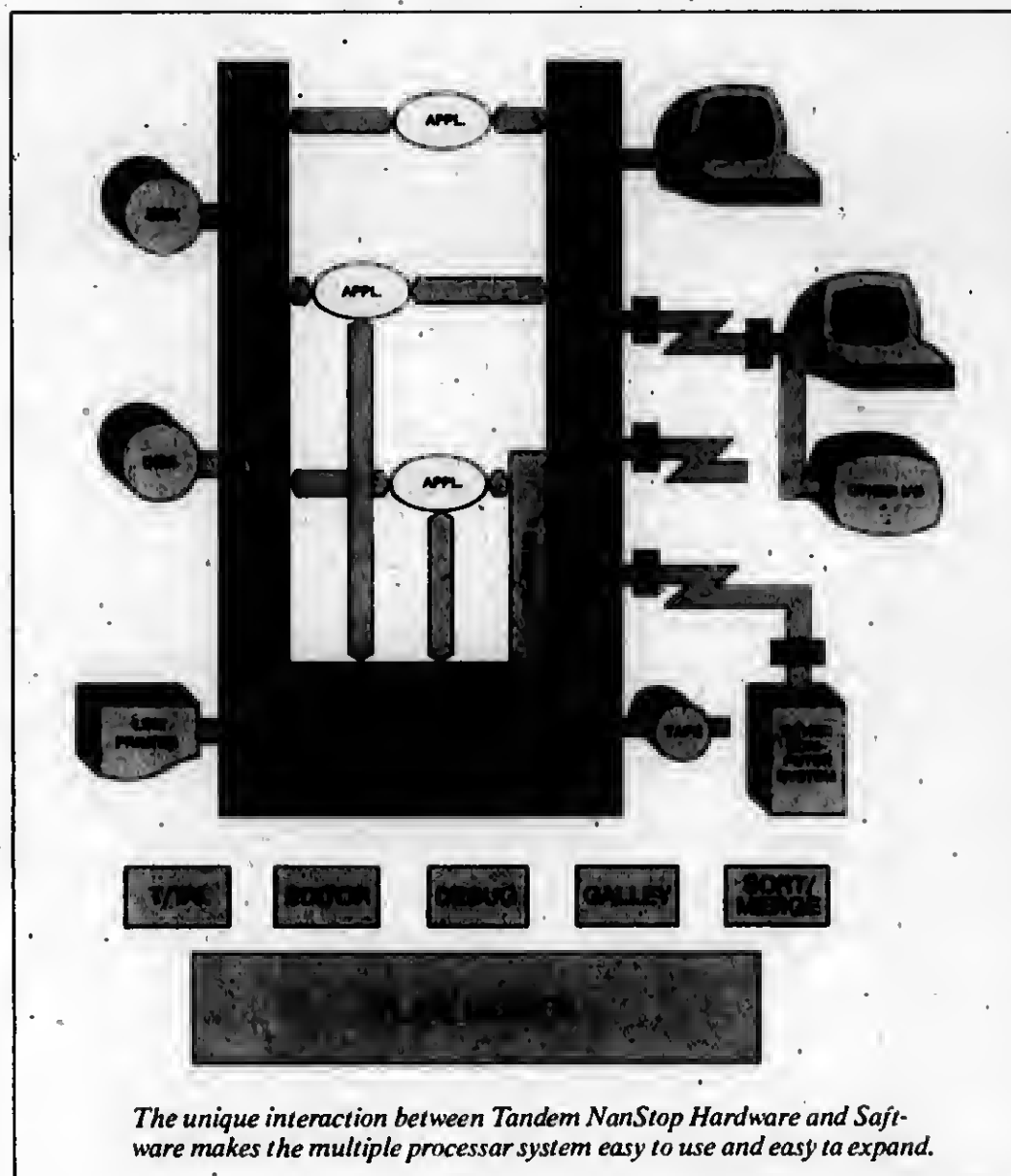
The final design consideration is that of system equipment interconnection. If the system equipment connects directly to a central computer and the central computer fails, all the processor capabilities now embedded in the system components are not usable. There are two alternatives to this design problem.

The first alternative is to redesign the I/O component of the computer to employ a passthrough architecture. The data arriving at any input port would be independently routed to all output ports as well as to the computer's memory or CPU. If the computer failed, the data would still pass through to the other system components.

The second alternative is to have all the system equipment connect to a non-hierarchical network. A star or radial network with a passive

(Continued on Page S/56)

standard about our COBOL.



beginning of the program to set the NonStop mode. From then on, CHECKPOINT controls passing information to the backup process at critical points. CHECKPOINTS occur automatically at any OPEN or CLOSE after the backup is established. These two simple instructions eliminate the downtime, restart, and revalidation which plague any user without the Tandem NonStop capability.

ANSI X3.23 '74 to Level 2 in Nucleus, Table Handling, Sequential I/O, Indexed I/O, and Sort-Merge right now. With Communications to Level 2 this Spring. Completely standard with CVSS and that means portability.

Compiles more than 1,000 statements per minute. And that's only average. In some benchmarks, we've topped 1,250 statements per minute. It's big system COBOL at mini-based prices. And non-stop, too. Not even the largest computers can match that.

It's working now. There are more than fifty Tandem NonStop Systems installed in a variety of applications. In banking, distribution, department stores, utilities, legal firms, hospitals, universities, steel mills, even a municipal network emergency system. Whenever downtime or a system failure means a potentially unrecoverable loss. There's only one NonStop System on the market today. It's expandable without penalty. Without reprogramming. Without one cent of loss on the original investment. And it's easy to use as COBOL. Good old standard COBOL without the operational difficulties or special expense you'd expect in an on-line multiple processor system which won't quit.

For further information, contact Tandem Computers, Inc., 19333 Vallco Parkway, Cupertino, California 95014 or Tandem Computers GmbH, Bernerstrasse 50, Frankfurt 56, West Germany.

TOLL FREE 800-538-9360 or (408) 996-6000 in California.

TANDEM



DDP Design Makes Less Vulnerable System

(Continued from Page S/55)

center node would have the least vulnerability. Data would be sent to the passive center node, which would "reflect" the data to all system components, including the originator.

The data would be sent to all components for many reasons. The most obvious is that a passive center node would not have the ability to know the point of origination

or the desired destination.

Having the data echo to its origination point without extra software overhead is an efficient method of checking for data continuity. Providing the data to all system equipments allows the community to check the health of each system component.

When any data is sent, all members of the system community can check the data for validity. If the data is not

valid, the member making that determination can verify that fact.

It is important to verify the decision with another member to be sure the problem is indeed with the originating member and not, in fact, an error of the determining member. By the time a total evaluation is made, all system members would know of the problem and its original and take the necessary steps to keep the

rest of the system healthy.

This design tends to make the software less vulnerable to errors, and error detection is totally integrated within the system software. This design also provides constant checking of the health of all system equipment.

Even if one system device is not providing input to the system, it would be required to transmit system status information periodically. Any de-

vice not participating over a specified time interval would be considered faulty, and the remaining equipment would react accordingly.

In conclusion, the distributed architecture has the potential to produce a command and control system that could be less vulnerable to both equipment loss and software faults. In the event of hardware or software faults, automatic modes of degraded operations are inherent to this system design.

The areas of bus bandwidth, distribution of the data base and intrasystem processor reliability will have to be further investigated.

Oxman is a computer systems engineer with the Naval Underwater Systems Center in Newport, R.I. He is currently working on his master of science degree in computer science at Worcester (Mass.) Polytechnic Institute.

Knitter Eases Operations

(Continued from Page S/54)
cloth) production, pulled greige pieces and finished inventory.

Special In-Plant Uses

The stand-alone processing capability and flexibility of the systems come in handy for other special in-plant applications as well.

At both Monroe and Mullins, for example, the systems are responsible for producing knitter earnings reports based on the performance of machines each knitter operates. At the heart of this system is a Computrol Corp. computer, which monitors operation of each of the 480 knitting machines in the two plants.

Normally, reports are printed via the Computrol printer after every shift. But with 15 separate reports being generated by the end of the work week, manually calculating knitter earnings became complex and time-consuming.

To improve accuracy of such reports, a Texas Instruments, Inc. cassette recorder was installed on top of the Computrol printer. Using a dial-up acoustic coupler, operational data stored on the cassettes is now batched in the morning at each plant to the Sycor which, using a special file, calculates each knitter's daily and accumulated weekly salaries.

A second report produced independently of the home office at each of the plants covers production of "seconds." Based on quality control lot inspections, the report tabulates how many pounds of second-grade fabric is attributable to knitting, dyeing or finishing operations.

Price/Performance
no one else



IMSAI Introduces the PCS-80/30 Integrated Video Computer

- ☐ 3 mHz microcomputer
- ☐ 3K ROM monitor
- ☐ 2K RAM
- ☐ 8 expansion slots
- ☐ 14 mHz integrated intelligent CRT (24 x 80)
- ☐ Intelligent Keyboard
- ☐ Parallel interface
- ☐ 2 serial interfaces
- ☐ Graphic and edit CRT functions
- ☐ 28 amp power supply
- ☐ All for \$1499* assembled and tested.

Software:

ASSEMBLER, DOS, TTY and ACR BASIC, Commercial/Scientific BASIC, FORTRAN IV and more.

Memory Options:

4, 16, 32 and 64K RAM memory boards.

Peripherals:

Printer, floppy disk and stack, standard mini and high performance double density floppy disks on the same system (in industry first), 1/2" magnetic tape drive, CRT and TV monitors.

Send today for your copy of the 230-page IMSAI PCS-80/30 User Manual. Price \$5.00. The cost of the manual may be applied towards your purchase of a PCS-80/30 Integrated Video Computer. Use the



Check one: ☐ I want the IMSAI PCS-80/30 User Manual, price \$5.00. I understand that the \$5.00 may be applied towards the purchase of a PCS-80/30 Video Computer System.

Check/Money Order enclosed. ☐ RAC ☐ MAC

Change only ☐ RAC ☐ MAC

Name _____

Address _____

City _____

State/Zip _____

IMSAI 14000 Wilshire Blvd., San Lorenzo, CA 94577

IMSAI

14000 Wilshire Blvd., San Lorenzo, CA 94577

(415) 423-2000 TWX 910-385 7287

*U.S. domestic price only. PCS-80/30 kit available. Other PCS-80 kits sold at 10% discount and specifications subject to change without notice.

Mini the Tool of the Future

DDP Genesis Owed to Electronics Revolution

By Robert Burns

Special to CW

In my opinion, the question of whether Distributed Data Processing (DDP) will be used or abandoned is really a question of technology. By technology, I do not mean programming technology or software sophistication — I mean technology of microelectronics.

With the development of the transistor 30 years ago, the potential of miniaturization was realized and a cause-and-effect relationship evolved between this component and new computer applications. This relationship was nurtured with the advent of Sputnik because the U.S. realized it was losing the space race.

An all-out effort began to develop sophisticated, complex electronics systems in which severe weight and power requirements were dictated. From this effort, the semiconductor integrated circuit was developed.

This happened in 1960. The advancements since then have been astonishing.

A single integrated circuit on a chip 1/4-in. square contains more electronic elements than the most complex piece of electronic equipment in 1950. Today's microcomputer, which costs a couple of hundred dollars, can out-compute Eniac, the first large scale computer, and is 20 times faster and thousands of times more reliable, operating as cheaply as an electric lightbulb. It is also available at hobby shops.

Now the most important fact of all: since 1959, the number of elements in the more sophisticated integrated circuit has been doubling every year. Today's circuits contain approximately 2^{16} (262,144) elements, and the trend seems to be continuing.

DDP is the deemphasis, if not the elimination, of one central processing location. The central DP operation began for two reasons: one, the cost of a computer was high when large companies were converting from manual systems to DP and, two, programming people were lacking. These two facts caused the central DP operation to remain the main configuration in most companies until five years ago.

Ideally, numerous smaller computers strategically located within a firm provide the firm with much more flexibility than one large mainframe. Individual groups within the firm can explore and develop within their own environment work in which they have a direct interest.

This promotes, to some degree, repetitions of things developed in other groups and, perhaps, as Charles P. Lecht stated, it means distributed incompetence. But it also means a dedication to a project not found in today's central DP operation.

Job Market Boom

I feel this situation could result in very sophisticated programs approaching state-of-the-art development. It also will help develop more and better programmers — still one of the industry's major problems today. The young person looking for a career will now have the option of not only learning programming, but of being directly involved in other major facets

of a corporation (i.e. accountant, engineer, lawyer, etc.).

DDP is definitely on its way to becoming the new DP configuration of the future because of this fact alone; new job market people will seek out the company that offers it.

In some companies in which I have worked, I saw individual groups developing highly sophisticated systems in which they were directly involved. The programmers who now work on complex management information systems are also, in many cases, the users.

There is a deemphasis of the typical programmer analyst going to a user department gathering facts, analyzing

them, having meetings, gathering more facts, writing a proposal, having it approved, etc. Today we see the emergence of many small groups within a large corporation with their own minicomputers, discussing among themselves the development of a new system and simultaneously, if possible, doing the systems work and the programming effort.

Design specs are established, but there is a much less stringent adherence to them. Actually, that kind of "design freeze" was established by DP departments because changes affected their deadline with the user, a constant source of arguments. Now benchmarks will be established, but

changes can occur without the usual problems.

Some companies are resisting the change because switching from centralized to distributed operations can be costly. However, I feel DDP can only benefit any firm in the long run.

The centralized aspect of DP will only remain as a management control area, monitoring each mini's expenses and output, which is necessary to keep costs down. But this will pose no major problem as most companies with large DP centers have this effort already established.

Burns is vice-president for development at Omni Software, Ltd. in Port Washington, N.Y.

EMM builds the most enhancements into add-on memories.

Enhancements make the difference in add-on memories. And EMM has more new enhancements for more new ways to grow your 360 or 370 cpu.

First, there's an all-new EMM Backup Package for 370/158s and 168s — with both a backup memory and a backup power supply. (We call it RASI for Reliable, Available, Serviceable, Improved.) And, it is only possible because of our totally static IBM compatible technology.

Then there's a processor speed enhancement (PSE) for 155s, planned for 145s and 158s — offering faster thru-put. And a low cost memory speed enhancement (MSE) for 155s that also increases thru-put.

Now, we can now expand 360/65 memory capacity to 8 megabytes. Add these new enhancements to those we already had and you get more performance and capacity than you ever dreamed possible from add-on memories.

EMM also offers the most user friendly for popular models like our extra standby memory and simple deferred maintenance... along with more good buyer features like our workable financial packages.

With new enhancements and excellent features like these, we expect our installed base of add-on memories to keep growing for a long time to come. Call or write today, for the complete EMM add-on memory story.

The difference in add-on memory

EMM

COMPUTER PRODUCTS

A Division of Electronic Memories & Magnetics Corporation
2311 W. El Segundo Blvd., Hawthorne, CA 90250

For more information, call your regional EMM sales office: Eastern (201) 777-4404, Central (312) 297-3110, Western (213) 777-4070, Canada: Toronto (416) 626-1160, Europe: Bad Homburg, West Germany 06172/6094.

Why Isn't Everyone Using DDP?

(Continued from Page S/33)

encryption devices to protect data communications and personnel identification schemes via voice prints, signature verification, etc.

Data Integrity

With the distribution of processing and, presumably, the data base, we are faced with assuring data completeness and accuracy. To assure data integrity, the system control procedures must be precisely defined and system monitoring must be tight.

Each user department cannot be left to its own procedures. Management must oversee the network, and that is a full-time function. Unfortunately, few people are trained or experienced in such activities — and that is very scary.

What happens when a failure occurs at a remote site? While you are waiting for the serviceman, are there alternative ways to process data and access the data base?

Whereas a central site can provide backup by a duplexing agreement with another user or with a local service bureau, the ability to provide equal capability at remote sites can be complex. Backup capabilities for each site must be examined.

Service and Support

It is no longer sufficient to have a technically sound product with a service capability in your single location. The manufacturer must be able to provide consistently sound support and service at all present and future remote

locations.

While headquarters may be in a major city, remote computer sites may well be in suburban and rural areas. Service is so critical that it overrides performance as the highest priority.

Until the user faces these issues and solves them properly, DDP systems will not be widely employed. For that reason, DP users must educate themselves as to the intricacies of distributed processing and how it can meet one's specific needs.

Feidelman is president of Management Information Corp. in Cherry Hill, N.J., publishers of data processing system evaluation reports. This article was extracted from the February issue of Datacom and Distributed Processing Report.

Terminals, DDP Go Together

(Continued from Page S/39)

only to authorized users, whether remote or local.

It is important to remember, though, that the more processing responsibility given to the local terminal, the better. Remote communication is time-consuming and costly because it necessitates phone-line use and requires the involvement of a host/processor, which adds overhead to the host.

Of all the tasks and functions associated with terminals used in distributed networks, source data entry ranks as the most critical, because any inefficiencies incurred at the source of the data will cause far greater inefficiencies — and waste more money — as they move through the system.

With user-programmable terminals, it is possible to edit the data as it is entered, by creating error-free screen formats that guide the operator while he enters the source data. This carries the added benefit of letting the person in charge of the local application contribute to the screen-format programming during format creation.

The real key to the processing potential of a network terminal is its software, since it is needed to keep up with the fast pace of hardware development. An intelligent terminal product may have the hardware to provide user-programmable screen formatting, but does it have a screen-formatting utility that runs under its high-level programming language?

Does it have a data entry utility? Can the operating system automatically allocate system resources when used in multitasking mode? Do utilities exist for creating data base files with multiple index keys?

The maturity of an intelligent terminal lies not so much in the hardware but in the software, which must provide means of exploiting the power inherent in the hardware.

Similarly, communications hardware is relatively simple to evaluate and use, but software is less tangible. Communications software interfaces used with an intelligent terminal should be efficiently written, mature and field-proven.

Furthermore, the terminal-product vendor should show a strong commitment to comprehensive development and testing of new software, because the surface of distributed processing is just now being scratched; its full potential will only be uncovered by software that has yet to be written.

As DDP evolves and matures, more and more minicomputer and microcomputer-based intelligent terminals will find their way into increasingly sophisticated terminal applications. It is vitally important, therefore, for the system designer to consider the future of a given distributed system when evaluating terminal processors that are being selected for limited use.

Budgetary considerations dictate that terminals be purchased with sufficient hardware and software features to do the job(s) at hand, but these same terminals must contain provisions for future enhancements and system expansion, since the primary virtue of any distributed network is its inherent capacity for orderly system growth.

Sharpe is PTS-1200 marketing manager at Raytheon Data Systems Co., Norwood, Mass.

We Put Our Customers Years Ahead In Computer Communications

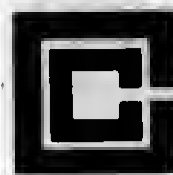
We're helping some of America's largest corporations build data communications bases that are launching them into the next decade of computer communications. With software that intelligently and reliably processes and routes data. And, by means of international data communications networks linking far-flung computer installations, we help maintain and expand the flow of critical data to top management. On-the-spot service teams help ensure that this data flow remains uninterrupted.

In addition to complex networks, our communications processing equipment provides instant access to any computer or terminal within the system, including message switching between IBM host computers, or, between non-compatible CPU's. Our powerful software is again, the key. It emulates the industry standard IBM 3704 or 3705 communications controller while handling terminals worlds apart.

CCI systems enable those terminals to operate like they're next door to your IBM mainframe. And, our systems are designed to handle future expansion, easily and compatibly. As your data communications requirements increase, we'll be right there with you.

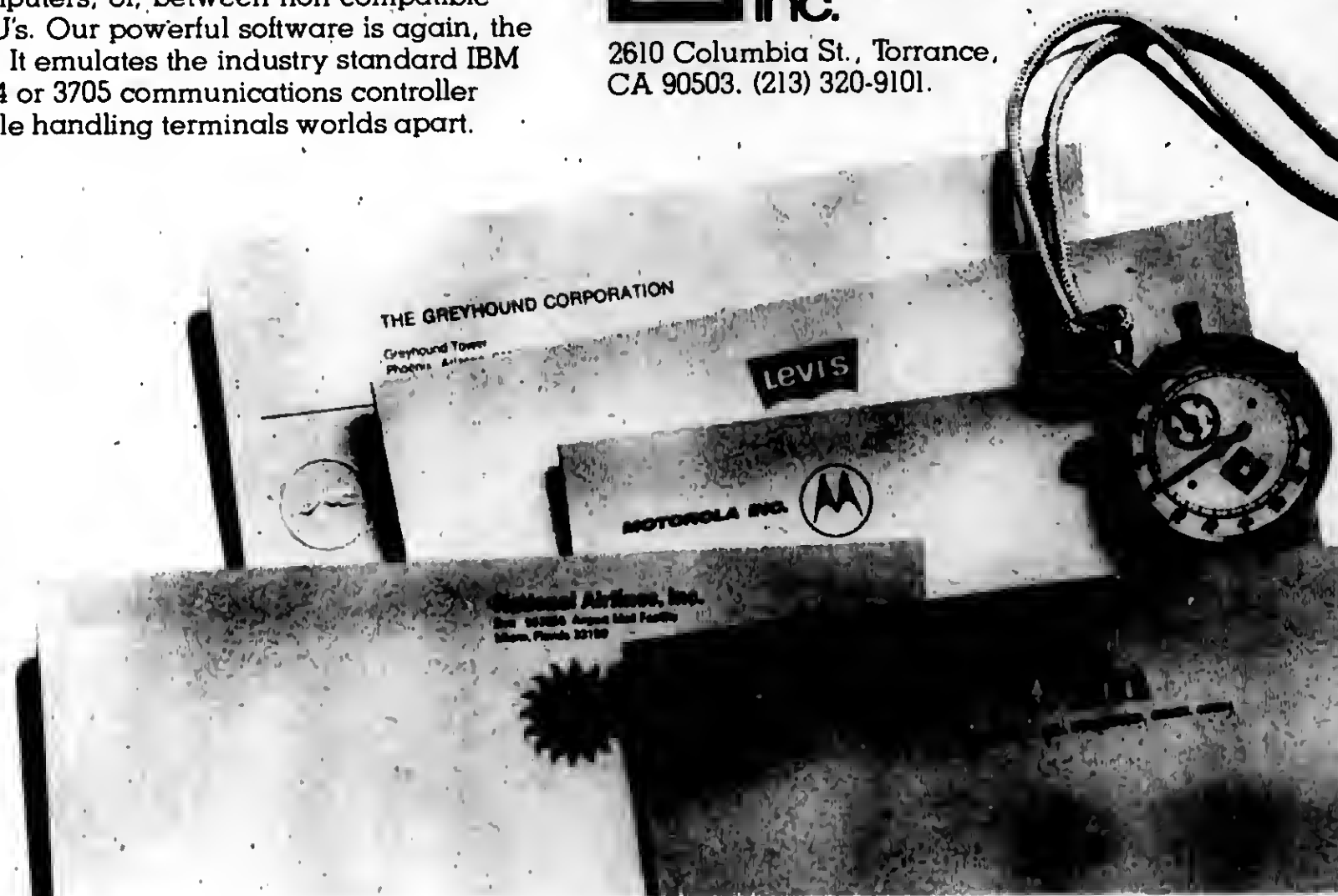
Don't wait for the 1980's. Join us there, now. Some of the biggest names in business already have. Find out how you can put your company's name year's ahead in computer communications. Call or write for your set of CCI installation profiles.

We're Winning The Computer Communications Race



Computer Communications, Inc.

2610 Columbia St., Torrance, CA 90503. (213) 320-9101.



Users Must See DDP as Evolutionary Process

(Continued from Page S/49)

network managers long oriented to the large mainframe expect the minicomputer to behave like a little IBM 370, and one of the immediate problems of minicomputer vendors is the slow-moving transition to Systems Network Architecture (SNA).

Three or four and possibly more communication protocols must be absorbed, and the protocols are getting more complex as they become embedded in data management, i.e. SNA/Synchronous Data Link Control (SDLC).

One approach for a system based on minicomputer central processing would be to decrease the total load on the central processor by distributing intelligence to programmable control units.

These control units, each of which contain a microprocessor, can be used as front-end communications processors (for bisynchronous, asynchronous, and SDLC communications), as intelligent controllers for peripheral units and so on.

The microprocessor controllers, which contain their own dedicated memories, are loaded dynamically from the central processor, thus giving each unit the inherent flexibility to adapt to future possible changes.

In all of these examples, it is intelligence that is being distributed. The distribution itself is invisible to the user. Future advances in network architecture will lead to a "virtual terminal" concept:

- Multicommunications between all elements of DP will occur without the operator or user knowing or caring where the actual computer power or data resides.
- Multilinks will exist.
- Corporate networks will become transparent and unified to allow for the interaction of all elements in the system.

This continuing evolution will see the elimination of the mystique that surrounds DP. Users will perceive the terminal as just another tool integrated into the organization and management of a business.

Is this prognosis for DP consistent with trends in business, government and society?

We all know that one of the great challenges of top management in this decade is the search for ways to make work more satisfying and meaningful to the individual while still fulfilling the purpose of the enterprise. The trend is to create ever smaller pockets of dedicated activity in which small groups have identifiable and measurable objectives which contribute to larger goals.

The real job of management is to eliminate bottlenecks that occur when the groups and/or their activities must interact.

Realm of Individuals

Society has proven it can survive as a whole despite major internal and external crises, but yet when it comes down to individual life styles, people identify with one or more special interest groups. Usually individuals structure their lives in those groups according to size and personal involvement into a hierarchy of affiliations.

As for the political system, in some respects the society is highly governed,

but in others it is loosely governed. A paradox?

No. The pervasiveness of government lies in its multilayered structure. The country is guided by rules dictated by the federal government, state governments, county governments, city governments and, in some cases, residential community governments.

Most of the rules are culturally assimilated, and as long as the rules are consistent and not overly oppressive, often individuals do not know or care which of the governments instituted the rules.

The similarities between the evolution of DP and the evolution of our social, political and business systems are not coincidental. The question is: Can we predict the future of DDP

based on these larger trends?

It is easy to forecast further distribution over the near term because it is already happening. Centralization and decentralization are relative concepts. If decentralization of a headquarters computer center leads to a number of scattered small computer centers that become centralized bottlenecks, it is questionable whether or not decentralization has been achieved.

But is there a limit to DDP? Is decentralization a swinging pendulum that, once an extreme is reached, will start swinging back to the opposite extreme?

The user of a "virtual terminal" that is linked to all elements of the system could care less whether the data or computer is centralized or not. The

truth is that vendors cannot, using existing technology, economically supply a system with everything centralized.

DDP is a solution that is contingent upon available resources of the present and foreseeable future. If the pendulum is to swing back, the change will be predicated on a reversal of current social trends and technical breakthroughs. Such events are measured in generations, not years or decades.

Ivan Socher is general manager of the Commercial Systems Division of Computer Automation, Inc., Irvine, Calif. The firm is following the off-loading approach outlined in this article.

ATTN: 3270 USERS

Here's a *tailor-made* system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. Systems Programmers, in particular, find the following features very valuable.

Both Local and Remote 3270 are available, of course,

PLUS

Local Job Entry. Line printers up to 1200 LPM with 1403 addresses and card readers with 2501 addresses can be placed next to any BRAEGEN CRT. These "hot" printers and readers are located in the users' areas up to 7,500 feet outside the computer room. Most popular uses are for programmer listings and accounting work. Users get the benefits of increased productivity because turn-around time is reduced to minutes.

PLUS

Address Switching. Any BRAEGEN CRT terminal provides as many addresses as required for Console, TSO, Applications, etc. Any CRT can have both Local and Remote addresses. This feature can reduce the number of CRT's required and will eliminate NCP,

VTAM type software overhead requirements.

PLUS

Multiple Controller Interfaces. The BRAEGEN controller allows multiple channel and remote interfaces. Any CRT can access multiple local IBM CPU's or remote CPU's. Just 2-3 seconds to switch a CRT between CPU's or addresses.

PLUS

Fast Cursor, Programmable Keyboard, 7500' Coax,

Multiple Drops per Coax, Wide range of speeds in 3286/3288 compatible printers; from 45 cps to 1200 LPM, Offline Data Entry, and our Offline TSO Editor.

PLUS

Features others have promised for 1978-1979 are AVAILABLE NOW . . . Local Copy, 128 character set CRT, Typamatic keys, Home key, etc.

PLUS

Low Prices — 1, 2, 3 year leases available.



Customers throughout the U.S. are benefiting from these features now. For more information please write or call; The BRAEGEN Corporation, 20740 Valley Green Drive, Cupertino, California 95014. (408) 255-4200.



First we reduced your processing workload. Now we've reduced the price. **\$4995***

When we introduced our powerful Model 770 Intelligent Terminal, we knew it would reduce your workload. We told you how it would ease the burden on your host computer and reduce your data communications costs. And we told you that by preprocessing your data at the source, the 770 would reduce errors, as well as delays in transmitting data (you could do it at high-speed during times when line rates are lower). Our 770 Terminal has been as good as our word.

Now we've reduced our prices.

We've been able to lower the price of the 770 from \$6400 to \$4995 for a single terminal. If you order in quantity, we can reduce the price by more than half — to under \$3200.

At the same time, we've reduced your maintenance costs by more than 14% — to \$58 a month, billed annually, for coverage within 100 miles of any of our 100-plus nationwide service locations.

We've also made TI printers available at a price you can afford. You can purchase our built-in 30-cps thermal printer for just \$1100. (With the price reduction on our terminal, that's like getting the printer free.) Or, you can expand your 770's capabilities with our low-cost Model 810 Multicopy Printer.

The one thing we haven't reduced is our features. The 770 supports TPL, a high-level business-oriented language with the industry's leading forms package; dual minicartridge tapes; a



*Model 770
Intelligent Terminal*

1920-character video display; up to 48K bytes of memory; a user-oriented keyboard for both data entry and application software development; a variety of communication modems or interfaces; and TI's total customer service with nationwide maintenance.

If you're ready to reduce your processing workload at our reduced prices, mail in the coupon. Or call your nearest TI sales office or Terminal Systems Marketing, (512) 258-7305.



TEXAS INSTRUMENTS
INCORPORATED

Yes! I am interested in the 770 Intelligent Terminal.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name _____

Title _____

Company _____

Phone _____

Address _____

City _____ State _____ Zip _____

Mail to: Texas Instruments Incorporated
P.O. Box 1444, M/S 784, Houston, Texas 77001

14-3-CW

*Quantity one price, without built-in thermal printer. Prices U.S. domestic only.

Copyright © 1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS.

Modcomp Systems Offer Cobol, 'Total' On 32-Bit Machine

NEW YORK — Designed primarily for measurement and control, communication and scientific applications, the Classic Series 7860, recently introduced by Modular Computer Systems, Inc. offers users Cobol and Total data base management capabilities usually associated with business applications.

Although the Classic systems have a different internal architecture from that of their predecessors, they are said to be program and I/O compatible with the Modcomp II and IV systems. The 32-bit minis run under the established MAX IV operating system.

The systems can be compared to the Digital Equipment Corp. PDP-11/60, Systems Engineering Laboratories 32-bit machines and the Data General Corp. Eclipse, a spokesman said.

An integral high-speed floating point processor that performs operations on 32-bit, 48-bit and 64-bit operands in parallel, an enhanced Fortran compiler and software for industrial applications were also announced.

The Classic systems accommodates up to 512K bytes of memory, either core or error-correcting MOS, or a combination of the two. The memory is either two- or four-way in-

terleaved, producing an effective cycle time as low as 150 nsec, the vendor claimed. With MOS memory, users can choose to configure their systems without error correction.

Five concurrent memory access paths on the system provide simultaneous CPU and I/O access capability. The CPU uses two paths — one as an instruction pipeline and a second as an operand pipeline. The rest of the paths are taken up by the I/O processors, optional communications processors or by external users. Access paths can be prioritized by the user in certain applications, the firm pointed out.

Memory Protection

Two forms of memory protection are available on the minicomputer. The memory protect implemented in the Memory Management System consists of a four-level protect code assignable to each 512-byte page. A second protect capability is used with extended memory addressing. An upper and lower boundary is established, and accesses outside these boundaries generate a protect violation, the firm said.

Memory is addressed by con-

(Continued on Page 46)



Traveling to trade shows and malls, minicomputer-based systems like this one are providing people with posters and T-shirts with their pictures on them. See story on Page 46.

Familiarity Breeds Success, User Finds

By Esther Surden
CW Staff

PORT WASHINGTON, N.Y. — A knowledgeable user is the key to running a successful small business system. That's the opinion of Cornell Jaray, president of Kennikat Press, owner of a Digital Equipment Corp. Data-system 340.

"When you have a small company (DP) problems will continually crop up," he stated. "Ninety percent of these involve going over to the machine, looking at it, analyzing the difficulty and pushing a few buttons. But you've got to know what you're doing," he pointed out.

Jaray chose his small system based on service criteria, he explained. "We ruled out almost all of the smaller companies; the most important element was ready availability of service." Next in importance was suitability of the system for the operation, he said.

Narrowing down the field to IBM and Digital Equipment Corp., Jaray "leaned toward IBM" until he found out that "75% of IBM small systems users had in-house DP managers" — something he didn't want to have. So the DEC system was chosen.

However, Jaray has really had to become his own in-house DP manager anyway, he pointed out. He's learned to find minor bugs and make minor modifications.

After he decided on DEC, Jaray received a postcard from an OEM soliciting business. After talking to the salesman, he placed an order with him. The OEM sent candidates for doing the programming.

The first person "was totally ignorant of accounting functions," so although he knew the DEC machine, the publisher did not use him. The next person the OEM sent him to interview was David Gale, then a freelancer and now president of Mini Computer Business Applications, Inc. (MCBA) a Los Angeles-based turnkey firm.

Gale knew the machine and was aware of the problems facing businesses, Jaray pointed out, and he began working to get the machine operational by Jan. 1.

Directly to DEC

A bit later, the OEM called and said he couldn't get the discount he expected on the system so the system was going to cost the publisher more money. Since this didn't seem right to Jaray, he went directly to DEC, explained his predicament and proceeded to buy a DEC system. Gale remained on as the system's programmer, doing all the programming in Boston and delivering the software to Port Washington on disk packs, Jaray noted.

So that the system would be up and running by Jan. 1, Jaray and

(Continued on Page 46)



Modcomp Classic 7860 System

MINI-TWO-RTD

#2 IN DEC BECAUSE WE'RE **#1 IN DELIVERY**

DEC LARGE SYSTEMS
SPECIALISTS

10 ★ 20 ★ 11/34 ★ 11/45 ★ 11/60 ★ 11/70
CPUs • MEMORY • PERIPHERALS • SYSTEMS

8 & 11 OVER 250
DIFFERENT
ITEMS

SEND FOR
FREE
DEC PRICE
LIST NOW!

CENTRONICS 101A, 102A, 103
8, 11, RS232 & NOVA INTERFACES

AMERICAN USED COMPUTER

P.O. BOX 68, KENMORE STA.
BOSTON, MASS. 02215

617-261-1100

Firm Builds Traveling Portrait Trade on Mini

By Ann Dooley
CW Staff

TORRINGTON, Conn. — Computer Artists, a traveling computer portrait company headquartered here, uses a minicomputer to reproduce faces on T-shirts, pillowcases, calendars and puzzles.

The process takes less than a minute, according to Michael Kramer, operator of the system, who said the computerized portrait appeals to people of all ages, "from little kids to grandparents."

Kramer uses a Digital Equipment Corp. PDP-8A minicomputer, a Cen-

tronics Data Computer Corp. Model 102AL printer, a closed-circuit TV camera, two TV monitors, two zoom lenses, a close-up lens, a heat transfer machine for imprinting the picture, lighting and cabling, computer paper, three ribbons for portrait and transfer use and other accessories.

The TV camera transmits the subject's image to the mini. Then, the 102AL, operating at 125 line/min, uses 12,000 numbers, letters and symbols to produce the portrait, Kramer explained.

The whole unit costs approximately \$15,000 from Computer Games, Inc.

After a few days of training on the system, Kramer began taking his busi-

ness to trade shows, shopping malls and other "well traveled" locations from Florida to New York.

"Beach locations often prove to be the best," Kramer noted.

He is planning to upgrade to a PDP-11 and add another Centronics 102AL printer so that he can print out horoscopes, biorythms, lettering and reverse images.

The cost for the system will be \$28,000.

Since Kramer travels to so many different locations, good service and equipment is essential to him. But he has had no problems with breakdowns so far and is extremely happy with the system, he commented.

Modcomp Has 32-Bit Series

(Continued from Page 45)

verting the 16-bit virtual address defined by the instruction into a 21-bit physical address, the spokesman explained. The 21 bits allow the system to address up to 4M bytes of memory, and any one of nine addressing modes can be used.

With extended addressing, users can directly address any word in physical memory. This scheme works with most indexed and short-indexed instructions, the firm said.

The I/O processor for the system is available in two versions. Users can get a single plug-in board with one I/O bus or another plug-in board with two I/O buses. A system may have up to four I/O buses depending on the model selected, the firm said.

The I/O structure includes a "party-line" bus that can accommodate up to 63 peripheral devices. The mini has 16 priority interrupt levels, two of which are I/O levels that can be connected to 64 sublevels used by device controllers and external users, the company explained.

The Cobol used on the Modcomp system is "a low intermediate implementation of the Ansi standard X3.23 1974," the firm said. It will run on the Modcomp II, III and IV as well as Classic. The language requires a CPU with 256K bytes of memory, at least 5M bytes of moving head disk capability and a console device, the Modcomp said, and it costs \$7,500.

The system uses Total from Cincom Systems, Inc. for data base management. It operates under both the Max III or IV operating systems and costs \$10,000.

Maxine — the Modular Application Executive for Industrial Engineering — is designed to reduce the amount of time an industrial control engineer must spend developing a control system, Modcomp said. It will run in CPUs having only 32K bytes of memory and costs \$5,000, the firm reported.

A basic Classic system with 64K bytes of memory costs \$58,000. Modcomp is at 1650 West McNab Road, Ft. Lauderdale, Fla. 33309.

Familiarity Breeds Success

(Continued from Page 45)

his wife and staff spent Christmas week working day and night to input 2,000 titles and 4,000 customers.

Using the previous system, all invoicing and billing were done by hand with an outside service taking three weeks after month end to produce gross sales reports. Now the publisher gets more detailed sales reports half a day after the month closes.

When the system was first installed, it met some objections from the firm's order clerk, Jaray indicated. "Our invoices used to come out letter perfect manually, but with the computer, our invoices came out in shambles."

It turned out that the clerk had been

redoing the invoices each time she made a mistake — even if it meant re-typing several pages. With the system, she could no longer fall back on her old method of retying and would resort to pushing buttons.

After investigating why the invoices were coming out with so many problems, Jaray had the system programmed so that when it started up, a message flashed on the screen saying "Norma, please don't push my buttons today." This improved the situation enormously, he stated.

Every system will have problems with bugs, Jaray said, but he feels most of the bugs are out of his software now.

DO YOU QUALIFY?

OUR PRODUCT WAS DESIGNED FOR THE VANGUARD OF THE COMPUTER INDUSTRY. SOPHISTICATED USERS RECOGNIZE THE VERSATILITY OF OUR MACHINE AND HAVE BEATEN A PATH TO OUR DOOR.

We've installed our revolutionary computer system, the QM-1, in Fortune 500 Aerospace Corporations, Universities, the Military, major System Houses and in a giant Computer Manufacturer.

They purchased our system because:

- The QM-1 was specifically designed to enable you to emulate any computer or, for that matter, any peripheral or digital device.
- When an emulator is running, the QM-1 architecture is transparent to the user. Software developed on the QM-1 will run on the machine which has been emulated. The opposite is also true; application and system software from the "real" machine will run unchanged on the QM-1.
- QM-1 customers have emulated commercial, militarized, avionic and special purpose computers. They range from micros to fourth generation Large Scale General Purpose Systems.
- Users are not limited to one system identity; they can emulate as many kinds of computers as they like, even run multiple emulations of different systems concurrently.
- The QM-1 allows you to control and monitor the emulated system, even primitives like gates, data buses and registers. You can use it to design new computers.



Here's what QM-1 users have found to be true:

- Emulators on the QM-1 are running one hundred times faster than simulators on more expensive systems.
- The QM-1 is an easily modified, reusable breadboard to verify and validate device design.
- The QM-1 is without equal as a software development tool for any computer. It will also protect investments in software running on destandardized machines.
- The QM-1 is an excellent design tool for analyzing software structure, system composition and hardware/software trade offs.
- The QM-1 is ideal in a computer science environment for instruction and research into hardware and software architecture.

Prices range from \$190K for a minimum system configuration, capable of running Nanodata supplied software, to upwards of \$700K for a multiprocessor. A "typical" customer configuration sells for \$290K and includes emulators of the PDP 11, Data General NOVA, IBM 360, etc.

Do you qualify as a prospective user? If you do, then write for additional information or, better still, call Michael Senft, Director of Marketing.



NANODATA CORPORATION

2457 Wehrle Drive • Williamsville, N.Y. 14221 • (716) 631-5880

Small System Suits Various Uses

MILPITAS, Calif. — The Xycon III system from Computer Systems Unlimited is designed for professional, educational and industrial/scientific uses, according to the vendor.

Built around an Intel Corp. 8085 processor board, the system includes a CRT and controller with character inten-

IBM 5100s Get Keypunch Link

PHILADELPHIA — A device to interface the IBM 5100 desktop computer and the Series/1 to both the IBM 129 keypunch and IBM 029 keypunch is available from Community Computer Corp.

The CCC 1700A keypunch interface receives bit serial data from the IBM 5100, converts it to Hollerith and transmits it to the keypunch for data card punching, the firm explained.

880-Char. Buffer

An 880-char. buffer allows data rates to exceed the punch rate of the keypunch, it reported. Standard transmission rates from 75 bit/sec to 9,600 bit/sec can be accommodated.

When connected to the IBM 129 and functioning as a card reader, the 1700A is capable of reading a deck of data cards continuously at 55 card/min.

The CCC 1700A keypunch interface costs \$2,850 from Community Computer Corp., 185 W. School House Lane, Philadelphia, Pa. 19144.

sification, blinking underscoring and reverse video on a character-by-character basis, a 63-key typewriter-style keyboard with a 16-key numeric and cursor cluster, 32K bytes of random-access memory (expandable to 64K bytes) and dual floppy disks.

The system can support the use of high-resolution graphics or special and scientific or foreign alphabets, the vendor pointed out. Using an intelligent controller for the

disk drives allows the system to control two dual-sided disks for 1M byte of auxiliary storage.

A system with 32K of memory, keyboard, numeric and cursor control pad, 2K-byte system monitor in read-only memory, two 500K floppy disk drives, CRT and operating software costs \$9,220, the firm said. Computer Systems Unlimited can be reached through P.O. Box 870, Milpitas, Calif. 95035.



Xycon III System

TI's Model 810 Printer can make a big impact on your printer costs.

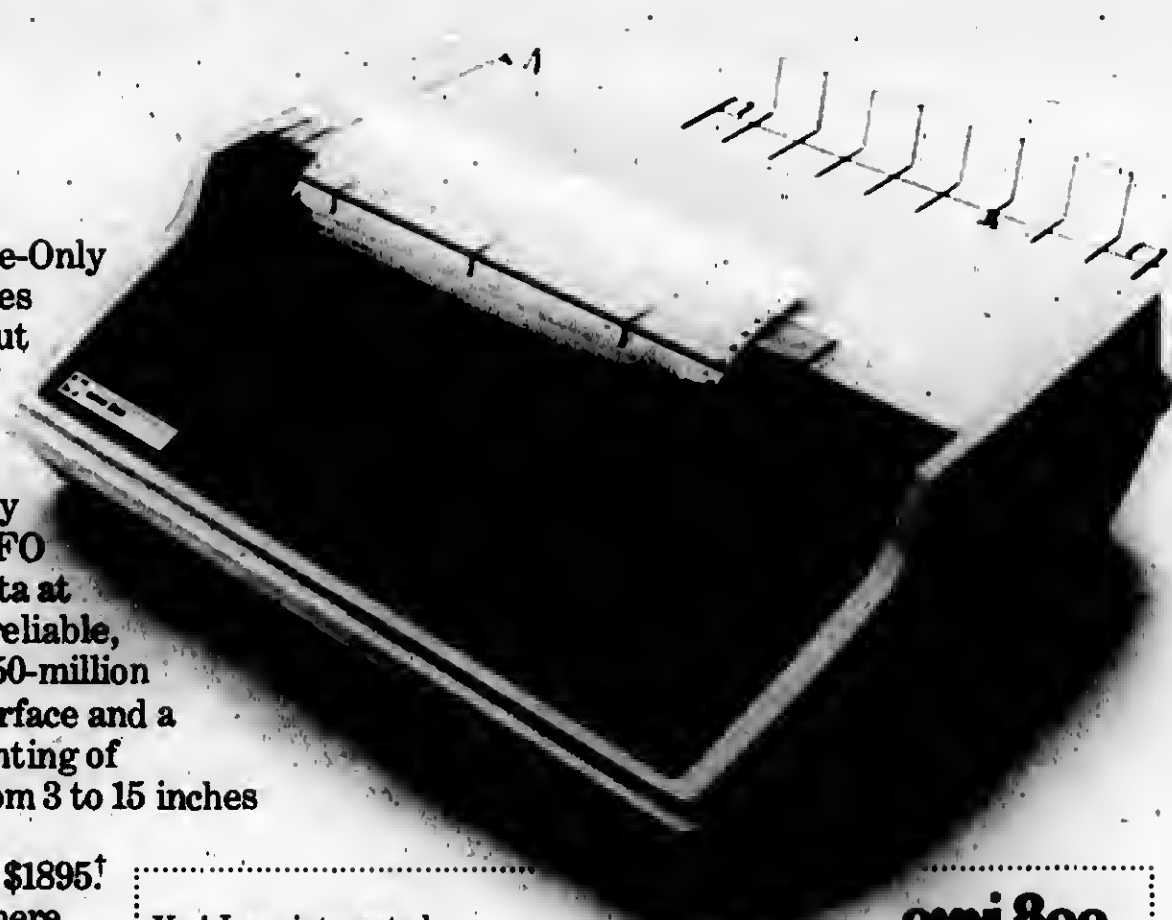
OMNI 800* Model 810 Receive-Only Printer has standard features designed for high throughput and reliability.

Features like bi-directional 150-cps printing of an original and five high-quality copies. A 256-character FIFO buffer so you can receive data at speeds up to 9600 baud. A reliable, low-cost printhead with a 150-million character life. An EIA interface and a self-test capability. Plus printing of reports, tickets or forms from 3 to 15 inches in width.

These and more ... for \$1895†

For added flexibility, there are options such as vertical forms control with compressed print, expanded print, international character sets, a tear bar and five different interfaces.

Add it all up and you can see why the 810 is the price/performance leader. For more information about how the 810 can impact your printer costs, fill out and mail the coupon. Or call your nearest TI sales office, or Terminal Marketing at (713) 491-5115, ext. 2124.



OMNI 800
electronic data terminals

Yes! I am interested in the Model 810 Printer.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name _____

Title _____

Company _____

Phone _____

Address _____

City _____

State _____

Zip _____

Mail to:

TEXAS INSTRUMENTS
INCORPORATED

P.O. Box 1444, M/S 784, Houston, Texas 77001

17-3-CW

*Trademark of Texas Instruments
†Quantity one, U.S. Domestic Price.

Copyright © 1978, Texas Instruments Incorporated

**CRT
PRICE
BREAK!**

HAZELTINE 1500

HAZELTINE
MODULAR 1

OEM
Distributors
for
Data Printer
Line Printers

ADL

TEXAS INSTRUMENTS.

Buys Unit With Custom Software

Firm Gains DP Without Changing Operations

By Tim Scannell
CW Staff

SANTA CLARA, Calif. — When officials of RYT Industries here began searching for a small business system, they wanted one that wouldn't require them to change their operations.

The manufacturer of custom microwave products examined several systems offering "canned" software, but discovered most of them would require a "change of air methods to adapt to theirs," Ken Yamaguchi, RYT vice-president, recalled.

RYT decided to purchase a Diablo 3200 computer, manufactured by Shasta General Systems, "both for the price and the custom software that was

included," Yamaguchi said.

The system is used at RYT mainly for inventory control and material planning. The inventory file, stored on diskette, contains the part number, description, costs, quantity on hand and vendor as well as quantity on order, committed and used for the year-to-date.

A model file is also maintained that consists of the model and part numbers and the quantities required to assemble the finished product.

Anywhere from 20 to 99 parts are required to produce a particular model of a filter, amplifier or isolator, Yamaguchi explained. A perpetual inventory of these parts, 3000 in all, is main-

tained by the Diablo 3200.

The system at RYT is based on an Intel Corp. 8080 microcomputer with 24K bytes of random-access memory. It also contains a dual-diskette drive with a 3M-character storage capacity, a 1,920-character CRT and a 200 char./sec matrix printer.

Supports Bid Process

The CRT workstation for the 3200 is used for on-line parts explosion and enables RYT to produce up-to-date bids for its customers, Yamaguchi said.

When RYT puts together a bid proposal, the operator keys the model number and quantity required and the

system lists, by part, the quantity required, cost information, on-hand balance, quantity committed and the quantity needed to meet customer demands. RYT management is able to make engineering, production and marketing decisions based on this information, Yamaguchi said.

Material usage is monitored through a stock requisition report that is generated daily by the system.

Parts are costed to the job simultaneously on a first-in/first-out (Fifo) basis, reflecting the actual experienced cost. Fifo costing was awkward for RYT under the previous manual system, because frequent purchases were made at different prices and parts from several purchases were on hand.

The system is now used successfully because the materials can now be identified as belonging to a specific job, Yamaguchi noted.

As materials are costed to a job, quantities committed are reduced, on-hand balances are diminished and quantities used in the year-to-date are updated, he said. "By reducing the number of overstocked parts and obtaining better pricing on frequently used parts, we have reduced inventory expenses," he pointed out.

Prior to the installation of the Diablo 3200, all records at RYT were kept manually. But "the complexity of our operation, coupled with the growth we are experiencing, dictated the need for an automated system," he stated.

The system, operational since October, is expected to handle such things as accounts payable, accounts receivable, payroll and general ledger.

SBC-80 Users Get Tape System

WALTHAM, Mass. — Computer Marketing, Inc. is offering a 1/2-in. magnetic tape system for users of Intel Corp.'s SBC-80 microcomputer.

The industry-standard System MT 80 is hardware- and software-compatible with Intel's SBC 80 microcomputer and its Microcomputer Development System, the vendor said.

The system is made up of one to eight tape drives and a single SBC-80 Multibus interface card. Formatters are an integral part of the tape drive and allow for NRZI, PE or dual-density operation on 7- or 9-track tape, according to a spokesman.

The program need only set up the MT 80 control register and all subsequent data transfers to and from tape are performed automatically, he said.

The interface card, contains a dual memory mapped DMA buffer and up to 8K bytes of static random-access memory which can be used for tape buffering or system memory. Software drivers are available for Intel's Real-Time Multitasking Executive RMX-80 and Isis II operating systems.

An MT 80 with 9-track, 800 bit/in. NRZI operation costs \$4,700, for the 7-in. drive and \$5,525 for the 10-1/2 in. drive. The price includes the tape drive, formatter, 512 bytes of static RAM documentation and a 5-ft cable.

Computer Marketing is at 257 Crescent St., Waltham, Mass. 02154.

THE JAMES MARTIN SEMINAR

on the design, management and future of distributed processing, data base, and networks

New York March 27-31 1978

San Francisco April 17-21 1978

Atlanta April 24-28 1978

ACCLAIMED THROUGHOUT THE WORLD

"This was excellent exactly what I needed" ... Chicago
"Totally excellent" ... Boston
"This is the best seminar I have ever attended (over 14 years in the field)" ... San Francisco
"I paid my own tuition and it was worth it" ... Houston
"Excellent seminar and superbly presented" ... London
"Outstanding" ... Chicago
"Inspiring" ... Los Angeles
"The best I have ever attended" ... San Francisco
"Very complete" ... London
"A tour de force by Mr. Martin" ... London
"I do feel the money spent was well worth it" ... Chicago
"Martin was fantastic" ... Toronto
"A fantastic week. Clear and concise" ... Tokyo
"I felt that this seminar was splendid" ... Paris
"Fantastic" ... Toronto
"A very worthwhile experience" ... San Francisco
"A course of excellence" ... Los Angeles
"Real" ... Boston
"I think the entire seminar was terrific" ... Boston

For full details phone (617) 887 2776 or complete the coupon and mail to:
Miss J. Tumber, Savant Institute, 8 Normandy Row, Topsfield, Mass. 01983.

Please send me full details of the James Martin Seminar in

Name (BLOCK CAPITALS PLEASE)

Organisation

Address

Driven by Intel 8048

Axiom Unveils Two Electrostatic Printers

GLENDAL, Calif. — Axiom Corp. has unveiled two electrosensitive printers, each driven by an Intel Corp. 8048 microprocessor and compatible with RS-232C and 20mA serial input as well as parallel Ascii interfaces.

The Model EX-801 operates at speeds up to 160 char./sec and offers a choice of three character sizes to provide 80, 40 or 20 columns on the 5-in.-wide electrosensitive paper, according to a spokesman. The unit features a 256-character multiline asynchronous input buffer expandable to 2K characters and 96 Ascii standard characters that can be increased with programmable fonts, he noted.

Available as an option is 2K bytes of user-programmable read-only memory (Prom) that allows the user to call on subroutine blocks in the software package stored in the 8048 controller, Axiom said. Input data can be formatted to user specifications, it claimed.

The unit also has a reverse printing capability so light characters can be formed on a dark background, the spokesman said.

The EX-820 printer is similar to the 801 except that it has the ability to mix alphanumerics and graphics on each line. The user can define the size of each graphics field and choose from four preprogrammed horizontal dot resolutions up to 128 dot/in., Axiom said.

Vertical dot resolution is fixed at 65 dot/in; there is also a provision for automatic histogram-generation, according to the firm. A 512-character serial input buffer expandable to 2K characters is standard.

Printout for both units is produced by passing a high current from the eight tungsten wires in the printhead to the conducting surface of the aluminized paper. The aluminum is removed by the current which lasts a few microseconds and exposes a layer of black ink which is seen as a dot matrix, forming the printout, the spokes-



EX-801 Microprinter

man explained.

Both printers include a power supply, character generator, low paper detector and built-in self tester. The Ex-801 is priced at \$655 in single quantities and \$450 OEM; the EX-820 sells for \$795 individually and \$555 in quantities of 100.

Axiom is at 5932 San Fernando Road, Glendale, Calif. 91202.

16-Bit Board Has Variety of Options

IRVINE, Calif. — A 16-bit microprocessor board set compatible with the S-100 bus plus a variety of options have been announced by Alpha Microsystems.

The AM-100 microprocessor board set replaces 8-bit-based processors and offers multitasking, multiuser time-sharing in an advanced disk operating system environment, the firm stated. Utilizing a Western Digital Corp. WD-16 microprocessor, the unit reportedly provides 16-bit capabilities with 11-digit floating-point arithmetic and an on-board real-time clock.

The board contains the Alpha Microsystems Operating System (Amos), which allows device independence and provides disk file management, a multistructured file system and a multipass macro assembler with linking loader, according to a spokesman.

'NLOS/1' Handles English Phrases

NAZARETH, Pa. — A phrase-oriented programming language that operates on both 8080 and Z80 microprocessors with a minimum of 12K bytes of random-access memory (RAM) has been released by Cybermate.

The Natural language Operating System (NLOS/1) breaks information from sentences into phrases that are classified both grammatically and by the type of data they convey, a spokesman explained. A dictionary of phrases is maintained within the RAM.

Grammatical forms recognized by the system are "subject" for nouns and pronouns; "links" for verbs; "prepositions" for prepositional phrases; and "modifiers" for adjectives and adverbs, the spokesman stated.

Associated subjects and classified sentences are stored in a section of the dictionary and can be retrieved by inserting one of six reserved words.

Other commands include "clear," which initializes the RAM dictionary; "save," which saves the dictionary on cassette tape; and "load," which restores the dictionary from the tape input, the firm said.

NLOS/1 is available with a fully documented set of Assembly language source listings for \$200 per program copy from the firm at R.D. No. 3, Box 192A, Nazareth, Pa. 18064.

The memory can be expanded to more than 256K bytes in partitions of up to 64K bytes via the memory management system included in Amos, he noted.

Peripherals such as static memory, memory paging and I/O facilities are also supported by the unit, the spokesman said.

Disk Controller

Also introduced was the AM-200 direct memory access (DMA) soft-sectored floppy disk controller, designed to support the AM-100. The controller allows user formatting of floppy disks and provides multiple drive control and multilevel interrupts.

The unit will control up to 16 floppy surfaces and provide full or partial sector reading, the spokesman said. It supports either IBM 3740 diskette format (256K byte/drive surface) or the firm's AMS format, which allows 315K byte/drive surface. The CP/M disk operating system is implemented as an option, the firm said.

Another option, the AM-300, is a six-port serial I/O unit that provides fully programmable RS-232C ports with 16 transmission rates up to 19.2 kbit/sec. The unit is based on Western Digital's Astro chips (UC-1671B) and will accept data in either asynchronous or synchronous modes.

The AM-400 is a disk subsystem that supplies the user with 50M bytes to 2.4 G bytes of on-line storage, the firm said. The unit is capable of supporting up to eight California Computer Products, Inc. Trident disk drives with an average access time of 28 msec.

The AM-400 includes two disk drives with 225M bytes of storage controllers, and hardware as well as documentation.

Prices for the AM-100, AM-200, AM-300 and AM-400 are \$1,495, \$695, \$695 and \$20,355, respectively, from Alpha Microsystems, Suite N, 17875 Sky Park North, Irvine, Calif. 92714.

Drive Takes Files Of Various Sizes

LAKEWOOD, Colo. — A tape drive subsystem that records variable-length blocks on standard cassette tapes and is compatible with the S-100 bus is being offered by General Micro-Systems.

The SYS I records biphase Manchester code at 1,600 bit/in. on Ansi standard data cassettes with a transfer rate of 2,000 char./sec at 10 in./sec, a spokesman said.

Because recording is in variable-length mode, a 10K-byte record, for example, can be followed by a 32K-byte record, the spokesman explained. The user program may load the next record, operating as a batch data processing system, with an unlimited amount of data.

Using large records, more than 700K bytes can be recorded on one side of a standard cassette, the firm noted.

Rewind time is less than 30 sec at more than 120 in./sec, the firm said. By counting interblock gaps, a record can be located in less than 15 sec, the spokesman claimed.

The single-drive unit is priced at \$595 and the dual-drive unit \$969, with the S-100 interface board costing \$168 from the firm at 12369 W. Alabama Place, Lakewood, Colo. 80228.

Book Details MPU Interfacing

BERKELEY, Calif. — Sybex, Inc. has published a book that details the assembly and operations of a microprocessing system from the various buses involved to the assembly of the MPU.

Microprocessor Interfacing Techniques, written by Rodney Zaks and Austin Lesea, is aimed at those who have a basic understanding of microprocessor operations. The book, which focuses on interfacing in general, attempts to instruct the reader on how to link a complete system to all the usual peripherals, a spokesman said.

Discussed within the book are I/O tech-

niques, keyboard interfacing, LEDs, teletypewriters, printers, floppy disks, CRTs, cassette type media, industrial-interfacing, analog-digital techniques and communications standards, according to the spokesman.

The book also presents a study of a multichannel communications system; another chapter is dedicated to various troubleshooting techniques.

Microprocessor Interfacing Techniques is priced at \$9.95. Sybex is at 2161 Shattuck Ave., Berkeley, Calif. 94704.

MICROCOMPUTING

M MAP — 1. Refers to activities to transform information from one form to another. 2. A listing provided by a compiler to enable a programmer to relate his data names to the core addresses within the program.

MARK READER — A device capable of reading pencil marks on documents up to a size of 13- by 8 in. The marks can be positioned anywhere on the document. The reader's sensing cells are switched on by special clock track marks.

MASKING — A technique for sensing specific binary conditions and ignoring others. Typically accomplished by placing zeros in bit positions of no interest and ones in bit positions to be sensed.

MASS STORAGE DEVICE — Refers to various storage units with large capacity such as magnetic disk, drum, data cells, etc.

MASTER CLOCK — 1. Oscillator component which generates all the digital impulses required in an electronic computer. 2. The primary source of timing signals used to control the timing of pulses.

MEGA — Prefix denoting 10^6 (one million). Abbreviated M.

MEGABIT — A unit equal to one-million binary digits.

MEGACYCLE — A million cycles per second; 10^6 cycles per second.

MEMORY CYCLE — 1. A computer operation consisting of reading from and writing into memory. 2. The time required to complete this process.

MICR CODE — Refers to the special magnetic ink character recognition code that has been designed to consist of a set of 10 numeric symbols and four special symbols standardized as Font E-13B developed for the American Bankers Association.

MICROCOMMAND — Refers to various commands specifying elementary machine operations to be performed within a basic machine cycle.

MICROFILM, COMPUTER OUTPUT (COM) — Normal printed output of a computer reduced to one of several available microforms by a special output device that takes the place of the line-printer. The COM device allows high-quality output at speeds of 5,000 or more line/min.

MODE — 1. Refers to various methods of operation, e.g., the binary mode, the interpretive mode, the alphanumeric mode, etc. 2. The most frequent value in the statistical sense.

From Microcomputer Dictionary & Guide by C. J. Sipprand
D. A. Kidd. Used with permission of Matrix Publishers, Inc.
207 Kenyon Road, Champagne, Ill. 61820.

COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

MICRODATA MEMORIES, 1600 CPUs, SELECTRIC #735 I/Os (new), PC Bd. REPAIR; Shebasta 1-513-474-1860.

NEED TO LEARN MORE ABOUT MICROCOMPUTERS? We offer a complete line of the latest in Microcomputer Books! Our latest catalog is available for \$1.00, to cover postage and handling. Computer Hobbyist Bookstore, 796 Navy St., Ft. Walton Beach, FL 32546.

CUSTOM PROGRAMMING FOR RADIO SHACK. TRS-80 COMPUTER. SEND SPECIFICATIONS FOR PRICE QUOTE. MICROWARE ASSOCIATES, 404 SOUTH PECAN, # 118, ARLINGTON, TEXAS, 76010.

FOR SALE IBM 5100 Computer 32K, Basic, Aux Tape Unit, 5103 Printer (60 CPS). Please call Tom Kolb 616-233-0162.

MICRODATA REALITY CORE MEMORY. JOHN HARDMAN (201) 751-3000.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02180.
I have read the rules, and would like to place my ad as follows:
Date of first appearance (or "next available issue"): _____
Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____
COPY: (Attach copy on typed or printed page.)
Total words at 80¢ each equals: _____ Plus Box Charge (if any): _____
Equals total cost per insertion: _____
Times total number of insertions: _____ Equals total enclosed: _____
Name _____
Signature _____
Address _____
City _____ State _____ Zip _____
Phone where you can be reached during day (_____) _____

Market Study Predicts

U.S. CPU Shipments to Jump 15% in '78

By Jeffry Beeler
CW Staff

CAMBRIDGE, Mass. — Rising demand for teleprocessing and data bases as well as for traditional DP applications will "strongly" boost hardware, software and services revenues during 1978, International Data Corp. (IDC) predicted in its latest five-year forecast of computer industry market trends.

Despite slackening sales in a few market sectors, the anticipated growth will continue to the benefit of all suppliers — especially mainframe vendors — at least into 1979, IDC spokesmen said here recently during the first of two scheduled presentations of the annual market survey.

In the general-purpose computer sector, the market research firm predicted that worldwide shipments by U.S. vendors will grow 15.1% this year to total \$14.1 billion. Of that figure, domestic sales will account for \$7.5 billion and international shipments for the remaining \$6.6 billion.

Domestic shipments of general-purpose computers will increase 16.1% this year, compared with an estimated 14% growth in foreign sales, the market study forecast.

Last year, by contrast, mainframe sales in the U.S. totaled almost \$6.5 billion, a 21.2% increase, while international shipments neared \$5.8 billion, a 9.2% expansion, IDC noted.

By 1982, U.S. revenues from general-purpose computers will reach \$18 billion, although annual growth in the sector will slow to 5.9%. At the same time, shipments to domestic users will grow 5.6% annually to total \$9.5 billion, and international sales will rise 6.3% per year and total \$8.5 billion, the report estimated.

Because of rising shipments both in this country and abroad, the worldwide installed base of U.S.-made general-purpose computers will grow from \$76.8 billion last year to more than \$86 billion this year — a 12.2% increase, IDC concluded. Domestic users will account for \$47.1 billion of this year's total, while foreign users will contribute the other \$39.1 billion, IDC predicted.

International Base

The international installed base, however, will grow 12.7% annually this year, compared with only 11.9% for its domestic counterpart, the company added.

In five years, the worldwide installed base of U.S. general-purpose computers will total \$128.6 billion, a 9.7% increase from the previous year's figure. Of that total, U.S. installations will account for \$69.4 billion and

foreign users for \$59.2 billion, the study predicted.

As expected, IBM accounted for almost 39,000 or 70.6% of the more than 58,000 CPUs installed domestically through last year and for almost 35,300, or 71.1%, of the nearly 53,200 computers installed internationally. Other leading U.S. vendors of general-purpose computers include Honeywell Information Systems, Inc., with 7.5% of the worldwide market; Univac, with an identical share; Burroughs Corp., with 5.8%; Control Data Corp., with 3.4%; and NCR Corp., with 2.3%, IDC found.

Since 1977, plug-compatible mainframe manufacturers have also emerged as a "major force" and have begun vying for industry importance with their more established competitors, the company added. Probably the most important new comer to the field is Amdahl Corp., followed by ITEL Corp. and several other IBM-replacement-oriented vendors.

IBM, Bell Headed for Clash In Mid-1980s, Analysts Warn

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — A major clash over markets is inevitable between IBM and AT&T in the 1980s, two major industry analysts agreed here at the recent DataComm '78 conference.

"AT&T is in essentially the same business as IBM, no matter what they say," Charles P. Lecht, president of Advanced Computer Techniques, Inc., said, while Frederic G. Withington, a consultant with Arthur D. Little, Inc., said it was "inevitable" that the two would compete even more than they have to date.

Lecht said the major collision between the two industry giants will come in the mid-1980s after the satellites of Satellite Business Systems (SBS) are launched, but Withington predicted the collision will result more from offerings planned for the late 1980s and early 1990s.

However, both agreed the big question mark in the equation is the threat of government regulation.

Legislators do not realize the significance of the coming clash and are not really equipped to deal with the issues raised, Lecht pointed out, while Withington said he hopes the government will not stop or stifle the innovative growth period ahead.

Of all the sectors in the mainframe market, the large systems area will prove the "most dynamic," the report concluded. In the U.S., the installed base of computers costing at least \$4 million each will soar from \$20 billion last year to nearly \$45 billion in 1982, as major corporations develop worldwide data bases and distributed processing capabilities.

Minicomputer Sector

In the minicomputer sector of the CPU market, U.S. vendors this year will ship more than \$3 billion worth of OEM and end-user products, with domestic sales accounting for more than \$2 billion of that total. At the same time, the number of units U.S. minicomputer manufacturers will ship worldwide will total 100,000, IDC predicted.

By 1982, annual minicomputer sales of domestic firms will surpass \$8 billion, equivalent to 200,000 units shipped, the

(Continued on Page 52)

In reaching their conclusions, the two traveled slightly different paths.

By 1983, 87% of all computers will have some terminal hookups, Lecht noted, adding that computer mainframers that cannot offer a communications capability will end up as "component suppliers to those who do."

IBM's SBS, he said, is breaking the previous lines between computers and communications by placing a computer mainframe maker strongly in the communications business — even if only through a subsidiary.

Writeoffs for AT&T?

At the same time, AT&T could be facing huge writeoffs — in the neighborhood of \$20 billion — if its terrestrial plant is outmoded or leapfrogged by satellite services such as SBS, he noted.

To counter this, AT&T is developing communications systems such as its as yet unannounced Advanced Communications System (ACS) that will handle many communications functions previously handled in a mainframe or front-end-type processor, Lecht predicted.

ACS, he said, will have the capability for data capture and data entry and will provide a host of preprocessing services formerly handled by communications software on a mainframe. The line between the two has always been fictionally drawn, Lecht noted, and it will be even more blurred in the 1980s when it will be impossible to tell whether computers are the slave of communications or vice versa.

With the development of ACS, the battle will really begin, he predicted, because IBM's Systems Network Architecture (SNA) will not be able to coexist with the Bell ACS offerings.

IBM Perspective

Withington looked at the picture from the IBM perspective, noting that pretending to be president of IBM was one of his favorite fantasies.

IBM wants to keep up its dramatic growth, starting from its base in the data processing and office markets, so the next step is integrating its word processing systems into networks and then having links with its DP base, he said. This will call for the develop-

(Continued on Page 56)

Fujitsu Introduces 64K RAM

SUNNYVALE, Calif. — Fujitsu Ltd. has announced what it claims is the world's first production-type 64K dynamic random access memory (RAM).

Fujitsu officials said the component, which contains about 150,000 circuit elements, will be available for customer evaluation by early spring and production is planned for this fall.

The MB 8164 RAM is produced using conventional photolithographic techniques and the double-poly embedded field oxidation process.

The product utilizes a 2-micron photolithographic process with an effective channel length of 2 microns. These extremely fine patterns and short channel transistors make possible a 33.5K chip that is not much larger than Fujitsu's 16K chip, the company said.

The chip size reportedly contributes to the product's 110-nsec access time and 250 mW power consumption.

The MB 8164 is packaged in a 16-pin ceramic DIP, and the pin outs are Jedec standard. Using the device, a 1M-byte memory unit will require only four printed circuit boards, each containing 32 devices, Fujitsu said.

The unit reportedly utilizes power supply voltages of 7V and -2V. All inputs and outputs, including clock and control inputs, are fully TTL-compatible, Fujitsu added.

Company officials noted that while some manufacturers had converted to the 16K RAM, which became available in 1976, the 4K RAM is still considered the industry standard. The 64K RAM, however, remains the device that manufacturers really want for the 1980s, they added.

CPU Shipments Seen Jumping 15% This Year

(Continued from Page 51)
market research firm continued.

Last year, Digital Equipment Corp. ranked as the leading U.S. mini vendor, with CPU sales of \$1.1 billion, or 41% of the country's total revenues in the field. Hewlett-Packard Co. placed a distant second, with \$390 million in shipments (14%) of the domestic market, followed by Data General Corp., with \$279 million (10%), the survey found.

Other leading U.S. competitors in the minicomputer area include HIS, with 1977 sales of \$130 million; Perkin-Elmer, with \$86 million; General Automation, with \$84 million; and Texas Instruments, Inc. with \$80 million.

Significantly, IBM, with minicom-

puter sales last year of only \$70 million, accounted for only 3% of the domestic mini market. By 1982, however, IBM's share will jump to 15% to 20%, an IDC spokesman predicted.

'Profound' Growth

The data communications and data entry products market will also experience "profound" growth during the next five years, the report said. Starting from \$11.5 billion last year, the value of U.S. shipments in that sector will climb to \$28.5 billion in 1982, when some seven million terminals will be in use.

Much of that growth will stem from sales of intelligent or "application-specific" products like automatic teller

terminals and point-of-sale units, the study predicted.

Turning its attention to the other sectors of the U.S. computer market, IDC arrived at the following conclusions:

- The rapidly maturing software and services industry, which grossed nearly \$6 billion last year, will near \$12 billion by 1982. The service side of the industry, meanwhile, accounted for more than \$1 billion of the 1977 figure and will rise to \$2.5 billion annually five years from now.

- Emerging applications for computer output microfilm, word processing and information transmission techniques like facsimile will boost the installed base of computer output devices to five million units by 1982. Between now and then, the cumulative

value of that installed base will grow to \$20 billion.

- Worldwide shipments of American OEM products will more than double to \$5 billion between 1977 and 1981. Much of the growth will stem from minicomputer sales, which in the OEM sector will climb from \$935 million in 1977 to \$2.3 billion in 1981. Printers and low-cost memory products will also contribute to the growth in this market.

Small Systems Seen Facing Growth Period

LOS ANGELES — The U.S. small business computer market will grow 35%-40% during the next five years, with the low-end sector attracting increasing attention from hardware vendors, according to Carl Jeremias, marketing vice-president of Basic/Four Corp.

Speaking at the southern California introduction of the firm's System 200, Jeremias predicted that rapid expansion in the low-end sector of the small business computer market will double Basic/Four's business during the next 10 years.

"The market for small systems is extremely important when you consider that for every business with sales greater than \$1 million, there are 500 companies with annual revenues of less than a million," he said. "But the key to capturing that market will be inexpensive, easy-to-implement software."

Contradictory Trends

Among other comments, Jeremias noted that the small systems market is currently characterized by two apparently contradictory trends.

On one hand, hardware and software are becoming "extremely sophisticated," he said. On the other, small systems are becoming increasingly transparent to their users.

Success in the small systems market depends on providing hardware that is easy to operate, uses everyday business terminology like "profit" or "loss" and doesn't require constant supervision by a highly paid programmer.

"We believe a standardized approach like the System 200 software is the answer for this market," Jeremias concluded.

"Naturally, such systems are not going to work for every business, but there are thousands of small companies with essentially the same routine office requirements."

Your top competition is going to meet your prime prospects. What are you going to do about it?

They've made a smart decision. Last year the nine computer market areas on our itinerary drew 42,178 qualified buyers.

This year we expect more than 50,000. Can you afford to miss this chance to present your products and services?

There's still room for you. But it's going fast. Get complete information with this coupon now, on how Computer Expo 78 can work for you. Or save time by calling Kim Wichert collect at 617-964-4550.

These companies have already signed to exhibit at Computer Expo 78:

NCR	Computerworld	Trac Associates
Varian Graphics	NCI	Sperry Univac
Informatics	AT&T	Xerox
Honeywell	Kodak	Sykes Datatronics
Datamation	BASF	Cummins Allison
Communication News	IBM	American Microprocessor
McCormack & Dodge	Anderson Jacobson	International Data Corp.
Data Rentals	Computer Input Services	Programs, Inc.
Computer Sales International	Paradyne	Beehive International
Intel	ComData	Intersec Data Systems
Electronic Ventures	Genesis One	Software AG
Computer Roomers	Data Processing Sciences	Creative Engineering
Customer Priorities	Applied Computer Systems	Graphic Controls
Computer Software Solutions	Agile	Mini-Computer Systems
Systems Marketing	Woodford Systems	Tandem Computer
S.E.A.	American Used Computer	PCC/Perfec
Tri-Data	Business Forms Service	Computrend
Midwest Marketing	Itel Corporation	Extel
Logabax	Deltak	Mentel
AAA Chicago Computer	Peripheral Products	Sycor
Intelligent Systems	General DataComm Industries	Digilronics
Shasta	Continental Peripherals	Computer Services
Mostek	Computer Associates	Datamart
DIVA	Qantel	Courier Terminals
SBC Magazine	Diablo Systems	Modems Plus
Tele-dynamics	Marketechs	Software Design
Control Data	Racal-Milgo	Curtis 1000
National Semiconductor	Data Systems Specialists	Spectron
Printronic	Key Tronic	K&K Associates
Codex	Administrative Management	Applied Digital Data
Lear Siegler	Small Systems World	Epic Data
E.M. & M.	American Terminal Leasing	Terminal Rentals
The Morley Company	Journal Systems Management	Applied Data Communications
Vanier Graphics	Optical Business Machines	Data Forms Company
Total Typography	McGinn Safe	Imperial Technology
Wang Labs	Allstate Computer	Mathematica
Computer Devices	H/G Professional Forms	Rianda Electronics
Ann Arbor Terminals	Nichols & Company	Computer Corp of America
Datapro Research	Datapro	Cullinane
Inforex	Input Services	Hewlett Packard
Perkin-Elmer	Plessey Services	Pansophic Systems
Telcon Industries	Industrial Computer Controls	
Versatec	Vincent Data Products	
Computer Performance	World Info Systems	
Advanced Systems	DP Power	
Delta Data Systems	Conrac	
Inform	Educational Data Systems	
Computer Decisions	Cybertek	
Infosystems	Cosmic	
T-Bar	Business Automation	
Corporate Systems	Insyte Datacomm	
Dynatech	YE Data	
Western Union	Arcus	
Calcomp	St. Louis Info	
General Computer	Digiog	
Atlantic Research	Herrera Kirby	
Telefile Computer Products	Foto-fun	
General Electric	Hamilton Sorter	
Qume	Dispotech	
Moore Business Forms	Consolidated Computer	
DataMedia	Cybersearch	
Texas Instruments	Wolfe Computer	

COMPUTER
CARAVAN'S



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
☐ Have Sales Representative call me
☐ Send Reservation Agreement
☐ Send Copy of 1977 Attendee Analysis

- | | | |
|--|---------------|---------------|
| ☐ Southern California Computer Expo | Anaheim/LA | March 21-23 |
| ☐ Northwest Computer Expo | San Francisco | March 28-30 |
| ☐ Southwestern Computer Expo | Houston | April 11-13 |
| ☐ Southeastern Computer Expo | Atlanta | April 18-20 |
| ☐ Gateway Computer Expo | St. Louis | April 25-27 |
| ☐ Midwestern Computer Expo | Chicago | May 2-4 |
| ☐ Mid-Atlantic Computer Expo | New York | May 9-11 |
| ☐ Great Lakes Computer Expo | Detroit | May 23-25 |
| ☐ New England Computer Expo | Boston | May 30-June 1 |

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (____) _____

168

System available
for short
term sublease

MDISCO
312-698-3000

NOW SHIPPING. THE MOST RELIABLE AND VERSATILE 55 CPS CHARACTER PRINTERS EVER BUILT.

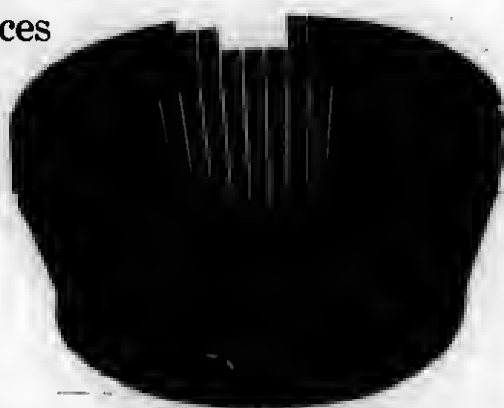


It takes experience as well as technological know-how to deliver character printers better than today's best — and NEC has both. We gained experience building and shipping more than 10,000 printers that use the technologies in our new Spinwriter family. We're now shipping Spinwriters throughout the country.

We're ready with reliability that's more than a promise. Our Mean-Time-Between-Failure rate of better than 2,000 hours is based on experience with printers in use.

We're ready with print quality equal to typewriters — at speeds to 55 characters-per-second. Our unique "thimble" print element holds more characters, lasts longer and costs less than "daisy wheels."

We're ready with printers that fit your applications. The Spinwriter 5500 Series includes microprocessor-controlled receive-only and keyboard send/receive models, and basic mechanisms for those wishing to add their own power supply and housings. You may choose from RS 232-C, current loop or 8080 bus line interfaces, as well as Diablo- and Centronics-compatible interfaces. Customized interfaces can also be provided. Choose from six data rates from 110 to 1200 baud for half- or full-duplex communications. Spinwriter housings are die-cast aluminum for noise reduction, durability and appearance. They fit into any environment.



We're ready with service, through one of the largest, most competent organizations serving the computer industry. And we're delivering right now. Our experience tells us you can't afford to wait, and you don't have to. Spinwriters are available in OEM quantities in 60 days or less.

Tell me more about the Spinwriter family.

- ☐ Please have a sales representative call
☐ Please send literature

Name: _____

Title: _____

Company: _____

Street: _____

City: _____ State: _____ Zip: _____

Telephone: _____

To find out more about the experience and the technology that make Spinwriters the best character printers in the industry, fill out the coupon, or call NEC Information Systems, Five Militia Drive, Lexington, Mass. 02173 (617) 862-3120.

NEC NEC INFORMATION SYSTEMS, INC.
5 Militia Drive, Lexington, Massachusetts 02173

Seen at \$1 Billion by '82

Annual 18% Growth Forecast for Medical Gear

By Jeffry Beeler

CW Staff

SAN JOSE, Calif. — The U.S. market for medical information systems totaled \$476 million last year and will grow an average of 18% annually to exceed \$1 billion by 1982, Creative Strategies, Inc. (CSI) predicted in a newly issued industry report.

Most of the anticipated growth in the domestic market will occur between 1980 and 1982, CSI said.

At the same time, the world market for medical information systems will expand an average of 19% annually and total about \$1.5 billion in 1982, the study forecast. Last

year, by contrast, that market totaled approximately \$622 million.

In its report, CSI divided the medical information systems market into three sectors: users, applications and suppliers. The users area in turn consists of three smaller sectors — hospitals, nursing homes and medical groups.

In the hospital sector, the market totaled \$419 million in 1977 and will grow 18% annually through 1982, when it will approach \$940 million. Most of this anticipated growth will result from the increasing need to implement effective financial planning and budgeting systems, CSI said.

But some of the increase will also result from the growing use of medical information systems in patient care applications like acquiring patient data from clinical laboratories, pharmacies and radiology laboratories.

In the nursing home and medical group sectors, the market will expand an average of 20% annually, from \$57 million last year to an estimated \$140 million in 1982, the industry report forecast.

Most large domestic clinics currently rely on batch-type service bureaus for their automated accounting functions. As early as this year, however, about 200 of the largest clinics will begin trying to replace these service bureaus with in-house computing systems, the study predicted.

The most likely applications for medical information systems in nursing homes and medical groups include the standard accounting functions, scheduling and appointment management. Systems with more extensive capabilities will probably remain financially unattractive at least through the next three years, CSI warned.

Applications Market

Elsewhere in its study, the market research firm divided the medical applications market into eight sectors: accounting and financial management, admission-discharge-transfer, clinical laboratory, pharmacy, radiology, medical records, order entry and communications. Few hardware vendors try to compete equally in all these sectors, but rather specialize in the areas that promise the greatest financial return, the research firm explained.

During the next five years, the clinical laboratory applications sector will grow faster than any of the other seven areas, primarily because of the

influx of low-cost, in-house minicomputers for daily processing. CSI predicted the clinical laboratory sector will increase 26% annually, from \$43 million last year to \$137 million in 1982.

Most of the medical information systems installed in the U.S. will serve as accounting and financial management aids. During the next five years, however, a large and almost saturated market base will make accounting and financial management the slowest growing of the eight applications market sectors, the industry report concluded.

By 1982, medical systems will begin handling other patient care applications like diet management and inventory, the study added.

Domestic suppliers of medical information systems fall into five categories: hardware vendors, time-shared or shared systems manufacturers, in-house or turnkey systems vendors, total systems makers and other companies, which include consultants and multihospital groups that market DP services to other hospitals.

Of these five types of suppliers, the hardware companies held the largest share — more than 40% — of the domestic market in 1977, CSI found.

Although more than 50 com-

panies vie for shares of the U.S. medical information systems market, four competitors account for 47% of total domestic sales. Most suppliers hold very small market shares and compete primarily in the well-established accounting and financial management systems sector, CSI noted.

As expected, CSI found that suppliers of medical system hardware differ in their areas of technological specialization. Some companies concentrate on hospitals in a specific size range; others focus only on nursing homes and medical groups, while still others serve the entire market spectrum.

In the international market, IBM ranks as the leading medical systems supplier, followed by Siemens, International Computers Ltd., Univac, AEG-Telefunken, Digital Equipment Corp. and Burroughs Corp.

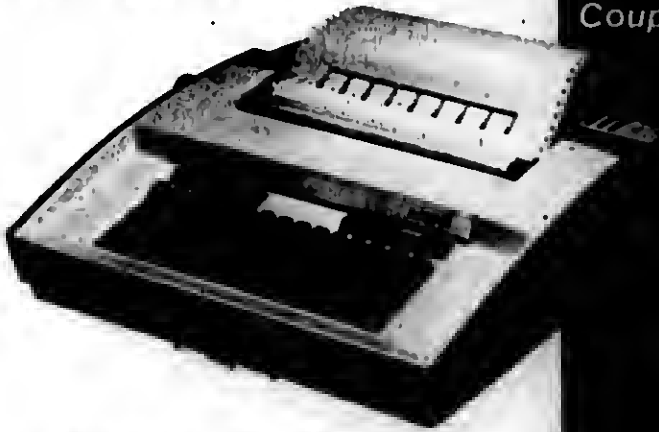
Although many companies have penetrated this market through acquisition or a novel marketing approach, expansion has slowed, and some firms have even left the fray. Most companies that fail do so either because they underestimated the difficulty of landing systems sales or because the large resource outlays required to enter and stay in the business outstripped their financial capabilities, CSI said.

Mom takes it off for almost anybody.

**MOM'S
WAREHOUSE**
WE MOTHER YOU BY MAIL.

**you can be well
connected for only
\$1285 or \$38 per month.**

The all new 43 Teleprinter, with Acoustic Coupler, is ready for immediate delivery. This quiet desktop impact printing terminal features full ASCII character set, buffered 10 or 30 cps operation. It prints up to 132 characters per line on regular paper. Modular, solid-state construction and self-test ability means easy maintenance. And, the 43 Teleprinter, is supported with nationwide service.



Time Sharing
Data Entry
Communications

43 Teleprinter
with Acoustic
Coupler

READY FOR
IMMEDIATE
DELIVERY

At Management Response, we are your Terminal Connection. We also have DEC LA-36, LS-120, LA-180, VT-52, Regent 100, and more. READY FOR IMMEDIATE DELIVERY.

Order now, right from our stock,
CALL TOLL FREE: (800) 323-2135



Management Response Corporation

Supershorts

Ampex has separated its instruments recorder and computer peripheral products sales staff into two distinct marketing areas.

Down under, Qantas has decided to drop its IBM systems in favor of Amdahl Corp. as part of a \$9 million updating of its Quantum computer operation. The airline is replacing two 360/65s with Amdahl 470V/5s, but two 360/65s will remain in operation for reservations and departure control.

COMPUTER TERMINALS Save Up To 40%

Over 100 models to choose from
Hardware, Software, Data Entry, I/O, & LSI
LSI10 Double 6401 Text Editor, 100,000

Example:

Texas Instruments 745: \$1,739

CALL FOR A QUOTE

201-469-9344

Terminal Sales & Development
867 Sebring Ave., Bound Brook, N.J. 08801

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call and per-call field service at rates much less than the competition.

NEED FAST TURNAROUND? CALL OR WRITE:

COMPUTER SYSTEMS SUPPORT CORPORATION

9112 Galther Road
Gaithersburg, Maryland 20878

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

"Making better business decisions means making comparisons."



"Because our peripheral customers are IBM users, you know they made a lot of comparisons before deciding on our Monolithic Memory or our Disk Storage Drives.

"Of course hardware compatibility was a must. Our products had to fit into their system. But the most important factors were price, performance, software compatibility and service.

"For example, many businesses decided on our new 33801 Data Module Drive instead of a 3350. Why? Because with our drive they get more capacity, more fixed head storage, faster access time and without the need of costly software conversion. Another attractive comparison is our product's compatibility with either the 3350 or 3330-11 modes.

"And a lot of our more than 1400 IBM user sites thought our Monolithic Memory made more sense - when they discovered how economical it was and that we could deliver memory for the entire 370 line within 30 to 60 days.

"They compared reliability and service support too. Our customers can depend upon our broad product experience and our worldwide dedicated hardware and software specialists.

"But why not make your own comparisons. And review some of the other reasons our customers have made the better business decision. Call your local representative. For the number of our rep in your area, call 612 853-7600."

GD CONTROL DATA
CORPORATION

More than a computer company

Analysts Predict IBM, Bell Clash in Mid-'80s

(Continued from Page 51)

ment of both graphics and image processing systems, which will require very wide bandwidth communications systems, such as will be available from SBS, he added.

As these functions get distributed on communications nets, he predicted, IBM will then "have to get into voice," possibly to the extent of even supplying telephones.

Presently, IBM and AT&T compete in the terminal area to a great extent, he said, noting that AT&T's teletypewriter is one of the most popular terminals and that the Dataspeed 40 gear is actively competing in the market.

Withington also downplayed some of the things people have said might constrain the two from competing.

For example, he said many people have said that the threat of antitrust action against IBM would constrain the firm. But, he noted, IBM has been more aggressive in price cutting against the plug-compatible CPU makers than it ever was against the peripherals firms, even though it is being sued on antitrust grounds now.

In addition, the two firms would not stop being customers for each other's equipment even if they became competitors, as some have predicted.

Withington predicted that the confrontation would start on the equipment front with IBM coming out with more and more terminal equipment, initially specialized for the SBS, and including such things as facsimile, video and audio equipment for

teleconferencing, and remote printing devices. In addition, it will get into the business of multifunctional units to provide such services.

Furthermore, IBM is heavily involved in fiber optics research and

may offer fiber optics systems for in-plant use, he said, as well as entering the PBX marketplace with its Carnation unit that has been available in Europe for almost five years but never introduced here.

Executive Corner

- Daniel F. Sullivan has joined Bunker Ramo Corp. as divisional vice-president and general manager of Brokerage Systems.

- John G. Henry has been appointed vice-president of product marketing at Centronics Data Computer Corp.

- Gary E. Polaczyk has been elected

corporate controller at Control Data Corp.

- J. Thiel Sullivan has joined Computer Sciences Corp. as vice-president of the Information Sciences Center of the Systems Division.

- Ralph Johnson has joined Telenet Communications Corp. as vice-president of marketing.

- Robert E. Huettner has been appointed vice-president of engineering at Intertel, Inc.

- Thomas K. Carpenter has been appointed to the post of president of MI Corp.

- Thomas E. Bailey has been named vice-president of engineering and Walter A. Freeman has been named vice-president of consulting at Data Processing Security, Inc.

- Edward Lee Bryan has joined Harris Corp.'s Data Communications Division as vice-president of product planning.

- A.M. Cosentino has joined Microdata Corp. as senior vice-president in charge of domestic sales, marketing and service organizations. P. Cleveland will be in charge of planning.

- Ron Lightowler has been named computer output microfilm service administrator for U.S. Datacorp.

- Jon S. Gould has been named vice-president of Conversational Systems Corp.'s subsidiary, DDP Products, Inc.

- Robert A. Billhimer has been named vice-president, marketing, for Monolithic Systems Corp.

- William Flinn has been appointed national sales manager, Industrial Sales Division, for the Panasonic Co.

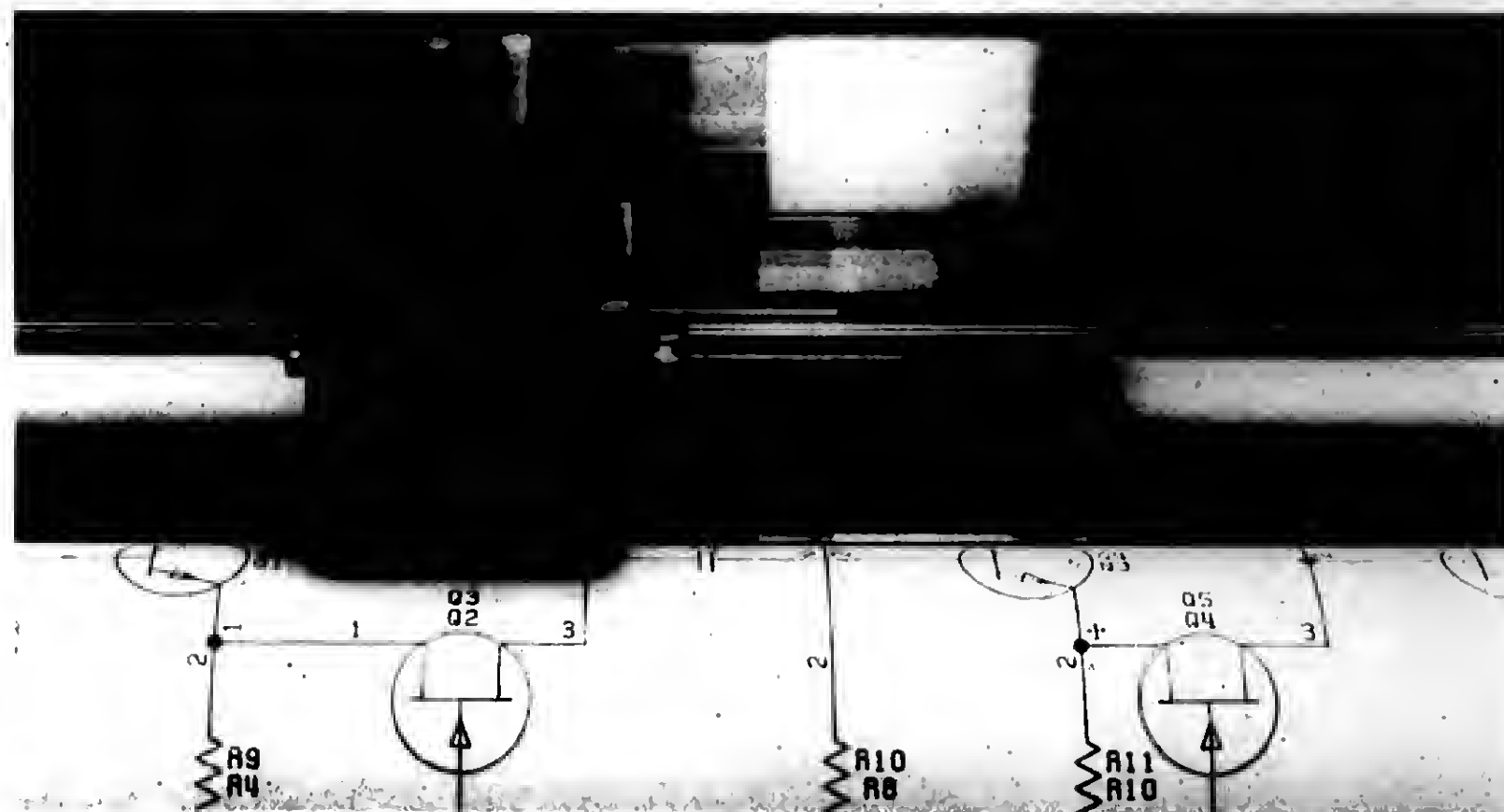
- Robert L. Runge has been appointed vice-president, systems development, of Sycor, Inc.

- Harold M. Wishnow has been named a vice-president of PRC Data Services Co.

- Don M. Muller has been promoted to the position of executive vice-president and chief operating officer at Pertec Computer Corp. Allen Lay will move to corporate headquarters as senior vice-president, market development.

- Dr. Earl Jacobs has been appointed vice-president and general manager of Computer Automation's Industrial Products Division.

How to drum-up superior graphics in record time.



There's nothing to it.

Not when you start with the best. And that's exactly what the new CalComp 1055 high-performance drum plotter is — the best. In fact, it easily surpasses everything we — and our competitors — have created to date.

There's simply no other 36-inch, roll-fed drum plotter with specs like these. Plotting speed is an unprecedented 30 inches-per-second (762 mm-per-second) on axis. Complemented by a 4G acceleration ramp and 10MS pen-down time. The results are unbeatable quality and throughput.

What's more, you get the versatility that only four pens can provide and a practical, roll-fed design that keeps operator intervention to a minimum.

But that's not all. For increased accuracy, we made the 1055 completely d.c. servo-motor driven. And we gave it a special linear pen drive mechanism to help maintain consistently superior line quality. In every application.

The bottom line is this: Our new Model 1055 creates an entirely new set of standards

for all would-be, high-performance drum plotters. In terms of speed, accuracy and line quality. And in terms of good old-fashioned price/performance, too.

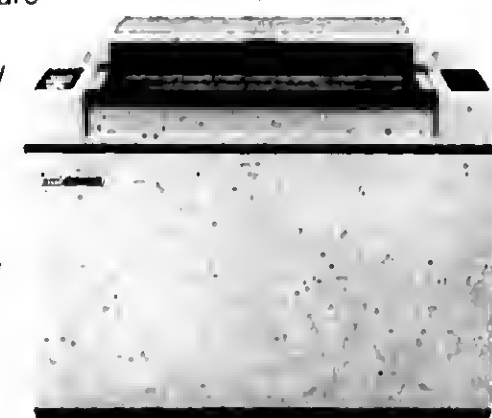
Of course, you may not need the sophistication of a 1055 right now. In that case, our new 1051 is the answer. You get 10-ips performance today, and the ability to field upgrade to a 1055 tomorrow — when your needs have expanded.

One thing hasn't changed, though.

CalComp service and support. It's still worldwide and second to none. For field service personnel. For in-place field systems analysts. And for the kind of help you expect from the world leader in digital plotters.

All of which proves, when it comes to high-performance drum plotters, CalComp's really drawing away from the competition. Again.

To arrange a special preview demonstration of the new 1055, please call your local CalComp sales representative in the following areas:



CALCOMP

2411 W La Palma Avenue, Anaheim, California 92801

WEST: Orange, CA (714) 639-3690 / Santa Clara, CA (408) 249-0936 / Houston, TX (713) 776-3276 / Dallas, TX (214) 661-2326 / Englewood, CO (303) 770-1950 / Beaverton, OR (503) 646-1186
SOUTH: Norcross, GA (404) 449-4610 / Huntsville, AL (205) 533-6260
MIDWEST: Southfield, MI (313) 569-3123 / Rolling Meadows, IL (312) 392-1310 / Dayton, OH (513) 276-3915 / Cleveland, OH (216) 362-7280 / Shawnee Mission, KS (913) 362-0707 / Bloomington, MN (612) 854-3448
EAST: Waltham, MA (617) 890-4850 / Union, NJ (201) 686-7100 / Bala Cynwyd, PA (215) 667-1740 / Rockville, MD (301) 770-5274 / Pittsburgh, PA (412) 922-3430

BLIS COBOL
MULTI-USER OPERATING SYSTEM

**NOT HAVING
BLIS**

For information call today...

Phone (305) 847-2200 USA
 TWX/Telex 810-853-5033
 1000 Lee Rd., Winter Park
 (Orlando), Florida 32789

first class
permit no 40760
newton ma

BUSINESS REPLY MAIL

no postage stamp necessary if mailed in the United States



COMPUTERWORLD

**797 Washington Street
Newton MA 02160**

Postage will be paid by addressee

CIRCULATION DIRECTOR

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

a new subscription

new address

new title

new industry

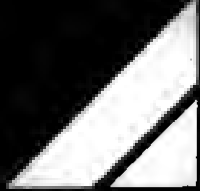
WALK AWAY LEASES

for
IBM
3031
3032
3033

158, 168 and most other
Processors and Peripherals

- Lowest Lease Rates
- Contract Flexibility
- Simple Documentation

Call or Write

 **alanthus leasing company**

11140 Wilshire Blvd.
Beverly Hills, CA 90210
(310) 276-1111

11140 Wilshire Blvd.
Beverly Hills, CA 90210
(310) 276-1111

Alanthus Leasing Company
11140 Wilshire Blvd.
Beverly Hills, CA 90210
(310) 276-1111

Modcomp Hopes Supermini Signals Comeback

By Esther Surden
CW Staff

NEW YORK — In a move that Modular Computer Systems, Inc. hopes will signal its comeback into active marketing and aggressive promotion, the firm recently announced a system destined to be the first member of a family of superminis.

The Classic Series 7860 system (see Page 45) competes with offerings from the firm's

competitors: Digital Equipment Corp., Systems Engineering Laboratories, and Data General Corp., according to Kenneth Harple, Modcomp president. It was designed for users in the firm's traditional market areas — communications, industry and science.

The introduction of the system was Modcomp's first public announcement in more than a year. "After our loss in '76, we devoted our time to

strengthening management," Harple said. A new chairman of the board was appointed and management was reorganized, resulting in a better financial picture, he noted.

Both receivables and inventories have been greatly reduced since the firm's management shakeup, he stated.

But the last year was "not an aggressive one in respect to marketing and promotion," Harple said. During the period

of silence from the Fort Lauderdale, Fla., based firm, Modcomp was interfacing with its users, trying to determine their needs.

The result of this dialogue was the family of systems whose initial member was introduced. "This year we will spend \$1.5 million on marketing and promotion," Harple said, and will expand the sales force.

Six more members of the

Classic line are scheduled for introduction this year, with the next announcement planned for June.

CAI a Possibility

Although the systems are aimed at the firm's traditional marketplace, Harple forecast that the Total data base management system and Cobol introduced with the systems "will give us opportunities in new markets." Modcomp plans to target three specific vertical markets in the future and concentrate its efforts in those areas.

One of the areas the firm is considering is computer-aided instruction (CAI), a field Modcomp feels will soon open up to minicomputers. The University of Illinois is running Plato — which usually runs on a large-scale Control Data Corp. machine — on the Modcomp mini.

This development presents a bright picture for the company, Harple said, explaining "the market has been untouched because the price of the hardware has been out of line" for most users.

Speaking about the firm's brief foray into the turnkey minicomputer arena with its acquisition of ECS Information Systems, Inc. and its subsequent pull out of that business, Harple said, "It turned out to be a lot easier [to get rid of the venture] than I thought."

THERE'S A LITTLE BIT OF THE WIZARD IN EVERY SOUTHERN SYSTEMS PRINTER.

And that's why more and more mini-computer users — and DECsystem-10 users, too — are putting Southern Systems printers to work for them. They know a little bit of the Wizard goes a long way . . . in trouble-free printer performance, in cost-saving (up to 50%), in efficiency of future system expansions.

The Wizard? He's actually just a symbol (but don't tell him that!) of Southern Systems expertise . . . in the precise configuration of printers . . . in the design and manufacture of new interfaces and controllers (like our S-10 for DECsystem-10) . . . in the delivery of printer systems for about half of what you'd pay elsewhere.

Southern Systems printers. For your DEC, Data General, Interdata or others. At speeds from 300 lpm up to 1500 lpm. SSI typically ships within 30 days and offers complete installation and nationwide service.

No wonder our customers keep coming back to us for a little bit more of the Wizard. You will, too.

For more information, call or write to



**SOUTHERN
SYSTEMS, INC.**

Intracoastal Building
3000 Northeast 30th Place
Fort Lauderdale, Florida 33306
(305) 561-5226

Please send information on SSI's _____ lpm printers.

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____



Contracts

Bunker Ramo Corp. has received a \$1.1 million contract from United States National Bank of Oregon in Portland for the installation of Bank Control System 90 data terminal equipment in the bank's 158 branches.

Bradford National Corp. has signed long-term agreements under which its subsidiary, Bradford Financial Processing Services, Inc. will provide computerized trust accounting services to five banks; Industrial National Bank of Rhode Island, Commonwealth National Bank in Harrisburg, Pa., Citizen's National Bank of Evansville, Ind., American National Bank of Austin, Texas and the Capital National Bank in Houston.

The Pertec Division of Pertec Computer Corp. has signed a \$350,000 two-year contract with General Robotics Corp., Hartford, Wis. to supply T8000 tape drives, D3000 cartridge disk drives and FD500 flexible disk drives for use in the General Robotics CD/X3 cartridge system and FD/X3 floppy disk system.

When the Name of the Game is Subsystem Cost Per Byte, We Have the Only Game in Town.

Ampex and MSC.

Masterminds of more for less.

Over there is where you are going to put your snazzy, new, super-sophisticated minicomputer. Your PDP-11, HP3000 or Z1MX. That Nova, Eclipse or the latest miracle from Interdata or Mlerodata. And over here, the space you've reserved for the disk subsystem to best meet your mass storage needs. The space where much of your computer's promise is going to spring to life. And the space where many of its potential problems might also be born.

It's to talk to you about that space that we've purchased this space. We are Microcomputer Systems, a company that among other things makes disk controllers. Together with Ampex, a company that among other things makes disk drives, we are offering disk subsystem packages that meet your top line performance requirements while you meet your bottom line cost objectives. Disk drives from Ampex's justifiably respected family of storage modules combined with our Series 1000 disk controller, a product of advanced microprocessor-based technology that has been field-proven to be the most reliable and maintainable in the business.

In short, not only do we think we can fill that subsystem space for you, we think we can fill it with the best subsystem at the lowest cost per byte.

Ampex. A familiar name in disk drive quality...and innovation.

What's in a name? Obviously more than Romeo thought when he uttered that now famous line. In the mass storage market, what is in a name — or behind it — can help open a door or close a sale. The name Ampex, for instance, implies credentials that are generously delivered by its product line. Performance. Reliability. Maintainability. Quality control. Innovative engineering

technology. And distinguished manufacturing techniques.

More specifically, that part of the Ampex product line that helps make up the MSC disk subsystem packages — the DM940, DM980, DM9100, DM9200 and DM9300 — offers a full range of capacities from 40 to 300 megabytes and the kind of feature list you would expect from a company like Ampex. Total family plug compatibility. Standard and custom interfaces. Variable sector formatting. Variable length record format. Double density upgrade on the 940 and 9100. Dual port upgrade. Simplified maintenance design. Changeable logical unit address. And, of course, any number of options to meet any number of needs.

Speaking up for the silent partner. The MSC Series 1000 Disk Controller.

The controller half of our subsystem packages is not as well known as our disk drive partner. But as a happily growing number of customers and a painfully groaning number of competitors are learning, Microcomputer Systems is a name to be reckoned with.

And little wonder. The Series 1000 is the consummate controller. With software support for all popular minicomputer operating systems. Micro-programmed controller architecture. Full ECC error correction. And operator-oriented self-testing capability. To be direct, the MSC Series 1000 is the most flexible, efficient, functional, maintainable, reliable, feature-filled and affordable intelligent controller on the market today.

Be the bottom line hero in your company. Buy the top line subsystem from ours.

This is the part of the ad where most companies trying to sell you a disk subsystem would take a lot of features and a lot of dollars, wrap them into one seemingly irresistible package, tie it all vaguely together with several smart-sounding terms like "maximum cost efficiency" and "price/performance ratios," then run it up the flagpole.

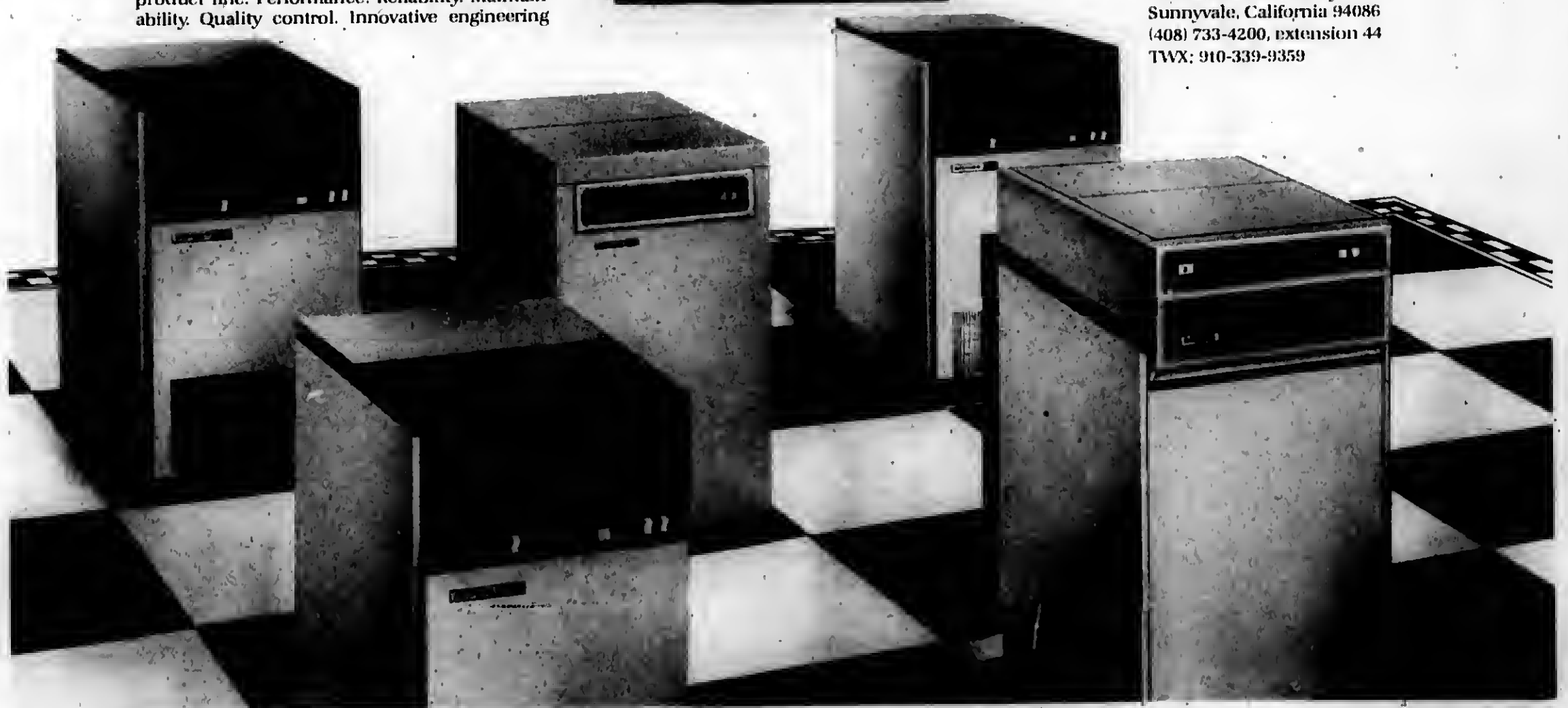
We'd prefer to put it more bluntly. Yes, we think the MSC/Ampex subsystems are, feature for feature, the best that you can buy anywhere today. But, with some estimable competition out there, the most important fact is that the MSC/Ampex subsystems deliver the lowest subsystem cost per byte. Period. Lower than Systems Industries. Lower than CalComp.

Doubt it? Pick up the phone, call (408) 733-4200, extension 44 and check it. After all, this is a game we're both playing for keeps.



**microcomputer
systems
corporation**

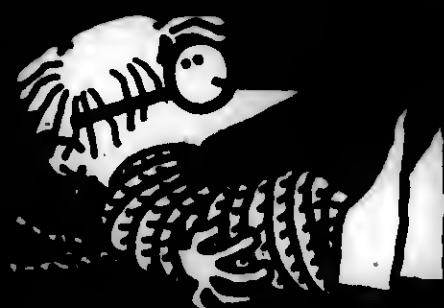
440 Oakmead Parkway
Sunnyvale, California 94086
(408) 733-4200, extension 44
TWX: 910-339-9359



Your computer is the corporate safe,
and it is always open...without PANEXEC



Your vital records are in that safe. And they are vulnerable. Because no matter how many times you change the door code after how many passwords are needed to enter, computer people are still going to get in. And they will take your data. Millions every year.



PANEXEC is the only company that can help you protect your data. We are the only company that can help you protect your data. We are the only company that can help you protect your data. We are the only company that can help you protect your data.

PANEXEC is the only company that can help you protect your data. We are the only company that can help you protect your data. We are the only company that can help you protect your data. We are the only company that can help you protect your data.

PANEXEC is the only company that can help you protect your data. We are the only company that can help you protect your data. We are the only company that can help you protect your data. We are the only company that can help you protect your data.

PANEXEC is the only company that can help you protect your data. We are the only company that can help you protect your data. We are the only company that can help you protect your data. We are the only company that can help you protect your data.

PANSOPHIC

800-323-7335



position announcements

position announcements

position announcements

position announcements

position announcements

POSITION ANNOUNCEMENTS

ENGINEERS, COMPUTER SYSTEMS

Compek Research, Inc., a rapidly expanding computer technology company, has an immediate opening and the growth opportunity for a shift-sleeve professional in the following area:

BS or MS in Electrical Engineering or Computer Science with demonstrated capabilities in the area of mini/micro computers interface and peripheral design, computer systems design and development, and real-time assembly language programming. Project management experience desirable.

Forward your resume to: Ms. Ruth M. Jensen, Compek Research, Inc., 455 Cayuga Rd., Buffalo, NY 14225. An Equal Opportunity Employer.

COMPUTER SALES

We are looking for sales professionals to sell our mini-computer systems to end-users. For the right individuals, these are truly unique and unusual opportunities for career and financial growth. To be considered, applicants must have prior sales/marketing experience in the mini-computer and/or small computer business systems marketplace. Compensation will include base salary plus incentives, and a liberal employee benefit package. Send detailed resume including current earnings to our Employment Manager.

LOCKHEED

ELECTRONICS COMPANY
U.S. Highway 22
Plainfield, N.J.

Equal Opportunity Employer M/F

PROGRAMMERS

Large N.W. based transportation company has immediate openings for career minded programming professionals.

Successful candidates will have the following qualifications:

- 2+ Years Assembler
- CICS Experience
- Working Knowledge of COBOL
- Background on Large Scale IBM CPU's - Under OS and/or MVS
- College Degree or Equivalent Experience

This is a career opportunity for the right individual with excellent advancement possibilities. Salary 15-20K, depending on experience and background, and excellent fringe benefit package.

Send resume in confidence to:

Michael S. Cavitt
Mgr. Systems Development
Consolidate Freightways
P.O. Box 3301
Portland, OR 97208
An Equal Opportunity Employer

CAREER OPPORTUNITIES IN INFORMATION SYSTEMS

Midwestern life insurance company has three immediate openings.

MANAGER programming successful applicant will direct a staff of eight programmers and analysts. Minimum requirements are:

- Supervising experience,
- Life Insurance Data Processing experience with a consolidated functions system.
- Assembler Programming background
- On line experience a plus.

PROGRAMMER/ANALYST

- Successful candidate should have 2-3 years experience in guage background.

- Life insurance background a plus.

- Will work in an on line source program maintenance environment.

METHODS ANALYST

- Successful candidate should have 2-3 years experience in automated and manual systems and procedures.

You will participate in the installation of a consolidated on-line data processing system providing external interface to insure that Manual Systems are designed and implemented properly.

- Consolidated Systems of life insurance experience a plus.

Company offers an excellent Benefits package with competitive salary based upon experience. If interested call toll free 1-800-843-3316.

ROBERT HALF PERSONNEL AGENCIES

PICK YOUR POSITION PICK YOUR PLACE PICK YOUR PAY

Robert Half, staffed by EDP professionals for EDP professionals with 55 offices throughout the U. S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

BOSTON

SYSTEMS PROGRAMMERS

Several openings w/fast growth computer mfr. Successful candidates must want state of the art environment. Requires strong comm. skills + min. 2 yrs. systems prog. exp. w/MVS & JES-2. Salary \$16-\$19,000.

SR. SYSTEMS ANALYST

Multi-national firm seeks degreed sys. analyst w/financial systems exp. for growing staff in Boston office. Proj. Mgmt. exp. a must. Programming exp. a plus. Salary to \$25,000.

Gerry Battista
140 Federal Street
Boston, MA 02110
(617) 423-6440

BUFFALO

SYSTEMS ANALYST

Highly profitable capital goods mfr. requires systems pro. Company has up & running system that needs modification, definition & expansion. Must be shirtsleeve project leader with COBOL bkgd. Position entails heavy interface. \$21,000.

P. Siegal
1310 Liberty Bank Bldg.
Buffalo, N.Y. 14202
(716) 842-0801

PROVIDENCE

PROGRAMMER/ANALYST

Project Leader

So. New England area needs EDP Professionals.

Promotable individual w/min. 2 yrs. exp. w/COBOL in Mfg. 350/16B environment.

\$16,000

Growth to D.P. Mgmt. Univac 9030 Hardware. Strong MRP/COBOL and Mfg. Systems Design exp. \$23,000

Dee Ecker
400 Turke Head Bldg.
Providence, R.I. 02903
(401) 274-8700

HARTFORD

TP PLANNER

Connecticut Corp. expanding nationwide network. Individ. with IBM bkgd. and exp. in networks, terminals, NCP, TCAM, etc. qualifies for sr. staff position. To \$24,000.

Stan Durba
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

DALLAS

ANALYSTS

PROGRAMMER/ANALYSTS

SYSTEMS/PROGRAMMERS

We actively seek immediate inquiries on a confidential basis from professionals at all levels... entry to senior... all technical environments... IBM - UNIVAC - HONEYWELL - CICS - IMS - PDP/11 - VARIAN - OOS/VS - MVS - SVS - OCL - SYS. 3 - Teleprocessing - CPE - JCL - PTF - APAR - EW - SYSGEN - PARS - Networking - Utilities - Original software... all languages... COBOL - PL/I - RPG II - ALC - FORTRAN - BASIC. We ethically represent dozens of major companies in the DALLAS AREA.

Insurance - Banks - Oil - Transportation - Finance - Manufacturing - Distribution. All fees, interview, and relocation expenses are completely paid for by our client companies. Please rush your letter or resume on a strictly confidential basis to:

Ron Urbech, COP
Two North Park East
Suite 750
Dallas, TX 75231
(214) 383-3300

ATLANTA

PROGRAMMER \$13-16K

Excellent opportunity if you have 2-3 recent yrs. using COBOL. Pref. 370/145 OOS of OS/VS experience.

PROG./ANALYST \$18-22K

Immediate needs for individuals who are heavyweights with COBOL & CICS. Fine company with top benefits.

3379 Peachtree Rd.
Atlanta, GA 30326
(404) 266-2153

HOUSTON

...Needs You

IMS Programmer Analysts

are in great demand

IMS-Banking \$18-20,000

IMS-Petroleum \$16-22,000

IMS-Mfg. \$16-19,000

IMS-Insurance \$16-19,000

IMS Syst. Analyst \$16-24,000

IMS Proj. Leaders \$20-28,000

Contact:

Jim Fleming
4801 Woodway, Suite 231 W
Houston, Texas 77056
(713) 961-3271

ST. LOUIS

SYSTEMS PROGRAMMERS

To 30K

IBM, CDC, POP, CAD/CAM, DATA BASE, Graphics experience. Major St. Louis based firm. EXCELLENT OPPORTUNITY - URGENT NEED!

PROJECT LEADER

To 22K

Central Missouri service firm. Large 360 shop COBOL. RPG II:

DATA PROCESSING MGRS.

To 21K

Small Cobol shops, St. Louis area. Supervise operations, programming. Must like systems and programming.

PROGRAMMER/ANALYSTS

To 20K

COBOL, RPG II, at least 6 mos. experience. St. Louis and Central Missouri.

7733 Foreyth - Suite 360
St. Louis, MO 63105
(314) 727-1535

PITTSBURGH

SYSTEMS

DESIGN & ANALYSIS

Lg. Co. seeks individual with grocery or retail background. Exposure to DL-1; DOS; IMS; Data Base; & Data Dictionary. Looking for a super technician. Small town living just N. of Pgh. Salary to \$24,000.

OS COBOL

PROGRAMMER/ANALYST

Pgh. conglomerate offers exciting opty for individual exp'd in Mfg. &/or Fin'l applications.

OS COBOL programming ability is a must. Salary to \$22,000.

Contact:

Elizabeth Hardtmayer
Gateway Towers
Pittsburgh, PA 15222
(412) 471-5948

SEATTLE

SYSTEMS PROGRAMMER

Northwest data center requires a software programmer with solid experience in IMS,VSAM, and TP monitors. Company is growth oriented and needs heavy weight software type for the care and feeding of a large scale IBM system.

Salary to \$23,000.

Call Keith North, CPA, COP

2626 Rainier Bank Tower

Seattle, WA 98101

(206) 824-9000

LOS ANGELES

PROGRAMMER SR. PROGRAMMER ANALYST

The Corporate Headquarters of a Fortune 200 conglomerate located near Beverly Hills is expanding their staff. This installation utilizes a 370/145 OS VS II (SVS). TSO, IMS and supports a large RJE network for many of their divisions.

The successful applicants will have a solid background in OS COBOL and experience in either manufacturing or financial systems. A knowledge of TSO, IMS, or RJE are a real plus. Excellent fringe benefits, starting salary to \$23,000 and relocation expenses paid for out of town applicants.

Contact Duncan White or forward resume to:

ROBERT HALF
Personnel Agencies
Of L.A., 3600 Wilshire
(213) 386-6805
Of Orange, 500 S. Main
(714) 835-4103

MILWAUKEE

Local prestige manufacturing company needs analysts who have come up through programming; one in financial applications; one in manufacturing cost applications. Starting salary to \$20,400.

For the career-minded analyst. A Sr. Analyst position; must have Financial or Accounting Systems experience. This is a major utility with excellent advancement possibilities. Base salary to \$22,000.

Major manufacturer needs Applications Software Support Specialists to work in developing and maintaining large-scale applications; e.g., Data Base Managers, Librarians, Generalized Application Packages. Salary range to \$25,000.

Contact:
Jim Bonin or Dick Bird
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414) 271-9360

IOWA

SYSTEMS ANALYSTS

Pure systems work. 3-5 yrs. in mfg. Some on-line data base exp required. IMS or IDS. Will go from scratch to implementation. Exc MW location. Salary \$16-22,000 plus bonus.

Call Ken Allen
Robert Half Personnel
of Iowa
317 6th Ave.
Central National Bank Bldg.
Des Moines, IA 50309
(515) 244-4414

KANSAS CITY

Manager Systems & Programming - five years in OP with two years in major project leadership in a structured shop qualifies. Supervise staff of 35 in major OS upgrade. Salary \$25,000.

System Analysis - Expanding DOS/VS shop requires a project leader to implement a new Data Base and communications network. CICS and OL/I preferred. Salary to \$22,000.

Nationally based KC firm has announced major staff expansion for '78. Multiple openings exist for Programmers with min. 2 yrs. OS-COBOL EXP. & Project Leaders with heavy inv. control background. Salary range \$17-25,000.

All fees and expenses paid by client companies. For confidential review of where you might fit.

Contact:
George Waterman
Robert Half
127 West 10th Street
Kansas City, MO 64105
(816) 474-4583

ARIZONA

SR. PROGRAMMER/ANALYST

Fin'l sys IBM/os 14-17K
Retail Inv. Cobol 14-16K
Bnkg. Burr. Cobol. OB 15-18K
Cobol. IMS. os. ALC+ 15-22K

PROGRAMMERS

3-5 yrs. Ans. Cobol. 90/30
JCL. OEG. A+ 15-19.5K
os/Cobol. Cics/vs To 15K
IMS/PL1. sys Oev'l To 19K
SYS3/15D COBOL To 15K
SYS3/12 RPGII 12-20K

EE'S

BS 5 yrs Software/COC 22K
DP COORDINATOR
NCR. BURR. Fin'l 20-25K
3225 N. CENTRAL. #B12
PHOENIX, AZ 85012
(602) 264-6486

SAN FRANCISCO PENINSULA

Palo Alto - San Jose

COBOL Programmer. Multiple openings for programmers with one or more years exp. Exclnt. opportunity for on-line experience.

Systems Engineers sought by major mainframe manuf. Either COBOL or FORTRAN or Assembler exp. Good client contact plus some mini o/p. helpful.

RPG II Programmer/Analyst/Consultants wanted for Sr. in-house positions as well as external consulting.

Stan Ings
#2 Palo Alto Square
Palo Alto, CA 94304
(415) 493-6700

FREE:
Ask for our latest
"EDP" Salary Survey."

PROGRAMMERS

This top-notch State of the Art Shop, one of the largest in the mid-west, is experiencing tremendous growth and is looking for promotable individuals. Back to back IBM 370's including TSO, CICS, IMS and OCR in operation now to prepare you for the challenges of the future. Associate degree or equivalent helpful. Call or send resume in confidence to Vicki Anderson, EOP Director, Snelling & Snelling, 1415 Directors Row Suite 12A, Fort Wayne, Indiana 46808 (219) 482-1511. A licensed employment agency

SYSTEMS SUPERVISOR

To head up staff of minicomputer software Co. Experience with Datapoint preferred. Send Resume and Salary Requirements to

**Blumenfield
Marketing Inc.**

300 Broad Street
Stamford, CT 06901

PROGRAMMERS/ ANALYSTS

Central New Jersey positions available in State Government agency. Experience in 370/158 using CICS and DL/I. Must be able to code in COBOL or BAL.

Analysts preferred experience with large scale on-line business applications

Salary dependent upon experience. Excellent benefits. Call collect to (609) 292-2960, Monday through Friday 9:30 to 4:30

SYSTEMS PROGRAMMER

The University of Iowa Computer Center is seeking an exceptional person with systems programming experience on COC NOS or KRONOS operating systems. The qualified applicant will have three to five years' experience and a strong background in CP and PP COMPASS. Responsibilities will include systems maintenance and participation in challenging software development projects. We offer competitive salary, exceptional benefits, and the special advantages of living and working in a University environment.

Send resume and salary history in confidence to Wayne L. Robinson, 112 LCM, The University of Iowa, Iowa City, IA 52242. An Equal Opportunity/Affirmative Action Employer.

position announcements

position announcements

position announcements

position announcements

position announcements

MOS Engineers:

In Houston, you've got the Gulf for a playground.

You can cruise up the coast to New Orleans or down the coast to Mexico. Or you can play in your own port—on the water or on the town. Houston is Big City in size and sophistication. Except for New York, it's the only U.S. city that has fully professional companies in all four of the performing arts. The cost of living is well below the national urban average. And there is no state income tax.

We give you the Gulf...



...and a green light.

At TI—Houston, you'll work with industry-leading products.

High-density MOS memories; 16k RAMS and EPROMS; and 16-bit microprocessors and minicomputers. You'll get to prove how good you are working with a broad scope of job opportunities with MOS semiconductor memories and microprocessors—the latest LSI devices.

Your technical expertise will address a wide range of applications: computers; automobiles; appliances; industrial controls; toys; and many others.

MOS Microprocessor Design Engineers

Member of a design team responsible for specification, design, and testing of MOS microprocessors and microprocessor peripheral devices. Will be responsible for MOS system, logic and circuit design, planning and supervision of chip layout, development of test programs, device testing, and characterization. Requires BS/MSEE and 1 year circuit or logic design. MOS experience desirable.

MOS Microprocessor Systems Engineers

Responsible for the specification, design and programming of microprocessor-based systems from

concept through production. Requires BS/MSEE and 1 year experience in assembly level programming, logic hardware, and minicomputer and/or microprocessor software.

Product Engineers

Work with a team of process engineers, device and system designers, and production personnel to implement new products into production and into the market. Quickly assume responsibility for test generation, yield improvement, cost reduction, and device characterization of MOS LSI devices. Requires BSEE or physics and 2 years' applicable experience. Requires knowledge of LSI fabrication and testing.

Product Manager

Coordinate test development and product engineering for digital/analog MOS LSI circuits. Requires thorough understanding of digital LSI test techniques and/or familiarity with data transmission over switched communication network. Requires BS/MSEE and 3-5 years' related experience.

Product Marketing Engineers

Handle all product marketing responsibilities for geographic area for MOS memory or microprocessor products. Provide customer presentations, proposals, spec evaluations,

and price and delivery negotiations. Develop penetration programs for market area and coordinate resources to pursue. Requires BSEE or CS and 2 years' related experience, and the ability to operate in rapidly expanding market environment.

Strategic Marketing Manager

Analyze market opportunities. Participate in product definition for MOS microprocessor products. Prepare product documentation, pricing and merchandising for specific markets. Requires BSEE or CS and 3-5 years' applicable experience.

Applications Engineers

Apply microprocessors and/or memories to systems designs. Basic design requirements include digital, analog, and systems programming from concept to prototype debug. Requires BSEE or MSCS with heavy emphasis on electronics and microprocessors/memories. Requires 2 years' related experience and assembly level programming.



If you qualify for any of the above positions, send your resume in complete confidence to: Staffing Manager/P.O. Box 1443, M.S. 605/Houston, TX 77001.

TEXAS INSTRUMENTS INCORPORATED

An Equal Opportunity Employer M/F

OUR STANDARDS ARE HIGH THEY HAVE TO BE

Our vice presidents personally hire each programmer/analyst (over 100 will be in 1978) because they know that a professional service firm's FUTURE IS YOU.

Immediate openings in Miami, Houston, Washington, D.C., and Philadelphia areas. Call collect or send resume with current salary requirements to:

Mr. Fred Trimble

Data Technology Industries, Inc.
5511 Kenilworth Ave., Suite 413
Riverdale, Maryland 20840
(301) 775-8828

HOUSTON, TEXAS NEEDS YOU! ALL SKILLS ALL INDUSTRIES

The DPCenter.
Data Processing Careers
4815 SW Freeway, Suite 800
Houston, Texas 77027 • (713) 980-9103
Personnel Consultants

Sr. Sales Rep's

Selling to insurance producers now. Great opportunity to join industry oriented data center. Prefer following among agents ... ex ARC, Systems, Safecom, etc. Openings in N.E., S.E., Midwest. Relocation not nec. Salary & Comm \$20M+ 1st year. Send resume or call Thos. C. Bailey, Arisla/Bailley Automation, Box 12339, Winston-Salem, N.C. 27107 (919) 722-5167.

Digital Computer Systems Administrator D.C. Superior Court

Large urban trial court with independent DOS/VS, CICS/VS 370/145 installation with distributed processing seeks aggressive, dynamic individual to plan, coordinate, and supervise its computer system. The individual will be responsible for expanding on-line applications into the juvenile and civil areas and planning for the development of a fully integrated court information system. Implementation of a data base management system throughout the court is planned.

The successful candidate, must have demonstrated management competence and technical ability and should have a minimum of a bachelor's degree and 5 years of O.P. experience in progressively more responsible positions. Individual must have a proven ability to manage timely and successful completion of DP projects, must be able to develop short and long range DP plans, and provide internal training programs for DP staff and users. It is imperative that the individual selected be able to communicate successfully with court executives and other DP users as well as with OP personnel. It is desirable that applicants have experience in the use of data processing in the justice environment and DP management experience is preferred.

The job offers a salary in the range of \$36,171 through \$47,025 and excellent government benefits.

Respond by March 10, 1979 to director of personnel, D.C. Superior Court, 613 G St. N.W., Rm. 505, Washington, D.C. 20001. Providing a detailed summary of experience and references.

data processing

PROGRAMMERS

Key Positions with Our Winning Computer Consulting Team in Springfield, IL., Indianapolis and Chicago.

If you're skilled in COBOL, ALC and/or PL-1 and have at least a 2 year success record of accomplishment with large scale IBM systems under IMS... we have the programming and system challenges to match your expertise (also DEC with mfg. applications). These positions require high productivity.

As a member of our professional staff, you'll be rewarded with an excellent salary and benefits. For details call Don Breitfelder collect, from 10AM to 5PM at (312) 786-0220.

INDECON, INC.
300 South Wacker Drive
Chicago, IL 60606
since 1966

An Equal Opportunity Employer M/F

RETAIL EDP PROFESSIONALS

SYS SPECIALIST To \$26K
Retail chain, multiple operating systems; IBM 370/168, distributed minicomputers, hvy. develop. program.

EOP AUDITOR To \$22K
Programmer/systems analyst exp. required COBOL, BAL, JCL, Minicomputer & Telecom retail bkgd a plus.

APPLI SOFTWARE DESIGNER To \$30K
Time-Sharing service center and mini-computer sales support.

PROGRAMMERS & SYSTEM ANALYSTS
Several \$15,000 to \$25,000 Medium or Large scale CPU bkgd COBOL, DOS or OS, IMS or DDB, East & West. Call or mail resume in strict confidence

ALAN LERNER ASSOCIATES
210 Boylston St.
Chestnut Hill, MA 02167
(617) 964-7722

Alan Lerner Assoc. specializes in nationwide search and placement of retail industry executives. All fees are client co. paid.

SENIOR/LEAD

PROGRAMMER/ANALYST

Due to a recent increase in projects, we have immediate openings for Senior/Lead Programmer/Analysts for Claims and Financial Systems in a large scale IBM 370 OS/MVS environment. Skills required include: 2-6 years programming experience, heavy COBOL applications and knowledge of OS.

We offer salary comparable to experience, excellent benefits, immediate responsibilities, and a career opportunity. For immediate consideration, send resume to:

Jim Paddy
2201 Main
Dallas, TX 75222

BLUE CROSS/
BLUE SHIELD

of Texas
Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Computer
Professionals

Exciting Minicomputer and Small Systems Career Opportunities!

\$15-\$45,000+

**Call
Gary Wilson
Today at
1-800/
821-2270,
X540**

(in Missouri call
1-800/892-7655, X540)

Our Toll Free Lines are
open 24 hours a day,
7 days a week



If you have (or would like to gain) experience in any phase of minicomputers and/or small commercial systems, you can take advantage of one of the most significant booms in the history of computing. The 50%+ annual growth rate in this segment of the industry has rivaled and surpassed that of the third generation mainframes in the sixties. Compensation levels are rising rapidly as a result. To find out the myriad of opportunities you now have available locally or on a nationwide basis, call Source Edp today. Source Edp, the largest organization in North America specializing in the placement of computer professionals, can help you accelerate your career. Types of positions currently available within our client organizations are indicated below. For complete details without obligation call in confidence today or this week.

Software and Applications

Store-And-Forward Software
Developers
Firmware Coders
Software Technical Writers
Compiler Architects (COBOL, BLISS,
BASIC, FORTRAN, RPG, ALGOL)
Real-Time Operating Systems
Developers
Data Base Software Programmers
Data Communications Programmers
Test System Software Programmers
Diagnostic Programmers
Dual Processor Operating Systems
Developers or Architects
Software Quality Assurance Analysts

Micro Programmers/Communications
Process Control Micro Programmers
Point-Of-Sale Micro Programmers
Managers of Micro Programmers
DEC PDP-11 RSX-11 Systems
Programmers
Data General AOS Systems
Programmers
DEC System TOPS-10 Systems
Programmers
HP 3000 Systems Programmers
RSTS/E Systems Programmers
DEC System-10 COBOL
Programmers/Manufacturing &
Financial

DEC PDP-11/BASIC-PLUS
Applications Programmers
MUMPS Programmers
Real-Time Laboratory Systems
Programmers
Radar Applications Programmers
Process Control Applications
Programmers
Data Base Administrators
RSX-11 Software Managers
Distributive Processing Network
Analysts
I/O Interface Programmers
PDP-8 PAL-8 Programmers
Data General INFOS/IDEA Specialists

Micro Processor Applications
Programmers
Small Commercial Systems Managers
RPG II Programmers
System/3 CCP Programmers
System/3 Model 15 Managers
System/32 Programmers
IBM Series/1 Software Programmers
System/3 RPG II Project Leaders
IBM System/7 Programmers
System/3 Model 15 MIS Directors
Microdata Reality Data/Basic
Programmers
MODCOMP Programmer Analysts

Hardware Engineering

Large Scale CPU Design Engineers
LSI Design Engineers
Tape Drive Design Engineers
Logic/Memory Design Engineers
Interface Design Engineers
Disk Drive Engineers

Test System Design Engineers
Test Systems Supervisors
Micro Processor Design Engineers
Firmware Architects
Technical Writers
New Product Planning Engineers

Analog Design Engineers
Field Service Engineers
Field Service Managers
LSI Product Development Managers
Managers of I/O Product Development
Data Communications Architects

Communications Product Managers
Radar Engineers
Systems Engineers
Process Control Engineering
Specialists
Reliability Engineers

**For immediate
consideration, call the
Source Edp office
nearest you.**

East:
Boston 617/482-7613
Wellesley, MA 617/237-3120
Hartford 203/522-6590
Stamford, CT 203/329-8411
Union, NJ 201/687-8700
New York City 212/736-7445
Philadelphia 215/665-1717
Washington, DC 703/790-5610

Midwest:
Detroit 313/963-0510
Southfield, MI 313/352-6520
Cleveland 216/771-2070
Chicago 312/782-0857
Northfield, IL 312/446-8395
Rolling Meadows, IL 312/392-0244
Oak Brook, IL 312/986-0422
St. Louis 314/862-3600
Minneapolis 612/544-3600
St. Paul 612/771-0544
Kansas City 816/474-3393

South/Southwest:
Atlanta 404/325-8370
New Orleans 504/561-6000
Dallas 214/387-1600
Fort Worth 817/338-9300
Houston 713/626-8705
Denver 303/773-3700

West Coast:
Seattle 206/454-6400
San Francisco 415/434-2410
Palo Alto 415/328-7155
Los Angeles 213/386-5500
Encino, CA 213/995-8866
Torrance, CA 213/540-7500
Irvine, CA 714/833-1730
San Diego 714/231-1900

Canada:
Toronto 416/364-2919

If unable to call, write:

Source Edp
Department CW 9
721 Enterprise Drive
Oak Brook, Illinois 60521

When writing, please be sure to
indicate home address, phone
number and position title.

source edp

position announcements

position announcements

position announcements

position announcements

position announcements

The life style you've been seeking... The income your talent deserves

Are you technically satisfied? Does your income match your talent? If not, Control Data and Minnesota can offer you what you are seeking. Our division is extraordinary in that we have built a team of IBM talent that is one of the best in the world. You can be a part of that team.

PROGRAMMER/ANALYST—IBM A new opportunity to participate in a major new development in the Computer Industry—our end-user Systems Software Development Group. This position requires a minimum of 2-3 years IBM assembler coding experience, and a working knowledge of the following areas:

- O/S JCL
- Utilities
- Data Management/Job Management
- Supervisor Services

SYSTEMS PROGRAMMER—IBM Excellent position for the individual with 2-3 years IBM assembler coding experience and a working knowledge of O/S JCL, Utilities, Data Management/Job Management and Supervisor Services. In addition, you must have an internal knowledge and hands-on experience in one or more of the following:

- MVT
- VS1
- SVS
- MVS
- Structured Programming
- TSO
- S/370 Sysgen
- Performance Measurement Tuning

SYSTEMS EDUCATORS—IBM Excellent opportunity to develop and present courses on hardware utilization and software internals. Position requires experience in:

- IBM Operating Systems
- Education

H-6000 SYSTEMS/SOFTWARE PEOPLE Opportunity to participate in a major new development in the Computer Industry—our OEM Systems Software Development Group. This position requires hands-on experience with one or more of the following:

- File Structures
- COBOL/H-6000
- COBOL-74
- Structured Programming
- GMAP
- UFAS
- JCL

COMPUTER FACILITIES SYSTEM ANALYST—IBM Position performing Software and Hardware Configuration Planning for a Computer Facility consisting of 370/155, 370/148, OMEGA/480 and running various IBM Software Systems. Responsibilities will include:

- Planning
- Sysgens
- Training
- System Maintenance
- Interfacing Customers/Users

PROGRAMMING INFORMATION CENTER ADMINISTRATOR Excellent opportunity assuming responsibility for the operation of the Divisions Programming Information Center. This position requires:

- IBM Operating Systems
- Sysgens
- Organizational Ability
- Operating Systems
- Maintenance Procedures
- Effective Communication Ability

ENGINEERS—MEMORY OR DISK Excellent opportunity to support the CDC add-on Memory or Disk products for IBM 370/135 through 370/168 CPU's. These positions require engineering design or continuation support experience on CPU main memories or disks.

ENGINEER Position offering support to MASS Storage, a major breakthrough in the technology of data storage and retrieval. Position requires:

- Micro Diagnostics
- Willingness To Travel
- Microcode Controlware
- Ability To Pass Top Secret Clearance

CUSTOMER SERVICE ENGINEER Excellent opportunity for worldwide travel. Responsibilities include installing and support of peripheral products. Position requires knowledge of:

- CPU Mainframe
- Diagnostics

ENGINEERS—OMEGA Positions providing support to the OMEGA 370 compatible CPU design and development. Requires experience in one or more of the following areas:

- IBM System Architecture
- CPU Mainframe Development
- Microprogramming
- Plug Compatible Peripheral Controls

SOFTWARE SUPPORT ENGINEER Opportunity for worldwide travel for the individual capable of installing and providing maintenance support to IBM SCP's. Experience in one or more of the following areas required:

- DOS/VS
- SVS/VS2
- VS1
- OS

SYSTEMS DESIGNER—IBM Position for the professional to do Systems Planning and Design of New Peripheral Systems. Requires a working knowledge of:

- OS Internals
- Global System Design
- Data-Base Management
- Excellent Communication Skills

If you meet the qualifications above and are willing to accept the challenges of our dynamic organization, then don't hesitate. These positions are located in beautiful Plymouth, Minnesota, a western suburb of Minneapolis. You can trade traffic, crime, and pollution for 10,000 lakes, pheasants and trees.

For immediate and confidential attention, please call COLLECT or send your resume to:

Milt Spieler
PERIPHERAL SYSTEMS GROUP
2200 Berkshire Lane
Plymouth, Minnesota 55441
(612) 553-4315



CD CONTROL DATA CORPORATION

An Affirmative Action Employer M/F

"COAST TO COAST"

"COMPUTER SALES PROFESSIONALS"

I currently have 25 openings with 6 mini and main FRAM MFGS. If you are currently employed in a direct or closely related field and would like to compare your compensation and career package, please forward resume with salary history & desired location, or call collect person to person Attn: Mr. James A. Love, C/O Professions Unlimited, 35 E. 7th St., Ste. 201, Cinc., OH 45202 - (513) 721-0909.

All fees, interviewing & relocation expenses paid by Client Companies. All responses held in strictest confidence.

Communications Software Designers

We have openings in our ATLANTA based R&D lab for Engineers and Programmers to design communications software for sophisticated word processing systems.

We require a BS or MS in Electrical Engineering or Information and Computer Science plus at least 3 years experience in data communications. Experience should include widely used protocols such as: ASCII, BSC, SDLC, HDLC, etc. or emulation of IBM terminals such as 2260, 2770, 2780, 3270, etc.

Lanier, an international leader in its field, offers excellent earnings and benefits as well as the opportunity to make significant contributions and grow professionally.

If you would like to talk with us while you are at the Data Communications Conference in Las Vegas, call collect to set up an appointment.

(404) 321-3336

or, send resume and salary history to JOHN HEGARTY:

LANIER BUSINESS PRODUCTS
1700 Chantilly Drive N.E.
Atlanta, GA 30324

An Equal Opportunity Employer M/F

LANIER

Immediate Career Opportunities

Morrison Incorporated in Mobile, Alabama is growing rapidly and needs the following career EDP positions filled as soon as possible:

Systems Engineer — 3 to 5 years functioning as a systems engineer/programmer with knowledge of DOS/power/VS INTERNALS, CICS INTERNALS, Telecommunications and 370 Assembler Language.

Senior Systems Analyst — 3 to 5 years functioning as a systems analyst with experience including DOS/power/VS: ANS COBOL; DATA COMMUNICATIONS/DATA BASE (CICS). Requirements definition and systems design of financial and merchandising applications.

Programmer Analyst — 2 years functioning as a programmer writing program specs and designing COBOL programs. Specific experience should include DOS/POWER/VS, ANS COBOL, CICS and developing programs for financial, merchandising and inventory control applications.

Competitive starting salaries, excellent benefits program and opportunities for career growth.

Call now or send resume to:

MORRISON INCORPORATED

 Human Resources Department
First National Bank Building
P.O. Box 2608
Mobile, Alabama 36625
205/432-9711 Extension 261

position announcements

position announcements

position announcements

position announcements

position announcements

COMMUNICATIONS

SOFTWARE PROFESSIONALS

Grow with NCR-Columbia, South Carolina
Expansion has brought about additional opportunities
for creative software developers.

When you read "microcomputers," do you think of games and hobbies? If you do, you're not all wrong, but at NCR-Columbia, we think of real-time communications systems. We are developing microcomputer systems that rival the performance of minicomputers. Using "state-of-the-art" computer design techniques, a microprocessor becomes a very powerful device, but the advantages it offers

in systems design can sometimes be offset by complex software problems. We are developing software for operating systems, front end processors, communication drivers, I/O device handlers and diagnostics. If you are one of those software professionals who has helped solve the systems software problems experienced by minicomputer and mainframe developers,

**we invite you to explore these key openings
in our software departments:**

MICROPROCESSOR SOFTWARE DEVELOPMENT

This department is engaged in the development of software for on-line interactive data processing systems. Software product areas currently under development or planned for the near future include both development of support systems and real-time operating systems. We seek people with design, implementation, and support of compilers, assemblers, link editors, object processors, automated software distribution and control libraries. Openings also exist for individuals with design/implementation of real-time communications-oriented multitasking operating software for microcomputers or equivalent.

ADVANCED SYSTEMS DEVELOPMENT

This area provides early definition and design of future microcomputers in communications products along with initiation, early program management, and startup development of new programs. This group offers opportunities for individual contributions in a systems level scope of design from the conceptual stage to finished product. We require senior analysts with a minimum of 5 years in software plus knowledge of hardware in any one of the following areas: • Microcomputer Design • Communications Product Design • Communications Network Architecture • Systems Modeling Performance Measurement and Analysis.

MICROPROCESSOR SYSTEMS DEVELOPMENT

This department is primarily responsible for designing, implementing general purpose microcomputer systems. Key decisions are made here regarding processor design, memory design, and overall systems architecture. We seek software professionals to help make the decisions for our next generation microcomputer systems. These people must have extensive experience in both systems and applications software. Other opportunities exist for personnel with experience in the following areas: • Diagnostic Systems • Diagnostic Programs • Startup Firmware • I/O Handlers • Microcode.

COMMUNICATIONS SYSTEMS DEVELOPMENT

This group is charged with the responsibility of proposing, designing, and providing hardware and software modules for future communications products. Concentrating both hardware and software development in one group of professionals allows the application of top-down systems design techniques developed only recently within the industry. Current challenges include the successful application of small, inexpensive microprocessors in communications systems, such as controllers and front ends in place of minicomputers often used today. Opportunities exist for personnel with experience in any of the following: • Design and Development of Communications Protocol Drivers • SDLC • Communications Diagnostics • Intelligent Communications Controller General Software.

COMMUNICATIONS SOFTWARE

Get in on the ground floor of advanced communication design and participate in NCR's entry to Distributive Network Architecture, consisting of a series of microprocessor-based terminals and nodes connected by communications lines. We seek individuals who have in-depth software background with solid communications experience. Qualified applicants must provide definition, design, and implementation leadership in any one of the following areas: • Microprocessor Software • Communications Links Disciplines (SDLC, Bisinch, ISO, etc.) • Front End Processor Software • Network Node Software • Network Definition Language (System Generators) • Constructors for Nodes, Cluster Controllers and Front Ends • VTAM, NCP (for interface to SNA Network).

NCR-Columbia not only offers you a state-of-the-art technical environment, but also a lifestyle which will offer you the best of both worlds. Columbia, which is close to the seashore and mountains, enjoys the lifestyle of both city and country living with fine recreational facilities for tennis, golf, fishing, camping and water sports. The area also has excellent housing opportunities, low taxes, and is the home of the University of South Carolina.

End your search for
technical challenge and a
high quality of life by
sending your resume to:

Mr. Ken Uhlig
NCR Corporation
3325 Platt Springs Road
W. Columbia, S.C. 29169

An equal opportunity employer M/F

NCR

COMMUNICATIONS

M
I
C
R
O
C
O
M
P
U
T
E
R
S

M
I
C
R
O
C
O
M
P
U
T
E
R
S

position announcements

position announcements

position announcements

position announcements

position announcements

CSC**SYSTEMS SOFTWARE PROFESSIONALS:**

**IT MAY NOT MEAN A THING TO
YOU THAT CSC IS THE LARGEST
INFORMATION SCIENCES
COMPANY IN THE NATION ...**

**UNTIL YOU START WORKING
HERE**

It's not just a matter of size.

It's the advantages you enjoy as a software specialist in a Company of software specialists. Opportunities to work with the leading individuals in your chosen field ... opportunities to move upward rapidly through many projects and many different operations — without having to leave the Company to do so.

■ SYSTEMS PROGRAMMERS

Intermediate and senior level positions await individuals capable of serving in a consulting role to the Customer:

- to propose courses of action
- to provide solutions to operating systems problems
- to assist in preparation of policy papers
- to participate in program development

Qualifications should include two to five years recent H6000, H716, H516 experience, GMAP and higher level language programming experience, two or more years "hands on" experience with GCOS internals and/or GCOS. Analysis training, and previous teleprocessing or military communications experience, real time or telecommunications experience.

■ PROGRAMMER/ANALYSTS

Minimum one year experience in one or more of the following areas: IBM 360/370, COBOL/FORTRAN, data base management systems, IMS.

For further information about these openings, you are invited to telephone Dianne Reason Toll Free at

800--336-0173

Or forward your resume and salary requirements in strict confidence to Dianne Reason, Dept. 210.

**COMPUTER
SCIENCES
CORPORATION**

Systems Division
6565 Arlington Blvd.
Falls Church, VA 22046
Major Offices and Facilities
Throughout the World
We Aggressively Support Equal
Opportunity and Affirmative Action

PROGRAMMER/ANALYST

Experienced on Univac 1100 Series Computer

SEEKING A CHANGE?

Raybestos-Manhattan is a leading corporation dealing with friction materials used in the manufacture of brake linings, clutch facings and other brake related parts. R/M has annual sales exceeding a quarter billion dollars and is listed on NYSE.

R/M is centralizing and developing new manufacturing systems through the use of UNIS-1100 data base. To qualify for this position individuals must have at least 2-5 years experience with COBOL including a minimum of 2 years experience in manufacturing applications and data base experience. DMS-1100 experience is a plus.

Interested candidates please apply to:
Mr. Peter L. Hemmer

Raybestos R/M Manhattan

100 Oakview Drive, Trumbull, CT 06611
(203) 371-0101

An equal opportunity employer M/F

**COMPUTER
OPERATOR**

Time-shared DEC 11/70 (IAS). Principal duties satisfy requests from remote users. These will include tape/disc mounts and printer set-ups. Candidates must be good communicators and be willing to develop some programming and documentation skills. Little or no overtime hours. Large medical research center in Philadelphia. Send detailed resume to: W-46, P.O. Box 2069, Philadelphia, Pa. 19103. Equal Opportunity Employer.

**EDP SYSTEMS
ANALYST**

**\$1529-\$1893
per month**

Two years experience in analysis, design and implementation of EDP business applications, including one year on IBM 360 DOS or 370/135 or equivalent with multi programming. Apply by 3/17/78. City of Glendale Personnel, 633 E. Broadway, Room 303, Glendale, CA 91205. (213) 956-2110. EEO EMPLOYER

CAREER OPPORTUNITY IN DATA BASE ADMINISTRATION PROGRAMMER ANALYSTS

Excellent opportunities for Programmer/Analysts with 1-2 years experience in Data Base design or 3-5 years applications experience. Positions available on the Data Base Administration staff of the largest privately owned electric utility company in Texas. Applicant must have good communicative skills and solid experience in two or more of the following areas:

*COBOL *IDMS *OS
*ALC *TOTAL *DATA DICTIONARY
*JCL *IMS *TELE PROCESSING

Excellent benefits and opportunities with a growing Company. Prefer individuals with a Bachelors Degree in Computer Science or Math with a concentration in CS. Salaries commensurate with experience.

For more information, contact:

**THE EMPLOYMENT OFFICE
HOUSTON
LIGHTING & POWER COMPANY**
Houston, Texas
(713) 228-9211, Ext. 2202
An Equal Opportunity Employer M/F

STRUCTURED PROGRAMMING

If you have a working knowledge of "structured" systems development techniques, YOURDON would like to talk to you.

YOURDON is the leading consulting firm in the area of structured programming, structured design and structured analysis. Our technical staff includes P.J. Plauger, co-author of *The Elements of Programming Style*, and *Software Tools*. Tim Lister, co-author of *Learning To Program In Structured COBOL*. Ed Yourdon, author of *Techniques of Program Structure & Design*, and co-author of *Structured Design*. We are looking for one or two people with the following qualifications to join our technical staff of consultants and educators:

- At least 2 years of experience (more experience may or may not be helpful!)
- Practical experience in the use of structured programming, structured design and structured analysis.
- Experience in COBOL and at least one other language on at least two computers.
- An ability to communicate effectively in writing and in oral presentations.
- A yen to travel 100,000 miles per year to spread the gospel of structured systems development techniques throughout the USA, Canada, Europe, South America and Australia.

If you're the person we're looking for, you can expect to get:

- An above-average salary.
- Vacations in Fiji.
- Further training in structured techniques from the leading experts in the field.
- Encouragement to develop your own ideas and present them in papers, conferences and books.
- A workload sufficient to keep you busy 12-14 hours a day — including Saturdays and maybe even Sundays. We generally give our staff the day off on Christmas.

This is not the sort of job the average data processing professional would want. But then we're not looking for an average person. If you think you might be the person we're looking for, send your resume to:

Mr. Jeffrey Frazier
YOURDON Inc.
1133 Avenue of the Americas
New York, New York 10036
212-730-2670

position announcements

position announcements

position announcements

position announcements

position announcements

Trustees
California State University & Colleges
 Division of
INFORMATION SYSTEMS
 Miracle Mile, Los Angeles
 Now Taking Applications for

PROGRAMMERS & ANALYSTS

Jr. and Sr. level positions requiring knowledge of a diversity of programming languages and experience particularly with CDC 3300-3170, CDC Cyber 173, and DEC 11/45 systems. If interested, complete coupon and mail to:

Trustees, California State University & Colleges
 400 Golden Shore, Long Beach, CA 90802
 Job Line 213/590-5750

Please notify me when a position vacancy occurs in the Division of Information Systems.

Name..... Data.....
 Street..... Phone #.....
 City..... State..... Zip.....

My experience qualifies me for: (Check position and field of specialization.)

☐ Administrative Programmer/Analyst	☐ Instructional Computing Consultant
ANSI COBOL ☐	FORTRAN ☐
D.B.M.S. ☐	ALGOL ☐
OTHER ☐	PASCAL ☐
	APL ☐
	COBOL ☐
	SIMULA ☐
	OTHER ☐
☐ Operating Systems Programmer/Analyst	
RSTS/E ☐	Program Lib. Mtce. ☐
NOS ☐	Data Base Lib. Mtce. ☐
MASTER ☐	SPSS Software Support ☐

Assistant EDP Examiner

We are seeking an individual with a commercial banking background who is prepared to assist in the EDP examination of district member banks and data centers in the New England area. Qualifications for this position include experience in either commercial bank operations or auditing, and a familiarity with data processing. Excellent communication skills and the potential to advance are essential. Position requires 25-35% overnight travel.

For prompt consideration please submit detailed resume stating salary requirements to Ms. Judy Lytle.

FEDERAL RESERVE BANK OF BOSTON
 600 ATLANTIC AVENUE, BOSTON, MASS. 02110

Equal Opportunity Employer

halbrecht

Our 20th year, the first recruiting specialist in data processing and the management sciences.

THE LEADER IN MANAGEMENT AND SUPERVISORY LEVEL EDP RECRUITING NATIONWIDE
BUSINESS SYSTEMS MANAGER-RETAIL
 to \$35,000

Will interface with retail group of 2+ Billion Corp with responsibility for systems planning, identification of business opportunities and development of systems projects to support business objectives. Desire mix of EDP and retail operations background.

DIRECTOR MIS-PUBLISHING
 to \$50,000

Publishing background preferred; not required. Desire previous experience in major conversion effort, strong applications development background and capability of organizing and developing major data center activities.

BUSINESS SYSTEMS CONSULTANTS
 \$25,000 to \$35,000

Opportunities exist in both Corporate MIS organizations and management services function of "Big 6" accounting firm (NYC Office). Must be high achievers with knowledge of business functions as well as EDP expertise.

MANAGER FINANCIAL SYSTEMS
 to \$38,000

Opening due to incumbents promotion to comptroller position in this Chicago based mfg. firm. (Open-ended career path). Requires sound technical background plus successful record of developing and installing financial systems.

Our clients assume all fees.

Contact Thomas J. Kubiak

HALBRECHT & CO., INC.

201 East 42nd Street
 New York, N.Y. 10017 (212) 682-3333

Keeping in the forefront
 of a growth industry provides

an environment for professional growth at General Dynamics Communications.

If any field today is growing at a near exponential rate, it's business communications. Growth has been accelerated by the development of sophisticated telecommunications equipment. With an 80-year headstart, we have long held a leadership position in the design and development of electronic communications. Our advancing technology generates stimulating, new opportunities for talented, ambitious professionals. If you would like to explore current assignments at GDC centers nationwide, we will be glad to discuss them with you. You must have a successful background in one of these areas:

Sales — professionally representing our company and its total communications systems capability to executive level clients.

Engineering — providing telecommunications expertise in support of marketing efforts in such areas as application, network design and configuration, transmission and technical presentation.

Operations — directing installation and service activity of sophisticated telecommunications and ancillary products.

Please send confidential resume to: Manager of Employment,
 General Dynamics Communications Co., 10151 Corporate Square,
 St. Louis, Missouri 63132.

GENERAL DYNAMICS Communications Company

An equal opportunity employer, m/f

PROGRAMMER ANALYST

Management consulting firm serving the health care industry has immediate opening for a data processing professional in accounting and financial information systems. Preference will be given to an individual who has designed, programmed and implemented on-line billing, accounts receivable and the related management information and control systems using CICS. Experience with hospital and physician billing and accounting systems desirable. Some travel required. Excellent opportunity for a person who is seeking a challenging assignment in a vigorous and demanding work environment to get on the ground floor with a rapidly growing firm. Salary is open depending upon qualifications. Our employees are aware of this ad. Send resumes to CW Box 1469, 797 Washington St., Newton, MA. 02160.

equal opportunity employer m/f/h

PHILADELPHIA OPERATIONS MGR. To \$30,000

We are recruiting for a prominent PHILA. mfg. seeking a results-oriented EDP ADMIN. Must be current in the state of the art & have a proven track record in OPERATIONS MGMT from mfg. environ. Ability institute sys. & procedures nec. Exp. HARDWARE ANAL. feasibility studies, computer room layout essential. Career spot w/leader in its field.

For immediate, confidential attention: please call or forward resume to:

ROBERT HALF
 PERSONNEL AGENCIES

2 Penn Center, Suite 706
 Philadelphia, PA 19102
 (215) 566-4380

Data Processing

COMPUTER PROFESSIONALS

CHICAGO AREA

SENIOR PROGRAMMER ANALYST

We currently have several openings for a Senior Programmer Analyst with at least two-five years actual Assembler Language programming experience under OOS or OOS/VS. A working knowledge of COBOL would be beneficial as well as experience with LIFE/70 or other insurance consolidated systems such as CFO or LIFE/COMM. Your responsibilities will include the installation of LIFE/70 and the modifications and enhancements necessary to accomplish this.

SENIOR SYSTEMS ANALYST

Several openings currently exist for a Senior Systems Analyst with at least 3-5 years experience, preferably in the insurance industry, including manual and computer systems design and implementation. LIFE/70 or other consolidated insurance systems experience is very desirable. Programming experience desirable but not mandatory. Your responsibilities will include development of computerized systems as well as the conversion to LIFE/70.

We are a fast growing Life Insurance Company specializing in pension and association group business. In March we are upgrading our hardware to a 370/148 operating under OOS/VS. We offer top salaries and comprehensive benefit package, including dental insurance and an incentive savings program; advancement opportunities from within and a location convenient to all public transportation.

Send resume in confidence to:

CW Box 1471
 797 Washington St.
 Newton, MA 02160

Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Software Professionals looking ahead to new challenges

Northrop's enviable position as the foremost leader in the design, development and manufacture of airborne computers, electronic countermeasures, and other sophisticated electronic systems is the result of an environment of top priority software professionals dedicated to the solution of critical problems.

To meet our ever expanding needs, challenging assignments offering professional stimulation and career mobility are available in the following professional areas:

ENGINEERS ANALYSTS PROGRAMMERS

These positions require degree in electrical engineering, computer science or related fields.

Involvement will be in one of three specific areas requiring experience in Data General NOVA/ECLIPSE or HP 2100 at the assembly language level. Digital or analog experience helpful.

NOVA— to involve the writing of process control and real-time control programs.

HP 2100— working on operating systems, assemblers and loaders.

HP TODS BASIC— will involve working on automated acceptance and manufacturing test procedures for production hardware.

If your career concentration has been in any of the above areas, and you seek a climate that will exercise your talents and independence, we invite you to consider Northrop Defense Systems Division. Address your resume with salary specifics, in confidence to:

Manager, Employment
NORTHROP CORPORATION
Defense Systems Division, Dept. CF
600 Hicks Road, Rolling Meadows, IL 60008
An equal opportunity employer m/f

NORTHROP

MANAGER, EDP EDITORIAL SERVICES

New position in Corporate Communications of major computer systems company for strong, experienced journalism professional. Responsibilities require direct interface with top corporate officials involving speech writing and other major research and writing assignments. The successful candidate must have:

- Journalistic experience
- Excellent writing and editing skills
- Knowledge of computer industry
- Managerial potential for planning, organizing and directing a wide range of communicative activities

This position has high visibility and provides outstanding growth opportunity for the right candidate.
Send resume and salary history to:

NCR
Complete Computer Systems

An Equal Opportunity Employer

Mr. Gary R. Moyer, Director
Corporate Executive and
Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

FIELD SERVICE

SYSTEMS 370/360, H-200,
XDS, Univac, CDC
All Large & Medium
CPU's

MINI's PDP, NOVA, G.A.,
HP, etc. All Mini
Systems

I/O STC, TELEX, CDC,
ITEL, CALCOMP,
etc. All Peripheral Ex-
perience

MTR

(312) 344-6750
MTR ASSOCIATES
1107 Mannheim Road \$12.30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

USER SERVICES CONSULTANTS

University Computing Center
seeking programmer and analyst/
programmer. Must have good
technical skills and be able to
communicate that effectively
with faculty, staff, and students
in an academic community. Prefer
degree in computer science or statistics with:

- two years experience in design and programming of time sharing system or applications, and experience with TSO; or
- two years experience in design and programming of job accounting or financial management applications.

North Carolina State University,
P.O. Box 5445, Raleigh, N.C.
27650. An Equal Opportunity/
Affirmative Action Employer.

Datatrol Inc.

DATATROL, a recognized leader in the development and manufacture of turnkey computer systems for retail credit authorization, electronic point-of-sale, EFTS, banking information and on-line gaming (lotteries).

PROJECT MANAGEMENT

We are seeking senior individuals with experience in terminals communications and mini-computer turnkey systems. Positions are available in our retail and banking business areas.

You will be responsible for all phases involved in the implementation of mini-computer-based on-line retail, financial and EFTS terminal systems. This includes project management, specification, design implementation and sales/marketing support.

In addition we are looking for a highly motivated individual to define and propose new business areas around Datatrol's unique product line.

If you are interested in these openings and would like to work for a growing company which offers excellent employee benefits and a pleasant working environment, please submit your resume including salary requirements, to: DEPARTMENT C, DATATROL, INC., KANE INDUSTRIAL DRIVE, HUDSON, MA 01749.

An Equal Opportunity Employer M/F
A Subsidiary of Applied Devices Corporation



programmer/ analysts

air traffic control systems

Opportunities In
Jacksonville, Florida

CSC's System Sciences Division

CSC is constantly expanding in the information sciences industry all over the world in governmental, commercial, and industrial systems

CSC's System Sciences Division is now staffing a new FAA Air Traffic Control Systems Project, developing and implementing technology in our Jacksonville, Florida location

We offer both a Florida lifestyle and a professional workstyle on one of our development teams. All levels of experience are welcome to apply for these positions

- Software test and validation including development of tools to test and validate real-time software systems.
- Simulation/modeling of air traffic patterns. Knowledge of JOVIAL a plus.
- Design and implementation of data base management systems.
- OS/360 System generation and maintenance.
- Diagnostic design, development or enhancement and hardware orientation.
- Software Quality Assurance.

CSC offers a liberal relocation policy in addition to a complete benefits package. For immediate consideration, please send resume or call:

Dave Stewart

Call Collect: (904) 355-9687

**COMPUTER
SCIENCES
CORPORATION**

System Sciences Division
1633 Boulevard Street
Jacksonville, FL 32206
Major Offices and Facilities
throughout the World
Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS ANALYST/CONSULTANT

MCAUTO (McDonnell Douglas Automation Co.), one of the nations leading data services companies, has several openings in St. Louis for proven Data Processing Professionals to implement comprehensive financial systems. Applications include General Ledger, Accounts Payable, Accounts Receivable, Fixed Assets, Payroll and Personnel. The qualified applicant will possess the following:

- Background in Financial Systems
- Preferably a degree in Accounting or Business
- Knowledge in COBOL, RJP and OS
- Good communication skills to deal with users
- Self-starter willing to travel and assume responsibility

If you can handle a challenging position in a growth oriented company which offers an excellent salary compensation package, forward your resume and salary history to:

W. B. KELLENBERGER
Section Manager,
Professional Employment
Department CW-27SA
P.O. Box 516
St. Louis, Missouri 63166

**MCDONNELL DOUGLAS
AUTOMATION COMPANY**

A DIVISION OF MCDONNELL DOUGLAS
An Equal Opportunity Employer

SOUTH FLORIDA PROGRAMMING OPPORTUNITIES

Racal-Milgo, Inc., a leading manufacturer of data communications equipment, has immediate openings for qualified individuals in the Information Systems Department.

SYSTEMS PROGRAMMER

Qualified individual must have Univac 1100 and Exec. B experience. This individual will be responsible for SYSGENS, tuning and troubleshooting of systems. Must have experience with Univac 1100, Assembler and COBOL. Knowledge of TIP/CMS and DMS preferred.

SYSTEMS SPECIALIST

At least 2 years systems analysis and programming experience with financial application, utilizing ANS COBOL is required. Experience on a Univac 1100 series and degree is preferred.

Racal-Milgo, Inc. offers excellent salaries, complete company benefits, liberal relocation allowance and the benefits of South Florida living. Send your resume in complete confidence to Miles Johnson, Employment Representative, or call collect (305) 591-5212.

Racal-Milgo —the new name for ICC
8600 N.W. 41st St., Miami, FL 33166 (305) 592-8600

Equal Opportunity Employer

RACAL
The Electronics Group

San Diego opportunity in SOFTWARE SYSTEMS DEVELOPMENT

Want to combine the ideal career opportunity with your favorite lifestyle? NCR Systems Engineering/Torrey Pines needs your help now in developing advanced, high-technology, EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, La Jolla and downtown San Diego. You can live in the setting of your choice — beach, valley, mountain, country, small town or urban — and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too — from mild coast to dry desert. San Diego is a place of extraordinary choices — and right now the choice is yours.

COMPUTER PROGRAMMERS

The Systems Engineering/Torrey Pines Division has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- Telecommunications Software
- File Processing
- Network Development
- Large Mainframe, Mini and Micro Processor
- Operating Systems
- COBOL Applications
- Assembly Language

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems; both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.

NCR

Thom Harris, Employment Specialist
SYSTEMS ENGINEERING/TORREY PINES
4046 Sorrento Valley Blvd., San Diego, CA. 92121
An Equal Opportunity Employer

PROGRAMMER ANALYST

Florida based multibank holding company seeks programmer analyst with 3-4 years experience utilizing large IBM system under OS/VS1. Should also be experienced in IMS Data Base and have heavy telecommunication background. Must have experience in Credit Card and Installment Loan banking applications. Send resumes to:

Atlantic Bancorporation
Personnel Department
General Mail Center
Jacksonville, Florida 32231
An Equal Opportunity Employer

INT'L MARKETING DIRECTOR Minis-Florida Base \$45000 +

Develop and support distribution organization; corporate level liaison to subs. Must communicate effectively at the policy level.

PRODUCT MANAGER Florida Base to \$30000

Plan & promote discs, drives, printers, terminals. Ideal for the individual with solid technical background in mkt. develop. of peripherals and software drivers for peripherals.

REGIONAL STAFF SE Midwest To \$24000

Co-ordinate Corporate support to branch mgrs. & SE's. Extremely high visibility; super growth co. with excellent track record in employee retention and promotion. Ideal would be SE with a mainframe or DDP vendor 2+ yrs.

SALES/MARKETING/MGT. Mini/Mainframe/Peripheral Exp. \$15000-75000

Florida and Nationwide. Our clients are looking for proven winners, and have demonstrated their willingness to reward outstanding performance. Raises are averaging in excess 20% with positive options in geographic preference, title, compensation and prof. environment.

OUR CLIENT COMPANIES pay all fees, interview & relocation costs. For quick response, call or write John Cummings of our Firm:

FRANK LEONARD Personnel
1211 No. Westshore Blvd., Suite 100
Tampa, Florida 33607
(813) 872-1853

DIRECTOR OF SYSTEMS DEVELOPMENT

Loyola University of Chicago, a major independent university with ten colleges and a large teaching hospital, is now actively seeking a Director of Systems Development.

This position will report to the Vice President-Finance. Responsibilities will include planning, developing, testing, and installing computer-based real time systems for use at the University and to assure that user service standards are maintained. Major areas of service include all financial and accounting functions for the educational and health care operations of the University as well as academic computing services support. Works in conjunction with the Director of Computers, who is in charge of production operations using IBM 370/SVS system, CICS and TSO with PL/I and COBOL as primary languages.

The successful candidate will be a proven effective manager, especially adept at communicating with users, oriented toward planning, developing and installing major systems, and ready to manage a strong professional staff. Experience in higher education or health care is not required. Master's degree or equivalent experience required.

We offer excellent compensation and comprehensive benefits including undergraduate tuition for family members. Position is located in western suburbs of Chicago. Qualified individuals are invited to submit resume, including salary history and expectations, in confidence, to:

Personnel Director
Loyola University of Chicago
Lewis Towers Campus
820 North Michigan Avenue
Chicago, Illinois 60611

an equal opportunity
employer m/f



position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMERS & ENGINEERS

Expansion has created several new positions which offers rewarding career development opportunities for those professionals seeking new challenges and an innovative environment.

PROGRAMMERS & ANALYSTS

Minimum of three years of programming experience with PL1 or FORTRAN on IBM 360/370. B.S. or M.S. degree in a related scientific field is desired. Successful candidate should possess a background of accomplishments in at least two of the following areas:

- Inertial Guidance
- Satellite Tracking Systems
- Telemetry or Radar Data Analysis
- Scientific Data Reduction
- Inertial Navigation Systems
- Missile Trajectory

ELECTRONIC/SYSTEMS ENGINEER

We are seeking an individual with a background in the field of electronics, R.F. and Missile Tracking Systems Testing and evaluation. Task responsibilities will include:

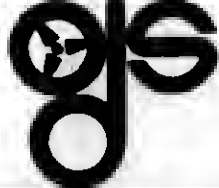
- Review test procedures
- Monitor contractor testing
- Evaluate systems performance

Applicants familiar with overall conduct of large scale systems test programs are desirable. BS/EE or Physics Degree (M.S. preferred).

These positions are located in a country side setting 30 minutes from Washington, D.C. and Baltimore, MD. If you are ready to make a change, call collect to find out more about the positions. While you are on the phone, ask about our attractive starting salary, TEN company paid benefits, and your future with

(301) 948-5200

D.M. Grove



OLD DOMINION SYSTEMS, INCORPORATED

4 Professional Drive, #119

Geithersburg, MD 20760

EOE/MF

UNIVERSITY OF NEW HAMPSHIRE

UNH has an opening for a Computer Specialist IV-Team Leader, Financial Systems. This position requires a working leader who will provide technical guidelines to other team members in developing and maintaining the various financial systems, overseeing the submittal of production runs and interfacing with the financial community. Will work closely with other team leaders in developing standards and procedures as required.

Minimum qualifications include a Bachelor's degree or equivalent experience plus five years of significant experience. Additional desirable qualifications are leadership qualities, knowledge of DECsystem-10, data base techniques and financial systems.

Salary range: \$14,700 to \$22,884. Starting salary normally not to exceed \$16,500.

Resumes should be submitted no later than March 15, 1978 to:

Mr. Bill Conroy

University of New Hampshire

Computer Services

Richards House

Durham, N.H. 03824

An Affirmative Action/Equal Opportunity Employer

DATA PROCESSING

Immediate opportunity available for:

EXPERIENCED PROGRAMMERS

Minimum 1 year's applications experience required. Growth opportunity in a state-of-the-art environment which includes AMDAHL 470/V6. Should be familiar with IBM 360/370, ANS COBOL, OS/MVT or OS/MVS.

These positions offer excellent salary combined with a comprehensive fringe benefit program and convenient suburban location. Opportunity for individual growth and development.

Since 1964 Computerized Automotive Reporting Service (CARS) and its data processing company Action Computer Technology (ACT) have established the industry's leading data processing operation which provides comprehensive accounting, inventory and leasing services to automotive dealerships throughout the U.S., Australia and Japan.

For immediate consideration contact Personnel Department.

CARS

P.O. Box 235 • Birmingham, Alabama 35201

We Are An Equal Opportunity Employer M/F

The ROMAC DIFFERENCE

Our Clients Call Us Names

Al... Bud...

Lance... Jim...

And we're proud of it. It's the result of a close, long lasting relationship with employers and qualified professionals who we have placed in key positions in EDP, Accounting and Banking.

For years, we have prided ourselves on providing consistent service. The quality of that service can be measured by the number of career professionals who have moved up within the organizations of Romac employer/clients. Another part of the Romac Difference.



ROMAC

& ASSOCIATES/
Personnel Consultants

Contact Romac & Associates, A. L. Lemay, President, 2 Sun Life Executive Park, Wellesley Hills, MA 02181 for transmission to our Partners in Atlanta, Boston, Buffalo, Charlotte, Hartford, New Haven, New York, Philadelphia, Portland, Rhode Island, Rochester/Syracuse, Stamford



IOWA BEEF IS A CUT ABOVE THE USUAL BULL.

Growth and promotions have created a need on our MIS staff for data processing professionals. We invite you to consider a career opportunity with Iowa Beef Processors, a company who, in its short 17 year history, has established a position of unquestioned leadership in our industry, with sales exceeding \$2 billion. We are currently seeking the following:

SYSTEMS ANALYSTS

As part of our systems development group you'll play a major role in the on-going development of new business systems. To qualify you should be degreed with 3-5 years experience that emphasizes the design of on-line data base systems. Manufacturing systems background a plus.

PROGRAMMER ANALYST

Requires a minimum of two years experience in COBOL programming and one year experience in systems design that emphasizes team leadership responsibility for the development of a major computer system.

SYSTEMS PROGRAMMER

Requires programming experience with Honeywell 600/6000/6600 Series hardware with GCOS operating systems; knowledge of basic software utilities and familiarity with GMAP programming.

PROGRAMMER

Minimum of 2 years COBOL experience on large scale hardware. We offer an outstanding compensation and benefit program that includes annual cash bonus and stock options. Interested candidates should send resume in confidence to: Manager Professional Employment, IOWA BEEF PROCESSORS, INC., P.O. Box 3350, Sioux City, Iowa 51101.



IOWA BEEF PROCESSORS, INC.



An Equal Opportunity Employer M/F

SYSTEMS QUALITY ASSURANCE

FUNCTIONS:

- QA of software, hardware and systems
- Review of product specifications
- Development of product test plans/procedures
- Design and development of new QA tools

Areas Being Addressed Include:

- Applications software (EG, computer aided manufacturing, computer aided design, text processing)
- Systems software (EG, vendor and internally developed operating systems, executives/monitors, DBMS)
- Computer hardware (micros, minis, and maxis) and peripherals including graphics and plotters

Requirements:

- BS in computer science, math or engineering
- Two or more years of applicable experience
- Desire to produce high-quality products

MDSI is the recognized leader in the development and marketing of high technology products and services for manufacturing applications. Our rapid, highly profitable growth provides a challenging environment with excellent personal growth opportunities. Let our competitive salaries and comprehensive benefits set the stage for a discussion regarding your career with us. Send resume, in complete confidence, to:

Manager of Technical Recruiting

Manufacturing

Data Systems Incorporated

or call collect
(313) 995-6035

Manufacturing Data Systems Incorporated

4251 Plymouth Road

Ann Arbor, Michigan 48106

MDSI

We Are An Equal Opportunity Employer M/F

MDSI Manufacturing Data Systems Incorporated

position announcements

position announcements

position announcements

position announcements

position announcements

Advanced Data/Data Base Systems Position Requirements

Rapidly growing large-scale computer company seeks individuals with hands-on experience in data and data base requirements: definition, planning, development, design, conversion and implementation, primarily with DL1 based systems. Exposure to multiple DBMs is preferred. Working level knowledge of several dictionary/directory products would also be desirable. Qualified candidates may currently be data base administrators in a large data processing operation seeking increased opportunities for experience and challenge. The ability to effectively communicate with all corporate levels and in customer environments is essential. Qualified candidates are invited to direct their response to CW Box 1476, 797 Washington St., Newton, MA 02160.

Equal opportunity employer.

PROGRAMMER/ ANALYST

M.I.S. International Inc., an internationally known computer systems integration organization, requires specialized professionals for Michigan, Ohio and Indiana branches.

- BUSINESS SYSTEM ANALYST/PROGRAMMERS with experience in COBOL/PL-1 on IBM/IMS, CICS, BURROUGHS/DMS II and HONEYWELL/IDS
- REAL TIME ANALYST/PROGRAMMERS with experience on micro/Mini Computers
- ENGINEERING ANALYST/PROGRAMMERS with time sharing experience

Experienced men and women interested in furthering their career should consider M.I.S.'s top salary structure, stable employment environment, fully paid fringe benefits, educational opportunities and relocation allowances. You are invited to send your resume to Mr. Gene Bryant. Interviews will be arranged locally.

M.I.S. INTERNATIONAL, INC.

31360 Smith Road
Ann Arbor, Michigan 48174
(313) 328-7810

COMPUTER CENTER MANAGEMENT Commitment Competence

That's what makes SCT number one in higher education computing. After 9 years of service, SCT has established a superb reputation providing Systems and Computer Center Management to colleges and universities. Several recent and large Computer Center Management and Systems Development contracts have created opportunities for competent professionals with an entrepreneurial drive and a service orientation who are willing to commit themselves to SCT's continued growth and professional excellence.

**Administrative Systems Managers
University Financial Analysts
Student Systems Analysts**

All positions require thorough knowledge and previous experience in administrative systems and computing, plus the ability to communicate with, and understand, user requirements and related processes. Administrative Systems Managers must have a proven track record of accomplishment in the management and/or design and implementation of financial, student and/or related integrated systems. University Financial Analysts must be experienced in analysis, development, and implementation of financial accounting, budgeting, and payroll systems applications. Student Systems Analysts must be experienced in analysis, development, and implementation of registration, record keeping, and other student related applications.

If you meet the above qualifications, we need your expertise and experience. To learn more and arrange for a convenient interview:

**CALL COLLECT
MR. WILLIAM DRANSFIELD**
Director, Corporate Recruitment
(215) 692-7990

Tues. Through Thursday, 3/7 to 3/9, 10am to 8pm (EST) Or Saturday, 3/11, 1pm to 6pm (EST).

... or write indicating travel and relocation restrictions, salary, and position of interest to Mr. William Dransfield.

**SYSTEMS & COMPUTER
TECHNOLOGY CORPORATION**

Seven North Five Point Road
West Chester, Pennsylvania 19380
(215) 692-7990

An Equal Opportunity Employer M/F

INTERGLOBAL is...

a subsidiary of a NYSE listed company, with an EDP service bureau placing Consultants throughout the United States and foreign countries.

To take advantage of our nearby and worldwide EDP opportunities, please submit your resume for inclusion in our worldwide computerized retrieval system, to our corporate headquarters in New York City.

Ralph Young
**INTERGLOBAL
TECHNICAL SERVICES, INC.**
56 W. 35 St., NY, NY 10001
(212) 695-7773

Equal Opportunity Employer M/F

FLORIDA

Programmers, Analysts, EE's software and hardware. Career positions for IMPLEMENTORS in BANKING, MFG, and SCIENTIFIC. Need highly skilled individuals with DMB, T.P. on line, INTERNALS and APPLICA-TIONS. Large scale and minis. Submit resume with present salary and position for immediate consideration by best client firms in FLORIDA.

**FRANK LEONARD
PERSONNEL**

1211 N. Westshore Blvd.
Suite 100
Tampa, FL 33607
(813) 872-1953

SYSTEMS ANALYSTS

Systems Analysts needed to develop large scale business oriented Batch and Online Systems. This is an opportunity for analysts to work in a professional environment with excellent advancement potential.

Applicants must have the following qualifications:

- 2+ Years Experience
- College Degree or Equivalent Experience

Salary 16-25K (depending on qualifications) with excellent fringe benefits.

Send resume in confidence to:

Michael Cavalli
Mgr. Systems Development
Consolidated Freightways
P.O. Box 3301
Portland, Oregon 97208
An Equal Opportunity Employer

ANALYST PROGRAMMER REAL-TIME PROCESS CONTROL

Southern California utility is seeking an individual with experience on real-time process control and interrupt-driven computers for development of an energy management system. The individual will join a project team responsible for the development and implementation of an automatic generation control (AGC) and supervisory control and data acquisition (SCADA) process control computer systems. Position requires a Bachelor's degree or equivalent, preferably in computer science, engineering, or mathematics. Candidates must have knowledge of assembler and Fortran programming languages and real-time process control computer systems.

Send resume and salary requirement to:

Employment Office

SAN DIEGO GAS

&

ELECTRIC COMPANY

P.O. Box 1831
San Diego, CA 92112

An Equal Opportunity and Affirmative Action Employer

FLORIDA VOICE/DATA TELECOMMUNICATIONS CONSULTANTS

We are a three-quarter billion NYSE international corporation with dispersed geographical locations and are seeking internal Telecommunications Consultants for user application definitions, analyses and recommendations.

Candidates should have a bachelor's degree in one of the basic business disciplines and a minimum of 2 years telecommunications voice and/or data experience. The positions require interface with top management, good oral and written abilities, and percentage of travel. These are high exposure positions requiring mature individuals with good basic business and technical abilities.

Please send resume of accomplishments and salary history/requirements to:

Personnel Development
RYDER SYSTEMS, INC.
P.O. Box 52016
Miami, FL 33152

SYCOR

Sycor, Inc., a leader in the manufacture of distributed data processing systems, is currently seeking qualified:

SYSTEMS ENGINEERS

This headquarters position requires a degree in a data processing discipline or equivalent experience. Specific experience in the use or support of programmable terminals, communication terminals or 3270 compatible on-line terminals is desirable.

These individuals will provide technical marketing support for the final stages of new product development and for first shipments of new products and programs. Responsibilities will include preparation of functional specifications for new products or programs, functional acceptance tests of new products, performance measurement, start-up assistance for first customer installations and other functions and technical liaison between our sales and development organizations.

TECHNICAL WRITERS

A degreed individual with a minimum of two years experience as a software programmer, systems engineer or technical writer of computer software documentation. Projects include communications, language and computer system architecture manuals.

PRODUCT SPECIALIST

The successful candidate must have a minimum of two years experience successfully selling terminals, peripherals or small systems and general knowledge of D.P. applications, including communications.

INSTRUCTOR

WASHINGTON, D.C. AREA

This position will be responsible for the training of users of intelligent terminals and distributed processing systems. The ideal candidate will have experience teaching a business type computer language. Programming experience and an aptitude and desire to teach can also qualify a candidate. A degree is required.

We offer competitive salary and a fully-paid benefit package, including retirement. Send resume and salary history or call:

Si
SYCOR, INC.

Sycor, Inc.
100 Phoenix Drive
Ann Arbor, Michigan 48104
1-800-521-1532

An Equal Opportunity Employer M/F

"Sycor Puts Computer Power
Where the Work Is"

SYCOR

position announcements

position announcements

position announcements

position announcements

position announcements

Principal or Senior Software Engineers

We have three openings at our Merrimack, New Hampshire facility in the area of word processing development. Individuals in these positions will have responsibility for project leadership, systems design, implementation and testing. A BS or MS in Computer Science or equivalent is required, and experience with PDP 11 and/or PDP 8 assembly language programming is highly desirable.

If you are interested and qualified, please forward your resume, including salary history to Les Nagy, Digital Equipment Corporation, Dept. N36 3807, 5 Flagstone Drive, Hudson, New Hampshire 03051. We are an Equal Opportunity Employer M/F.

digital

IF YOUR DP TALENTS HAVE BEEN PUT IN OFF-LINE STORAGE ...

... We've Got the Career Programs to Get Them Back On-Line!

SYSTEMS GROUP MGR to \$60K
Manage department of 60 professionals. Midwest location.
SYSTEMS ANALYST IMS to \$32K
Develop new systems in large state-of-the-art environment. Southeast location.
DP OPERATIONS MGR to \$32K
Manage large scale 370 installation. Southeast location.
TECHNICAL CONSULTANT to \$30K
Manage financial/technical planning function of DP department. Miami location.
SYSTEMS PROGRAMMER to \$25K
Generate/maintain IBM system. Knowledge of current IBM equipment required.
PLANNING ANALYST to \$24K
Prepare long and short range plans for software requirements. Miami location.
DATA BASE ANALYSTS to \$24K
Strong IMS support background. Southeast location.
PROGRAMMER/ANALYSTS & SYSTEMS ANALYSTS
Various levels throughout the U.S.

Quality of experience takes precedence over number of years. All relocation expenses paid. For complete information, forward detailed resume, including salary history in confidence.



**H. EARL SMALLEY
ASSOCIATES**

2583 S. Bayshore Drive
Coconut Grove, FL 33133

Marc Hirsh

We represent equal
opportunity employers M/F

NEW ENGLAND SOFTWARE PROS TO 32K

Our broad base of computer vendors, users, engineering and research firms have listed over 400 urgent requirements with us for: Minicomputer Systems Programmers, Microprogrammers, Diagnostic Programmers, Data Base Specialists, Software Consultants, Systems Analysts. Several project end management level positions.

Send your resume in confidence. Contact: Jim Masciarelli

WINTER, WYMAN & COMPANY

Personnel Consultants
60 William St.
Wellesley, MA 02181
(617) 235-8505

PROGRAMMER/ ANALYST

Aggressive, rapidly-growing independent bank in Southern California seeks programmer/analyst experienced on Burroughs medium systems and financial applications. Data communications experience a plus. Salary commensurate with experience. Send resume and salary history to:

Southwest

Bank

P.O. Box 1748

Vista, CA 92083

Equal Opportunity Employer M/F

programmers

SUPPORT ANALYSTS

Experienced mini-computer support analysts to confer with users, marketing representatives and company technical personnel in defining business data processing problems and mini-computer solutions for end users. Will formulate statements of these problems and assist in devising data processing solutions. Will prepare proposals and assist in or supervise the installation of appropriate end user systems. Will also support marketing personnel in the field with presentations to end users. A new and growing division of a major electronics company with unusual opportunities for career and financial growth. All benefits including savings and dental plans. Automobile provided. For a local interview appointment, please send in confidence a detailed resume including your current salary to our Software Support Manager.

CW Box 1470

797 Washington St.
Newton, MA 02160

Equal Opportunity Employer M/F

ASSISTANT DIRECTOR COMPUTER SERVICES

Unique opportunity for person with minimum of six years experience in computer center operations or commercial computer systems. Will have supervisory responsibility for functional operating units and coordinate as liaison with users on Dallas County Community College District's seven campuses. BA or MA in Computer Science or Business required. Management experience with an on-line application and equipment desired in an academic institution. Excellent benefits program in the environment of a large community district.

Send resume with salary request to:

J.R. Hill
Dallas County Community
College District
1931 N. Industrial
Dallas, TX 75207
(214) 746-2141
EOE/MF

SAN FRANCISCO

Don't hesitate to call us to discuss a wide range of opportunities from large IBM 370/IMS/168 installations to small mini/distributive systems/telecom. environments.

PROJECT LEADER

Prestige consulting firm needs Project Leader with strong COBOL applications exp. plus some IBM OS/DB/DC internals.

COBOL PROGRAMMERS

With a minimum of one year on-the-job exp. are in critical demand by pur large IBM 370/IMS/TSO shops. Learn data base techniques.

SYSTEMS PROGS

With either IBM 370/DOS or 370/OS exp. Several clients.

RPG II PROGRAMMERS

For IBM Systems 3, IBM Systems 32 & 34 shops. Locations in San Francisco and smaller communities in the area.

EDP AUDITORS

For several large IBM/370 installations.

ROBERT HALF PERSONNEL AGENCIES

Jerry Anderson
111 Pine St.
San Francisco, CA 94111
(415) 434-1900

Stan Ings
#2 Palo Alto Sq.
Palo Alto, CA 94304
(415) 493-8700

Marketing Support Representatives

Time to Consider California?
Opportunities now open in
Los Angeles & San Francisco

Several exceptionally good career positions are now available with our West Coast offices for individuals with about 2 years programming experience, with either direct customer contact experience in a marketing environment or a strong desire to enter this rewarding and challenging field. In addition, must be familiar with micro programming or familiar with programming mini computers in Assembly language. Teleprocessing experience preferred.

As an innovator and pacesetter in the field of sophisticated on-line distributed processing systems, we can offer the successful applicants excellent salaries, generous company paid benefits, paid relocation, and the opportunity to enjoy that "easy style" California living.

Local Interviews Will Be Arranged

Call COLLECT for more information.

Peter Soligon: 203-377-4141

If unable to call, send your resume with salary history and requirements, in confidence to: Mr. Peter Soligon, Bunker Ramo, Information Systems Division, Trumbull Industrial Park, Trumbull, Conn. 06609. An equal opportunity employer M/F.

**BUNKER
RAMO**

INSURANCE DATA PROCESSING PROFESSIONALS

WE KNOW OUR DIRECTION, DO YOU?

We offer a ground floor opportunity to grow with a rapidly expanding Life Insurance Company.

We seek career-oriented data processing professionals to fill several new positions for Systems Analysts and Programmers in our Data Processing Department.

We offer a pleasant suburban location; a people-oriented atmosphere; training and educational programs; excellent salary; benefits; and relocation assistance.

NOW IS THE TIME TO ANALYZE YOUR CAREER

If you have two or more years data processing experience, exposure to life insurance applications, and a knowledge of IBM Assembler and COBOL, we can help you meet your career goals.

Please send your resume or qualifications, and salary requirements in confidence to:

WILLIAM S. WILKINS
Vice President of Data Processing
33045 Hamilton Boulevard
Farmington Hills, Mich. 48018



Alexander Hamilton Life Insurance Company of America

AN EQUAL OPPORTUNITY EMPLOYER M-F

EDP PROFESSIONALS

Medium size New York based financial institution undergoing dramatic expansion seeks the talents of EDP professionals in the following specialties:

PROGRAMMER

with 3+ years experience in IBM ANS COBOL, IBM assembler DOS/VS JCL.

PROGRAMMER/ANALYST

with 3+ years experience in IBM 370/135 DOS/VS COBOL

PROGRAMMER/ANALYSTS

with IBM 370/135 DOS/VS Systems Programming with heavy BAL, COBOL & Teleprocessing experience.

PROGRAMMER/ANALYST

with PDP proficiency to design & write systems specs, documentation & programming of systems.

Qualified applicants should possess previous banking expertise, have demonstrated professional competency to deal effectively with our sophisticated IBM equipment.

These positions offer excellent remunerations. You will participate in our outstanding benefits program and be exposed to realistic financial and professional growth in our expanding data processing environment.

Please submit a detailed resume complete with salary history and requirements in confidence to:

CW Box 1474
797 Washington St.
Newton, MA 02160

An equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

More Than 75 Outstanding CPE Specialists Now Work at FEDSIM. Join a Team of Experts!

The Federal Computer Performance Evaluation and Simulation Center (FEDSIM) is seeking both entry-level and experienced CPE analysts. FEDSIM provides consultant services to other Federal agencies in such areas as:

- Evaluating the performance of hardware configurations, operating systems, application programs, data base management systems, and communications systems. Applicants for these positions should have detailed experience in system programming, with such systems as MVS, EXEC-8 and GCOS and must have an understanding of both operating system internals and computer technology.
- Assessing the operational efficiency, management practices, and organizational effectiveness of data processing installations. Applicants for these positions should have experience in EDP management, EDP auditing, or EDP management consulting.
- Performing capacity planning studies, which include workload requirements analysis, configuration sizing and communications network design and evaluation, and providing ADP procurement assistance in such areas as benchmark design, specifications development, proposal evaluation and life-cycle planning. Applicants for these positions should have experience with hardware and software evaluation and with computer and/or communications system modeling techniques.
- Assessing the design and predicting the performance of special purpose computer systems, and analyzing the overall performance of complex systems that contain computers as integral subsystems. Applicants for these positions must be knowledgeable in Operations Research techniques, computer operating systems, and discrete-event simulation languages.

Salaries range from \$15,090 to \$30,750 with excellent opportunity for management responsibility. Advanced degree desired. Send resume of qualifications and salary history to:

Headquarters, U.S. Air Force
Det S, 1100 ABG/DPCS
Washington, DC 20330
Offices located in Alexandria, VA.
AN EQUAL OPPORTUNITY EMPLOYER

CICS EXPERTISE

Metro New York Area

TELTECH, the recognized leader in CICS consulting, which has had a significant impact on the CICS state-of-the-art, is seeking competent individuals with the CICS SOFTWARE and APPLICATIONS experience anxious to tackle exciting, complex tasks and expecting commensurate salaries.

We also welcome promising Applications Programmers with good BAL and COBOL and light exposure to CICS wishing to advance into teleprocessing.

Our staff members enjoy SECURITY, EXCELLENT BENEFITS, six month salary review and excellent ADVANCEMENT opportunities.

Call or send your resume to Bruce Boylan at:



TELECOMMUNICATIONS TECHNOLOGY CORP.

200 Park Avenue, Suite 303 East
New York, N.Y. 10017
(212) 682-4140

PROGRAMMING MANAGER Mini Computers

\$26,000-\$28,000

Exeter Associates Executive Recruiters

Bruce A. Montville
P.O. Box 623
Computer Park
Hampton, N.H. 03842
(603) 926-6712

CINCINNATI

Software Manager 35K
Technical Support 25K
Prog. Anal-on line 24K
Systems Analysts 24K
EDP Audit 23K
Software Engineer 23K

Fee & Relocation Paid
Call Bill Riethmiller
(513) 961-5575 or
eve/wknds (513) 561-8935
Angus/Baldwin Assoc., Inc.
2337 Victory Parkway
Cincinnati, Ohio 45206
Nationwide Coverage
90 affiliate offices

Communications

Control Program

300 bed hospital/55 physician clinic on Florida's West Coast in need of experienced System/3CCP Communications Programmer.

Responsibilities include designing new and maintenance of existing communications based health care applications using RPG II and IBM Communications Control Program. Maintain and manage necessary system software to insure continuous operation in on-line environment.

Must have at least 3 years programming in RPG with 1 year in use of System/3 CCP. Ability to communicate with using department; organizational management important.

Submit detailed resume to Director of Personnel, Mease Hospital and Clinic, Ouedin, Florida 33528.

MIDDLE EAST OPPORTUNITIES FOR SENIOR COMPUTER SYSTEMS ANALYSTS

E-Systems has positions open in Saudi Arabia, Egypt and Oman for Computer Professionals with the following qualifications:

Five to ten years experience in computer based systems using large mainframe computers and minicomputers. Must be capable of translating user requirements into system requirements, system studies to optimize the throughput rate and man-machine interfaces and, software system design including definition and design of large data base and communications systems. BS/MS degree in Computer Science or E.E. Must be willing to travel (TDY) or relocate (PCS) in the Middle East to accomplish the task.



E-SYSTEMS

Garland Division

An equal opportunity M/F employer

If you qualify, send your resume to:
Employment Manager
E-Systems, Inc.
P.O. Box 6118
Dallas, TX 75222

CAREER OPPORTUNITIES

We are currently seeking experienced professionals to work on a 370/158 in an IMS/DB/DC and TSO environment. Openings currently exist for:

Senior Systems Programmer

Requires a minimum of 3 years experience in systems programming. Must be able to SYSGEN and maintain SVS. A conversion to MVS is planned later this year.

Senior Programmer Analyst

Requires 3-5 years programming experience and thorough knowledge of COBOL. Experience with financial applications a plus.

We offer an attractive starting salary, a comprehensive benefits package and are located in an attractive rural setting within easy reach of major New England cities, ski areas and the ocean.

For prompt consideration, send a resume including current salary, in complete confidence to George Mabey.

AO American Optical

14 Mechanic St.
Southbridge, MA 01550
An Equal Opportunity Employer



Blue Cross and Blue Shield of North Carolina has several opportunities for data processing talent. As a leader in health care and with the expansion in health care services, we can offer you an expanding career and a challenging job. We are located near beautiful Chapel Hill, North Carolina; an excellent place to live. Our state-of-the-art data processing department utilizes IBM OS/VS, IMS, COBOL and/or Assembler. Our needs include programming or systems experience. If you want in on this opportunity, submit resumes to:

BLUE CROSS BLUE SHIELD OF NORTH CAROLINA

Attention: Personnel Manager
Post Office Box 2291
Durham, North Carolina 27702
An Equal Opportunity Employer, M/F



WHY EDP SEARCH?

Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

PROGRAMMERS ANALYST

"Free Resume Service"

NORTHWEST • SOUTHEAST
SOUTHWEST • MIDWEST

- Scientific and commercial applications
- Software development and systems programming
- Telecommunications
- Control Systems
- Computer Engineering

Send resume or rough note of objectives, salary, location restrictions, education and experience (including computers, models, operating systems, and languages). Our client companies pay all of our fees.

- NATIONAL PLACEMENT
- FOR PROFESSIONAL WOMEN
- P.O. Box 834
- HARTFORD, CT. 06142

We Aggressively Support Affirmative Action

EDP SPECIALISTS

Nationwide

- Dir Fincl Syst Midwest location To \$35K
- POS Proj Ldr Midwest Location To \$30K
- EDP Cost Cntrl Miami location To \$28K
- Syst Analyst Update NY location To \$24K

Fees assumed by Client Companies

Fees assumed by client co's.

J. J. KAVANAGH
505 5th Av. NY, NY 10017
(212) 661-0670 (agency)

position announcements

position announcements

position announcements

position announcements

position announcements

EDP AUDITOR

Major chemical/manufacturing company with worldwide operations seeks an experienced EDP Auditor for their New York City Staff.

Candidate should possess programming/systems experience plus a background in either general or computer auditing. Big B and/or MBA is desirable, or equivalent experience.

Position will involve audits of large scale installations and specific applications within a dynamic EDP environment. Travel of up to 40% may be required. Competitive salary and benefits. Please respond with resume to:

CW Box 1473
797 Washington St.
Newton, MA 02160

Equal Opportunity Employer M/F

Programming Manager

The University of Wisconsin-Milwaukee is seeking a Programming Manager to direct 15-18 programmers specializing in administrative applications in the field of higher education. The candidate must have proven managerial experience, preferably in a university data processing environment, with a thorough knowledge of project management. Ability to communicate well both orally and in writing is important.

Candidates should be well-versed in concepts of data base technology; experience in training applications programmers and systems analysts is desirable. An appreciation for and knowledge of thorough documentation techniques is sought. Sensitivity to the human condition, talent to create a professional environment, and ability to motivate define some of the qualifications for this position. Candidate must have a college degree or equivalent work experience.

Salary commensurate with ability and experience. This is an administrative position reporting to the Director. Please send resume, including salary requirement, by March 15, 1978, in confidence to:

Director
University of
Wisconsin-Milwaukee
Computing Services Division
P.O. Box 413
Milwaukee, Wisconsin 53201
An Equal Opportunity/
Affirmative Action Employer

SYSTEMS ANALYST

Blue Cross of Western Pennsylvania

is seeking candidates for an opening in its Systems Department. This position offers both an attractive starting salary and an excellent employee benefits package.

Applicants should have a minimum of 3 years' systems experience with a medium to large scale IBM 370 OS COBOL configuration.

Send resume, detailing educational background, work history, and present salary to:



William C. Cunningham
Personnel Services
Blue Cross
of Western Pennsylvania
One Smithfield St.
Pittsburgh, PA 15222

An Equal Opportunity Employer

PROGRAMMERS

We are the largest, publicly owned greeting card firm in the United States with sales exceeding \$300 million per year. We have two immediate openings for our corporate headquarters in Cleveland, Ohio.

Scientific Programmer in our corporate research department, requires proficiency in Fortran and a working knowledge of APL. Duties involve programming to support market research experiments, writing specifications for sophisticated information retrieval systems, and coordinating the efforts of contract applications programmers.

Applications Programmer in our applications programming department which is responsible for a variety of business applications such as order processing, payroll, on-line accounts receivable, and production scheduling. Machine environment is 370/145 and 370/158 operating under OS/VS. Applicants should have ANS Cobol with OS JCL.

If you would like to be considered for either of the above positions, please forward resume including salary requirements to:

AMERICAN GREETINGS CORPORATION
10500 American Road
Cleveland, Ohio 44144
Attn: Employment Manager
An Equal Opportunity Employer M/F

Director of Data Services for Kent County. Responsible for overall implementation and maintenance of the Data Processing system. Develop intermediate and long range plans/supervise personnel/recommend acquisitions of hardware and software; work with users in providing training, developing procedures compatible with O.P. and statutory requirements, and developing plans for new O.P. uses. Desire Bachelor's in Business or Public Administration or Accounting; management level experience preferably in government; knowledge of state and county financial procedures and statutes; and experience in selection of hardware and software. Submit application with salary requirements by March 15 to Kent County Personnel, 300 Monroe N.W., Grand Rapids, MI 49503. An Equal Opportunity/Affirmative Action Employer.

PROGRAMMER ANALYST

Growing commercial bank is seeking an experienced programmer/analyst offering exposure to one of the most sophisticated banking on-line data base/data communications systems in the Northeast. Successful candidate will participate in the development of an IBM 3600 Financial Control System and an IBM 3790 Distributive Processing System. The successful candidate must have current experience in an on-line environment using ANS COBOL and Data Base Management systems. However, other candidates with equivalent experience and/or credentials are encouraged to apply.

We offer an attractive starting salary and fully paid benefits for this challenging position. For confidential consideration, please contact the Personnel Department at (617) 681-8096 or respond by resume to Bay State National Bank, P.O. Box 249, Lawrence, MA 01842.

Bay State National
BANK
An equal opportunity employer

PROGRAMMERS

PHILADELPHIA INVITES YOU

To take advantage of our outstanding historical, cultural & recreational activities. To grow personally & professionally.

If you are a PROGRAMMER or PROGRAMMER/ANALYST w/1-10 yrs EOP exp. current in the state of the art; proficient in COBOL, ASSEMBLER, RPG, II, EASY-COOLER, WE CAN HELP YOU FIND EXTRAORDINARY OPPORTUNITIES.

Make the move now! Please call or forward resume to:

ROBERT HALF PERSONNEL AGENCIES
2 Penn Center, Suite 706
Phila, PA 19102
(215) 568-4580

COMPUTER SCIENCE

An academic staff position will be available beginning August, 1978 at the University of Wisconsin-Platteville. Undergraduate courses with emphasis on teaching excellence. Computer science background with interest and/or experience in business and industrial applications. Salary upward from \$14K depending on degree and experience. Send resume and list of references to: Dr. Leonard Myers, Computer Science Department, UW-Platteville, Platteville, WI, 53818. An Equal Opportunity/Affirmative Action Employer.

MINICOMPUTER MANAGER

A leading computer consulting and software firm in N.Y.C. A strong PDP11 background in consulting with proven management skills to assist clients in problem definitions and solutions. \$35,000 FEE PAID

ROBERT HALF PERSONNEL AGENCIES
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

EDP PROFESSIONALS

M.I.S. International, an internationally known computer systems integration and management consulting organization, requires specialized professionals for top assignments in southeastern Michigan, Indiana and Ohio areas. MIS is developing advanced systems in:

- Financial Systems, Process Control, Communications, IMS, IDS, & OMS.

Knowledge of the following computers is desirable:

- MICROCOMPUTERS: Motorola 6800
- MINICOMPUTERS: PDP-11, SPC-16
- LARGE COMPUTERS: B6700/4700, IBM 370, H6000, U1100

Top salaries, fully paid fringes include life, health and dental insurances, moving allowance and educational benefits. To arrange an interview, call or send your resume, to Mr. Gene Bryant.

M.I.S. INTERNATIONAL, INC.

31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010

UNIVERSITY OF VERMONT ANALYST/PROGRAMMER

The Office of Management Information and Computing is seeking an Analyst/Programmer with two to four years of college and coursework in math or business related field. Applicants must have three to six years experience in systems analysis and programming, two of which must be in systems analysis; COBOL and IBM/DOS required. Applicants with experience in higher education applications, on-line systems or DBMS preferred. We offer an excellent benefits package. Salary is in mid-teens. Send resume and three professional references by March 13, 1978 to University of Vermont, Personnel Office, Box 570, Waterman Building, Burlington, Vermont 05401. An Affirmative Action Employer

Computer Maintenance Specialist having at least two (2) years of actual maintenance experience with Electronic Associates, Incorporated machines including specifically the EAI Model 8945 Hybrid Computer, the EAI SPACER and the EAI SPACER 2000. This is a professional position on the staff of Michigan Technological University which is an equal opportunity educational institution and an equal opportunity employer. Please address Employee Relations, Michigan Technological University, Houghton, Michigan 49931.

Positions Available Nationwide

Call Toll Free
800-426-0342
Assured Confidentiality
and Employer Retained

SYS PROGS 23-32K
IBM or CDC software support.
Several openings available.
DATA BASE OS/VS 23-28K
IBM exp., Midwest location.
SOFT DESIGN & DEVELOPMENT 17-25K
Micro processors & mainframes. 1-3 years experience on any processor.
PROJ LDERS 25-30K
Manufacturing background in an IMS environment.
APPLIC PROGS 14-22K
Several openings throughout USA.

PARKER PAGE ASSOC.
P.O. Box 12308
Seattle, WA 98111
Offices in Wash. D.C., Chicago, Atlanta, Portland, Or.

PROGRAMMERS/ANALYST

The Dayton area's largest and most progressive financial institution has openings for experienced Programmers and Systems Analysts.

Two years NCR NEAT/3 or NCR COBOL experience desired. Experience with CIF, CIRF and/or commercial bank applications preferred.

We offer an excellent starting salary plus an outstanding fringe benefit program. Send resume to:

Personnel Officer

Winters
National Bank & Trust Co.
Winters Bank Tower
Dayton, Ohio 45401

An Affirmative Action Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

MANAGER PRODUCT PLANNING

MOS...The Most Intelligent Choice For A Dynamic Career

The success of MOS is well known worldwide. From our modest beginning, we have grown to a \$160 million, multi-national corporation in 14 short years.

And the bulk of the credit for our achievements must go to our people. Highly intelligent, highly motivated, dynamic professionals who have not only helped make us what we are today, but in the process have also carved out exciting and rewarding careers for themselves.

Due to current expansion, we have an immediate career opportunity in our product planning organization at our Los Gatos, California facility.

If you have experience in product or market planning for data entry equipment, intelligent terminals, data communications systems, or small distributed processors, you may qualify for a key position on our product planning team. Candidates should have previous experience in assessing trends and user requirements in the data entry, intelligent terminal and data communications segments of the data processing industry. You should also be skilled in converting requirements to functional specifications assessing hardware & software implementation of those specifications, and releasing completed products to a worldwide marketing organization. Creativity, attention and ability to interface with the technical community, the marketing organization, and end users are musts for product planning.

In addition to excellent compensation and fringe benefit programs, we offer the opportunity to grow with us as we continue to introduce significant new systems. For immediate, confidential consideration, please send resume including present compensation to:

MR. D.P. McCONNELL
Director, Corporate Personnel

Mohawk Data Sciences

985 University Ave., Los Gatos, CA 95030

An Equal Opportunity Employer M/F



DATA PROCESSING PROFESSIONALS be with the best, be with BECHTEL

We're one of the international world leaders in the field of engineering and construction management. If you're looking for an innovative and active professional career in data processing, we offer outstanding opportunities. If you have a minimum of two years experience in the following areas we'd like to talk to you:

- SENIOR SYSTEMS ANALYSTS
- BUSINESS PROGRAMMER/ANALYSTS
- ENGINEERING PROGRAMMER/ANALYSTS
- SENIOR SYSTEMS PROGRAMMERS

Write or call in confidence:
Mr. K. David Bates (415)
768-5942 collect. Bechtel
Corporation, Employment
Dept. 8-6C-8, P.O. Box 3965,
San Francisco, CA 94119.



An Equal Opportunity Employer M/F

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM II, Assembler and COBOL. Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:



W.M. Jones
Harper-Grace
Hospitals
Human Resources Department
3990 John R.
Detroit, MI 48201
(313) 494-8082
An Equal Opportunity Employer M/F

EDP Professional

We are seeking an EDP professional looking to advance your career opportunities. This position on our expanding EDP audit staff will offer the following challenges:

- Preinstallation system reviews
- Postinstallation system reviews
- Design and implementation of computer assisted audit techniques
- Support internal audit staff

You should have a college degree and a minimum of 3-4 years' systems/programming experience in a sophisticated computer environment. You will be trained in EDP auditing techniques, and good written and oral communications skills are essential. Familiarity with accounting and insurance concepts is desirable.

Salary range is mid to upper teens. We offer a comprehensive employee benefits package. Please send resume and salary history in strict confidence to: Director of Personnel.



Mutual Benefit Life

520 Broad St., Newark, N.J. 07101
Equal Opportunity Employer M/F

Evans Products Company

DATA COMMUNICATIONS ANALYST

Pacific Northwest based Company has an opening in its MIS Department for an experienced Data Communications Technician. The applicant selected will participate in the evaluation, selection and monitoring of a Nationwide telecommunications Network. Previous experience with RJE and On-line telecommunications desirable. This experience to include a working knowledge of Host Processors, Communications Processors, Modems, Multiplexers, Data Terminal Equipment and Common Carrier Offerings. If qualified, please send resume and salary history in confidence to:

Chris Utter
Corporate Personnel Mgr.
Evans Products Company
P.O. Box 3295
Portland, OR 97208

Evans Believes in
Equal Opportunity

data processing

Assistant Director Of Computer Services Denver, Colorado

Direct the activities of a group of systems analysts and programmers in the design and implementation of data processing systems in support of the administrative offices of the university. Must be able to work effectively with administrators at all levels of the institution in identifying the requirements for computing services. Bachelors degree plus 7 years experience in automatic data processing including at least 4 years of experience in the design and implementation of data processing systems. Should be familiar with modern techniques of data base management, on-line transaction systems, and structure design and programming. Mail resume to: University of Denver, University Park, Dr. O.W. Rechard, Director of Computing Services, Denver, CO 80208

Equal Opportunity Employer M/F

DATA PROCESSING MANAGER

Irvine based food supplement manufacturer seeks an individual who will be responsible for the operation of the DP Department. Position reports to the Vice President of Finance. Specific responsibilities to include system development, programming, machine operation of an IBM System 3/Model 15 environment and training of supporting staff.

Successful candidate will have experience with IBM System 3/Model 15, RPG-11, and CCP. Experience with computerized manufacturing control systems including forecasting will be helpful.

Please send resume and salary history to Vice President-Finance, P.O. Box 16307, Irvine, CA 92713.



Top Salaries In the Sun Belt for D.P. Pros

Current employment not jeopardized & confidentiality guaranteed. All fees paid by our client companies

BANK DP PLANS MGR	.....	TO \$28K
SYSTEM PROGRAMMERS	.....	TO \$24K
BANK PROJECT LEADERS	.....	TO \$24K
DATA BASE ANALYSTS	.....	TO \$23K
BANK SYSTEMS ANALYSTS	.....	TO \$23K
SR. P/A. NCR NEAT 3	.....	TO \$23K
P/A. PDP. 11 RSX-11	.....	TO \$22K
S/A. HW. 6000 FOR TRAM	.....	TO \$22K
BANK PROG ANALYSTS	.....	TO \$21K
IMS PROG ANALYSTS	.....	TO \$21K
LIFE INS. P/A'S	.....	TO \$21K
MANUFACTURING P/A'S	.....	TO \$18K
MARK IV P/A'S	.....	TO \$18K
APPLICATION P/A'S	.....	TO \$16K

AVAILABILITY, INC.
Dept. C/5401 W. Kennedy Blvd./Suite 285
Tampa, FL 33609/1813172-2631

Systems Software Technician/Analyst

Join a team of Data Processing professionals in directing the technical future of a major Virginia multi-bank holding company. Dominion Bankshares Corporation, located in the scenic Roanoke Valley surrounded by the Blue Ridge Mountains, is currently a twin 370/158, DSVS1, CICS, VM/CMS installation. Our statewide on-line environment consists of 3270's, remote System 3's, and Docutel ATM's. A position exists in the technical group with responsibilities that include support of the current configuration, computer performance evaluation, support for application areas, and evaluation of MVS, TSO, and VTAM/NCP.

The desired candidate must have high technical motivation and standards, at least 3 years of detailed experience in MVS or VSI operating systems supporting a similar TP environment, and the ability to relate and interact with other departments in DP.

To take advantage of this opportunity with an excellent company, send resume, including present and desired salary, to Mrs. H. Lewis, Personnel Representative, Dominion Bankshares Corporation, P.O. Box 13327, Roanoke, Virginia 24040, or call (703) 362-7681.

Dominion Bankshares Corporation

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYSTS

Live and play in the mountains, woods and streams of northern Idaho.

Work with medium size Burroughs hardware on challenging projects.

Openings exist for various levels of experience and salary. We will provide training and opportunity for growth.

Write in confidence to:

COMPUTER SERVICES MANAGER

THE BUNKER HILL COMPANY

P.O. Box 29
Kellogg, Idaho 83837
An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

PROJECT DIRECTOR BANK SYSTEMS- ARIZONA

General banking and data processing background required. Direct experience in central operations and branch operations required as well as direct knowledge of COBOL programming and data base concepts. Systems involve on-line terminals, ATM's, savings systems, installment and commercial loans. Prefer 3 to 5 years experience, salary commensurate with background. For immediate response send personal resume complete with salary history to The Arizona Bank, Human Resources Department, P.O. Box 29961, Phoenix, AZ 85038. *Equal Opportunity Employer M/F*

PROGRAMMER OR PROGRAMMER/ANALYST

Due to a reorganization within our Data Processing department, we have an immediate opening for an individual who has a minimum of 2 to 3 years BAL experience in a DOS environment, preferably with a Financial institution. The person we select will be given an opportunity to work in all facets of our On-Line systems.

COBOL and REAL time experience helpful, but not essential.

If you want to work in a challenging environment and are looking for a professional growth position, then you should consider us.

Excellent starting salary with many company paid benefits.

Please send your resume, in complete confidence, including experience and salary requirements to:

CW Box 1459
797 Washington St.
Newton, MA 02160

SYCOR

Sycor, Inc., a leader in the manufacture of distributed data processing systems, is currently seeking qualified individuals for:

EDITOR/TRADE SHOW ADMINISTRATOR

Position requires a Bachelor's degree in journalism, advertising, or other communication arts curriculum.

The ideal candidate will have a minimum of 5 to 10 years experience in a marketing communications environment with emphasis on press releases and publications. Trade show experience helpful. Employment with computer manufacturer or other related EDP organization a plus.

Will work closely with marketing staff, field personnel, and all levels of company management. Some travel involved. An excellent position for an aggressive, self-motivated person.

We offer a competitive salary, full benefit package and excellent opportunity for advancement.

Send resume and salary history, in confidence, to:

Linda E. Swehla
Salaried Employment Specialist



SYCOR, INC.

Sycor, Inc.
100 Phoenix Drive
Ann Arbor, Michigan 48104

An Equal Opportunity Employer M/F

"Sycor Puts Computer Power
Where the Work Is"

SYCOR

R S T S in COLORADO

Expanding company has two positions available for individuals experienced in the following fields.

TIMESHARING SALES

- Represent packaged applications software
- Offer generic computer resource
- Develop new market areas
- Salary plus commission

PROGRAMMER/ ANALYST

- BASIC PLUS under RSTS/E
- MBA degree or accounting background
- Good personal communications skills
- Salary range \$14K-\$19K

EDI Computer Services
13693 East Iliff Ave.
Denver, CO 80014
(303) 758-4619

computer hardware



and software candidates RELAX

SUPERIOR RESOURCES
16400 Ventura Blvd.
Encino (L.A.) CA 91436
(213) 986-4400

ANDERSON-TAYLOR
P.O. Box 21
Exton, PA 19341
Philadelphia Area
(215) 393-1900

DEALY-ROURKE
PERSONNEL SERVICE
1909 West End Blvd.
Suite 121
Nashville, TN 37203
(615) 329-1771

COMPUTER CAREERS INC.
Specialists-Data Processing
4720 Montgomery Lane
303
Bethesda, MD 20814
(301) 654-9225

members of
National
Personnel
Associates
Specializing in DP

DATA BASE ARCHITECT

Progressive company seeking individual with minimum of 4 years experience in data processing with emphasis in data base design. Will be responsible for designing data base architecture in converting applications from non-data base to a data base system.

Your capabilities dictate salary. Outstanding benefits package provided.

Please submit detailed resume and salary requirements to: CW Box 1475, 797 Washington St., Newton, MA 02160.

DATA PROCESSING PROFESSIONALS

Are you considering a career change for 1978? If so, we have immediate openings with the most progressive clients in North Carolina, nationwide and international. Immediate needs include:

Syst Designer	to \$30K
Syst Developers	to \$25K
Syst Analyst	to \$23K
Sr. Prog Anal	to \$21K
Prog Analyst	to \$18K

If interested send resume or call Continental Personnel, Inc., P.O. Box 11321, Charlotte, N.C. 28209. (704) 525-2160

Honeywell Is Looking For Technical Writers

Operating Systems Documentation

We need an incisive writer who can work directly with engineering, systems and marketing personnel to produce clear, helpful user documentation. You must have a college degree and 2-3 years related experience. In addition, you should have a solid working knowledge of small/medium operating systems and at least one higher level programming language - preferably COBOL. Above all, your lucid writing style must generate documentation that is a positive aid to our users.

Terminal Documentation

This top technical writer has a college degree and 2-3 years experience in preparing high technology documentation on terminals for systems analysts and applications programmers. You will communicate with software development personnel at their level of expertise and translate their information into concise, usable documentation. You must have a thorough background in minicomputer operating systems and a sound functional knowledge of communications, networking and distributed systems.

If the challenge of these positions appeals to you, and if you're interested in working in a dynamic, progressive environment, then we're interested in you. Please forward your resume and salary requirements, in confidence, to: Ms. Judy B. Heaton, HONEYWELL - MSISD, MS 425, 200 Smith St., Waltham, Mass. 02154.



Honeywell

An Equal Opportunity Employer M/F

EDP Auditor

We seek an individual with broad based systems experience to perform EDP Auditing on our corporate Internal Audit staff.

Ideally, our candidate will be degreed with 3-5 years of Data Processing Consulting or related Systems experience. A Masters degree is a plus. Excellent communication skills are necessary.

Headquartered in Chicago, we are an NYSE Fortune 500 company and the nation's largest commercial printer. If you are qualified, please forward your resume, including your current salary, in complete confidence to:



Pat Klinge
Recruiting Coordinator
R.R. DONNELLEY
& SONS CO.

2223 S. King Drive
Chicago, Illinois 60616

An Equal Opportunity Employer M/F

DIRECTOR OF MARKETING

• COMPANY:

A revitalized growing division of a major corporation engaged in the design, manufacture, marketing and servicing of mini-computer systems for small business applications. Location - New Jersey/New York metropolitan area suburbs.

• POSITION:

Total small business mini-computer line responsibility including product line management, national and international sales, technical support, advertising, business planning and marketing administration. Current marketing staff: 71 professionals.

• QUALIFICATIONS:

Must have a demonstrable record of accomplishments in the minicomputer/small business applications marketplace.

• COMPENSATION:

An attractive package commensurate with experience to include salary, incentives and benefits. For the right individual - the potential for a uniquely rewarding position.

• APPLICATION:

Please send a detailed resume in confidence to our Marketing Personnel Director, and please advise us of your current and desired earnings.

CW Box 1470
797 Washington St.
Newton, MA. 02160

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

FORTTRAN-APL SUPPORT ANALYST

For Corporate Headquarters

National CSS, a leader in timesharing and remote computer services seeks talented individual with three to four years of experience writing systems, trouble shooting, and a working knowledge of either 370/OS, VP/CSS or virtual memory systems. Familiarity with Graphics packages and associated devices a definite plus.

With a professional background and these qualifications, you're probably right for this job, but what do you want? A visible spot with exceptional growth potential? A chance to work with state-of-the-art personnel and systems? The opportunity to be THE Corporate Support expert for our language products, with heavy sales contact throughout the U.S. and Europe?

This position is based in our Corporate Headquarters in Fairfield County, Connecticut. The successful candidate should be able to communicate effectively with corporate and field sales personnel and assist them in all aspects of customer support. You must be creative, personable and results oriented.

Please send resume, including salary history and requirements to:

Mr. T. Russell Gloersen
Manager Product Support Services

National CSS, Inc.

542 Westport Avenue
Norwalk, CT 06851
An equal opportunity employer

SYSTEMS PROGRAMMER

A rewarding and stimulating career opportunity offering the professional and personal recognition you seek is available now at the new Earth Resources Observation Systems (EROS) Data Center. This facility is the national center for the processing and dissemination of spacecraft acquired imagery and electronic data of the Earth's resources.

Experience in systems software support of B-6700 computer preferred. Major efforts include support of:

- B-6700 multi processor systems
- Data communications network
- Large on-line data base
- Mini computer image processing system
- Array processing hardware

Excellent income, comprehensive benefits, relocation assistance, and the advantages of our midwestern lifestyle await you. Join Technicolor Graphic Services, Inc., a wholly-owned subsidiary of

Technicolor, Inc., Hollywood, California, for an exciting career opportunity at the EROS Data Center. FOR PROMPT AND CONFIDENTIAL CONSIDERATION, OR ADDITIONAL INFORMATION, SEND RESUME TO:

Mr. J.C. Pfliger
**TECHNICOLOR GRAPHICS
SERVICES, INC.**
P.O. Box 1242

Sioux Falls, South Dakota 57101
An Equal Opportunity Employer M/F

CAREER OPPORTUNITY

Teledyne CAE, a leader in gas turbine engine development, has an extraordinary career opportunity for an individual in the following area:

PROGRAMMER/ANALYST REAL TIME DATA ACQUISITION

Opening for Programmer to work with automated gas turbine engine test systems. Experience with interdata OS32-MT would be a plus. A degree

of equivalent experience is desirable. Salary up to \$20,000 commensurate with experience.

Become a team member developing the most advanced gas turbine engines. We offer an excellent fringe benefit program in addition to compensation. Send detailed resume in confidence to: Mr. Fred O. Reynolds, Jr., Manager, Industrial Relations, Teledyne CAE, 1330 Laskey Rd., Toledo, Ohio 43612.

TELEDYNE CAE

Data Communications Professionals

OMICRON, a SAN FRANCISCO-based professional search firm specializing in the recruitment of systems software people, would like to talk to you about some challenging career opportunities.

Meet with us at INTERFACE '78

If you're in Las Vegas March 5-9, please call Robert Leis, OMICRON President, at the SANDS HOTEL

753-9111

OMICRON INC.

Exclusively Employer
Retained Agency

YOU'RE UNIQUE AND YOU KNOW IT AND PHILADELPHIA NEEDS YOU

There aren't many of you around. So, our client, a prominent PHILADELPHIA area firm, has asked us to identify a creative, technically sophisticated EDP pro for the following positions:

ON LINE TECH
2+ yrs TDS sys generation & programming
DATA BASE TECH
Design & program IDS DATA BASE SYS. Knldg TDS & MDQS a +.

Depending upon your experience, salary to \$30,000.

For confidential attention, please call or forward a resume to:

**ROBERT HALF
PERSONNEL AGENCIES**

2 Penn Center, Suite 706
Phila, PA 19102
(215) 560-4580

Tired of the Snow?

Try San Francisco!

Programmer/Analyst
S.F. Unified School District currently has openings in computer systems area.

Programmer/Analyst: \$15.5K
Three positions, min. qual. college degree and 1 yr. exp. as analyst or prog./analyst. Sr. Analyst: \$18K, min. qual. college degree and 2 yrs. exp. as computer systems analyst. PL/I, T.P. and TOTAL DB helpful. Candidates should arrange for an interview by calling Laura Tombolini at:

(415) 565-9247 or
Send resume to:
S.F.U.S.D.
EDP-Room 213A
135 Van Ness Ave.
San Francisco, CA 94102
Equal Opportunity Employer M/F

AN EDUCATIONAL OPPORTUNITY OR TWO

We are a Progressive Community College with expansionary needs in our Data Processing Department for a Systems Analyst and Programmer. Both positions offer unique challenges in the field of Data Processing as it applies to educational organizations.

Our equipment consists of a new Burroughs 6800 with teleprocessing applications.

The Programmer we seek should be familiar with DMS II and CANDE. The Systems Analyst will, preferably, be experienced in an educational environment.

Apply in confidence to:
Daytona Beach
Community College
Collins Hall
P.O. Box 1111
Daytona Beach, FL 32015
Equal Opportunity Employer M/F

Systems Analysts SAN FRANCISCO

Our client has engaged us to recruit a few top-notch systems analysts who are capable of assuming greater responsibility.

Successful candidates will have experience with large IBM/370 systems and will have worked on at least one major application from beginning through implementation. The positions require excellent communications and people skills and offer a splendid career opportunity for the right persons.

Commercial applications experience is a requirement and some knowledge of banking a real plus. Excellent compensation and benefits program. Relocation assistance is provided.

For consideration, please send resume and salary history in confidence to: Management Consultant, CW Box 1472, 797 Washington St., Newton, MA. 02450.

Communications Software Professionals

TRW Information Services is a Southern California based firm with one of the largest and most advanced electronics communications network in the U.S. Due to our continued growth, we presently are seeking top professionals to join our staff.

Senior Communications Software Programmer

Responsible for the development and maintenance of a computerized network modeling simulation system. This will also include evaluating network changes and operation, systems generation, user consulting support and software development for POP II series computers.

Staff Specialists

Responsible for teleprocessing software development and maintenance of minicomputers, including hardware/software evaluation for new products, systems software installation, system generation and user consulting support and general administrative duties related to the development of the computer system.

Both position requirements: 2 or more years experience with POP II series computers, knowledge of RSX 11-M & S operating systems, MACRO II coding, communications software, including synchronous and asynchronous protocols; An added plus would include experience with modeling or simulation program methods.

We are a non-defense company offering both stability and challenge in a growing state-of-the-art environment. Our starting salaries and benefits are exceptional. Please send resume including salary history and requirements to:

**TRW INFORMATION
SERVICES**

505 City Parkway West, P.O. Box 6230
Orange, Calif. 92667 (714) 937-2487

We are an equal opportunity employer M/F/H

Senior or Lead Programmer

Interstate United Corporation, one of America's largest and most respected professional foodservice management companies, has an exceptional opportunity available to a Senior or Lead Programmer.

Our programming staff is expanding in preparation for conversion to an IBM 370 system. As an experienced IBM COBOL Programmer familiar with accounting/financial applications, you'll "take the lead." We will consider applicants with Burroughs or Honeywell experience.

In addition to advancement with an industry leader and potential for entry into Data Communications projects, we offer an excellent starting salary and comprehensive benefits that include profit sharing and tuition reimbursement. Please send resume or letter of introduction in complete confidence to:

Sandre Knipp

**INTERSTATE
UNITED**

120 S. Riverside Plaza
Chicago, IL 60606

Equal Opportunity Employer M/F

position announcements

position announcements

buy sell swap

buy sell swap

buy sell swap

Southeast Missouri State University
COMPUTER SCIENCE
ASSISTANT PROFESSOR/INSTRUCTOR

Full-time, tenure track position in an expanding department. Progressive, teaching-oriented state university. Current enrollment of 8,500 students. Located in one of the most scenic parts of the U.S. Pleasant small city living. Convenient access to metropolitan areas.

Position involves undergraduate instruction and curriculum design. Masters required; Ph.D. desirable. Previous teaching and/or industrial experience helpful. Available Fall 1978. Application deadline: March 24, 1978.

Send resume to: Dr. La Verne Thompson, Chairperson, Computer Science, Southeast Missouri State University, Cape Girardeau, MO 63701 phone: (314) 651-2113.

Southeast Missouri State University is an Affirmative Action/Equal Opportunity Employer.

Smart & Dumb Data Terminals

Are our Business, We continue to grow and need.

SALESMEN/W

in six locations nationally

SR. SOFTWARE

Systems Designers

A Computer Scientists Dream

ENGINEERS

PRODUCT ENGR'S & APPLICATIONS ENGR'S

New Product Development

For Detailed Information

Write or Call Personnel

800-631-7050

data SERVICES

70 McKee Drive

Mahwah, N.J. 07430

Equal Opportunity Employer M/F

DIRECT FROM FACTORY • TESTED • WARRANTED

MODEMS

Used ICC Modems at Significant Savings

Now you can buy or lease dependable ICC modems at a special low cost. We have a stock of modems, largely from customers who upgraded their data communications networks with our latest modems. These modems have been factory tested, are under warranty, and are backed by Racal-Milgo's nationwide service/support organization. Quantities are limited. Prompt action can assure you of these substantial savings.



Conditions of Sale

- 1) Orders must be postmarked prior to March 31, 1978 with delivery scheduled no later than June 1, 1978.
- 2) Offer subject to availability of products.
- 3) All prices are F.O.B., Miami, Florida and do not include installation.
- 4) Based on ICC Terms and Conditions.

March Special

Save 43%
over original price on a 2000 bps modem

Save even more on this Bell 201A compatible modem. Modem 20LSI, originally \$1,585, is available during March only at a special low price of \$895, or \$42/month for a 30-month lease. This is \$155 under our normal Special Offer Division price of \$1,050. Modem 20LSI operates in full and half duplex mode over two-wire or four-wire dial or unconditioned leased lines.

Offer expires March 31, 1978

Typical Savings

Original Price

Special Price

2400 bps



MODEM 2200/24

Half or full duplex operation over dial or dedicated facilities.

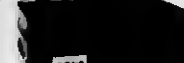
\$1780

\$60/mo.*

\$725

\$29/mo.*

3600 bps



MODEM 3300/36

Dial or dedicated operation with reverse channel. Built-in auto-answer on dial-up.

\$3620

\$85/mo.*

\$950

\$38/mo.*

4800 bps



MODEM 4500/48

Automatic equalization unconditioned dedicated dial lines. Optional dual 2400 bps operation on dedicated lines.

\$4980

\$100/mo.*

\$1795

\$72/mo.*

7200 bps



MODEM 4800/72

Dedicated line with optional multipoint operation for up to three 2400 bps channels.

\$6900

\$165/mo.*

\$1995

\$80/mo.*

9600 bps



MODEM 5500/96

Dedicated line with optional multipoint operation for up to four 2400 bps channels.

\$7990

\$185/mo.*

\$2995

\$120/mo.*

Prices apply to sale or lease in U.S. only * Based on 30 month lease

Racal-Milgo Special Offer Division, 8600 N.W. 41st St., Miami, FL 33166

Reserve now. Phone collect (305) 591-5535 or send this form.

Racal-Milgo

— the new name for ICC

I want more information about your Special Offer Division products.

☐ Yes, I am interested in the March special. Please send order form and data sheet

☐ Purchase ☐ Lease Quantity

☐ I'm interested in the following modems:

Modem No.	Quantity

☐ Purchase ☐ Lease

Name _____
 Company _____
 Street _____
 City _____ State _____ Zip _____
 Phone No. _____

☐ Please place me on your mailing list for future specials. A

DATA PROCESSING PROFESSIONALS
 Excellent Oppty's in Portland, Oregon

Current Openings:

PROG/ANAL \$18-20K

DEC exp desired, bus applications.

SYS/ANAL \$18-30K

3-5 yrs exp, Big 8 exp desired, heavy user interface in communications environment.

PROG/ANAL \$18-25K

3-5 yrs exp, mfg applic. MRP, DBOMP in 360-370 environ.

SYS PROG \$17.5-25K

2-5 yrs exp, communications expertise req'd in CICS, IMS.

PROG ANAL \$14.4-16.6K

to start

2-5 yrs exp Cobol ANS in bus environment.

EDP is our exclusive field. We can corner the market for you. All fees paid by the employer. Relocation allowances available. Several clients currently scheduling interview trips to South, Midwest and So. Calif. For further info call Don Harris, Manager, 724-4477 or send resume to: Computer Search, 811 SW6th Portland, OR 97204

FLORIDA

370/DOS/VS 16K

CICS Mfg 16K

360/DOS/VS 16K

CICS INS 18K

370/DOS VS IMS 18K

Cobol 15K

Burr 1700 Up Bkg 15K

Sys/3 CCP Mfg MRP 15K

Mini Bsc Fnd Sys 15K

NCR CIF Bkg 15K

360 or 370 CICS BAL 15K

OEC/NOVA Real Time 17K

All fees and relocation pd NO STATE INCOME TAX Mail resume to Stan Allen.

ROBERT HALF

PERSONNEL AGENCIES

1311 North Westshore Blvd.

Suite 309

P.O. Box 22651

Tampa, FL 33622

FOR SALE

IBM 370/138 (1 Meg)

3330/3340 IFA

FOR LEASE OR SALE

IBM 370/135 (512K)

with 3046 Loaded

Features Include:

4 ICA Lines, 1 ICA OATA SYNC, IFA, IFA, 3210/1 AOPATER, EP FLOATING POINT, 1st SELECTOR CHANNEL AND 1st 12K CONTROL STORAGE INCREMENT.

Available Immediately

Contact:

Mr. MacLeod (212) 825-7801

Mr. Lee (212) 825-5813

FOR SALE

IBM Sys/32
13.7 MB Disk,
285 line/min.
printer

Contact: 653-2989

Dallas, Texas

DATA PROCESSING MANAGER

The City of Englewood is seeking an individual with three years experience on IBM System III Mod 10 disc using RPG II. Municipal application knowledge and experience preferred. Salary range 18-22K commensurate with experience. Super benefits. Send resume and salary history to Fran Farber, City of Englewood, Box 228, Englewood, N.J. 07631. Equal Opportunity Employer M/F.

Computer Science University of Wisconsin-La Crosse

One or more teaching positions possible for 1978-79 academic year. Applicants should have preference for undergraduate teaching and strong background in computing. Successful applicant will be expected to provide leadership for department in his/her area of specialization. Must be willing to participate fully in program and teach a variety of undergraduate courses. Ph.D. required for tenure track appl.; M.S. considered for non-tenure track. Salary open.

Apply by March 15 to: Lounny B. Winick, Chairperson, Computer Science Dept., University of Wisconsin-La Crosse, La Crosse, WI 54601 (608) 785-8284.

UW-La Crosse is an Affirmative Action/Equal Opportunity Employer.

MINICOMPUTER EQUIPMENT
 Buy-Sell-Trade
DEC * DG

SAVE 10% to 50%

Computer Interface

Technology, Inc.

Santa Ana, CA

(714) 979-9920

San Jose, CA

(408) 225-3844

NEW DG NOVA 3/12's

WITH BATTERY BACKUP AND AUTO PROGRAM LOAD AND RESTART
 NEW DG MEMORY
 32 OR 18 KB

IMMEDIATE DELIVERY WITH 22% DISCOUNT

CALL CLARK & ASSOC.
 (816) 741-3183

FOR SALE

Basic Four Model 400 System
 Operator System Level 8J
 16K 8.4M Disk Capacity
 2 Model 7220 Video Display Terminals
 1 Serial Printer
 Contact R.A. Pace
 A.H. Robins Co.
 1407 Cummings Drive
 Richmond, Va 23220
 (804) 257-2180

370/158

Serial Number 23566
 Available May, 1978

Contact: Ann Rhame
 Commonwealth Computer
 Advisers, Inc.

707 East Main St. Suite 1650
 Richmond, Virginia 23219

(804) 643-9123

AVAILABLE FOR SALE OR LEASE

IBM 3705-1 Model A1 with following features:
 1642-4650-8002
 4701-4714-1302
 1541

WESTERN MARKETING AND FINANCIAL
 (415) 526-9221
 (312) 397-3311

Fred Hegeman Jack Air

FOR SALE DEC

16 channel - modem control
 DH II AD Multiplexer
 DH II AA Multiplexer
 DZII Multiplier
 PDP 8M - 4K and 8K
 9 Centronics 508 printers

Call Don Grempler

(301) 296-0094

FOR SALE

Used Sperry Univac
 8440 Disk Controllers
 And Drives
 4 5033-99 Disk Controllers
 8 8440-02 Disk Storage Units
 8 Dual Access Features
 All Equipment Is
 Guaranteed Maintainable
 By Sperry Univac
 Marketing Dept.
 (213) 787-7300
 INTERSCIENCE SYSTEMS, INC.
 7814 Burnett Ave.
 Van Nuys, CA 91405

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE

Univac 9400 System
131 K Memory
3-8425 Disk Drive
717 Card Reader 600 CPM
Communications Sub System

Contact:

T.M. Semienchuk
General Manager MIS
Redpath Sugars Ltd.
P.O. Box 490
Montréal, Québec H3C 2T5
(514) 935-6341

370-165-II

For Lease Or Sale

By Owner

Four Megabytes
Memory Speedup

CW Box 1477
797 Washington St.
Newton, MA 02160

FOR SALE

PDP 11/34

(2) RK05J'S

RSTS/E

96K bytes

IMMEDIATE DELIVERY

\$24,500

CALL M.E. CONGDON

EDUCOMP QUODATA

(203) 728-6777

Why Comdisco is First in the Second Market:

IBM Processors available

135/145

145s needed
135s available
for lease

155

Immediate
delivery with
DAT

158

want to
buy or
lease

165

Available
for sale
or lease

IBM Peripherals available

3420

We will purchase
your 1600 BPI
drives and replace
with Models 4 or 6
immediately.

3330/33

All models
available for
delivery now.

3340/44

Wanted to
buy

SPECIAL

3420 models 4 & 6
available now.
3830-2 Control
Units-Now

IBM 3031, 3032, 3033 operating leases available.

Atlanta 404/256-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107



New York 201/568-9666
San Francisco 415/944-1111
Paris, France 374-1130

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

Your First Choice in the Second Market

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115 370/125



MEMBER COMPUTER DEALERS ASSOCIATION

ECONOCOM

1255 LYNNFIELD ROAD
P.O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

We are buying, selling, & leasing!

Buying: 3830, 3420
Selling: 360/65, 360/40
Leasing: 370/155, 360/65

Please contact:

Linda Vaughn / (415) 955-0220
Tommy Talbot / (415) 955-0238



MAGNETIC TAPE SALE

Slightly used, Money-Back Guarantee
U.S. Government Archives
Manufactured to G.S.A. Specs!

2400' 1600'bpi/3200fci
w/Hanging Seal \$4.50 ea.

Freight prepaid on orders over 200
Tapes. Shipped within 48 Hrs.

CALL or WRITE:

Computer Tape Mart

31 Sprague Ave., Amityville, NY 11701

(516) 691-2309

(Brokers Inquiries Welcomed)

FOR SALE BY OWNER

PDP 11/70 DA

AVAILABLE

IMMEDIATELY

PDP 11/70 64K

1 FP 11-C Floating Point
1 RMP04-AA Disk Drive
1 TNU1G-EA Tape Drive & Control
1 LP11-VA Printer & Control
6 DL11-E Modems
2 LA36 DEC Terminals
1 ART11-KT Analog Sub-system

(All Under Continuous DEC Maintenance)

PRINCIPALS ONLY

For Full Particulars

Respond to

CW Box 1445

797 Washington St.

Newton, Mass. 02160

FOR SALE

PDP11

IMMEDIATE DELIVERY
Datasystem 354

Includes:

PDP11/34, 64K, 2-RK05
Disk Drives, 1-VT52
terminal, 1-LA36 terminal,
1-LA180 Printer

Including full accounting
applications software.

Also immediately available:

- PR11 High Speed paper tape reader
- PDP11/03-KA with 16K end power supply

Spiridellis & Assoc., Inc.
14 W. 40th St.
New York, N.Y. 10018
(212) 221-7270

FOR SALE

OR LEASE

IBM 2314-A1 1x4

Available

April 24, 1978

Call Collect or Write

Berlent Industries,
Inc.

1975 Hempstead Turnpike
East Meadow, N.Y. 11554

☎ 516-794-9722

370/125's

For Sale * Lease * Purchase
* Purchase Leaseback

Specialists in 125 Systems
3410's and 3411's Also Available



CORPORATE COMPUTERS, INC.

(203) 661-1500

115 Mason St., Greenwich, CT 06830

Member CDA

WANTED TO BUY

IBM 370/155

with or without DAT

Contact: Harry Blair

(713) 524-8249

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap		
BUY • SELL • LEASE 026 \$ 850 085 \$ 750 029 1850 088 2500 059 1375 129 3350 082 800 514 800 083 1800 548 1500 084 2500 552 900 557 2800 MOHAWK-6401-6403 NCR-736 Want to buy IBM 029 s. 129 s. 3741 s. 3742 s. COMPLETE LINE BURSTERS, SHROOBS, DECOLLATORS AND BINDERS ECONOMIC LEASE PURCHASE PLANS DP SERVICE INC. STAN PELC or NATALIE REYES 312-774-2556 5505 N. MENARD AVENUE, CHICAGO, ILLINOIS 60630	CMI BUY LINES BUY-SELL-LEASE-TRADE 3031/3032/3033 (Lease Only) John Mills (313) 642-8000 3420 3803 3333 3830 3330 3340 Darryl Hastings (313) 642-8000 360 30/40/50/65 Gary Smith (313) 642-8000 370/165 370/168 Bob Van Hellemont (313) 642-8000 IN CANADA IBM 360 370 Don DuPuis Windsor, Ont. (519) 258-8910 Ron Ridding Toronto, Ont. (416) 683-3704 Jacques Dagenais Montreal, Que. (514) 374-5920 CMI Company 3270 CRT's Printers/Controllers 1130 Call Jim Carleton (313) 642-8000 370/158 Ron Baker (313) 642-8000 System/3 Model 15 Jerry Roberts (313) 642-8000 370/155 Gary Smith (313) 642-8000 3742 3741 5496 Jerry Sharon (313) 642-8000 370 148/145/138/135 Pam Hoban (313) 642-8000 1403 2821 2501 1442 1443 If you rent any of these and are returning them to IBM call me. I'll show you how to make money using your rental credits. We buy and sell all of these units. Kathy Housey (313) 642-8000 360/20 083-029-059-026 Call Marie Bednarz (313) 642-8000 370/115/125 Bob Southwell (313) 642-8000 The IBM Specialists CORPORATION 1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000 Member Computer Dealers Association			MINICOMPUTERS & SYSTEMS Don't waste company time or money. Check with us before you buy or sell. New DEC Equipment Immediate Delivery RK11-RK05 Disk Systems - \$8500 PDP 11/04s and 11/34s - 20% off list DZ 11 DEC Station 78 New DG Equipment Immediate Delivery DG 10 Mbyte Disk Systems from \$7500 DASHERS - 15% to 25% off list Nova 3/12 or 3D - 20% off list Immediate delivery for MOSI Inventory Clearance call us for free brochure MINICOMPUTER EXCHANGE (408) 733-4400 TWX 910-339-9272	BUY • SELL TELETYPE MODELS 43 • 33 • 32 NATIONAL TELETYPEWRITER CORP. 207 Newtown Rd. Plainview, N.Y. 11803 (516) 293-0444	CONNECTICUT FINANCIAL COMPUTER INC. For Sale or Lease 25-3277-2 Mar. 15 1-3286-2 Mar. 15 3-3330-11 May 1 2-3333-11 May 1 1-3830-2 May 15 -3350 Feet 2-3420-7 May 15 Leases 1,2,3,4, yr-303X CONTACT: John Redden CFC, Inc. 179 Lyons Plain Weston, CT 06883 (203) 227-5151

WANTED TO BUY

SYSTEM/3 MODEL 15

- Any configuration.
- Rental Credit Machines O.K.
- Highest prices and commission paid.

Call or Write

data3

computer corporation 114 central avenue box 266 buffalo minn. 55313 (612) 682-4884

2314-A1

- 8 or 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

COMDISCO
312-698-3000

BUY SELL LEASE

SYSTEM/3

Models 15, 10, 8, 6.
Systems 32 & 34
All Support Peripherals
COMPUTER BROKERS, INC.
P.O. BOX 28298
Memphis, Tn. 38128
Phone 901/372-2622
Member CDA

SALE

ALL
IBM Unit Record
Equipment
129 & 029's
East Coast
(717) 564-8870
West Coast
(415) 332-6265
Unit Record
Leasing Company
110 Hivista Rd.
Sausalito, CA.

LEASE

370/165-II

- FOR SALE OR LEASE
- AVAILABLE JUNE 1978
- AS SHORT AS 24 MONTH LEASE AVAIL

CALL TED MOLINARI AT:
(201) 947-4200

IPB IPS COMPUTER MARKETING CORP.
2460 LeMoine Avenue
Fort Lee, N.J. 07024

CALL CHANCELOR

FOR A CUSTOM TAILORED LEASE ON YOUR 30XX SYSTEM OR ON YOUR CURRENTLY INSTALLED CPU AND/OR I/O

AVAILABLE	DATE
138 J, ICA, IFA (Sublease)	NOW
2314 A-1 (1x9)	4/15
3340 B2	NOW & June
2501 B1	3/15
System 3 Mod 15, B-20 complete with tape and disc	7/1
WANTED	DATE
3340 A2	4/1
1442 N2	4/1
158 2meg (Mod 1 and 3)	ASAP
158 Memory K to L feature 4655 (135 IFA)	ASAP
	4/1/78

BOB SCOVILLE (617) 482-8726 CHERI HARING
31 Milk St., Boston, Mass. 02109

SELLING

**PREVIOUSLY OWNED
EQUIPMENT & SYSTEMS**

N.C.R. & BURROUGHS

N.C.R. 31, 32 & 151 & 152 Teller Units
735/735 & 745 Mag. Tape Enc. & Line Printers
N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S
Also B-700 Thru B-4700 Systems w/wo Peripherals
WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS
BUYING OR SELLING-CALL US FIRST.

KEY-EXIMPORT CORP.

256 LIVINGSTON ST. IP O BOX 129 NORTHVALE N.J. 07647
TELE. N.J. (201) 767-3444 N.Y.C. (212) 736-7736
TELEX 135148 CABLE KEYEXIMP NORTHVALE NJ

BUYING

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS

Bob Russell
Jack Emery
Dave Hapburn
Paul Baillie

SYSTEMS MARKETING, INC.
200 E. THOMAS ROAD
P.O. BOX 8507
602 254-1600 FAX 602 254-1334



BUY-SELL TRADE

For Computer
Call Action Write

CAC

P.O. Box 80572
404/458-4425 Atlanta, Ga. 30366

FOR SALE

Avail. November 1, 1978

4 meg 370/168 mod 1
ISC with 2 channel switch &
3350 attachment feature
1 2870 byte multiplex w/IDAL
2 2880 block multiplexors mod 2
1 3067 PDU/CDU mod 2
1 3066 console mod 2

CONTACT:

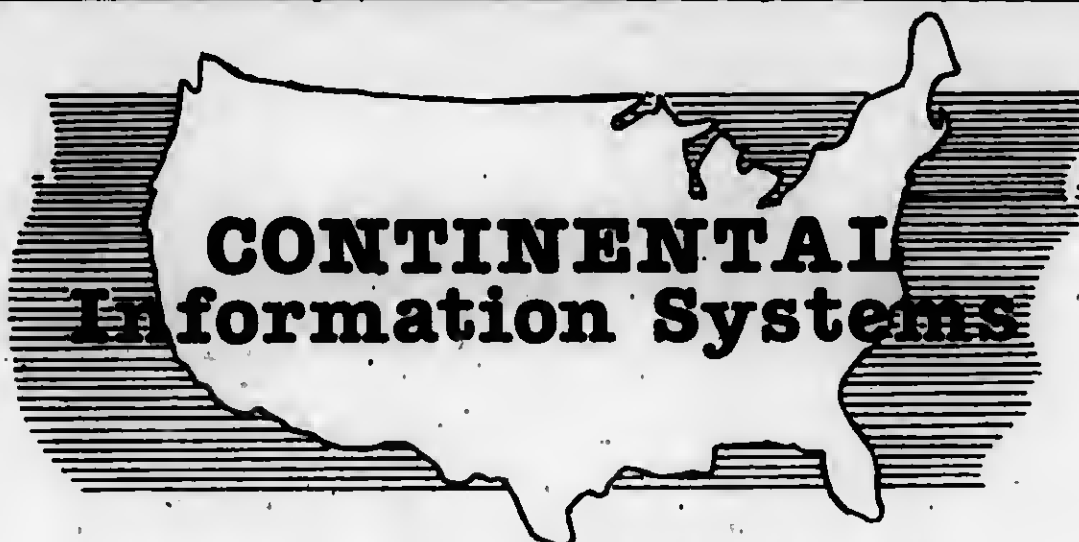
American Republic Insurance
6th & Keo Way
Des Moines, IA 50334
Attn: Chas. T. Kuebrich
(515) 245-2174

For Sale or Lease

370/168

with attached
processor
July, 1978

Call
R. Van Hellemont
(313) 642-8000
CMI Corporation



BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

AVAILABLE

Mar 78 165-II
168 memory, pre-owned
168 1435 buffer expansion
2860-2
2870-1
2880-2

Apr 78 135
145
155-II
158 pre-owned
165-II
158 AP, ITC qualified
168
158-3 upgrade
2880-2
3271's, 72's, & 77's

May 78 135
158, pre-owned
168, pre-owned
3360-5 (4)
2 MB 158 INTEL
2860-2

Jun 78 158, pre-owned
2880-2
158

We will also take your currently installed IBM equipment in trade on a new system.

Peripherals and I/O

All 360/370 Disk, Tape
Printers, Readers, and T/P

Gene Chappell

Wanted:

3330's, 3340's & 3420's

Call Us!



CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900

CIS is very interested in
buying pre-owned
IBM 370 systems.
If you are thinking
about selling, let us
make you an offer.

FOR SALE/LEASE

DEC LSI 11

PDP 11V03 SYSTEMS

LA 36 DECwriters

LA 180 * VT 52

In Stock For
IMMEDIATE DELIVERY



UNITRONIX CORP.
1081 U.S. Hwy 22
P.O. Box 8516
Bridgewater, N.J. 08807
(201) 725-2560

BROKER

IN
DEC COMPUTER
SYSTEMS AND
COMPONENTS

C.D. SMITH
730 N. Post Oak Road
301
Houston, Texas 77024
(713) 686-9405

FOR SALE

370/155 Serial = 10736

3155J Proc. Unit
7855 Adapter
321 51 Keybrd. Pntr
1433 Bl. Mul. Ch. =3
1434 Bl. Mul. Ch. =4
1435 Bl. Mul. Ch. =5

Available May 1, 1978
(No Core or D.A.T
Associated with Sale)

Call or Write
Charles T. Hall

513-632-3201
Cinti. Gas & Elec. Co.
P.O. Box 960
Cinti, OH 45201

FOR SALE OR LEASE

370/

168

AVAILABLE JUNE 78

(MODEL 1, 3 or A)

Bob VanHellemont

CMI CORPORATION — (313) 642-8000

FOR SALE

370/135I (All IBM Core)

AVAILABLE 3-15-78

★★★★

WE NEED

370/138I

DELIVERY 4-15-78

CALL OR WRITE RALPH GRAVES
(214) 630-6700



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

For Sale

NCR Century 100 32K

4-655 Spindles

450 LPM Printer

20-655 Disk packs

2-Disk file

W/Cobol, Fortran, Neat/3

/RPM Compilers

W/CRT Interface

Under NCR Service Agreement

June 30, 1978 delivery

Incl multi-divisional G/L Accounting

ing w/budget comparisons

A/R, A/P, and payroll (multi-state

systems, all interfaced to G/L)

\$25,000

HOUGH BROS., INC.

9875 Grand Ledge Hwy.

Sunfield, MI 48890

Contact: David Hough

1 (517) 566-8041

GRAPHIC RESOURCES CORPORATION

The Graphics Specialists
Plotters-Sale, Purchase, Leasing
Plotter Supplies-Manufacturer
Plotter Re-Conditioning
Services & Parts
Interactive Graphic Systems
Line Printers
All Manufacturer's Equipment
Available

GRAPHIC RESOURCES CORP.

Offices Located In:

Los Angeles, Houston

Denver, Washington, D.C.

CORPORATE OFFICE:

(213) 598-3318 (714) 898-3584

5442 Research Drive

Huntington Beach, Calif. 92649

CALL OR WRITE FOR FREE

BROCHURES & SAMPLE

PLOTTER MATERIAL SWATCH

FOR SALE OR LEASE

3271-2 Control Units (2)

3277-2 Display Stations (Many)

Immediate Delivery

Call Collect or Write:
Data/3 Computer Corporation
114 Central Avenue
PO Box 266
Buffalo, Minnesota 55313

CONTACT:

Mr. Bob Johnson
(612) 682-4884

data3



ADVERTISEMENT FOR PROPOSALS

Sealed proposals for:
The Furnishing and Delivery of Computerized Payroll/Personnel System Software to The Curators of the University of Missouri, Columbia, Missouri, with the following general specifications:

- Must be written in ANSI COBOL
- Must have flexibility to merge user-defined data elements in addition to standard payroll/personnel data elements
- Must operate in a higher education multi-campus environment
- Must be operating acceptably in at least one major institution of higher education
- Must not require significant modification to adapt to the University of Missouri environment
- Added consideration will be given to a system utilizing the IMS DB/DC Management System
- System is intended to become operational in a user-driven environment and documentation should support this. Initial implementation is currently scheduled for January 1, 1978. Consideration will be given to the company demonstrating a proven record of successful implementations and demonstrated long term corporate solvency.
- Will be received by the undersigned at the Office of the Director of Purchasing, University of Missouri - Columbia, Room 192A General Services Building, Columbia, Missouri 65201 until 3:00 P.M., C.S.T., March 13, 1978, after which time no further proposals will be accepted by the University of Missouri and thereafter proposals will be carefully examined and evaluated after which arrangements will be made for interviews with representatives of those vendors that are determined to be qualified to provide the specified Computerized Payroll/Personnel System Software.

Specifications and the conditions of proposal together with the printed form on which proposals must be made may be obtained from the Director of Purchasing, University of Missouri - Columbia, Room 192A General Services Building, Columbia, Missouri 65201.

The University reserves the right to waive any information in proposals and to reject any or all proposals.

THE CURATORS OF THE UNIVERSITY OF MISSOURI

By: Harry J. Pickett, Director

Purchasing and Materials Management

University System

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

PDP 11/45 FOR SALE

2-RP03 2-TU10
Full Memory Cache
1800 LPM Printer
RF/RS RSTS

FINANCIAL SOFTWARE

If the Performance of en
11/70 end the price of en
11/34 appeal to you ...

Contact: Michel Niernberg
EOI COMPUTER SERVICES
13693 E. Cliff Ave.
(303) 758-4619

call... **the Matchmakers**

BUYING • SELLING • LEASING • TRADING

1-800-654-9179

TOLL FREE!

ESI COMPUTER
SALES INTERNATIONAL, INC. 

BUY

Surplus DEC And Data General Hardware

SELL

PHIL THOMAS

For Sale

(305) 272-8753

Thomas Business Systems, Inc.

AVAILABLE
One 370/158 AP
With associated model
upgrades
MAY 1978
3830, 2150, 2151, 6111
Available April 21, 1978
(ITC Qualified)
WESTERN MARKETING
AND FINANCIAL
(415) 526-9221
(312) 397-3311
Fred Hegemen - Jack Air

FOR SALE
1X8 Itel 6420-7
Stage 2 Drives
\$45000.00
3411-03 DD
with 7003
\$20000.00
Sun Data Inc.
404-449-6116

FOR SALE BY OWNER
Burrough's B-1726
50% OFF
System Under Full
Burrough's Maintenance
B1726 Central Processor
65KB Main Memory
A9340 Console Printer
B9118 Card Reader 80 COL
B9247-3 Train Printer
(750 LPM)
B9299-8 Dual Disk Stor.
174.4 MB Capacity
B9381-13 Mag. Tape Clust.
800 BPI 9 Track
3 Drives
Principals ONLY
Contact:
E. DelloRusso
(212) 949-1340

WANTED

**BURROUGHS 'L' Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299**

Boynton Business Systems
87 Route 208
Wallkill, N.Y. 12584
914-895-2007

For Sale IBM Series I

4955 Model A Processor-64 K
with 4962-10MB Disk Stor-
age, Diskette, TTY Adapter,
ADM3A Terminal plus many
other features - under con-
tinuous IBM Maintenance
Agreement:
(212) 755-3600

FOR SALE
IBM 370/138 (1 Meg)
3330/3340 IFA
FOR LEASE OR SALE
IBM 370/135 (512K)
with 3046 Loaded!
Features Include:
4 ICA Lines, 1 ICA DATA SYNC.
IPA, IFA, 3210/1 ADAPTER, EP
FLOATING POINT, 1st SELEC-
TOR CHANNEL AND 1st 12K
CONTROL STORAGE INCRE-
MENT.
Available Immediately
Contact:
Mr. MacLeod (212) 825-7801
Mr. Lee (212) 825-5813

ECLIPSE C300

- SURPLUS -

20 meg. dual disks, mag tape
300 LPM printer, 8 line communications
4 CRT'S. Full software, 1 1/2 yrs. old

BUY OR LEASE FROM OWNER

PHIL THOMAS

(305) 272-8753

Thomas Business Systems, Inc.

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
AND PERIPHERALS
WE BUY • SELL • LEASE • TRADE

transdata



P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 300	\$20/Mo.	082	\$ 850	\$ 35/Mo.	407	\$1800	\$ 80/Mo.
026	\$ 900	\$35/Mo.	083	\$1800	\$ 60/Mo.	514	\$ 800	\$ 45/Mo.
029	\$1800	\$50/Mo.	084	\$2500	\$100/Mo.	519	\$1000	\$ 55/Mo.
046	\$1200	\$50/Mo.	085	\$1200	\$ 60/Mo.	526	\$1400	\$ 70/Mo.
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	548	\$1600	\$ 60/Mo.
056	\$ 250	\$15/Mo.	129	\$3400	\$105/Mo.	552	\$1000	\$ 40/Mo.
059	\$1400	\$50/Mo.	402	\$1200	\$ 60/Mo.	557	\$3000	\$100/Mo.
077	\$ 450	\$25/Mo.	403	\$1500	\$ 70/Mo.			

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202
Chicago, Illinois 60611
(312) 944-1401

115 Harbor Island Rd.
Newport Beach, CA 92660
(714) 675-2810

DATA GENERAL FOR SALE

System A - Available
May 1, 1978
NOVA 840-131KB Core;
Expansion Chassis; 3 cabinets
2-800bpi 75ips O.G.
6021/6023 Tapes;
3-25MB Century Discs;
8 line MUX;
Teletype;
8 Superbee Terminals
Price \$50,000
System B - Available
March 15, 1978
NOVA 840-131KB Core;
Jumbo Chassis; 2 cabinets
1-800bpi 45ips Weng Tape;
2-25MB Century Discs;
4 line MUX;
Teletype;
4-OC 6012 Terminals
Price - \$36,000
MISCELLANEOUS
1-EDS310 OMA Multiplexer
(never used) - \$3,000
1-4026/4027 4 line MUX - \$500
1-4010/4007/4008 I/O Interface
- \$250
1-4010/4029/ 4007/4029 I/O In-
terface 150 & 1200 baud -
\$400
1-O.G. Extender Board - \$150
These systems are in daily use and
can be seen running. Prices are
where is/as is. Payment in advance
by certified check.
Call
Frederick L. Feulknner, Sr.
(312) 263-4222
GRAPHIC ARTS DATA SERVICE
200 West Monroe
Chicago, Ill. 60606

AVAILABLE FOR LEASE 303X

Flexible Leases, Long or Short Term
3158 **3168**
Six, Twelve, Twenty-Four months or
Longer on Your Rented or Owned System

3138
3/24/78
4/21/78

3148
3/31/78
4/14/78



**Computer
Capital
Corporation**

1351 Washington Boulevard
Stamford, Connecticut 06902
Tel 203 357 9663

For Sale Or Lease System 3/15 Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.
Also complete inventory tapes — disks.
Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936



Pioneer Computer Marketing
1165 Empire Control
Dallas, Texas 75247

Member of Computer Users Association

135/

192K (GF)
240K (DH)
256K (H)
384K (HG)
512K (I)

- AVAILABLE FOR LEASE
- SHORT OR LONG TERM
- CONFIGURED TO YOUR NEEDS
- WITH OR WITHOUT PERIPHERALS

CALL MARY BERGER 1-800-225-2036

**Computer Systems
of America, Inc.**

141 MILK ST BOSTON, MA 02109

AVAILABLE
One 370/158 AP
With associated model
upgrades
MAY 1978
3830, 2150, 2151, 6111
Available April 21, 1978
(ITC Qualified)
WESTERN MARKETING
AND FINANCIAL
(415) 526-9221
(312) 397-3311
Fred Hegemen - Jack Air

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

FOR SALE OR LEASE BROKERAGE

COMPUTER WHOLESALE CORP. (504) 581-7741
 1111 W. Mockingbird Lane Dallas, Texas 75247

FOR SALE OR LEASE
 Immediately Available
IBM 3330/001's
IBM 3330/011's
IBM 3333/011's
 with features #8150
 Contact: Harry Blair 713-524-8249

BUY-SELL-LEASE-TRADE
 PURCHASE LEASEBACK / RENTAL CREDITS
 Write or call collect today to these representatives!

SYSTEM / 3
 All Peripherals
 call Ted Arbuckle

370's
 All Peripherals
 call Don Norris

SYSTEM 32's, 34's
 3270 CRT's
 call Marilyn Morris

360's
 All Peripherals
 call Duke Crumpton

EAM EQUIPMENT
 Refurbished, eligible for IBM M/A
 call Don Norris or Duke Crumpton

MCC (214) 634-2750
 TWX 910-861-4171
METROPLEX COMPUTER COMPANY, INC.
 Suite 1208 Honeywell Bldg.
 1111 W. Mockingbird Lane Dallas, Texas 75247
 Industry's Fastest Growing Computer Dealer

BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK!

FOR SALE
 3505-B1 and 3525 P3
 3155-J with Dat Box
 3158-U36 — Del. 9/78
 3158-K — Del. 6/78
 3165-K — Del. 6/78
 (BUY OR LEASE)

WANT TO BUY
 370/145 I2-J2
 370/135 GF-I
 3-1403 N 1
 1442 N 1
 3420-5 Single Density
 3420-8 Dual Density

TW COMPUTER INDUSTRIES INC.
 3570 American Drive • Atlanta, Georgia 30366
 404. 451-1895 • TWX 810/757-3654

CHICAGO 312 298-3650
 WASHINGTON 703 525-3074
 LOS ANGELES 213 770-8841

FOR SALE
165-KII
 DATed, up to 4. mega-byte. For Sale or Lease.
158-K
 Available in April with or w/o ISC.
155-J
 Avail. in March with or without new DAT.
135-GF
 Avail. now. Will configure to your specs.
3420-7
 available now with switching features.
158 Memory
 K to KJ available now.

FOR LEASE
145-10
 available immediately for sale or short term lease.
125's
 We will purchase and leaseback your 125 system. Save rent starting today. Call for a quote.
IBM RENTAL CREDITS
 We will pay for your rental credits on FTP, ETP, and MAC machines. Call us before sending your machines back to IBM.

IPB Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

COMPUTER
 Facilities & Offices
 25,000 sq ft. lease
 Teterboro, N.J.
 • Quality building & construc.
 • 8,000 ft. raised computer floor
 • 17,000 ft. MOD A/C offices
 • Fully sprinklered plus utilities
 • Excellent location for professional & skilled
 • Nr. Rte. 80, Rte. 46, G.S. Pkwy. 20 min from NYC
 • Parking facilities
 50 cars (more avail.)
 Brokers invited. Call
MAJESTIC INDUSTRIES, INC.
 212/594-7235 201/489-7100

For Sale:
 I.B.M. System 32
 Model A 23
 9.1 meg. disc
 16K, 80CPS Bi-dir Prntr.
 \$29,000
 Available 3/78
 T.D.S.I.
 P.O. Box 18310
 Cleveland Hts, Ohio 44118
 (216) 371-5020

FOR SALE
 IBM 5410 System 3 CPU
 8 K Memory, Serial Number 17704, Used Hours: 3370.
 Continental Life
 Ins Co
 Call Mr. Bush,
 (602)957-1040

WANTED

RANDOLPH NEEDS:
 3340-A2 DISKS
 3420-3, 4 & 8
 MODEL TAPE DRIVES
 CALL: MIKE SEEKINGS
 TOLL FREE
 800-243-5308

RANDOLPH COMPUTER COMPANY
 Division of Firstbank Financial Corporation
 A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
 537 Steamboat Rd., Greenwich, CT 06830 • (203) 661-4200

THREE AND FOUR YEAR WALK-AWAY LEASES

1. ATTACHED PROCESSOR FOR 3158
2. 3158 - 3 MEG WITH APU FEATURE
 SPRING AVAILABILITY
3. 3158 - 3 MEG MOD 3
 SUMMER AVAILABILITY

TNCC

THOMAS NATIONWIDE COMPUTER CORPORATION
 Brian M. Battle — (312) 944-1401
 600 North McClurg Court-Suite 4202A
 Chicago, Illinois 60611
 Paul Nortman — (516) 752-1000
 1 Huntington Quadrangle-Suite 4S13
 Huntington Station, New York 11746

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WANT TO BUY

IBM 370/145 I2
3047 POWER UNIT
3215 CONSOLE PRINTER
PRINCIPALS ONLY
FABRI-CENTERS OF AMERICA, INC.
CONTACT:
TONY BERG
(216) 464-2500

FOR SALE
IBM SYSTEM/34

Delivery expected middle July.
 Installation and software services
 available if needed.



CALL
ED BROWN
(213) 735-1631

IMMEDIATE
DELIVERY

NEW PDP 11/04's
 16K MOS; DL11-E; DL11-WB;
 DUP11-DA; KG11-A; additional
 interface boards also available.
 40% off list price.

Call J. Jacobs
(312) 675-1600

FOR SALE

- One Data Products line printer/Model 2318/80 col.
- One Model 3673 Memorex disk controller
- Two True Data 400 epm card readers
- One GRI-99 Model 30 mini-computer with 10MB CDC disk storage.

Telefile
COMPUTER PRODUCTS, INC.
 17131 Daimler St.
 Irvine, CA 92714
 (714) 557-6660
 Ask for Joe Letbetter

FOR SALE:**BURROUGHS L-6500**

All purpose accounting machine.
 All general ledger functions
 available...
 Ledger card system...
 Three years old...

Please phone
 (800) 631-1025 or
 (201) 994-3311 collect

Ask for Mrs. Bennett
 or Mr. Lansky

3033 - 3032

48 month term
 1978 delivery
 Financing available to
 ITC Qualifying Account

CW Box 1461
 797 Washington St.
 Newton, MA 02160

WANTED 360/30

65k, 5 tape/3 disk system
 with full I/O set. Will con-
 sider individual units. State
 model # Feature #, serial #,
 price and date available. Must
 be acceptable for IBM maint.

CW Box 1442
 797 Washington St.
 Newton, MA 02160

FOR SALE**IBM Printer 600LPM**

1403 Model 7 with
 1133 Multiplexor

ATTENTION
1130 USER!

\$12,500

Call Gene Kijonowski
 (312) 798-0800
 Available April 1, 1978

LEASE**3033**

SHORT AND LONG
TERMS **360/** **30,40,50,65**
CPU **138,148,158,168**
370/ **125,135,**
DISK- **145,155**
TAPES

BUY**SELL**

National Computer Rental
415 Madison Avenue
New York, New York 10017
Tel. No. (212) 532-1500

Member of Tiger Leasing Group Member of Computer Lessors Assoc.

dataserv

buy • sell • lease • trade

370
 115/125 135
 Steve Lacny
 800-328-2406

For Sale or Lease
 Any 115/125 configuration
 Sending 115/125
 Back to IBM

Call us! We'll show
 you how to make money
 using your rental credits.

370
 138 THROUGH 158
 Dave Miller
 616-637-8481

For Sale or Lease
138 - 145 - 155 - 158
 CPUs — Peripherals —
 Memory
370/145-IH2

7855
 8810
 6982
 6983
 3215 Console
 3047 Power Units

370
 Peripherals
 800-328-2406
 Tom Anderson

Avail. Now	WTB
3284-Variable	3271 3330/3333
Width	3272 3410/11
Tractor	3275 3420
Drive	3277 3340
3881	3288 3344
3675	3803
3203-1	3830

STOP! Before you send
 any of the above machines
 back to IBM call us. We'll
 show you how to make money.

360
 CPUs and Peripherals
 Neal Johnson
 800-328-2406

For Sale or Lease
 360/30 - 40 - 50 - 65s
 CPU — Peripherals —
 Memory

We'll Buy
 Any 360 CPU
 IBM Peripheral
 Non-IBM Perph/Memory

Sys/3
 CPUs and Peripherals
 800-328-2406
 Sys 32's

SYSTEM/3
5410-5415
SYSTEM/32
SYSTEM/34
ALL MODELS
Deliver Positions

Call Toll Free 800-328-2406
or 612-544-0335

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd
 P.O. Box 9488, Minneapolis MN, 55440

FOR SALE:**IBM 1800-32K**

Plus large collection of peripherals

IBM 1130-16K

with 600 LPM printer

Contact: Bob Harris—Harris Laboratories, Inc.
 624 Peach Street, Lincoln, NE 68501
 402/432-2811

ATTENTION**IBM 360/370 USERS**

DATA AUTOMATION COMPANY, INC.

buy • sell • lease • trade

370
Peripherals

3410/3411 3330/3333 3211/3811
3420/3803 3340/A2, B2 3272/3277

360
We'll Buy
Any 360 CPU
Today

Peripherals
Lowest Price

2401-5 2804-2
 2402-2 1403-N1
 2403-1 2403-4
 W/DD

360/20
LEASE or SALE
2020 C1
w/2203 120pp
2560
w/2 line printer

360/40-50-65's Available



Data
Automation
Company

4858 Cash Road
Dallas, Texas 75247
214-637-6570

buy sell swap

buy sell swap

buy sell swap

BUY SELL SWAP

Wanted To Buy
3672-Memorex storage control unit
3673-Memorex disc controller
3670-Memorex disc module
3675-Memorex disc module

Contact:

Harry Blair 713-524-1401

efm computer
leasing, inc.3000 marcus avenue
lake success, ny 11040
(516) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40	360/65
360/50	370/135

WILLIAM MARION COMPANY, INC.
 P.O. BOX 309 • HACKENSACK, N.J. 07602

N.C.R.
 270-299-399-775
 31, 32, 41, 42 etc.
 BURROUGHS
 "L" TC 500, TC 700
 I.B.M.
 029-Systems 32/34

BUYING
 SELLING

029's & 059's
 immediate delivery
 Also: 026 - 056 - 082 - 083
 084 - 085 - 088 - 402 - 403
 407 - 514 - 519 - 548 - 552
 557 - Eligible For IBM M/A

FOR MORE INFORMATION CALL (201) 343-4554

DEC
PROCESSORS
PERIPHERALS & MODULES
BUY — SELL — LEASE — RENT
\$1, 000,000

NEW & USED DEC INVENTORY

DEC CPU'S

11/04 • 11/05 • 11/10 • 11/35 • 11/40 • 11/45 • 11/60 •
11/34 • 11/70 • PDP8E • DEC 310

DEC DISKS & CONTROLLERS

RK05 • RX11 • RK11D • RP02 • RP03 • RP04 • RP06

DEC TAPES

TU10 • TJU16 • TJE16

DEC TERMINALS

VT52 • VT50 • VT05 • VT20 • LA36 • LA180 • LA120

DEC PERIPHERALS

DH11 • DZ11 • DL11's • LPI1 PRINTERS

MISC. BOARDS & MEMORY

M7260 • M7261 • MM11DP • MM11L • DPI1D • KWI1L
MM11U • MS11BM • M792 • DUI1DA • MS11JP •
MF11L • MM11F • MF11U

Hundreds of Miscellaneous Modules & Cables Available
 CALL FOR OTHER COMPONENTS IN STOCK

SAVE 33%

NEW 11T34 CONFIGURATION

***** \$23,333.33 *****

For Fast Delivery & Substantial Savings
 Call the DATALEASE Digital HOTLINE

800-854-0350

DATALEASE

700 North Valley Street, Anaheim, CA 92801
 (714) 833-3020 TELEX 002439

FOR SALE OR LEASE

IBM 3277-2's with
4630 or 4633 Keyboards

30 Day Delivery

Call Collect or Write
 Berlent Industries, Inc.
 1975 Hempstead Turnpike
 East Meadow, N.Y. 11554



516-794-9722

FOR LEASE ONLY

ITC QUALIFIED
LESSEE ONLY
3033Currently available
May 1979Anticipated improvement
February 1979

WESTERN MARKETING

& FINANCIAL

(415) 526-9221

(312) 397-3311

Fred Hegeman

Jack Air



In Canada... let us
 quote a custom-configured
 IBM computer system in
 new condition, with quick
 delivery, at big savings
 under IBM factory prices.

Don Dupuis
 Windsor, Ont.
 (519) 258-8910

Jacques Dagenais
 Montreal, Que.
 (514) 374-5920

Ron Ridding
 Toronto, Ont.
 (416) 683-3704

CMI —

Remember the name

CMI COMPANY

DEC
HARDWARE

PDP 11 PDP 8

Processors Peripherals

Memories

VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES

Seekers and Sellers

(516) 585-0800

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340'sIBM UNIT RECORD
EQUIPMENT026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557.

029-059-129

Call us for all your needs, we buy
 rent and sell all types of IBM unit
 record equipment. Over 12 years
 of serving commercial and govern-
 ment requirements. Contact ACS
 for proposal.

7126 Mullins
 Houston TX 77081
 (713) 666-2122
 TWX 910 881 1526

EQUIPMENT CORP.



dearborn giveth:

370's: 370-145J (mod 2 & ISC avail.);
 3420-7 single.

dearborn taketh:

370-145's; 370-135's; 3420's; 3330's; 3340's.

Call Tom Millunchick: 312/827-9200
 or any dearborn office.



dearborn
 computer company

dealer-IBM computers
 systems software
 leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
 toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788

Short or Long Term
Leases From

RANDOLPH

370/138

370/148

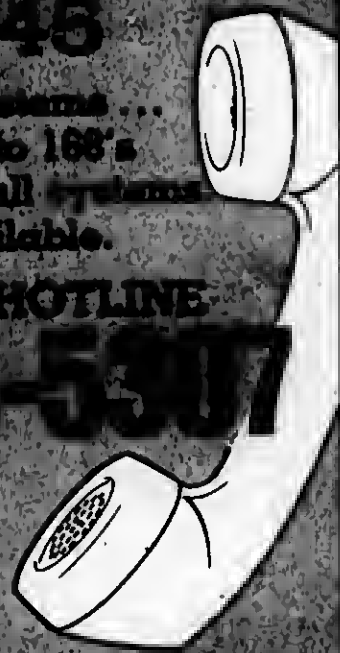
370/135

370/145

...and all other IBM systems ...
 from S/3's and I15's ... to 168's
 and all 303X CPU's or full systems
 Up to 8-year leases available.

CALL THE 370 HOTLINE

800-243-5307



Randolph Computer Company
 537 Steamboat Rd., Greenwich, CT 06830
 (203) 681-4200

**When you plan to buy or
 sell your computer
 equipment...**

For complete information call the Greyhound Representative in your area.

WANT TO BUY

370/158 370/155 370/145

U.S.

Home Office
 New York
 Chicago
 Dallas
 San Francisco

T. A. Takash
 Dick Ventola
 Pete Ahern
 M. W. "Bill" Tucker
 Henry Paulson

602-248-6037
 914-949-1515
 312-298-3910
 214-233-1818
 415-283-8980

INTERNATIONAL

Canada
 U.K./Europe
 Mexico
 Australasia
 Eurasia

Don Maunder
 Joe Gold
 Andrew Contreras
 John Hallmark
 Don Heworth

NON IBM

Dallas

John Hallmark

214-233-1818

GO GREYHOUND

Greyhound Computer Corporation

buy sell swap

software for sale

software for sale

software for sale

time & services

303X Leasing

Large industrial corporation wishes to purchase and lease back to substantial corporations IBM 303X Systems. We will only deal with end users and equipment must be scheduled for delivery in 1978.

CW Box 1410
797 Washington St.
Newton, Mass. 02160

SOFTWARE FOR SALE

PAYROLL PERSONNEL SUPER/PAY ONLY \$960 ANS COBOL 60+ USERS

Users on IBM, Burroughs, Univac and minis such as NCR, OG, & Four Phase

Easy To Use 30 Day Trial
Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

GENERAL LEDGER \$400 FULL PRICE

*Check Register *Journal Register
*General Ledger *Trial Balance
*Balance Sheet *Income Statement

Complete bookkeeping system for any medium to small company. Over 500 customers processed during the last ten years. Modular parametric design can be adapted to any small computer. Written in low level IBM Cobol. Price of \$400.00 includes Source programs, sample JCL with test data, and complete operating procedures.

FREE SAMPLES
& DOCUMENTATION

GENE SUMRALL
4211 S.W. Fraaway
Suite 106
Houston, Texas 77027

RPG II SYSTEMS

*A/R-OPEN ITEM OR B/F
*ACCOUNTS PAYABLE
*GENERAL LEDGER
*PAYROLL AND LABOR DIST.
*INVENTORY
*CREDIT UNION MAILING, ETC

Extensive Documentation Provided
Bancroft Computer Systems

P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our translators, write or call today.



Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

SOFTWARE YOU SHOULD KNOW ABOUT

DASD CORPORATION: I'm interested in:

TSO

☐ Increasing my capabilities with TSO with Video Programming Tools. VIP simplifies the creation and modification of data files and will automatically flow-chart JCL procedures.

CICS

☐ Saving 75% of my programming BMS coding time and automatically printing hard copy screen images with MAPGEN.

TAPE LIBRARY

☐ Effectively managing my tape library without hooking the operative system with LIBMAN. This intelligent tape library management system will always scratch least critical data first, and operates in an online environment for immediate inquiry and update.

RELATIVE BDAM

☐ SIMBA will save both disk space and access time by blocking my relative BDAM files.

REDCOMP

☐ DASDCMP does it better!

TRANSLATING

- ☐ RPG to COBOL (DOS or OS)
- ☐ SYSTEM/3 COBOL to OS COBOL
- ☐ DOS COBOL to OS COBOL
- ☐ GE MAP to OS COBOL
- ☐ 360/20 BAL to 360/370 OS ALC

DASD CORPORATION
National Marketing
1480 Renaissance Drive,
Suite 315
Park Ridge, Illinois 60068
312/298-6005

PLEASE SEND DETAILED INFORMATION TO:

NAME _____

COMPANY _____

ADDRESS _____

TITLE _____

PHONE _____

DISTRIBUTED PDP-11 DATASYSTEMS

Applications Software

- Accounts Receivable
- Accounts Payable
- General Ledger
- Payroll/Personnel
- Order Processing
- Inventory Control
- Financial Planning

Timesharing Dataservices

- Dual PDP-11/70's
- National Network
- RSTS/E System Utilities
- Distributed Datasystems
- Word Processing Systems
- Software Development

The RSTS/E Applications Specialists

ims

Interactive Management Systems, Inc.
375 Concord Avenue
Belmont, Mass. 02178 (617) 489-3550

TSO for VSI

TSO for VSI

CHECK THESE FEATURES

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with RES support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- Interactive program execution
- Operations console support
- Dataset maintenance
- Catalog management
- Standard IBM TSO command
- Enhanced 3270 usability
- Full ASCII terminal support
- No user swapping
- No TCBM
- No VS 2 overhead

TSO

1500 FRANK AVE
GARDEN GROVE, CA
92641 (714) 636-0901

ACCOUNTS PAYABLE

Now a low-cost software package for mini/mainframe computers with many cost-saving features:

- Batch processing using single data base for fast processing
- Modularly structured COBOL programs save on maint. cost
- Multi-company facility avoids duplicate software
- Generalized retrieval facility for printing reports
- Check reconciliation and more

For full details on how this software can save you time and money call (415) 254-1264 or write

LEGLER SYSTEMS CO.
23 CHARLES HILL RD.
ORINDA, CA 94563

MU Basic RT-11, Proven Programs, DEC PDP 11/03, Floating Decimal Point, General Ledger, Payroll, Accounts Receivable, Accounts Payable, Depreciation.

DATAPAK

(505) 266-4207

416 Fontana Pl. N.E.
Albuquerque, N.M. 87108

ACCOUNTING SOFTWARE FOR DEC RSTS/E OR CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Completely on-line, interactive systems available for ACCOUNTS-PAYABLE, GENERAL-LEDGER, FINANCIAL-REPORTING, ACCOUNTS-RECEIVABLE and PAYROLL applications.

These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

If you are installing or have installed a Digital Equipment Corporation RSTS/E or CTS-500 system, contact us for cost-effective solutions to your core accounting problems.

Plycom services, Inc.

(219) 936-2183
P.O. Box 180
Plymouth, IN 46583

time & services

\$4/HOUR

TIME SHARING PDP 11/70 RSTS

- 1/2 mag Free Storage
- 8 cents per CPU Sec.
- Basic Plus 2, RMS-11, FORTRAN IV

Contact: Art Scollen
(714) 994-3241

**COMMAND COMPUTER
SERVICE, INC.**

14402 Industry Circle
La Brea, CA 90639

WE ARE BROKERS OF COMPUTER TIME

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1681

COMPUTER TIME

BACK-UP RESOURCES AVAILABLE:

Honeywell 6060
T/S Batch, Remote Batch
256K Words Memory
1.2B Char. Mass Storage
3 High Speed Printers
7/9 track PE/NRZI tapes
Comm. Support
110-9600 BAUD
Sync, Async, Bsync

360/50
(2) 1100 LPM Printers
USC Feature
(8) 2314, 512K
(1) 7 trk tape
(6) 9 trk tapes

360/30
1100 LPM Printer
USC Feature
(8) 2314, 128K
(4) 9 trk tapes

Complete data processing services: keypunching, programming, systems analysis, thrift-line applications: payroll, accounts payable, accounts receivable, general ledger



Programs & Analysis, Inc.
21 Rte. Ave., Broomfield, CO 80020

370/158 mod 3 Datacenter

3.5 mag MVS
Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Kerlevsky
(212) 564-3030

Datamor

132 West 31 St.
New York, N.Y. 10001

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Data Craft, Data General, COC, DEC, EMM, Fabri Tak, Honeywell, GAI, HP, Interdata, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Verian, XOS.

Any Manufacturer's Memory

THREE DELTA CORP

1038 Kial Ct.
Sunnyvale, CA 94086
(408) 734-2680

CONNECTICUT
PRIME COMPUTER TIME
IBM 370/158 OS/SVS
IBM 360/50 DOS

REMOTE JOB ENTRY
BATCH PROCESSING

COMPETITIVE PRICES

Computeristics, Inc.

Benson Rd.

Middlebury, CT 06749

CALL COLLECT

Richard Wood:

(203) 573-2222

370/158 MVS 4 MEG

WYLBUR
IMS 1.1.4 DB/DC
7 Days/24 Hours
High/Low Speed Terminals
RJE and Batch
2- Xerox 1200 Printing
Systems
Full Key Entry Service

THOMAS NATIONAL

1775 Broadway, NYC

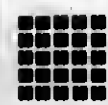
212-765-8500

REMOTE JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide incoming WATS lines
- Complete systems and software support
- Full application library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, HASP, INTERCOMM, ROSCOT
- Complete data security including off-site storage

For information
call John MacDougall
at (312) 861-7100



PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

RSTS/E

Consulting/Contract Programming

BASIC

BASIC PLUS

2RMS

FORTRAN

MACRO

Business/Scientific Applications

Performance Evaluation Systems Software Maintenance Development

RAINBOW COMPUTING, INC.

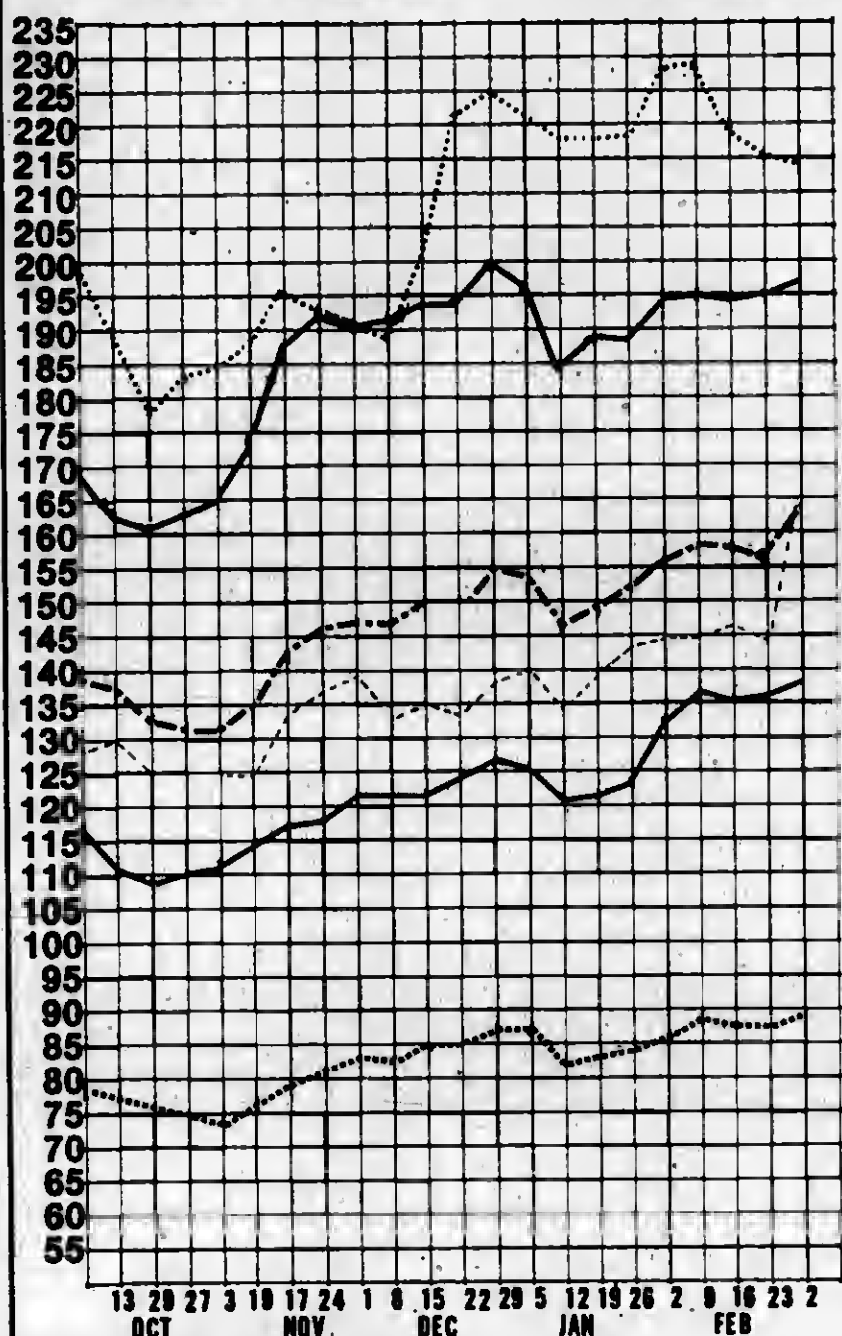
10723 White Oak Ave.
Grenada Hills, CA 91344
(213) 360-2171

COMPUTERWORLD

Computer Stocks Trading Indexes

Computer Stocks Trading Indexes

_____ Computer Systems - - - - Software & EDP Services
 Peripherals & Subsystems Leasing Companies
 _____ Supplies & Accessories - - - - CW Composite Index



Earnings Reports

	1977	1976
Shr Ernd	\$1.48	\$1.06
Revenue	50,032,000	22,707,000
Tax Cred	150,000	1,230,000
Earnings	3,920,000	2,420,000
3 Mo Shr	.40	.41
Revenue	15,831,000	8,020,000
Tax Cred	....	504,000
Earnings	1,386,000	945,000

SYSTEMS ENGINEERING LABORATORIES		
Three Months Ended Dec. 23		
	1977	1978
Shr Ernd	\$.44	\$.11
Revenue	11,644,000	7,024,000
Tax Cred	555,000	132,000
Earnings	1,249,000	314,000
3 Mo Shr	.75	.17
Revenue	21,435,000	13,926,000
Tax Cred	975,000	263,000
Earnings	2,125,000	471,000

FOUR-PHASE SYSTEMS		
Year Ended Dec. 31		
	1977	1976
Shr Ernd	\$2.19	\$2.25
Revenue	\$8,508,000	\$3,218,000
Tax Cred	1,110,000	3,090,000
Earnings	0,143,000	7,478,000
3 Mo Shr	.52	.54
Revenue	26,008,000	17,487,000
Tax Cred	---	809,000
Earnings	2,224,000	2,108,000

AMDahl		
Year Ended Dec. 30		
	1977	1976
Shr End	\$4.46	\$3.36
Revenue	188,806,000	92,820,000
Tax Cred	9,985,000	11,010,000
Earnings	36,850,000	22,803,000
3 Mo Shr	1.09	1.81
Revenue	59,243,000	40,484,000
Tax Cred	.....	8,235,000
Earnings	8,990,000	12,721,000

TERMINAL DATA		
Three Months Ended Dec. 31		
	1977	1976
Shr Ernd	\$.13	\$.11
Revenue	1,925,200	1,800,400
Spec Cred	.....	21,500
Earnings	02,800	140,300

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreinhofer
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Frank Collins
Account Managers
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey,
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezellan
Account Coordinator
COMPUTERWORLD
353 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Judy Milford
Account Coordinator
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

West Germany
Hans-Jürgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-S-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 1, 1950

**All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139**

NOT COFFEE MAKERS, FRAN. PERSONNEL.



FRAN TARKENTON, MINNESOTA VIKINGS' QUARTERBACK.

Fran Tarkenton's product isn't coffee makers, it's the Personnel Management Reporting System from MSA.

A comprehensive human resource system, PMRS, can put you in control of your organization's reporting requirements.

For instance, it will help you comply with required Federal Government Reporting, EEO/ERISA/OSHA/AFFIRMATIVE ACTION. Among its other features

are maintaining comprehensive personal data, skills inventory information, salary performance and reviews and termination/leave of absence reports.

And PMRS interfaces with MSA's complete line of accounting systems to provide solutions for all of your financial reporting requirements.

For more information, call Carol McConnell at (404) 262-2376 or return this coupon.

MSA
THE PERSONNEL MANAGEMENT REPORTING SYSTEM

Management Science America, Inc.
3445 Peachtree Rd., NE, Dept. C-1
Atlanta, Ga. 30326/(404) 262-2376
Telex: 549638 Answerback: MSA ATL
Chicago (312) 984-2450/Los Angeles
(213) 822-9766/New York (201) 871-4700
International Agents: MSA International,
Inc./Brussels, Belgium/Tel. (02) 673.99.63
Telex: 63020 Answerback: MSA B

NAME _____
COMPANY _____
TITLE _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
PHONE _____ COMPUTER MODEL _____

I am interested in:

- ☐ Personnel Management & Reporting
- ☐ Payroll Accounting
- ☐ General Ledger
- ☐ Canadian Payroll Acctg.
- ☐ ALITAX™
- ☐ Accounts Payable
- ☐ Accounts Receivable
- ☐ Financial Information & Control
- ☐ Supplies Inventory Control
- ☐ Purchasing
- ☐ Fixed Asset/Property Accounting

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Daily Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

March 13, 1978

75¢ a copy \$18/year

MAD

No. 198
April '78
OUR PRICE
60¢
CHEAP
14, 21

HOPES THIS ISSUE JAMS EVERY COMPUTER IN THE COUNTRY...



...FOR FORCING US TO DEFACE OUR COVERS
WITH THIS YECCHY UPC SYMBOL FROM NOW ON

Mad at UPC

With its latest issue, *Mad* magazine came out strongly against the Universal Product Code (UPC). The reason? Aesthetic, not technical — or, as only *Mad* could describe it, the UPC looks "yecchy." (Used with permission of *Mad* magazine, copyright 1978 by E.C. Publications, Inc.)

Two Software Houses Back Use of Electronic Messaging

By Don Leavitt
CW Staff

While the U.S. Postal Service and other government agencies are gingerly considering tests of electronic mail [CW, Feb. 27], at least two software houses have brought out packages specifically designed to support the electronic preparation, switching and receipt of messages.

The environments in which these recently introduced products operate are dramatically different, indicating the implementation of such systems may be limited only by the capabilities of the designer.

The Computer Message Transmission (Comet) package from Computer Corp. of America (CCA), for example, is based on the PDP-11 minicomputer from Digital Equipment Corp. utilizing standard DEC software. The Messenger system from On-Line Software International (OSI), on the other hand,

runs on IBM 360s and 370s under the Customer Information Control System (CICS) communications monitor.
(Continued on Page 8)

GAO Auditors Demonstrate SSA Data Too Easy to Steal

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — General Accounting Office (GAO) auditors recently removed 39 reels of magnetic tape containing the names and addresses of 114 million Americans from the Social Security Administration's (SSA) central computer facility — without a blink of a security guard's eye.

A \$500,000 security system was installed in the last few months at the fa-

IBM Planning to Open Chain of Retail Stores To Sell Small Systems?

By Jeffrey Beeler
CW Staff

BOSTON — IBM is apparently testing the feasibility of opening a retail store chain to distribute its small business systems.

Company officials, however, last week denied that goal prompted the firm to begin creating a series of demonstration centers in January for its newly introduced 5110. They dismissed speculation that the appearance of the centers, located at existing IBM offices in 22 major U.S. cities, heralds a major change in the company's distribution methods.

The IBM officials also stressed that IBM has long operated demonstration centers for systems other than the 5110 and that the latest sites were created for the same reason as their

predecessors: to demonstrate the capabilities of the company's equipment and to provide prospective users with technical information.

But the demonstration centers for the 5110 differ in some respects from IBM's earlier facilities. In fact, at times they smack less of a typical demonstration center than a conventional retail outlet.

Unlike the company's earlier centers, where interested parties usually met with IBM representatives by appointment only, the facilities for the 5110 are continuously manned on weekdays to accommodate prospective customers who can and often do request unscheduled equipment demonstrations.

Unlike their predecessors, the latest
(Continued on Page 5)

Ex-IBMmer Wanted to Testify IBM Broke Consent Decree

By E. Drake Lundell Jr.
CW Staff

SAN FRANCISCO — A former IBM employee was prepared to tell the jury hearing the Memorex vs. IBM anti-trust case here that he told management of IBM's disk drive facility some of the firm's pricing actions violated the 1956 consent decree against the firm and IBM's own code of business practice.

But the jury never got to hear that testimony because Judge Samuel Conti determined the employee was too far down the corporate ladder — even though Conti admitted "a statement like this could very well be the statement that swings the whole case in the eyes of that jury."

However, the witness testified that management at IBM's disk drive facility in San Jose, Calif., was aware IBM's actions were designed to drive competitors out of business.

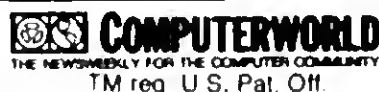
Brian Cunningham, an IBM employee from 1966 to 1972 and presently a lawyer in Gilroy, Calif., would have told the jury that he informed his boss that IBM's pricing actions in the disk area clearly violated the 1956 consent decree. Memorex lawyers told the judge. He was also prepared, the lawyers said, to testify that his boss's answer was, "Look, we can conceal it and we can get legal guidance."

And the answer I do think is significant, Your Honor, when the man says "we can get it by legal," in effect the man is saying "we can camouflage our price cut and we can sneak it by the legal department," a Memorex attorney continued.

Conti refused to allow the Memorex attorneys to question Cunningham about the consent decree because he held that Cunningham did not have responsibility for administering the consent decree and was therefore not in a position to speak for the corporation.

However, the Memorex attorneys argued that it was part of every IBM employee's job to read the internal IBM code of business practice — which contained the consent decree — and that Cunningham had almost completed his legal education at the time he objected to the practices.

(Continued on Page 6)



EDITORIAL

Editor: I. Drake Lundell Jr.
Deputy Editor: Ronald A. Frank
Managing Editor: Nancy French
Associate Editor: Donald Leavitt
Associate Editor: Esther Surden
Assistant Editor: Frank Vaughan
Washington Bureau: Edith Holmes
Staff Writers: Catherine Arnt, Jeffry Beeler, Timothy J. Scannell, Brad Schultz, Marguerite Zientara

Chief Copy Editor: Cheryl M. Gelb
Copy Editors: Barbara T. VanSoyoc, Susan Gerrard, Joe Hunn

Photography Editor: Ann Dooley
Editorial Assistant: Denise Petski
Editorial Cartoonist: Jim Orton

Bureaus:
London: Roger Frampton
Munich: Hans-Jürgen Ballnath
Asia: Hidetsuna Sasaki

Contributors:
Education: J. Daniel Couger
Legal: Roy N. Fried
Taylor Reports: Alan Taylor
Human Connection: Jack Stone

SALES

Vice President/
Marketing: Roy Einteinhufer

Advertising:
Administrator: Terry Williams
Display Advertising: Mary Anne Furlong
Classified Advertising: Donna Whalen
Recruitment Advertising: Kathy Steinberg

Sales Promotion:
Director: Jack Edmonston
Market Research: Kathryn V. Dinneen

CIRCULATION

Vice-President/
Circulation: Margaret Phelan
Circulation Manager: Barbara Jeannetti
Customer Service Rep: Peggy Kelly
Assistant: Maureen Burke

PRODUCTION

Manager: Lee Vidmer
Supervisor: Henry Hing
Assistant Manager: Peter Holm
Typesetting Supervisor: Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone (617) 965-5800. Telex: USA-92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone (01) 995-3352. Telex 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristenstrasse 11. Phone 36-40-36/37. Telex 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1115 Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone (03) 445-6101. Telex J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy. U.S. — \$18 a year, Canada and PUAS — \$28 a year, Europe and Middle East — \$50 a year, all other foreign — \$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed, write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/
Publisher: Patrick J. McGovern
President: W. Walter Boyd
VP-Marketing: Roy Einteinhufer
VP-Finance: William P. Murphy
VP-Circulation: Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Sparks Protest From Moss

FBI RFP Includes Message Switch

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Federal Bureau of Investigation has issued a request for proposals (RFP) for a telecommunications system that would allow message switching between state and local law enforcement agencies, and a California congressman is protesting.

Democrat John E. Moss made the RFP public last week when he wrote to U.S. Attorney General Griffin B. Bell asking that the Justice Department curb the FBI's flirtation with message switching by withdrawing or revoking the RFP.

The RFP asks vendors to include a message-switching option in the event Congress decides its benefits outweigh its risks to civil liberties and individual privacy.

Issued in mid-December, allegedly with the blessing of the General Services Administration (GSA), the FBI's RFP calls for between \$1 million and \$2 million to be spent on two minicomputers — one to act as a backup — to serve as the communications processors for the Bureau's National Crime Information Center (NCIC).

The RFP supplements two previous FBI requests for procurement authority from GSA to acquire 40 cluster terminal sets and 60 data terminals. These requests were made last October.

Double Message Seen

Rep. Moss and Sen. James Abourezk (D-S.D.) last week protested the fact that the FBI had issued the RFP for communications controllers and made earlier requests for terminals to provide message switching at the same time the Justice Department and the White House assured the members of

Congress "no final decisions" had been made with regard to NCIC message switching and none would be made "without prior consultation with and approval by the Congress."

Moss has yet to receive an answer from the attorney general. At his Senate confirmation hearings for the post of deputy attorney general, however, Benjamin R. Civiletti said, "The Justice Department's position is what it has always been: There will be no FBI message switching without full confirmation by the House and Senate committees concerned with the bureau."

The congressman has also asked the GSA to withdraw the go-ahead it gave the FBI for acquiring the minicomputers. Sources close to the GSA said the agency is "moving in that direction," but hasn't decided whether to revoke its original OK. GSA Computer Commissioner Frank Carr contended the FBI did not follow his guidelines in issuing the RFP.

Option Only

The FBI maintained last week its RFP was proper because it informed prospective vendors that while it wanted to see the message-switching capability included in any proposals as an option, the bureau did not yet have authority to install message switching.

Seeking to replace its own two IBM 2703 communications controllers with minis providing increased line capability and flexibility, the FBI noted in its RFP, "At the time of this solicitation there is under consideration a proposal to add a limited message-switching capability to the NCIC system. If implemented, this capability would enable individual users to send messages directly to other users via the NCIC network."

"In order to allow for this possible enhancement, bidders will be required to offer, as an optional feature, the hardware and software components necessary for message switching," the proposal request said.

Critics of the NCIC, however, have asked for a full evaluation of the system that would examine whether the FBI should be in the business of message switching at all (see story on Page 9). They fear FBI message switching would create a national data bank of instantaneously available information, thus turning the bureau into a national police force.

The procurement, now, of a message-switching capability would make the eventual operation of such a system by the FBI that much more probable by foreclosing other options, the critics suggested.

And that is just what the FBI intended with its RFP, bureau sources said. Officials within the FBI's Technical Services Division deliberately tried to keep the real intent of the RFP from the House Subcommittee on Civil and Constitutional Rights, which oversees the bureau, the sources stated.

In its RFP for minicomputers and its request for terminals, the FBI sought to acquire communications processors to interface with a total of four IBM 360/65s and as many as 240 communications lines.

In October, the bureau asked the GSA to "immediately" procure 20 Teletype Corp. Model 40/4 Tempest mini cluster terminal sets and 20 Tempest maxi cluster terminal configurations. At a total cost of \$484,930, these terminal sets are to be used for the on-line management of up to 18 major FBI cases by the end of 1978.

On the Inside This Week

NEWS

IBM 3270-Compatible Units Star at Interface 78	4
Coal Shortage Not Crippling DP Sites — Yet	5
Senators, Sipi Also Urge OTA to Study NCIC	9
Real-Time System Rounds Up Rodeo Scores	12
Cable TV Firm to Offer Home Alarm System	13
Do-It-Yourself Aspect of DDP Seen Changing	14
News Magazine's System Expedites Production	16
Support Recipients Get Paid Twice, Then Billed	17
Navy System to Process Satellite Weather Data	18
DP-Aided Design Weaves Technology, Art	19
Two HIS User Groups Plan Chicago Meets	21
In Depth: The Ten Great Software Myths	23-28

EDITORIAL

Interim Relief a Bad Idea	30
Human Connection: The Mail Battle	31
Taylor Report: System Could Fulfill Dream	31
Small Systems Vendors Better Learn English	32
Non-Codasyl DBMS Not Horrible Prospect	38

SOFTWARE & SERVICES

Scoring Eases Evaluation of User Guides	43
HIS Level 64 Packages Outgrowths of 2000	44
'Ksam' Handles Micro Files	47
Data Bases, Files Controlled by 'IDD'	48
Internal DP Controls Aid Divided Management	49
Package Real Asset for This International User	50

COMMUNICATIONS

Mini Saves User 65% of Cost of 3704	51
On-Line Terminals Track and Control Inmates	52
Europe's Largest Brewer Installing Terminal Net	56
Modem Has Transmit Filter	58

SYSTEMS & PERIPHERALS

One System Enough, Counties Discover	59
Restaurant Chain, Bank Share On-Line Service	63
Micrographics Group Sets Five-Year Objectives	64
DDP Collars Shirt Maker's Inventory Woes	66

MINIWORLD

Office Environment Poses Disk Problem	67
Cartridge Disk PDP-11-Compatible	69
System Gives Metal Manufacturer Control	70
Library Picks Micro Over Mini as It Automates	71
DDP Impact on User Organization Seen Major	72

MICROCOMPUTING

Pollster With Micro Gets Fast Results	73
Short Course, Workshop Set for Washington, D.C.	76

COMPUTER INDUSTRY

SBA Promises Help to Capital Seekers	77
Carter's Plans Hold Little Relief for CCIA Types	77
DEC Set to Explore New Waters With Its 2020	81
Israel Seen Good Site for DP Firms	82
Antitrust Not Stretching U.S. Resources	83
Micros Spurring Process Control Sales Abroad	84
Federal Laws Hurting Spending for Medical DP	86



What does SyncSort DOS have in common with our OS sort?

(Better performance than
anything IBM can offer!)

Call (201) 568-9700.

Ask for a
personal
introduction.

OVERSEAS REPRESENTATIVES —

Brussels CAP/GEMINI Belgium
Dusseldorf CAP/GEMINI GmbH
Geneva CAP/GEMINI Switzerland
Hague CAP-GEMINI/PANDATA
Johannesburg Computing Benefits Ltd
London GEMINI Ltd
Melbourne Shell Oil Co. of Australia
Milan SYNTAX
Paris CAP/SOGETI PRODUCTS
Stockholm BRA
Tel Aviv ADVANCED TECHNOLOGY Ltd
Vienna CAP/GEMINI GmbH



WHITLOW

COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

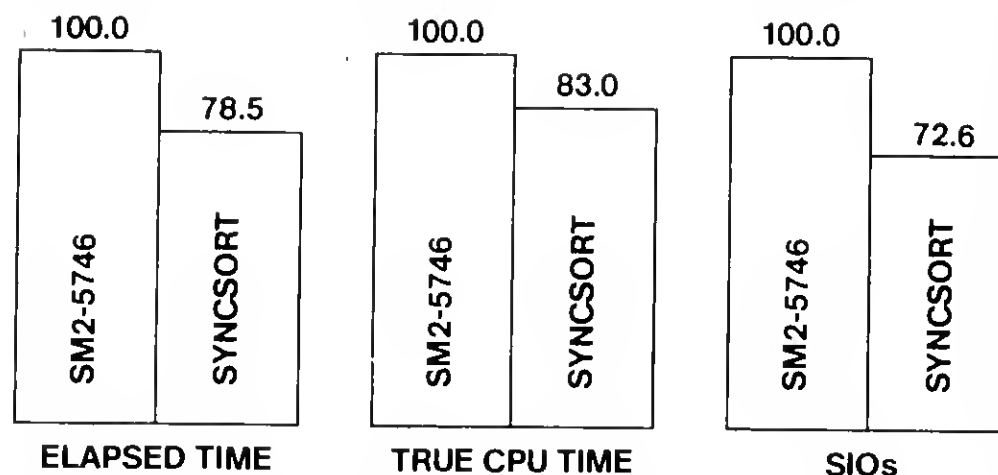
How time flies! Just a few years ago, SyncSort for OS and OS/VS was an unknown young understudy to the then reigning *Diva* of the day, a slightly overweight IBM sort. Would our promising young protégé ever get the big break she needed?

We decided to help make that happen. We set up a series of exhaustive "auditions" that matched SyncSort against the Lady from IBM in every role in the sorting repertory.

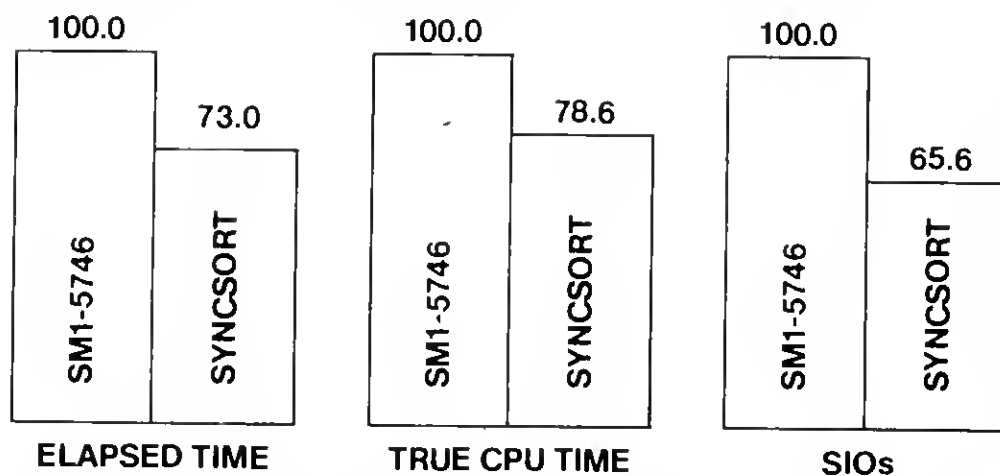
The rest, of course, is history. When word began to spread around the circuit that SyncSort simply did more sorting work at less cost in machine and human resources, the sorting public began to queue up. Today, SyncSort plays the top role in over half of all OS and OS/VS installations.

But what about SyncSort DOS and DOS/VS? Would it have that kind of success against all that competition from IBM? We decided to bite the bullet and find out.

First we tested DOS/VS against the Computer Giant's leading lady, which happens to be SM2-5746 — the "top of the line" sort for DOS/VS. Well, it came as quite a shock to us, but the "top of the line" is apparently not that high. Because SyncSort did a lot more sorting, for a lot fewer resources, in every single category:



Okay, we thought, maybe we made a mistake. Maybe SM2 isn't the best the Giant has to offer. So we took a look at SM1-5746. Here are the results:



Yes, we did a full matrix of tests against all those other IBM sorts for DOS and DOS/VS — the whole thundering herd of them. (Think *quality*, IBM, not *quantity*!) But the results were just more of the same. Our test crew said it was like being trapped on a down escalator.

So we think we may have another winning sort on our hands, and we think you'll think so, too.

Particularly if you like talented performers, with trim lines and no horns on their heads.

IBM 3270-Compatible Units Star at Interface 78

By Ronald A. Frank
CW Staff

LAS VEGAS — CRT systems compatible with the IBM 3270 led the terminal products introduced at the Interface 78 conference here last week.

Memorex Corp. introduced two controllers and a line impact printer for use with its 1377 CRT terminal. The 1371 remote controller and 1372 local controller were described as interchangeable with the IBM 3271 and 3272 control units.

Each controls up to 32 devices, which can be a mix of CRTs and printers, to configure a 3270-compatible system that can be attached to IBM 360, 370 or System/3 CPUs, Memorex said.

Also introduced was the Model 2089 printer, which Memorex said is functionally equivalent to the IBM 3288 and 3289 printers. The 2089 is also interface-compatible and software-compatible with the IBM 3284 and 3286 printers, the firm said.

The printer uses a flexible print belt with individually replaceable slugs and operates at speeds up to 410 line/min. The 2089 costs \$8,000 or \$209/mo on a two-year lease.

The 1371 remote controller configured for an eight-terminal system costs \$6,050 or \$190/mo on a two-year lease. The 1372 is priced at \$207/mo or \$6,800 for an eight-terminal local mode system. Device adapters for eight additional lines costs \$779 or \$53 mo.

Raytheon Data Systems Co. upgraded its PTS-1200 CRT terminal

system with the Mark I and Mark II configurations. The Mark I includes a processor with 64K bytes of main memory and a 10M-byte disk storage system. Up to eight CRTs can be supported with various printers, tape drives and card readers, according to a spokesman.

The Mark I supports both binary synchronous and IBM's Synchronous Data Link Control (SDLC) protocols and includes IBM 3270 emulation. A typical four-terminal system costs less than \$850/mo on a three-year lease, the spokesman said.

The Mark II supports up to 24 CRTs and has a processor that includes 128K bytes of storage. The system handles up to 20 I/O device connections in addition to the terminals, including the 600 line/min Model 3306 printer, 80M-byte storage module and Model 3910 magnetic tape transport, the firm said. The Model 3306 printer costs \$23,489 with controller or \$496/mo on a three-year lease. The Model 3820 costs \$35,000 or \$709/mo while the 3910 is priced at \$23,000 or \$750/mo.

The Mark II also handles bisynchronous and SDLC protocols; a typical 16-terminal system leases for \$2,625/mo on a three-year basis.

The SDLC capabilities introduced for the Mark I and II support batch and interactive transmissions on a phone line. Package net software called DMEP II and Raypack will be added, Raytheon said, to allow the PTS-1200 to operate under the X.25 protocol on existing and planned public packet

data networks.

Raytheon also introduced a downline terminal control feature that allows a PTS-1200 system to monitor and control Raytheon CRT nets running under 3270 protocols. A Teletype concentrator is said to allow users of large teleprinter nets to consolidate message traffic on PTS-1200 phone lines, the company said.

Other software for the PTS-1200 includes an enhanced editor for use of IBM TSO functions, a downline program loading routine and a remote debug feature for program patching of software routines.

TI Smart System

Texas Instruments, Inc. showed its 774/1 intelligent terminal system and debuted software for the 990 processor family. The 774/1 was designed for data entry and inquiry/response applications in distributed processing nets. The CRT-based system uses diskette storage and an extended version of the TPL 700 programming language.

IBM 3780 and teletypewriter emulation packages are available on the CRT system, a spokesman noted.

A hardware configuration of the 774/1 includes a 64K-byte processor, CRT, dual diskettes and two communications ports. This system costs \$12,950. A basic software version is also priced at \$12,950.

TI also added RPG-II software to its DS990 systems and an IBM 3780 emulator to the FS990 and the DS990 systems. An entry-level DS990 system with RPG-II costs about \$29,900, the company said.

Tektronix Showings

Tektronix, Inc. showed its 4020 series of CRT terminals that includes the 4025 and 4024. The terminals, designed that includes 4025 and 4024. The terminals, designed for the alphanumeric user who needs graphics capabilities, can copy up to 53 lines of screen information using the 4631 hard copy unit.

The 4024 with alphanumeric capability costs \$2,995; the 4025, with combined graphics and alphanumeric features, is priced at \$3,595.

Digi-Log Systems, Inc. of Horsham, Pa., introduced an upgraded version of its Microterm II terminal with Isam file control software and increased diskette storage. The intelligent terminal costs \$7,500.

Beehive International of Salt Lake City introduced its B152 CRT with detachable keyboard. The unit costs \$1,595.

Beehive also unveiled its B160 CRT, designed to interface with Admins software and the Digital Equipment Corp. hardware data base management system. The B160 costs \$1,850.

Exhibitors Unveil Variety Of Modems, Network Aids

By Ronald A. Frank
CW Staff

LAS VEGAS — Manufacturers brought out a variety of modems and network aids at the Interface conference here last week.

Penril Corp., Rockville, Md., introduced the 2400 DCM diagnostic-controlled modem. The 2,400 bit/sec unit includes centrally controlled integral diagnostics for operation in 2,400 bit/sec point-to-point and multipoint networks.

Designed for the user who has 10 to 20 modems, the 2400 DCM is said to avoid the investment of technical control centers by testing and controlling transmission functions. Testing and control of remote site functions are performed over a secondary channel from the central site so no additional test equipment is required, the company said.

The 2400 DCM includes features that allow the user to check the status of the network without operator assistance at remote locations. Tests included with the unit are analog loopback, line loopback, digital loopback, modem self-test, on-line monitoring, remote-controlled end-to-end testing and antistreaming shutdown, both automatic and manual.

The 2400 DCM costs \$1,650 for a central site configuration and \$1,350 for a remote site installation.

DMW Group, Inc. of Ann Arbor, Mich., announced the availability of its network design tools on the Tymnet data network. The software programs allow users to configure and fine tune their private-line nets by determining the least cost network options

Major tariff changes are covered by program updates so that users can track network options as needed. The programs include an on-line tariff guide for computing comparative prices for domestic carrier service. Response 1 and 2 are interactive programs for analyzing multipoint lines. The Network Design & Management System (NDMS) calculates optimum network layouts and produces rate tables and other parameters that enable the user to evaluate the operation of the network.

Basic charges for the full NDMS for a six-month period is \$650 plus 40 cents per Tymnet resource unit.

Comdata Corp. of Skokie, Ill., showed its dual modem unit designed to replace Bell 202 and 113B data sets.

Called the 330-2R-0, the unit provides smaller installations with features previously available only to larger sites, the firm said. The auto-answer modems for dial-up applications cost \$170 per modem plus a basic \$150 for the circuit board enclosure.

Western Union Information Systems of Mahwah, N.J., exhibited its System 4100/2 statistical multiplexer, which can operate with both synchronous and asynchronous applications. Using dual microprocessors, the multiplexer statistically multiplexes data from two 1,200 bit/sec asynchronous lines and one 4,800 bit/sec synchronous line over a 4,800 bit/sec facility. An advanced data link protocol with automatic repeat request is used for data reliability, the company said.

A typical system made up of four synchronous and 16 asynchronous lines, operator panel with keypad and display costs about \$10,000.

Look Into Johnson Systems'

CICS/VS UTILIZATION MONITOR AND CHARGEBACK SYSTEM



"Now, a powerful data collection system that lets you accurately account for and equitably bill for all resources used by each user."

"The first feasible alternative to Performance Analyzer."

Send me your brochure about the new CICS/VS UTILIZATION MONITOR and CHARGEBACK SYSTEM

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone (____) _____

Computer _____

Operating System _____

C313



**Johnson
Systems, Inc.**

8400 Westpark Drive
McLean, Virginia 22101

(703) 893-8700

Cutting Back in Light, Heat

Coal Shortage Not Crippling DP Sites — Yet

By Ann Dooley
CW Staff

Computer centers in coal-dependent areas continued to hold their own against dwindling coal supplies as the United Mine Workers' strike carried

on into its fourth month last week.

Although usage curtailments and power reductions occurred in those areas most affected by the strike, most installations cut back by turning off lights and lowering heat — not by re-

ducing computer use.

The consensus among several computer users in West Virginia, Ohio and Maryland was that power to DP centers would be reduced only after much larger cutbacks in hours, general workload or labor had occurred in other parts of their companies.

"Heavy industry gets hit first and we use just a fraction of that power," according to the DP manager of a West Virginia manufacturing company.

But most DP personnel remained unsure of what would happen in their near future. No one could predict how long the nonunion coal supplies being bought by the utilities would last or what the outcome would be as Presi-

dent Carter invoked the Taft-Hartley Act.

"We've done everything we can and now we're just sitting back waiting," according to Bob Hubbard, DP spokesman for the Union Carbide Corp. of Charleston, W. Va.

Edward Sloane, vice-president of Wheeling Dollar Savings and Trust Co. of Wheeling, W. Va., said the local utility company was thinking of cutting voltage by 5% and "that's putting us on the very margin of what we can work with."

If usage curtailment goes much past the 30% level, the bank may have to reduce computer processing time by eight hours each day, Sloane said.

IBM Eyeing Retail Stores

(Continued from Page 1)

sites have also received extensive publicity in the general media, especially on radio.

Industry Sources Skeptical

Partly because of these differences between the old and new demonstration centers, some industry sources have expressed skepticism about IBM's professed disinterest in retailing the 5110 at present. They called the latest centers evidence that the firm is at least toying with the idea of retailing the 5110 and perhaps its other small business systems.

Although he declined to speculate about IBM's long-range marketing intentions, William Grinker, executive vice-president of American Used Computer Corp. here, noted that two industry phenomena have forced IBM and other established hardware vendors to consider alternate avenues for distributing their small business systems.

The first of these phenomena is growing user sophistication. Until a few years ago, executives of small and medium-sized business lacked a strong technical grasp of computers and thus were often intimidated by them.

As a result, potential small systems users seldom initiated inquiries about computer hardware, and vendors had to aggressively recruit almost all their customers, Grinker said.

During the last few years, however, the computer-shy users have begun to give way to a new breed of small systems customers who are confident of their computer literacy and increasingly insistent in their demands for both hardware performance and economy, Grinker said. The presence of this growing generation of aggressive users is making retail stores an economically viable means for small systems suppliers to distribute their products, he added.

The other phenomenon that has prompted small systems vendors to re-examine their distribution methods deals with economics. "For a long time, IBM had control of computer technology, but a few years ago that control fell into the hands of other people like overseas vendors and semiconductor manufacturers," Grinker said.

Since then, hardware prices have dropped steadily, and competition among suppliers to cut prices still further has intensified.

To maintain high profit margins under these circumstances, vendors have been forced to redouble their efforts to hold down operating overhead, Grinker said.

If IBM does someday formally enter the retail field, the move will probably have a profound impact on companies that retail primarily to the most sophisticated small systems users, Grinker said.

"When a business depends on a com-

puter, it needs to be able to get service for that system within two or three hours," he explained. "It's highly unlikely that companies that already retail \$10,000 to \$15,000 systems to small and medium-sized businesses would be able to match IBM for service and reliability."

SHADOW II SHAVES ANOTHER 30% OFF ON-LINE APPLICATION PROGRAMMING TIME

On-Line Screen Map Generation is a new feature just introduced for the Shadow II TP Monitor.

It eliminates the coding of 3270 screen definitions by producing them for you from the screens you design at the tube.

The Cobol Command Language has been enhanced, Logging and Recovery is enhanced, also new testing aids and new documentation.

Shadow II version 2.1 continues to make TP applications development for IBM 360/370 users easier and easier. But then what would you expect from the world's fastest-growing TP Software Company?

Return the coupon to Altergo Software Inc., 55 William Street, Wellesley, Massachusetts 02181. Telephone (617) 237-6132, or telephone your nearest Regional Office for more information.

New Jersey	(201) 224-8080
Chicago	(312) 259-8373
Atlanta	(404) 482-8827
Dallas	(214) 233-2414
San Francisco	(415) 332-4125
Montreal	(514) 769-4158

Shadow II
The World's most advanced TP Monitor
altergo

Please send me the
Concepts and Facilities Manual right away.

Name _____

Title _____

Organization _____

Address _____

Zip _____ Phone _____

My computer is IBM _____ Op. System _____

Present TP Package _____

Our need is ☐ immediate

☐ 3-6 months

☐ over 6 months

GAO Demonstrates Security Gaps at SSA Site

(Continued from Page 1)

(D.Conn.) stated, "Too many of our citizens rely on Social Security — and too much money is involved — for careless security procedures.

"I am frankly shocked at such lax security at such a major federal installation. HEW [the Department of Health, Education and Welfare] spends more than any other federal agency," Ribicoff warned Joseph A. Califano, Secretary of HEW, which includes the SSA. "There must be a greater concern in seeing to it that the department's computer security programs are strengthened," the senator said.

SSA last week had "no comment" on the compromise of its computer operation by the GAO auditors.

"Unauthorized personnel have access to the computer room and tape vault. Magnetic tapes, disk packs and other property can be removed without proper authorization, and blank and valid Social Security and Medicare cards can be taken from the central computer facility without question," Curtis said in his letter to Wortman.

"Considering the overall impact So-

cial Security has on millions of Americans and the results which would occur if its central computer facility's operations were interrupted, we believe that more effective controls and security procedures must be established to protect both Social Security records and property and the privacy of the American people," Curtis added.

Part of SSI Review

GAO auditors investigated SSA's internal computer controls between Jan. 23 and Feb. 3 as part of their review of the Supplemental Security Income (SSI) system, which issues benefit checks to blind and disabled citizens.

They found, for example, that the central computer facility's turnstiles permit entry and exit at the same time once they have been activated by a security badge. As a result, several people can go in or come out of the center on a single admission authorization.

Two GAO auditors got into the center with one security badge and without being noticed by the security guards, who weren't in direct view of the turnstiles.

Temporary badges, which can be obtained by an authorized individual and then distributed to people not normally permitted access to the computer center, provide another means of entering the operation. While personal identifiers — such as Social Security number, name and organization — are required when a temporary badge is issued, the automated security system isn't programmed to make sure only one valid badge exists for every authorized person at any point in time.

During its investigation, the GAO team successfully admitted a GAO auditor who was not authorized to be on the SSA computer site.

Security guards seldom match permanent authorization badge pictures with the person trying to enter the center. If an authorized person permits it, unauthorized people can easily get into the computer center, the GAO auditors concluded.

Unauthorized Exits

Inside the center, unauthorized exits can be made without alarming the security guards by simply removing the screws of the electromagnetic connectors on each of the doors. Opening the door will then fail to break the circuit in the connector, so no alarm will sound to alert the guards.

Again, a GAO auditor demonstrated this flaw in the security system by taking Social Security property through one of the opened emergency doors without the security guards' knowledge.

Effective controls also need to be established regarding the removal of magnetic tapes and disk packs from the central SSA computer facility, Curtis said.

The GAO auditors were able to remove an entire cart of 38 tapes — two segments of the SSI master file — from the facility. In addition, they were able to smuggle tapes out in their brief cases and lunch containers and to remove tape dispatch passes for use in obtaining still more tapes.

The GAO recommended that SSA stop using tape dispatch passes and use a transmittal sheet instead, which would show authorization for removal of tapes and disks. Furthermore, both the SSA's tape library control section and security guards should be required to reconcile the number of tapes being removed by serial number, the audit agency said.

Security guards should always search notebooks, lunch containers and brief cases of people entering and leaving the computer facility, the GAO added.

"Social Security has not developed a comprehensive approach to securing the central computer facility, and no formal in-depth study detailing security requirements and ways to meet them has ever been made."

Curtis pointed out that a July 1976 Mitre Corp. report on SSA security warned that most of the agency's physical security measures had been implemented on a piecemeal basis. "We agree with this finding and believe that the new automated security system is the latest example of this practice.

"No in-depth risk-analysis has been performed to determine what security procedures should be established, and furthermore, no overall structured approach has been developed for securing the central computer facility," Curtis added.

Earn a Syracuse University degree through independent study.

Only eight days on campus each trimester.

Study wherever you are. A unique educational opportunity from a fully accredited university

BA in Liberal Studies

BS in Business Administration

Selected graduate degrees also offered

For information, write:

ISDP, Room 4F 610 E. Fayette St.
Syracuse, N.Y. 13202
(315) 423-3269

Witness's Testimony Barred

(Continued from Page 1)

Furthermore, the Memorex attorneys argued they had to start somewhere in the company since "you are not very likely to find the president putting memos in the file" on such matters.

In addition, the Memorex attorneys noted that Cunningham addressed the subject with the man in charge of IBM's disk drive program, who did have profit-and-loss authority for that program.

Purpose of IFA

Cunningham was, however, allowed to answer questions relating to the development of Integrated File Adapters (IFA), and other practices at IBM. He indicated, for example, that IBM's strategy for attaching disk drives with IFAs was for the purpose of making it "extremely difficult for a competitor to IBM to attach a computer product to the central computer unit" and that "the structure and method of the attachment strategy was to make it both physically and economically impossible to compete in the disk file area with IBM."

However, Cunningham said, the corporate legal department would not approve the strategy, apparently since it was couched in anticompetitive terms, and the following exchange took place on the stand:

"Q. Mr. Cunningham, after you learned that corporate headquarters had not approved the new attachment

strategy, what was done in San Jose?

"A. We had a series of meetings to prepare justifications for the strategy.

"Q. Was there any change in the strategy itself?

"A. No."

Cunningham said the strategy was developed "in terms of its anticipated effect on competition ... and how it would affect competitors."

When corporate legal counsel rejected that approach, Cunningham said "we were asked to prepare justifications for corporate headquarters insofar as potential customer benefits that could be derived after we put together the strategy itself."

In another area, Cunningham also testified that IBM designed the Fixed-Term Plan (FTP) — its first long-term lease arrangement — in order to lock customers into its products and to exclude competition.

The FTP was designed, he said, only for products in areas where IBM had competition.

Later, Cunningham said, when he informed management that he did not feel FTP was working, managers showed him a study of Memorex which indicated the FTP was having its effect and would cause Memorex to have a deficit and reduce its capability to get new financing.

The management at IBM's disk facility said the pricing actions on the part of IBM would drive Memorex to bankruptcy, he added.

OSha?

A single employee OSHA claim could demand a staggering quantity of workstation and medical data, that old-style payroll/personnel systems cannot provide.

Wang has a software system for IBM/Burroughs/Honeywell/Univac systems that can handle this problem.

For more, call Joe Nester (617) 851-4111, Wang Laboratories, Inc., Lowell, MA 01851.

WANG

Announcing OPTIMIZER III: Help at last for your most valuable system resource.

From Capex, a dramatic new approach to COBOL programming

Programmers need all the help they can get. Each day, the demand for more programs, better programs, grows.

Now at last, there's an answer. It's an exciting new program product we call OPTIMIZER III. If you use COBOL and any of the IBM OS, VS1, SVS or MVS operating systems, OPTIMIZER III can help you produce more reliable, more efficient systems... on time... at lower cost.

Works With Your Programmers

By providing key information in easy-to-use form, the new OPTIMIZER III works with each COBOL programmer to help produce better programs faster and easier. You get more programming capacity, more system capacity, better program quality.

OPTIMIZER III goes to work for you in three critical areas:

1. Expands Programming Capacity

OPTIMIZER III takes the guesswork out of programming. It shows the programmer exactly what the program did or didn't do, what was tested and what wasn't, and where opportunities exist for improving performance. It speeds program debugging by virtually eliminating the need for cryptic hexadecimal dumps. It helps you design, develop and maintain more efficient, more reliable programs

with less programmer time and effort. You get the capacity you need to develop more programs.

2. Improves Program Reliability

OPTIMIZER III shows the programmer exactly what the program does. It helps you find hidden logic problems and ensures adequate testing before the program goes into production.

If a production program does fail, OPTIMIZER III provides the information needed to quickly diagnose and correct the problem. Result: fewer program failures, fewer missed schedules.

3. Stretches System Performance

Programs compiled with OPTIMIZER III are smaller and faster, thanks to proven automatic object code optimization. Turn-around time is improved. Programs are developed using fewer compiles, fewer test shots. Printing time is reduced. Less time is lost to program failures and reruns. Overall system capacity is expanded and performance is improved.

Results Available Immediately

With OPTIMIZER III, you get more programming capacity, more system capacity, better program quality. And you get them *immediately*. Without changing systems. Without costly retraining. Without increasing costs.

You can have new OPTIMIZER III working for you literally in a matter of minutes. To find out how, write or call now: (602) 264-7241.

CAPEX CORPORATION
Atlanta (404) 261-3553
• Boston (617) 329-6170 •
Chicago (312) 596-6550
• Dallas (214) 238-7191 •
Los Angeles (213) 923-9216
• New York (201) 262-8888
• Other offices worldwide.

Capex Corporation
2613 N. 3rd St., Phoenix, AZ 85004

Gentlemen:

Please send me more information
on OPTIMIZER III.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

Model _____

System ☐ MFT ☐ MVT ☐ VSI
☐ SVS ☐ MVS

BY _____



He Took the Money — \$100,000 — and Ran

JERSEY CITY, N.J. — A keypunching error made by an employee at the Commercial Trust Co. here has allegedly netted a 55-year-old coin dealer \$100,000 in cash and treasury notes.

The money is gone — withdrawn — and so is the coin dealer, officials said.

Charles Walsh vanished allegedly after receiving his monthly bank statement that showed a balance of \$100,085 instead of the \$85 that he had actually accumulated, a spokesman explained.

The error apparently occurred when an operator hit the wrong key

on a keypunch machine, diverting two \$50,000 deposits from a commercial account into Walsh's savings account. The \$100,000 should have been deposited into an account with a bank number one digit different from Walsh's.

A warrant has been issued for Walsh, charging him with failing to appear in court when summoned on charges of defrauding the bank.

The error was discovered by bank personnel during a routine check of transaction records, the spokesman said. Police and bank officials refused to elaborate any further pending an investigation.

Two Software Packages Back Electronic Messaging

(Continued from Page 1)

Both vendors claimed the same basic advantages over conventional phoned messages and letter mail. Phone calls may allow immediate interchange of ideas, they admitted, but only if the intended recipient is available at the phone location called.

Speed is the big advantage over the mails, according to a CCA spokesman who "clocked" the time it took a memo, which required one revision, to take shape and travel from his office to the person he wanted to reach in CCA's Washington, D.C., office. That process took seven days, most of which was spent within his own organization, he noted.

In contrast, 10 minutes using Comet achieved the same results, he claimed.

User Structure

OSI's Messenger provides more structure for the user than does Comet. The OSI package supports a preformatted screen for an IBM 3270 CRT terminal, allowing the user to fill in the subject, the destination or destinations and the text of the message, as well as its priority and an indication of whether delivery is to be immediate or "as wanted" by the recipient(s).

Comet, by contrast, allows the user to format messages as he wishes. It also supports "local" editing of a message text before the text is sent to its destination.

Messenger allows modification of a text, but this apparently can be done only by retrieving it from the recipient's files or queues, reworking them and retransmitting them to whatever recipients are then appropriate.

Comparable Services

The packages appear comparable in the services they provide to recipients, including primarily the ability to scan the messages in the electronic mail boxes and choose the ones to be displayed in full at any given time.

The display/printout summarizing messages on hand under either system shows each recipient the sender, subject — if the sender provided one, the time and the date each message was sent. Either in the scan display or in the messages themselves, recipients can determine if there were multiple addresses for a given message and, under Messenger at least, who has already responded to it.

Link to Applications

One capability available under Messenger and apparently not under Comet is an interface with application programs so output from a program can be handled as if it were being input by a terminal operator. Messenger users can link into the system through a simple CALL operation, OSI said.

Messenger also provides a centralized control mechanism through which the status of terminals in the system can be changed, from receive-only, for example, to receive-and-transmit.

Messenger functions under "almost any version" of CICS, although OSI hasn't yet implemented it in a CICS-Entry environment. It will work under DOS, OS, DOS/VS and OS/VS and under CICS/360 or CICS/VS, the spokesman added.

The resident program requires about 9K bytes plus room for tables handling such chores as equating symbolic address names to real physical locations.

Cost of Packages

Messenger costs \$18,000 or \$600/mo under a 60-month lease/purchase plan that allows 50% of the least cost to be applied to equity.

Comet runs under DEC's RSX 11 on machines as small as the PDP-11/34 with 96K of memory. It can be licensed for in-house use or used on a service basis.

The in-house packaging costs \$40,000 or \$1,446/mo for 36 months, (with a charge of \$350/mo for optional maintenance). On a service basis, users tied into CCA's PDP-11 will be charged \$100/mo per billable account and \$50/mo for each user within that account. That covers seven hours of connect time and 500 messages stored each month, the spokesman said.

OSI is at Rt. 208 North, Hawthorne, N.J. 07506, while CCA's headquarters is at 575 Technology Sq., Cambridge, Mass. 02139.

Calcomp vs. IBM Plea Could Be Heard Soon

LOS ANGELES — The Ninth Circuit Court of Appeals, responding to briefs from California Computer Products, Inc. and IBM, has indicated Calcomp's appeal in that case may be heard here this spring, sources said.

After Judge Ray McNichols granted IBM's motion for a directed verdict, dismissing the case for lack of evidence, Calcomp filed a request for an expedited appeal; IBM then countered. The court has received a total of five briefs.

But getting a hearing and a ruling may be two different achievements, the sources noted. That same appeals court pondered the Greyhound case for about four years before ordering it back to a lower court for a full trial.

Perhaps the most dynamic franchise opportunity since fast food burgers.

A National ComputerLand Retail Franchise

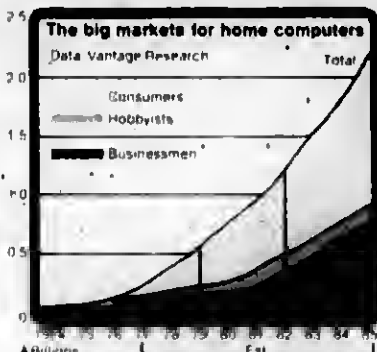
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising. . . And more.

THE QUALIFICATIONS Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 35 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Mail to E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW
San Leandro, CA 94577 (415) 895-9363

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

Introducing the 6880... Our Answer to the 2880

Before you add or replace an IBM 2880, take a look at the new CIG 6880 Block Multiplexer Channel. It's got some pretty impressive credentials.

Just like the IBM unit, our 6880 increases your throughput by increasing the flow of data into and out of the CPU during a specific time segment. The 6880's maximum data transfer rate is 1.5 million bytes per second.

The 6880 is cable-connected to 370/168 and 370/165 systems, and no modification of IBM hardware or software is required. It utilizes the latest available technology, including Shottky low-power T²L integrated circuits. It's extremely reliable and simpler to maintain than other such units.

Up to six 6880 Block Multiplexer Channels can be attached to an IBM 3165 or 3163 CPU on a standard basis. Up to eleven with the Extended Channel Feature of the CPU. And once it's connected, the 6880 performs the exact same functions as the IBM 2880, but more efficiently.

The 6880 is less than one third the size of the IBM 2880. It requires one quarter the power

to operate, and generates one quarter the heat.

Most important, a CIG 6880 is priced well below an IBM 2880. And, that saves you even more money. The price of a 6880 also includes the advanced technical support and reliable maintenance backup services of CIG, a leader in the independent computer products field.

Get the full 6880 story, including details of our flexible lease/purchase plans, before you decide which block multiplexer channel is the best investment for your hardware dollar. We think the advantages of the new CIG 6880 Block Multiplexer Channel will help you make the right decision.

CIG

A Subsidiary of Computer Investors Group, Inc.
16th Floor
488 Madison Avenue
New York, New York 10022
Listed, American Stock Exchange

Call CIG at (212) 753-0845.

Senators, Sipi Also Urge OTA to Study NCIC

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Three senators recently joined Representatives Peter W. Rodino Jr. (D-N.J.) and Don Edwards (D-Calif.) in their request that the Office of Technology Assessment (OTA) study the Federal Bureau of Investigation's (FBI) criminal justice information systems.

Senators James Abourezk (D-S.D.), Birch Bayh (D-Ind.) and James O. Eastland (D-Miss.) asked OTA for "a full-scale assessment and evaluation" of the National Crime Information Center (NCIC) and FBI plans to operate a central message-switching center between state and local police agencies through the system.

As the chairmen of the Senate Subcommittee on Administrative Practice and Procedure, the Subcommittee on the Constitution and the Judiciary Committee, Abourezk, Bayh and Eastland expressed concern about the constitutional and privacy issues involved in the storage and retrieval of Computerized Criminal History (CCH) files.

Meanwhile, the Scientists' Institute for Public Information (Sipi), an organization whose Criminal Justice Task Force presented testimony on NCIC in hearings before Edwards' House Subcommittee on Civil and Constitutional Rights last fall, has written to the congressman urging that "an in-depth study of NCIC" be performed by OTA, the General Accounting Office (GAO), a qualified independent organization or all three.

Sipi conducted a preliminary inspection of NCIC last August at Edwards' request and concluded that NCIC has not proved its worth as a crime-fighting tool despite 10 years of operation [CW, Sept. 12].

"The actual benefits of NCIC still remain in the area of surmise, rather than demonstrated results," according to the task force, which consists of computer scientists Daniel D. McCracken, Joseph Weizenbaum and Dr. Myron Uretsky.

During hearings held by Edwards' subcommittee, the FBI and the Justice Department said they would welcome an on-site independent audit of NCIC to satisfy such critics as Sipi, but stressed their belief that reevaluating the need for the criminal justice information system would be like questioning the need for police cars and two-way radios [CW, Oct. 17].

'Benefits Not Self-Evident'

In response to the FBI's testimony and comments regarding Sipi's preliminary report, the computer scientists said in a Jan. 6 letter to Edwards they do not believe "the recited benefits of NCIC" are "self-evident" at all.

"In considering a system which will eventually cost hundreds of millions of dollars, even apart from the political and social difficulties involved, we do not find it acceptable that the FBI calls the need for an in-depth evaluation 'questionable,'" they stated.

The Sipi task force pointed out that the FBI itself admitted it does not know how many positive responses it receives from NCIC in answer to state and local inquiries regarding stolen cars, missing persons and the like. Further, the bureau isn't sure what percentage of its NCIC data is "stale and incorrect" or what the dimensions of

its data base would be if it were to provide on-line, state-to-state access through centralized message-switching, as it hopes to do, the scientists said.

Not only is a study called for in light of these facts, they contended, but the work needs to be done "by sophisticated computer professionals."

While they applauded the FBI's willingness to have the GAO establish an on-site auditor for NCIC, the Sipi scientists reiterated the need for audits of field offices at the state and local levels to be done regularly and unexpectedly.

'Serious, Thorny Issue'

"... Some mechanism for independent auditing at the state and local level must be devised. This is a much

more serious and thorny issue than stationing a GAO employee at the [J. Edgar] Hoover [FBI] building's NCIC control room," the computer scientists stated.

"On a deeper level, very large computer systems that are added to on an ad hoc basis, an expansion here and a modification there, without long-range planning, are systems that are heading for inauditability and incomprehensibility," they warned.

Quoting from a March 31, 1977 GAO report entitled 'Vulnerabilities of Telecommunications Systems to Unauthorized Use,' the scientists wrote, "Even without penetration of the NCIC data bases, a perpetrator with adequate knowledge and equipment could intercept communications car-

ried over the NCIC circuits."

Bureau officials told the GAO that encoding techniques and devices are not used to protect NCIC traffic and that their value would be minimal because the greatest vulnerability to the system is the individual terminal operator, the Sipi task force said.

"If the system can be entered for the purpose of intercepting communications, doesn't the question also arise of a perpetrator entering incorrect data in the system, changing or erasing records or deliberately sabotaging the network?" they asked. "To mention not-so-far-fetched possibilities, could organized crime, terrorists or foreign powers attempt to disrupt criminal justice information and communica-

(Continued on Page 15)



USE FATS TO CLEAN UP YOUR TAPE LIBRARY

FATS will eliminate costly error recovery and wasted computer time due to poor quality tapes.

FATS gives you the information you need to know.

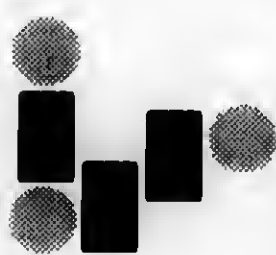
- Location of the error
- Length of all errors
- Total number of retries for each tape.

A detailed report shows which tapes should be:

...cleaned...discarded...stripped

Call or write today for your 30 day trial and compare **FATS** to your **OFFLINE HARDWARE EVALUATOR** or reports generated by **SMF** and **EREP**.

"Makers of FDR and DSF"



INNOVATION
DATA PROCESSING

970 Clifton Avenue, Clifton, NJ 07013 • (201) 777-1940

FS 990/4



Authorized Distributors

ALABAMA

(205) 837-8700 Hall-Mark Electronics—P.O. Box 1133, Huntsville, AL 35801

ARIZONA

(602) 243-4101 Kieruff Electronics—4134 Eastwood Street, Phoenix, AZ 85040
(602) 968-6181 Marshall Industries—835 West 22nd Street, Tempe, AZ 85281
(602) 272-7144 R.V. Weatherford Co.—3311 West Earle, Phoenix, AZ 85017

CALIFORNIA

(714) 979-3000 Cramer/Los Angeles—17201 Daimler Street, Irvine, CA 92705
(714) 565-1881 Cramer/San Diego—8913 Complex Dr., Suite E, San Diego, CA 92123
(408) 739-3011 Cramer/San Francisco—720 Palomar Avenue, Sunnyvale, CA 94086
(213) 884-4560 JACO Electronics (West)—21201 Oxford Street, Woodland Hills, CA 91364
(213) 685-5511 Kieruff Electronics—2585 Commerce Way, Los Angeles, CA 90040
(415) 968-6292 Kieruff Electronics—3969 East Bayshore Road, Palo Alto, CA 94303
(714) 278-2112 Kieruff Electronics—6797 Balboa Avenue, San Diego, CA 92123
(213) 999-5001 Marshall Industries—8015 Deering Avenue, Canoga Park, CA 91404
(213) 686-0141 Marshall Industries—9674 Telear Avenue, El Monte, CA 91731
(714) 558-6400 Marshall Industries—17975 Sky Park Blvd., Irvine, CA 92707
(714) 278-6350 Marshall Industries—8057 Raytheon Road, San Diego, CA 92111
(408) 732-1100 Marshall Industries—788 Palomar Avenue, Sunnyvale, CA 94086
(905) 964-6823 RPS—350 South Kellogg Avenue, Goleta, CA 93017
(213) 748-1271 RPS—1501 South Hill Street, Los Angeles, CA 90015
(714) 292-5611 RPS—7587 Conroy Court, San Diego, CA 92111
(408) 732-5555 TI Supply Company—776 Palomar Avenue, Sunnyvale, CA 94086
(213) 973-2571 TI Supply Company—831 South Douglas Street, El Segundo, CA 90245
(213) 320-0880 Time Electronics—18210 Van Ness Avenue, Torrance, CA 90504
(415) 965-8000 Time Electronics—2829 Terminal Blvd., Mountain View, CA 94043
(714) 633-9633 R.V. Weatherford Co.—1550 Babbitt Avenue, Anaheim, CA 92805
(213) 849-3451 R.V. Weatherford Co.—8921 San Fernando Road, Glendale, CA 91201
(714) 623-1261 R.V. Weatherford Co.—1095 East Third Street, Pomona, CA 91768
(714) 278-7400 R.V. Weatherford Co.—7872 Raytheon Road, San Diego, CA 92111

COLORADO

(303) 758-2100 Cramer/Denver—5465 East Evans Place, Denver, CO 80222
(303) 371-6500 Kieruff Electronics—10890 East 47th Avenue, Denver, CO 80239
(303) 761-5432 R.V. Weatherford Co.—3905 South Mariposa Street, Englewood, CO 80110

CONNECTICUT

(203) 248-3801 Arrow Electronics—295 Treadwell Street, Hamden, CT 06514
(203) 239-5841 Cramer/Conn.—35 Dodge Avenue, North Haven, CT 06473
(203) 795-0714 Milgray Electronics—378 Boston Post Road, Orange, CT 06477

FLORIDA

(305) 776-7790 Arrow Electronics—1001 N.W. 62nd Street, Suite 402, Ft. Lauderdale, FL 33300
(305) 923-8161 Cramer/Hollywood—4035 North 29th Avenue, Hollywood, FL 33020
(305) 884-1511 Cramer/Orlando—345 North Graham Ave., P.O. Box 20214, Orlando, FL 32814
(613) 443-4514 Diplomat/Southland Inc.—2120 Calumet, Clearwater, FL 33515
(305) 971-8280 Hall-Mark Electronics—1302 West McNab Road, Ft. Lauderdale, FL 33310
(305) 855-4020 Hall-Mark Electronics—7233 Lake Ellenor Drive, Orlando, FL 32609
(305) 647-5747 Milgray Electronics—1850 Lee Road #104, Winter Park, FL 32789

GEORGIA

(404) 446-9050 Cramer/Atlanta—8456 Warren Drive, Norcross, GA 30071

ILLINOIS

(312) 593-8230 Cramer/Chicago—1911 South Busse Road, Mt. Prospect, IL 60056
(312) 638-4411 Newark Electronics—500 North Putaski Road, Chicago, IL 60624
(312) 640-2964 TI Supply Company—515 West Algonquin Road, Arlington Heights, IL 60005

INDIANA

(317) 634-8202 Graham Electronics—133 South Pennsylvania Street, Indianapolis, IN 46204

IOWA

(319) 365-7551 Deeco Incorporated—2500 16th Avenue SW, Cedar Rapids, IA 52406

MARYLAND

(202) 737-1700 Arrow Electronics—4801 Benson Avenue, Baltimore, MD 21227
(301) 949-0110 Cramer/Washington—16021 Industrial Drive, Gaithersburg, MD 20878
(301) 459-2222 Milgray/Washington—9730 N. George Palmer Hwy., Lanham, MD 20801
(301) 461-2200 Technico Incorporated—9130 Red Branch Road, Columbia, MD 21209

MASSACHUSETTS

(617) 933-9130 Arrow Electronics—96D Commerce Way, Woburn, MA 01801
(617) 969-7700 Cramer/Newton—85 Wells Avenue, Newton, MA 02159
(617) 667-8331 Kieruff Electronics—13 Fortune Avenue, Billerica, MA 01821
(617) 890-0510 TI Supply Company—504 Totten Pond Road, Waltham, MA 02154

FS 990/4.

The microcomputer system you've wanted—at a price you've been waiting for.

TEXAS INSTRUMENTS.

Now you can have the high performance of the 990/4 microcomputer with the low-cost flexibility of a floppy disk, in an integrated, powerful FS 990/4 floppy-based system. It's all available at your local TI distributor.

A complete system.

The FS 990/4 is a cost-effective microcomputer package that starts for well under \$11,000.* It combines all the features and components you need to develop and execute a wide range of application programs... a 990/4 microcomputer equipped with 48K bytes of RAM, a floppy-disk ROM loader, CPU self-test feature and a full-function programmer panel. Plus a Model 911 video display terminal with detachable keyboard and added single-function keys, and a dual floppy-disk drive. All packaged in an attractive, contemporary single-bay desk. And for a surprisingly small additional investment you can



Optional low-cost TI Model 810 Printer.

add the convenience of TI's new Model 810 Multicopy Printer.

Even the software is off-the-shelf.

The FS 990/4 comes complete with an easy-to-use interactive development and maintenance software. Included is TX990, a real-time multitasking operating system with powerful floppy-disk file maintenance capabilities. You even get one full year of our software update subscription service.

Optional FORTRAN IV, too.

To simplify software development further, add TI's optional higher

level FORTRAN IV language. This comprehensive version of FORTRAN includes ISA extensions, making the FS 990/4 a performance standout among systems in this price range.

Get started now.

Delivery of the FS 990/4 microcomputer system is fast. In fact, many TI distributors offer it off-the-shelf.

- System hardware
- System software license
- User and programmer manuals
- Hardware installation

All available from your local TI distributor at one low price. Contact him today!

For information on the entire 990 Computer Family, including the FS 990/4 system, contact your nearest TI sales office or write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001. Or call Computer Marketing at (512) 258-7305.



*U.S. Domestic only
Copyright ©1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS

INCORPORATED

MICHIGAN

(313) 957-0600 Newark Electronics — 20700 Hubbell Avenue, Detroit, MI 48237
(616) 241-6681 Newark Electronics — Box 1828, Grand Rapids, MI 49501

MINNESOTA

(612) 888-5522 Arrow Electronics — 9700 Newton Avenue South, Bloomington, MN 55431
(612) 835-7811 Cramer/Minnesota — 7275 Bush Lake Road, Edina, MN 55435

MISSOURI

(618) 221-2400 LCOMP-Kansas City, Inc. — 2211 Riverfront Drive, Kansas City, MO 64120
(314) 291-6200 LCOMP-St. Louis, Inc. — 2550 Harley Drive, Maryland Heights, MO 63043

NEW JERSEY

(609) 235-1900 Arrow Electronics — Pleasant Valley Avenue, Moorestown, NJ 08057
(201) 797-5800 Arrow Electronics — 285 Midland Avenue, Saddlebrook, NJ 07662
(609) 424-5993 Cramer/Pennsylvania — 12 Springdale Road, Cherry Hill, NJ 08034
(201) 935-5600 Cramer/New Jersey — 1 Cardinal Drive, Little Falls, NJ 07424
(609) 964-8580 General Radio Supply Co. — 600 Penn Street at Bridge Plaza, Camden, NJ 08102
(201) 835-2120 Kieruff Electronics — 5 Industrial Drive, Rutherford, NJ 07070
(609) 424-1300 Milgray/Delaware Valley — 1185 Markess Road, Cherry Hill, NJ 08034
(201) 382-8400 TI Supply Company — 301 Central Avenue, Clark, NJ 07066

NEW MEXICO

(505) 243-4566 Cramer/New Mexico — 2480 Alamo S.E., Albuquerque, NM 87106

NEW YORK

(516) 694-6800 Arrow Electronics — 900 Broad Hollow Road, Farmingdale, NY 11735
(914) 896-7530 Arrow Electronics — Old Route 9, Fishkill, NY 12524
(616) 231-5800 Cramer/Long Island — 29 Deer Avenue, Hauppauge, NY 11787
(716) 275-0300 Cramer/Rochester — 6000 South Winton Road, Rochester, NY 14623
(315) 437-6671 Cramer/Syracuse — 6716 Joy Road, East Syracuse, NY 13057
(516) 549-8000 Milgray Electronics — 191 Hanse Avenue, Freeport, NY 11520
(716) 454-7800 Rochester Radio Supply Co. — 140 West Main Street, Rochester, NY 14603
(516) 273-5100 JACO Electronics/East — 145 Over Avenue, Hauppauge, NY 11787
(607) 754-1670 Wadsworth Electronics — 10 Hooper Road, Endwell, NY 13760

NORTH CAROLINA

(919) 725-6711 Cramer/Winston-Salem — 938 Burke Street, Winston-Salem, NC 27102
(919) 832-4465 Hall-Mark Electronics — 3000 Industrial Drive, Raleigh, NC 27609

OHIO

(216) 464-2000 Arrow Electronics — 23500 Mercantile Road, Cleveland, OH 44122
(513) 253-9178 Arrow Electronics — 3100 Plainfield Road, Kettering, OH 45432
(216) 248-8400 Cramer/Cleveland — 5835 Harper Road, Cleveland, OH 44139
(513) 226-1133 ESCO Electronics — 221 Crane Street, Dayton, OH 45403

OKLAHOMA

(918) 582-8272 TI Supply Company — P.O. Box Cramer "T", 12151 E. Skelly Drive, Tulsa, OK 74126

OREGON

(503) 292-3534 Almac/Strom Electronics — 4475 SW Scholls Ferry Rd., P.O. Box 25444, Portland, OR 97225

TEXAS

(713) 652-4700 Harrison Equipment Co. — 1616 McGowan, Houston, TX 77004
(713) 778-6511 TI Supply Company — 8600 Commerce Park, Houston, TX
(214) 238-6830 TI Supply Company — 6000 Denton Drive, Dallas, TX 75235
(713) 688-7406 R.V. Weatherford — 3500 West T.C. Jester Blvd., Houston, TX 77018

UTAH

(801) 486-3371 Standard Supply Co. — 3424 South Main, P.O. 151250, Salt Lake City, UT 84115

WASHINGTON

(206) 763-2300 Almac/Strom Electronics — 5811 Sixth Avenue South, Seattle, WA 98106
(206) 575-0907 Cramer/Seattle — 1059 Andover Park East, Tukwila, WA 98188
(206) 575-4420 Kieruff Electronics — 1005 Andover Park East, Seattle, WA 98188

WISCONSIN

(414) 764-6600 Arrow Electronics — 434 West Rawson Avenue, Oak Creek, WI 53154

Real-Time System Rounds Up Rodeo Scores

By Jeffry Beeler
CW Staff

BOZEMAN, Mont. — A computerized scoring system is helping to minimize delays and eliminate errors in reporting the results of high school and college rodeo competitions throughout the western U.S.

As soon as a contestant completes a round of competition, rodeo officials enter the individual's score into the system through a variety of teletype-writers and other remote data entry devices. The information is sent by a 300 bit/sec modem to Montana State University (MSU) here, where a Hewlett-Packard Co. 2116B records the score and compares it with previous results from the same event, according to Nicholas K. Shrauger, an MSU assis-

tant professor of electrical engineering and one of the system's originators.

The system then tentatively ranks each competitor according to his score and outputs the resulting standings on an HP 7900 printer back at the rodeo site. With each succeeding contestant, rodeo officials repeat the score-entering process, and the system places the individual's name in the appropriate spot in the revised competitive rankings.

At the end of the event, the system automatically generates a list of final standings. This process continues throughout the rodeo until the system has produced final standings for every competitive event in the program.

While the system is calculating each contestant's rankings, it is also totaling

all the individual scores for each team to produce final team standings in each event.

Season Standings

At the end of the rodeo, the system adds all the individual and team scores from each event to the results of competitions held earlier in the season. From the resulting cumulative totals, the system can determine the season's standings for both individual competitors and teams in each rodeo event.

Thus, during subsequent rodeos, the system can update the season's standings in real time simply by adding new scores to the previous totals.

Shrauger described the configuration as the first real-time rodeo scoring system in the country. Since its develop-

ment in 1971, it has served more than 20 amateur rodeos, including 11 national championships, for both the National Intercollegiate and High School Rodeo Associations.

Perhaps the high point thus far in the system's service occurred last August at the High School Championship Finals in Helena, Mont., where the configuration kept score for 1,131 contestants and 1,325 entries, Shrauger said.

Before they adopted the current system, rodeo officials kept track of scores and standings by hiring secretaries to manually record all competitive results as they occurred. In most instances, a different secretary was assigned to oversee each event, and officials later analyzed the results to determine individual and team winners, the engineering instructor explained.

Under that system, however, rodeo officials often could not identify the top finishers in each event until two or three hours after a competition had ended; even after a lengthy delay, scoring errors frequently occurred.

"At one rodeo several years ago in Helena, I watched the officials award a trophy to one individual and then take it away from him and give it to another competitor because they had suddenly discovered an error in the scoring," Shrauger recalled.

Shrauger attributed the frequent delays and miscues to the complexity of rodeo scoring. In high school, for example, a typical rodeo consists of 12 events, each of which in turn consists of several competitive rounds.

Under the earlier scoring system, rodeo officials not only had to keep track of all the results from each of the 12 events, but also had to manually analyze the accumulated data to determine standings and winners. To make matters worse, they also had to manually figure the final scores from each rodeo into the season's standings.

Undergrad Project

Not long after the embarrassing Helena episode, Shrauger concluded that rodeo officials could simplify their monumental scoring problems by replacing their manual bookkeeping methods with a computer system. He broached the idea to a local rodeo organization and, after the membership gave its approval, he assigned the task of developing the system to his undergraduate students.

As part of their project, the students wrote, debugged, maintained and documented all the programs for the configuration, Shrauger said.

Because of the system they eventually developed, rodeo officials have been able to report scores and standings usually within three or four minutes of the time a contestant completes each competitive round. With the previous scoring method, the delay was often hours, Shrauger noted.

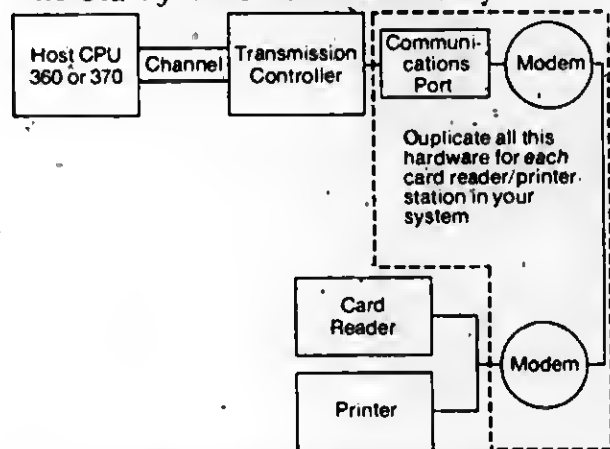
This decreased lead time enables television and radio sportscasters to inform their audiences of new scores and changing leads almost as soon as they happen, he added.

Since it began operating about seven years ago, the system has undergone several enhancements that allow it to perform functions other than just scoring. In 1972, students programmed the system to randomly draw starting positions and riding stock for each rodeo competitor.

RJE goes local; effectiveness goes up.

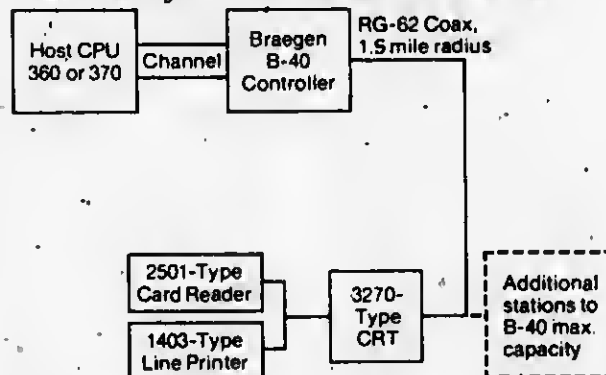
Local Job Entry (LJE) is Braegen's inspired solution to the many drawbacks of conventional Remote Job Entry systems. LJE performs exactly like computer-room peripherals in conjunction with an IBM 360 or 370 System, but lets you locate your card readers and printers as far as a mile and a half away from your CPU.

The Old RJE: Inefficient and Costly



Between your remote station and your host computer, even in the same building, there's a transmission controller, a modem, telephone lines, and another modem. If the lines are good, and the modems are fast enough, it works just fine. It also costs a bundle.

The New LJE: Efficient and Economical



A single Braegen B-40 controller attaches to your 360 or 370 channel. Then RG-62 coax runs out to every remote station, as far away as a mile and a half from the mainframe. At the other end, you connect whatever you need. Card readers, line printers, 3270-type CRT terminals, the whole works. It always works, and it saves a bundle.

And These Exclusive Advantages

Braegen's LJE concept offers a lot more than financial advantages. With LJE, there's full overlap of reading and printing. There's a "hot" card reader. The printer is a chain train type. All of your I/O devices run at *full rated* speed. And you're through forever with remote job entry software 270X/370X ports, modems, and telephone line complications.

LJE Is Available Right Now

Braegen LJE installations are at work throughout the United States, with user history reports available. When you learn how much others have saved with LJE, you'll want to upgrade your system, too. Call Bob Beaver at (408) 255-4200, or write The Braegen Corporation, 20740 Valley Green Drive, Cupertino, CA 95016.



BRAEGEN

One Micro Handles 2,500 Houses

Cable TV Firm to Offer Home Alarm System

By Tim Scannell
CW Staff

DAYTON, Ohio — Cable TV subscribers here may soon be able to subscribe to a home security system that automatically summons police, fire or rescue departments in case of an emergency.

Designed by Cableguard of Dayton, Inc. and currently installed on a test basis the system is actually a network of electronic smoke, fire and intrusion alarms installed within subscribers homes and connected to a central computer center, via TV cable, according to Walter Hotz, Cableguard president.

When a detector is triggered, an alarm is sounded and an electronic message is sent over the television cable to the microcomputer, which is monitored 24 hours a day. Each message is programmed to alert a specific doctor or emergency department and can even be adjusted to signal a neighbor, Hotz said.

Each home that subscribes to the protection service is equipped with a digitally addressable "subscriber terminal" that acts as a mediator between the signals sent along the cable and the detectors installed at various locations throughout the house, Hotz explained. The signals, sent by and to the terminal, are controlled from a central data center situated at the other end of the cable.

"The computer is [programmed] with all the demographics regarding the area in question and the home involved," Hotz said.

Constant Polling

One great advantage of the system is that it is constantly in an active state, according to Hotz. An "interrogator" sends a signal from the central system to each terminal once every six seconds, checking for any interruptions or "off" conditions.

By using radio frequency technology, "we're not waiting for someone to tell us" that something is wrong, "we're constantly polling each terminal," he

noted.

Signal integrity is maintained by a "reinterrogation" system that limits the possibility of any false alarms being transmitted, Hotz said. When a signal is received at the central computer, "our operator can reinterrogate the terminal up to five times in less than 10 seconds," he claimed.

A basic protection system, Hotz pointed out, would consist of intrusion detectors installed at perimeter doors and smoke and thermal detectors placed at "prime fire areas such as the kitchens, the furnace area, garage, attic and so on."

Also included with the package is the installation of both a "panic button"

and a "medical alert button." The panic button would be placed at a normal point of access in the house, such as the front door. When a person answers the door, "all he has to do is hold his hand on the button," ready to depress it in the event of an intrusion attempt.

When the button is pushed, a local alarm is sounded and a signal is sent to the central computer, summoning help.

The medical alert button is "placed in the home at the discretion of the homeowner," Hotz said, noting typical locations might include an elderly parent's room or the master bedroom. "In the event that someone has a seizure or is

under medical duress, all they have to do to activate the alarm is press the button," he stated.

The central computer is actually a Z80 based microcomputer manufactured by Tocom, Inc. Because of its limited memory capacity, it can only handle up to 2,500 homes, Hotz stated.

"At this stage in the game, we went with this size computer for the simple reason that ultimately it will become part of a network of connected systems, he explained.

The price of installing a basic system is approximately \$625 with an extra \$15.95/mo to cover maintenance and monitoring fees, Hotz added.

**THINKING ABOUT AN S/34? PDP-11/70? ECLIPSE?
PREFER A VIRTUAL MEMORY SYSTEM?**

**CONSIDER
WANG'S
NEW
2200VS.**

A virtual memory system at an entry level price under \$50,000.

Interactive. Responsive. 2.3 billion bytes of online storage. ANSI '74 COBOL, RPG II, BASIC and ASSEMBLER. IBM 360/370 instructions.

Multiprocessing; multi-programming. Software automatically adapts to sys-

tem size. High, immediate programmer productivity.

The first-time computer that protects your investment.

The replacement computer for the yield you never got.

The remote computer to which you distribute 90% of the application's processing.

Modular. Expandable without system conversion.



If you want to bite into something you can chew, mail this coupon to Wang Laboratories, Inc., Lowell, MA 01851. Or call (617) 851-4111.

I'm hungry. Send me information on Wang's 2200VS.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Phone _____

DP80/CW3138



'Sorry, Sir, You'll Have to Go Elsewhere, There's a Wild Programmer in There.'

155-II

Up to two megabytes with DAT.

Sale or Lease

COMDISCO
312-698-3000

Do-It-Yourself Aspect of DDP Seen Changing

By Ivan C. Francis

Special to CW

Although finding economic justification for distribution of processing may be easy, the implementation of a distributed DP (DDP) system is something else again. One of the major reasons that it is difficult has been the lack of vendor support and vendor-supplied facilities.

There are relatively few tools available today to assist a user in distributing his work. Current distributed processing users have to expect to do a great deal of work themselves.

However, this is changing. To meet the needs of the user community, vendors are providing an increased level of properly supported software and facilities oriented to DDP concepts.

In spite of the do-it-yourself implementation problems, a number of major corporations are investigating or implementing distribution of processing functions. In general, these companies feel distributed or decentralized processing gives them better control over their business and more timely solutions to business

problems. However, it should be noted that in most cases, only specific applications are distributed and that the central site operation is still retained by these users for the bulk of their applications.

Distributed Control

It is debatable whether or not companies are willing to distribute control along with processing. The move away from the typical hierarchical organization is a difficult one. Companies usually want to fit their multiple computers to the current departmental structure rather than change the organization to achieve a potential savings in processing cost.

In other words, the consideration of human factors such as the disruption of familiar procedures and problems associated with the transfer of responsibilities to new or different departments rightfully has a great deal of impact on the way processing is distributed.

The efforts of a number of companies are spotlighting the advantages and disadvantages of DDP. DDP is no panacea, but when applied to the right applications, it can save in communications cost, enhance system modularity, provide backup processing capability, improve response to business requirements and offer protection against host failure. On the other hand, however, centrally oriented processing provides unified control, easy update and retrieval, simple error recovery, operations economy and easier training on familiar systems.

The do-it-yourself aspect has caused many organizations to put off distribution for a while because of very high initial implementation costs. The decision to move to DDP today probably hinges as much on an organization's confidence in its technical competency as any other factor.

Management Considerations

Perhaps the most important consideration when assessing a move to DDP is whether the applications can really benefit from distribution. It is a simple fact that many applications are not distributable.

Assuming that a distributed processing application exists, the next question is the best schedule for implementation. The timetable for implementation often rests on the willingness of the user to undertake the effort involved.

Since distributed processing is still in its formative stages, implementation requires considerable investment in user's time as well as money.

Many of the pioneers in DDP have experimented with it by isolating one application involving one remote point

and doing a trial distribution.

All organizations have a considerable investment in their current equipment, personnel and programs. They must evolve from their current situation rather than revolutionize their operation just because technology gives them the opportunity.

Changing Requirements

The do-it-yourself requirement will change significantly in the next few years as software is provided to assist users in taking maximum advantage of new low-cost hardware technology and its distribution throughout their organizations.

Programs that facilitate DDP will emerge in four areas: workload distribution, program development, data management and human interfaces.

In distributed applications, the routing of transactions, jobs or data from system to system will be transparent to the end user, who will not necessarily know whether the processing was done locally or at some other node in the network.

Program development tools will be provided to promote the centralized creation of programs for remote location computers. This will encourage development and testing of jobs at a central location in the network, which fosters standards and prevents duplication of effort.

The most difficult area of distributed processing development will be the control of the data base. A major premise of DDP is that the data belongs in the hands of its most frequent users. If part of a

data base has high usage by several computers, it may be duplicated at various locations, in which case data integrity and control are more complex than with today's central data bases.

The lack of experience in effectively controlling distributed data is the biggest single drawback in the implementation of totally distributed systems. Algorithms are being developed to make distributed data handling more effective without putting an undue burden on the user.

More progress has been made in the ease-of-use area than in any other. There are already available, via CRTs, systems providing tutorial operator aids, question-and-answer operations and fill-in-the-blanks applications customizing such as Query Language Processors.

The major goal of the ease-of-use tools will be to make all of the machines in the system look the same to anyone wanting to use the system, no matter where the individual is at the time, and to reduce the need for specialists at remote locations.

One of the keys in applying all these facilities is a properly organized communications network linking the distributed systems. In theory, communications is not a prerequisite for distributed processing; however, from a practical point of view, the resources will seldom be close enough for direct connection and therefore a communications network will be required.

Francis is director of distributed communications program management at Univac.

Upgrade to IBM 6250 BPI tape drives now!

SAVE IBM RENT — ELIMINATE DOWN-TIME

caused by field conversion

We will purchase your IBM 800 1600 BPI drives now & install 4420 4 3420 6 drives immediately from inventory

Call Nick Dibari
312-698-3000
or your nearest Comdisco office

COMDISCO

Mom's going to expose herself next week.

MOM'S WAREHOUSE
WE MOTHER YOU BY MAIL



ECONOMY and POWER

IN STOCK!

Teletype® Model 43



- Display 24 lines, 1920 Characters
- Addressable Cursor
- Keyboard may be cleared remotely
- Ma Bell Compatible

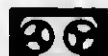


- 110-300 Baud, 132 Characters
- Upper-Lower Case
- RS232 Compatible 20ma option
- 9 x 6 Dot Matrix
- Height 5 1/2", Width 18", Depth 21 1/2", Weight 30 lb.

ADM-3A

Multiterm® Teletype® Data General® Lear Siegler® Data Media®

Sales - Service - Rentals



TERMINAL SYSTEMS INC.

1100 HAYLAND STREET NORTH HOLLYWOOD, CALIFORNIA 91605

213-769-6772

415-573-7723

For All your Mini Computer and Tele-Communication Needs

Full Time Service of California 800 422 2666

Preparing for 1979 Launch

System to Help Nasa Handle Space Shuttle Data

NASSAU BAY, Texas — When Orbiter 102 becomes the first space shuttle to be launched into orbit from the Johnson Space Center here in early 1979, it will have generated an astronomical amount of data during its 10-year, \$6.2-billion planning stages.

In planning the best way to handle that data plus the continuing stream of generated data, National Aeronautics and Space Administration (Nasa) officials asked their systems analysts to design a DP system that could:

- Track the location and inventory of the thousands of parts and supplies needed for the shuttle.
- Confirm the installation and maintenance of all required parts.
- Determine the status of a part in repair.
- Change related documentation in the event design changes are made.
- Keep contractors up to date.
- Determine how a load change in the space shuttle will affect the center of gravity.

To do these things, Nasa needed flexible systems that could handle a wide variety of applications as well as the constantly changing, high volume of data. The system would also have to communicate with users and contrac-

tors across the U.S., many of whom are not computer-oriented.

A Control Data Corp. Cyber 74 and MRI Systems Corp.'s System 2000 data base management system (DBMS) were chosen to implement the Shuttle Project Information Management System (Spims). Spims was started in July 1975 at the space center.

While Spims encompasses many important project areas, appearing at the top of the list are applications for tracking inventory, monitoring problems and controlling documentation.

Complex Inventory

Nasa's inventory problem is particularly complex in that it involves several thousand parts scattered across several locations. Additionally, it is critical that all components be in perfect order, for once an orbiter is launched, it would be difficult to replace mal-

functioning equipment.

To resolve this problem, Nasa designed an inventory system referred to as Flight Manifest Hardware and Tracking System (FMHTS) to track the history of all space shuttle parts as well as crew supplies and special equipment aboard each flight.

According to Lou DeWolf, the systems analyst in charge of FMHTS, Nasa is aiming at a two-week turnaround between orbiter flights. "This means we have to keep track of all these supplies between flights and have supplies ready for the next flight."

"Eventually there will be both an East Coast and a West Coast launch site," he continued. "A pool of equipment will be kept at Johnson Space Center and shipped to either coast just prior to launch. The DBMS will print inventory lists and a pre-packing list by location so that crews will know where to get the equip-

ment called for in a certain flight. The system will also track payloads on board the craft."

Problem Reporting

Another Spims application is the Problem Reporting Data System (PDS), which allows Nasa to monitor progress on problem resolution from initial discovery of the problem to the final correction.

"When someone asks whether a certain piece of hardware will be repaired in time for the next orbiter flight," PDS analyst Sterling Fugman said, "the answer can be found in the data base."

"PSD differs from the other applications in that everything is done in a forms mode," he continued. "A form predefined by the DBMS comes up on the CRT and we simply fill in the blanks with the proper data elements."

"We keep track of any anomaly on the orbiter, whether it

occurs before, during or after the flight," he added.

Shuttle Requirements Traceability (SRT) is still another application under Spims and was designed to ensure consistency within the documentation for the shuttle project.

"There are 18 volumes of documents containing standards for the space shuttle program," Brady explained. "A change in one affects many others ... and they are always changing. Our DBMS has allowed us to make these changes much more quickly than we could have without one."

Considering the entire network, a large number of terminals have access to Spims data. At Johnson Space Center alone, there are approximately 40 terminals used by the engineers, scientists and analysts on the space shuttle project, with 12 to 15 of them accessing the data bank at one time.

Senators, Sipi Urge OTA To Study NCIC's Impact

(Continued from Page 9)

tion if NCIC becomes the chief network performing those functions?"

The Sipi task force further objected that Justice is "foreclosing" future NCIC growth

options by directing that a blueprint be formed for message-switching, including CCH, message-switching. Calling this a cart-before-the-horse approach, the scientists suggested that "the blueprint itself" should determine whether message-switching over NCIC lines is desirable or even feasible.

They also said NCIC options are being limited with every addition the FBI makes to the system in the absence of a long-range plan. The FBI's new Criminalistics Laboratory Information System (Clis) and the Operation Identification program, intended to encourage citizens to mark valuable items with a unique, personal identifier, were cited by Sipi as examples of recent NCIC capabilities.

"Our point is that the NCIC is being added to piece-by-piece without addressing already identified problems and in a way which makes future changes less easy, likely and possible," the scientists said.

Senators Abourzek, Bayh and Eastland also urged in their request to OTA that alternatives to NCIC be studied. They asked that each alternative include an analysis of the effects of the system on citizens' political rights and privileges.

The Sipi members suggested that the NCIC policy advisory board be expanded to include outside scientific representatives in addition to people from the criminal justice community.

Mom's going to expose herself next week.

**MOM'S
WAREHOUSE**

WE MOTHER YOU BY MAIL.



ITEL UTILITY DATA SERVICES

CDC 7600
IBM 370/158-CMS
UT1108-EXEC 8

The
Scientific
Engineering
Data Base
Problem Solver

IBM Cyber 73
IBM 370/158-VS
UT1110-EXEC 8

COMPETITIVE PRICES

7540 LBJ Freeway Suite 510
Dallas, Texas 75251
(214) 233-0679

charge!

Get off the routing list and on to the subscriber list. Just take out your American Express, Master Charge or Visa card, find the subscription form bound into this issue, and CHARGE!



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

News Magazine's System Expedites Production

By Tim Scannell
CW Staff

WASHINGTON, D.C. — *U.S. News and World Report* has eliminated most of the manual paste-up and proofreading chores involved in publishing a weekly news magazine, thanks to its recently installed computer-based publishing system.

Described as "an evolution rather than a total change," the system can produce complete editorial pages electronically, according to John Tuohey, director of production and purchasing at the magazine's headquarters here.

The *U.S. News* system is based on an Information International, Inc. (III) 3600 illustration scanner, an III Videocomp 570 typesetter and an Atex, Inc. copy processor. The system elimi-

nates most of the problems encountered during the old, hot-metal days, an III spokesman said. It has done away with the need for outside camera work and art heads, special types, couriers using commercial and charter flights to move materials and the need for a publisher's representative at each of several printing plants, he explained.

Reporters and editors enter copy into the system by using one of the more than 50 display terminals. Copy is "recycled" by the editors two or three times and sometimes rewritten as many as six times to fit space requirements without ever having to generate a "hard" copy, the spokesman said. Concurrently, art work, line work and photographs are scanned by the 3600,

which electrically converts photos to digital halftones, he said. Both copy and photo information are transferred and stored on the Atex system.

Copy and graphics then go to the Videocomp 570 CRT typesetter, which produces complete pages of text and halftones, the spokesman explained. As the page proofs are reviewed and approved by the editorial staff, the Atex system merges the data for transmission to printing plants in Chicago, Los Angeles and Connecticut. At each plant, another Videocomp, equipped with a halftone record feature, receives the information transmitted from Washington and produces page-size film with all type and graphic elements in proper position, ready for plating and printing, he said.

Information is transmitted to the various printing plants via the Westar satellite, Tuohey said. This mode of operation is "cheaper than AT&T land lines and the quality is generally 'cleaner,'" he added.

Several-Year Evolution

"The system actually evolved over several years," Tuohey explained. The magazine was already using the Atex front-end processor when it decided to purchase an III Videocomp system, he stated. It was "the best available typesetter at the time and the most expensive, but it was the type of quality we wanted," Tuohey recalled. "After installation, we got involved with electronic generation of halftones. We've always wanted to send an entire page; it's something we had been trying to do for quite some time," he said.

Since the system became operational, deadlines for photographs have been extended by two days, Tuohey said, and editors also know exactly what each page looks like and can close pages as fast as they can write, edit and format the copy and photos.

Although "thoroughly satisfied" with the system now, Tuohey indicated all was not a bed of roses when the machines were first installed.

The 3600 scanner was actually a prototype, he said, and "you always have some difficulties with prototypes."

However, "we've found all the bugs and corrected them and the system will probably be 99% stable from here on. Of course, I say that with my fingers crossed," he added.

Tuohey observed that the present system also has room for improvements and upgrades. "We are now able to generate a high-quality halftone for magazines that is equal to anything you can get from a camera, but we think we can improve the quality," he said.

The III spokesman said that when President Carter was overseas, *U.S. News* took a photograph, sent it to Washington via satellite, reproduced it and, using the 3600, put it into digital form. That same day, it appeared in the magazine.

Booklet Details Net Run by N.Y. Police

MIAMI — A 12-page booklet with information, illustrations and diagrams of the New York Statewide Police Information Network (Nyspin) is available here. The booklet is written by the New York State Police and details Nyspin's data bases and operation.

For a copy of "New York Statewide Police Information Network," contact the Corporate Relations Department, Racial-Milgo, Inc., 8600 N.W. 41st St., Miami, Fla. 33166.

Make the right choice

Intelligent terminals or OCR

Intelligent terminals are reducing data entry costs every day. And so are our Laser OCR-ONE optical character recognition systems!

If you're considering intelligent terminals, we believe you ought to be considering OCR too. We make a loud, clear claim that for many, many applications, OCR can top intelligent terminals hands down in efficiency and cost effectiveness. And we'd welcome the opportunity to prove it.

Something else to think about. OCR and intelligent terminals can be a money-saving natural at working together in a multimedia system. They complement each other very effectively in a multitude of applications.

You owe it to yourself to find out about our cost reducing Laser OCR-ONE optical character recognition system. Contact me today. Our systems applications staff will help you make the right choice.

Billy Graham
Vice President/Marketing
Optical Business Machines, Inc.
804 West New Haven Avenue
Melbourne, FL 32901
(305) 727-1774

I'd like more information about the Laser OCR-ONE

- ☐ Please send descriptive literature
☐ Please have a salesman call me

Name _____
Title _____
Company _____
Address _____
City _____
State _____
Zip _____
Phone _____ M



OBM

PDP-II DISC

10MB -- \$7400.00

"Pleasy Disc Subsystem"
RK05 Compatible Both
Software and Hardware

EQUIPMENT RESOURCES,
INC.

1022 3 Cherokee Rd
Smyrna, GA 30080
(404) 434 1382

COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

☐ Please enter my subscription
(details on back)

☐ I'm already a subscriber,
but I'd like you to
change my:
address
title
industry
other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

Europe and Middle East — \$50 All Other Foreign — \$65 RATES: United States — \$18 Canada and PUAS — \$28.

(MC Only List four digits above your name)

1 2 3 4

5 6 7 8

If change we must have cardholder's signature: _____

Expiration Date: _____

First Initial	Middle Initial	Surname
Your Title		
Company Name		
Mail To:	State	Zip Code
City		

Address shown is: ☐ Business ☐ Home ☐ Check here if you do not wish to receive promotional mail from Computerworld ☐ Check here if you're interested in receiving information on Computerworld's Index.



THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

- 10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other
- 11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales Representative
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other

Detach here, fold, and place in post-paid envelope attached through binding.

Reason for Errors Unclear

Support Recipients Get Paid Twice, Then Billed

By Brad Schultz

CW Staff

LIBERTY, Mo. — Clay County's computerized child support system started operation recently by generating duplicate support checks for needy mothers — and then mailing court-ordered delinquency notices to the same women instead of the children's fathers.

Although circuit clerk Edward J. Wnuk attributed the mistakes to human error rather than to the system that was installed under his administration by Diversified Computer Services, Inc., the county DP manager is contending Diversified got an unclear picture of system requirements from Wnuk's office.

"It was a programming type of error," Wnuk stated. "It picked up the [man's] name, but the programmer somehow misconfigured a program and it picked up the woman's address."

The problem was easily corrected, according to Wnuk. Duplicate child-support checks totaling \$2,556 were stopped and destroyed by his staff before they were mailed. The erroneous delinquency notices, however, were not caught before they were sent.

'Funnier Than Heck'

The errors occurred only in the first batch of notices and checks, Wnuk said. "Personally, I thought it was funnier than heck when I saw it the first time," he said, "but the recipients didn't think it was very funny because they didn't understand what we were doing."

Wnuk reportedly changed the locks on his office door to keep Diversified personnel out and prevent what he indicated he feared would be further bungling. He is said to have asked the county to put its DP manager, Bob Williams, in charge of conversion to the system from that point.

However, Wnuk said he had the locks changed soon after the mishap to comply with federal and Missouri security requirements. There is a constant threat of sabotage since someone could break into his office and alter

certain records in such a way that — for example — a man's delinquency would be wrongfully expunged, he noted.

Needs Not Clear

Williams indicated that neither Wnuk's office nor Diversified had a clear idea of what requirements the child support system had to meet.

"Missouri was the 50th state to come into compliance with Title 40 of the Social Security Act," Williams explained, pointing out that Missouri's child support statutes were thus different from any other state's at the time the system was designed. Further, no other county in the state had experience with the law, and Clay County was challenged to use products never before applied to such tasks in an effort to establish the best system possible.

"So it's basically a 'from scratch' system. It was an unknown from the user standpoint — it wasn't sure what he needed — and it was an unknown from the contractor's standpoint... we couldn't define the system, in effect," Williams said.

Williams indicated the system malfunction and attempts to explain and resolve it should be seen in the context of Wnuk's political situation. According to Williams, Wnuk had been Clay's presiding county judge until he was defeated in a reelection bid. (In Missouri, county judge is an elective administrative post, called "commissioner" in other states.)

Wnuk was appointed to his present position by a former Missouri governor, but must win an upcoming election to retain the spot, Williams added.

Before Clay County judges received complaints about the malfunction from half the 100 women involved, Diversified had been in control of the conversion to their system, but the women's response persuaded the county judges to grant Williams control, especially of the programming.

The judges also ruled Williams can spend up to \$15,000 in hiring additional programmers to facilitate the

conversion. Williams has since hired three temporary programmers and plans to deduct their salaries from Diversified's fee.

Neither Wnuk nor Williams blamed the hardware involved: Datapoint Corp.'s 4530 minicomputer configuration, including the 5500 CPU with 20M-byte disk drive.

Four of these 4530s were ordered from Diversified after a county study found its existing NCR Corp. configuration, inadequate for compliance with the Social Security Act and other needs, Williams said.

Aside from the 4530 allocated to Wnuk's circuit clerk administration, 4530s were assigned to the county's voter registration, tax assessment and collection and general accounting fac-

ilities, respectively, Williams added.

All configurations have been "operating beautifully" except the one assigned to Wnuk, he said, adding that the county has continued relying in part on its NCR Century 101 CPU with four 29 million-byte Model 657 disk drives while the child support malfunctions are resolved.

About 1,500 child support and alimony cases have been passed back to the NCR equipment, and about 500 child support cases remain with the 4530 system, Williams noted.

While he predicted the problems will be resolved, Williams confirmed NCR officials have verbally agreed to leave their equipment beyond the April 1 deadline for completion of Diversified's system.



NEW WATER DETECTION ALARM

... FOR COMPUTER AREAS

Warns you of water leakage in sub-floor wiring areas.

- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained... no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

From \$40 - \$70.
Ask about **WATER ALERT** today.

Division of Electro Consultant, Inc.
7424 W. Layton Ave., Milwaukee, WI 53220
Phone 414 282 4840

Dorlen Products

Seminar to Detail RFPs

LOS ANGELES — The American Institute of Aeronautics and Astronautics and the Technical Marketing Society of America will co-sponsor a two-day conference on preparing requests for proposal (RFP) at the Hyatt House Hotel here March 27-28.

Each element of the RFP will be specifically addressed, according to a spokesman. Topics will include effective management of the overall RFP preparation process; planning for ef-

fective source selection; data and configuration management in the RFP; software procurement in the RFP; and separating fact from fiction.

Also to be covered are preparing the technical section of the RFP and preparing the cost section of the RFP.

Additional information on the conference is available by writing: Conference Registration, Suite 1010, 5959 W. Century Blvd., P.O. Box 91295, Los Angeles, Calif. 90009.

Emberson Gets IEEE Post

NEW YORK — Dr. Richard M. Emberson has moved from the position of acting general manager to that of general manager of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) by vote of the institute's Executive Committee.

Emberson is also the IEEE's executive director.

A native of Columbia, Mo., and a

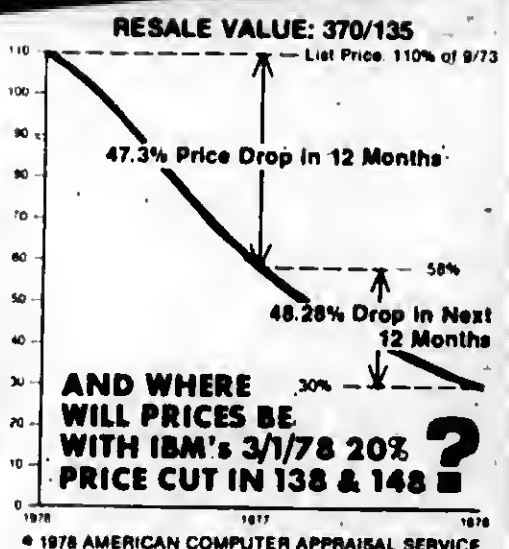
resident of Huntington, N.Y., Emberson is a fellow of the American Physical Society and the American Association for the Advancement of Science.

He is also a member of the American Astronomical Society, the American Association of Physics Teachers, the New York Academy of Science and Sigma Xi, the honorary scientific society.

PREVENT YOUR NEXT IBM 370 \$100,000 MISTAKE!!!

IBM 115-125-138
148-155-165
135-145
158-168

**CPU's • MEMORY • DISKS
I/O • TERMINALS
TAPES • SYSTEMS**



The Market in IBM 370 Equipment can swing in just a few days, resulting in fluctuations of over \$100,000. Therefore, the Economics of Buying, Selling, and Leasing IBM 370's require a highly specialized skill. We've been helping IBM users stretch their DP budgets for over 10 years.

SEND FOR OUR FREE 370/360 PRICE CHARTS

AMERICAN USED COMPUTER • 617-261-1100

P.O. BOX 68, KENMORE STATION, BOSTON, MASSACHUSETTS 02215

Navy System to Process Satellite Weather Data

By Tim Scannell
CW Staff

MONTEREY, Calif. — The U.S. Navy is planning to activate a satellite based system later this year in an effort to improve the accuracy of global weather forecasts.

The system here is designed to process information received from both the Defense Meteorological Satellite and the proposed Seasat satellite as well as from such conven-

tional sources as land stations, radiosondes, aircraft, ships and automatic weather buoys, a spokesman said.

Now running test data, the system will become operational after completion of a high-speed communication interface that will link the antenna in Monterey with data collection stations in Maine and Washington State via satellite, the spokesman explained.

The heart of the system is a Control Data Corp. Cyber 175, which will sort all of the data transmitted from the satellites and merge it with other data collected from various points around the globe. This telemetric data will include a digitized view of the atmosphere in the visual and infrared spectrum, temperature, humidity and two profiles of the stratosphere, the spokesman related.

Information will primarily be provided by the satellites because of their ability to monitor weather conditions over the oceans — an area in which few weather stations have been used successfully because of the expense and equipment losses, the spokesman stated.

Data Volume

The Defense Meteorological Satellite, which makes two

passes each 24 hours over a given location on the globe, sends 10 billion bits of data to the two ground stations on each of its orbits. This data is written to disk files in Monterey at the rate of 21,000 computations per second, filling a disk in less than five minutes, the spokesman pointed out. An extremely high-capacity on-line (Ehco) file is then generated by merging this information with data received from the other earth-bound sensors.

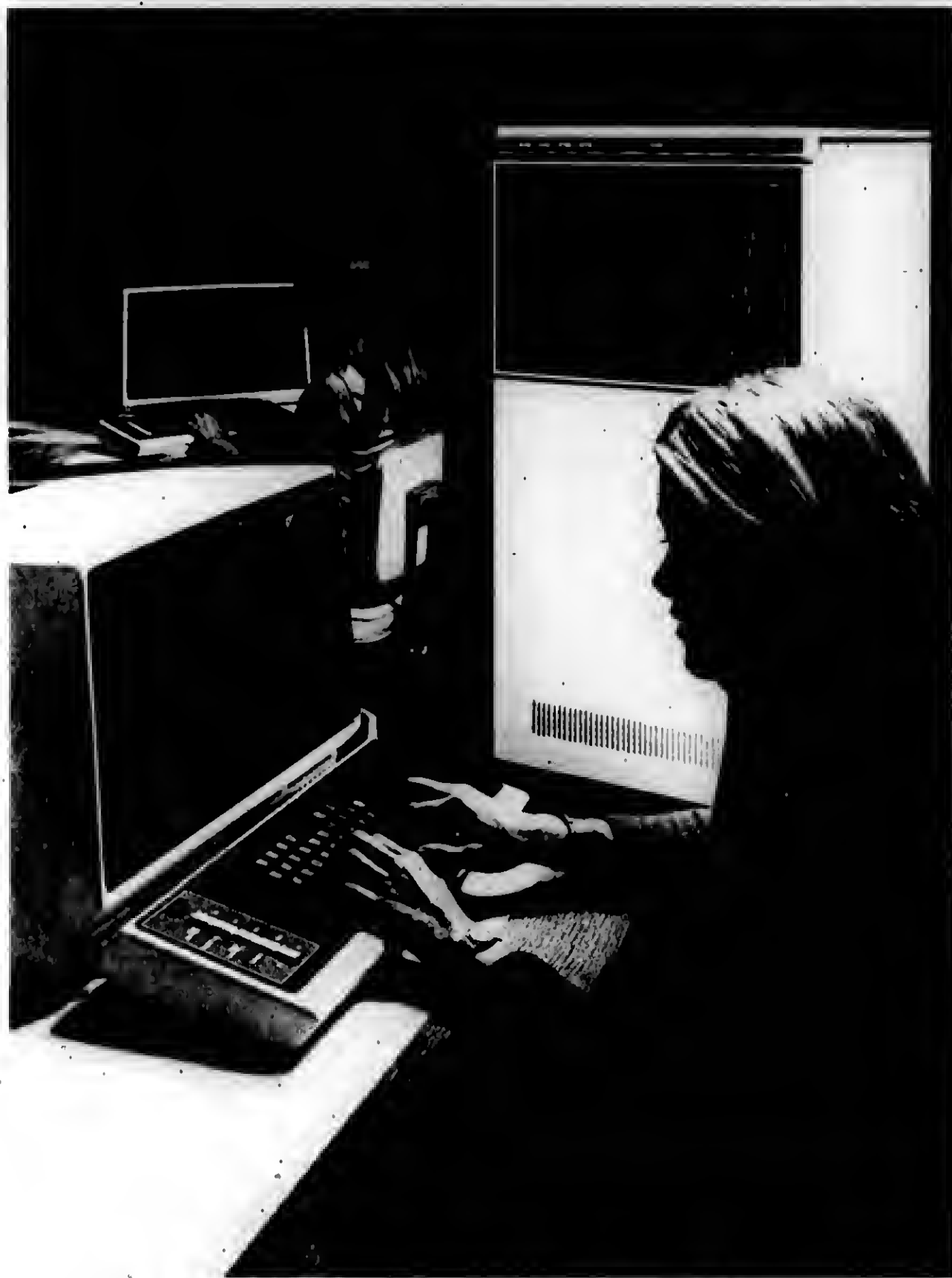
Data needed to recreate a visual image of the earth's atmosphere — the "satellite picture" — is striped out and transmitted to users. The remaining data, obtained from six different radiation windows in the atmosphere, provides a profile of the temperature and humidity from satellite altitude down to the earth's surface. The Cyber 175 uses this data in conjunction with known hydrodynamic equations and laws to produce a weather forecast, the spokesman said.

Forecasts Shared

A complete weather forecast, with emphasis on the Northern Hemisphere, is produced every 12 hours by the Monterey complex. The data is transmitted over the Naval Environmental Data Network to the Navy's ships and weather centrals and shared with other government agencies and foreign governments through the World Meteorological Organization Network, the spokesman explained.

The installation at Monterey, which has been operating since 1961, now includes three CDC 6500s, two CDC 3200s, two 8090s and the Cyber 175. The system has a total on-line disk storage capacity of 48M 60-bit words.

One particular problem that has been overcome through the use of satellites in weather forecasting involves translating the earth's curving surface into an accurate, flat representation. Using satellite data, the computer pulls the world into a "quadrilateral spherical cube," or six-sided box, which is then inflated so that each point in each of the six planes occupies the same position it would if the plane were to be seen in its natural spherical state, the spokesman said.



With the 1330, you can consolidate remote job entry and batch data entry applications without compromising either function. The system features expandable disc storage (up to four — 10 Mb. drives) foreground and background editing and bisync communications.



Inforex 1300 and 1301 offer highly cost effective data entry capability for smaller installations (4 to 8 keystations) or remote locations where you can take advantage of our communications capabilities.



The 1303 provides medium range data entry capacity, with about triple the disc capacity of the 1301. It supports up to 16 keystations and the addition of edits, table look-ups, range checks and cross-footing. The 1303 also offers communications capabilities such as spooling, HASP and RJE.



The Inforex 3300 is a powerful pre-processing system that allows you to edit data at the point of entry, enabling you to offload your mainframe. Its sophisticated editing capabilities can also handle many of those applications which you haven't had time to put on your present mainframe.

INFOREX: THE SIMPLEST SOLUTION TO ALL YOUR DATA ENTRY PROBLEMS.

The simplest and best solution to all your data entry problems is right here: the Inforex data entry family.

Simplest because we design them for ease of use and speed of throughput.

Best because we've been a leader in the innovation and development of key-to-disc data entry products and capabilities right from the start.

Which is why our family's got it all. From the basic keypunch replacement 1300 IKE System to the tremendously powerful max-editing System 3300.

So whatever your needs — modest, middling, or immense — the growing Inforex data entry family will meet them.

You don't have to settle for a compromise system. You don't have to sweat out an unsatisfactory price/performance choice. All you have to do is choose the system that's best for you.

And that's where an Inforex Support Team comes in. They'll help you select just what you need. They'll provide expert installation. And they'll give you the benefit of their years of experience in other installations.

But even after all that, you won't be left high and dry. Whenever and wherever you need help, an Inforex Support Team will be available with the support you need.

The Inforex data entry family. You shouldn't settle for anything less.

I would like more information on the following:
☐ Key-to-disc data entry ☐ Distributed processing
☐ Computerized records management
☐ I would like to talk with an Inforex Sales Representative

Name _____

Title _____

Organization _____

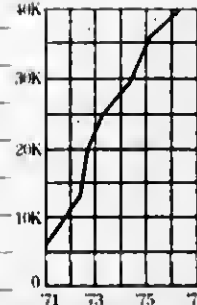
Address _____

City _____

State _____

Zip _____

Telephone _____



CW 2

Offices in major cities throughout the United States, Canada and Europe. Distributors worldwide.

INFOREX
Inforex, Inc., Dept. 321, 21 North Avenue, Burlington, Mass. 01803

See the System 1330 at the Computer Caravan — Expo '78.

Texas Instruments
Portable Data Terminals
FOR SALE

• 743 • 745

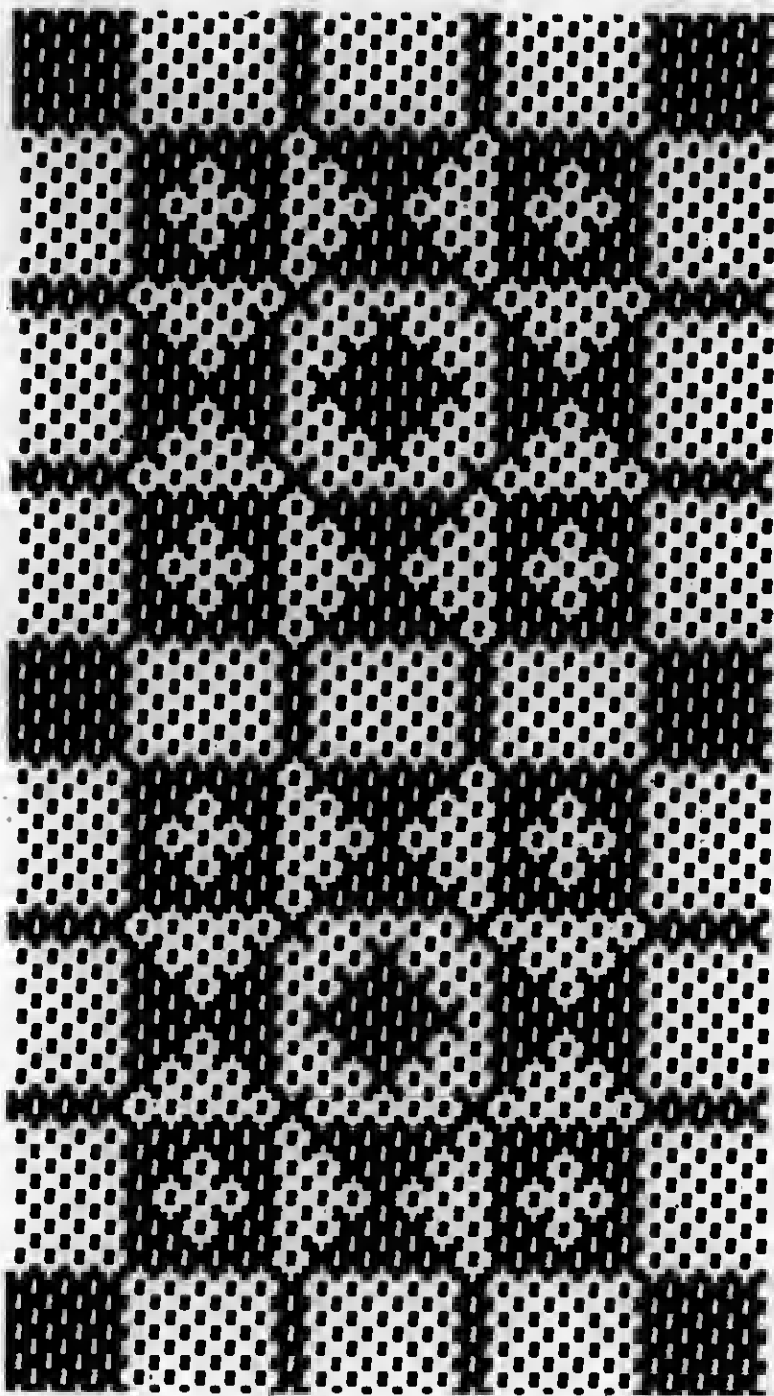
BEST PRICE • FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-279-1960

Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

DP-Aided Design Weaves Together Technology and Art



"Stars and Squares," "Snowball" and "Star of Bethlehem" (clockwise from left) are works of weaver/programmer Karen Huff.

By Marguerite Zientara
CW Staff

CAMBRIDGE, Mass. — When Charles Babbage conceived the idea of a general-purpose, programmable computer about 1833, he attributed his inspiration directly to the Jacquard loom. Now, nearly 150 years later, the computer is being used by some weavers as an aid in designing hand-woven patterns.

One such weaver is Karen E. Huff, a software engineer for Intermetrics, Inc., a consulting firm here. With 13 years of computer experience and nine years of weaving as a hobby, Huff said, "It was natural to put the two together. Anybody who's involved with handweaving would think of it if he or she had exposure to computers — it's a very natural transference."

Huff has used a plotter as her basic tool in developing weaving designs. "I originally had the idea that a computer plotter could be used to do the work

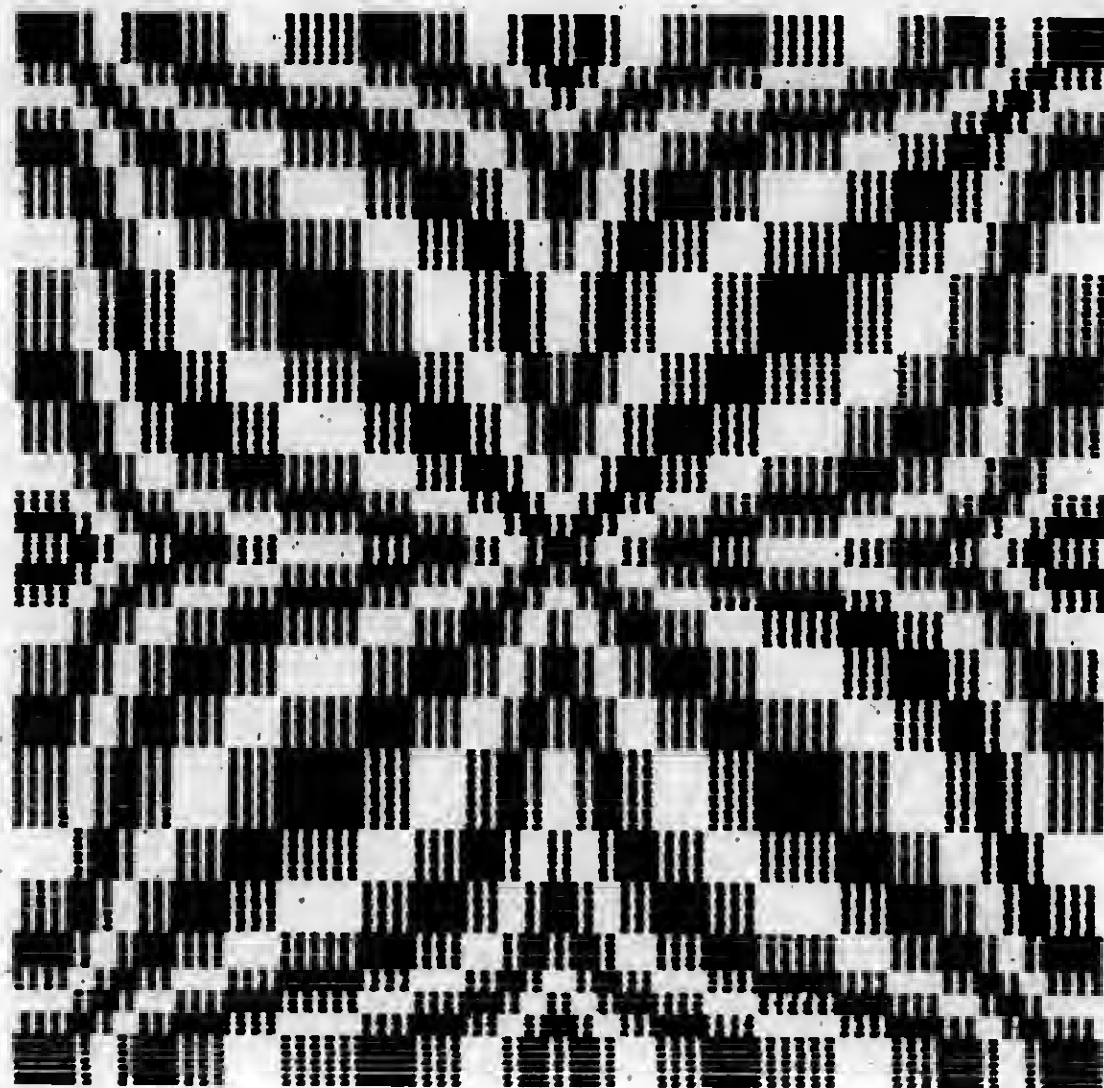
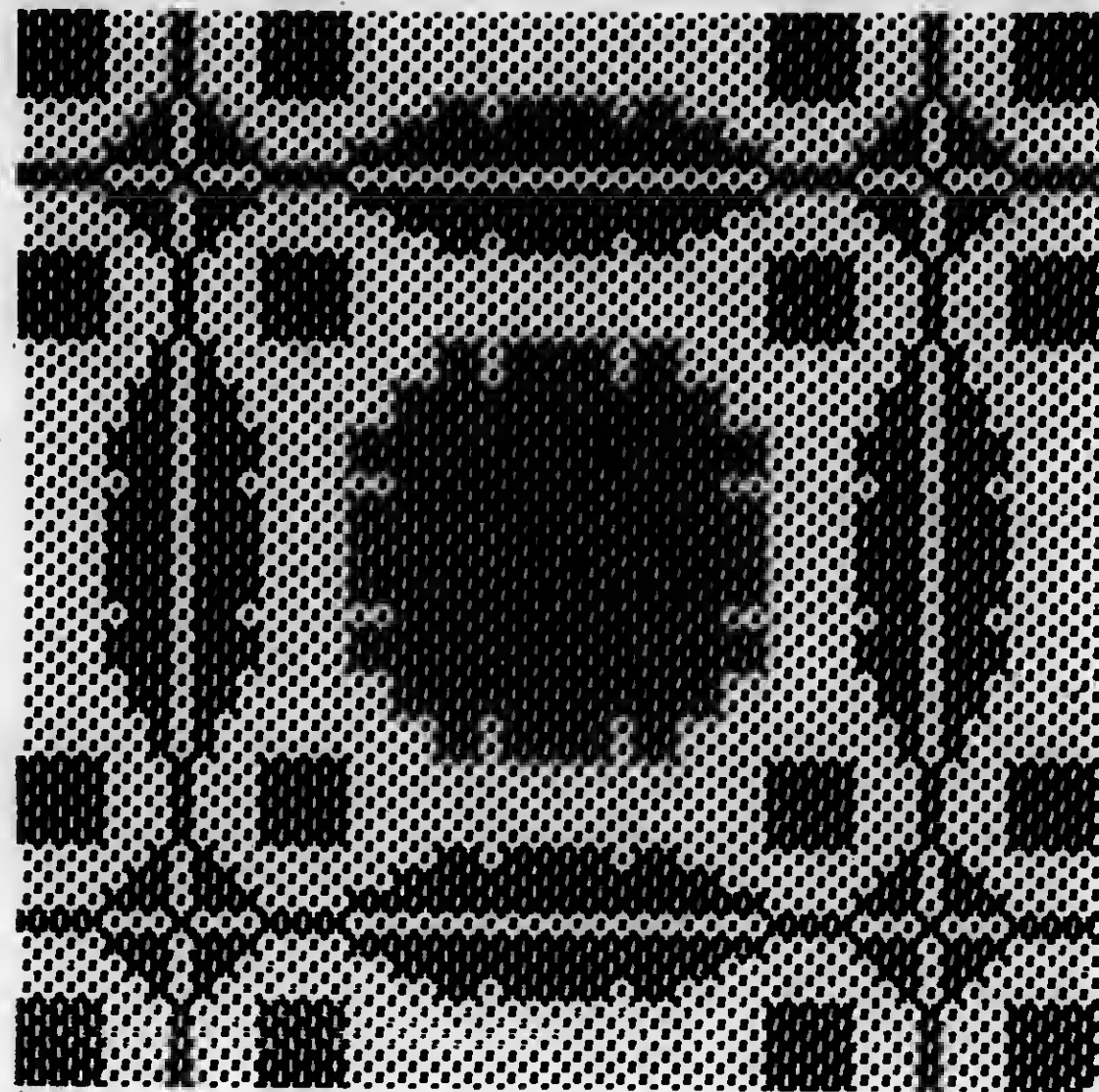
that I did very painfully by hand and with lots of errors," she said, referring to the tedious, time-consuming and error-prone task of working out a weaving design on graph paper.

Search for Representation.

The essence of weaving structure can be reduced to a pattern of warp (vertical thread) and weft (horizontal thread) crossings — one must determine where the warp crosses over the weft and where it crosses under.

In order to determine what the structural appearance of the woven fabric will be, the weaver can write down on graph paper the threading, tie-up and treadling instructions in handweavers' notations and from there work out the cloth diagram.

Handweavers' notations occupy one horizontal and one vertical border of a piece of graph paper. In certain squares of this border grid, the weaver can indicate the exact relationships be-



tween the threads, shuttle and treadles of a loom to produce a desired design. After coding this "recipe" in the borders, the traditional weaver must then translate these instructions point by point into a design by painstakingly filling in the appropriate blocks on the graph paper.

This cloth diagram indicates the exact interweave pattern of the warp threads and the weft threads. Each square on the graph paper represents a warp/weft crossing, being white if weft crosses over warp and black if warp crosses over weft. While this system clearly indicates the design, Huff said, it doesn't look at all like fabric.

The unique line-drawing capabilities of the plotter inspired Huff to consider the possibility of a more representational diagram that would use lines to represent the individual warp and weft threads and breaks to indicate where some threads crossed under others.

The figures shown above illustrate

the ultimate development of this theory.

Noting the interesting effect created when only the weft threads had been plotted, Huff considered the results of plotting very heavily only the weft pattern, thus simulating the appearance of weaving systems where a dark weft forms a pattern against a light background warp. It was this technique that produced the artistic designs illustrated here.

Three-Part Input

Huff's system utilized keypunch card input, which just as easily could be written out at a terminal, she said. There are three parts to the input instructions, each corresponding to one of the three parts in a manually produced draft — that is, the tie-up, threading and treadling instructions.

These instructions can be very easily expressed numerically, Huff said. The

(Continued on Page 20)

Programmer/Weaver Uses Plotter as Design Aid

(Continued from Page 19)

computer reads the input, applies the program's algorithm to the data and generates a tape containing instructions for the plotter.

The program works in two ways: it can draw both the warp and the weft patterns, giving a picture of the structural properties of the design; or it can draw only the weft, which produces a more "arty" effect, according to Huff.

"The designs showing both the warp and the weft perhaps have more educational importance in learning how to make threads interact to give different textures — to make something light and puffy or hard and rug-like," she explained. The weft-only designs are more indicative of pattern or design than of structure.

One of the major benefits of using a computer in this way, according to Huff, is the time saved in creating each design. "I would never undertake manually a design which the plotter takes two hours to produce," she said.

It takes between five and 20 minutes to prepare the data for a computer design, whereas manually it would take about four hours to work out on graph paper, she said.

While her computer-aided designs were originally created to help visualize weaving patterns, Huff now considers much of the product coming out of the computer as an end product in itself. Several framed designs grace her office wall and a number of them have been used as pamphlet cover designs and newsletter decorations.

"Originally I didn't think of it as art at all — I was just doing weaving design," Huff said. "I think the images that are produced are interesting and they give me a certain amount of pleasure, but I'm not expressing any great art philosophy or philosophy of life through these images."

"I think of myself as a craftsman, and it fits with my weaving interest very well," she added.

A year ago Huff lost access to a computer system when she moved to Intermetrics. She had developed the program on an IBM 370/158 using a California Computer Products, Inc. 663 drum plotter and utilizing the language of PL/1.

Huff is currently looking into the possibilities of using a home computer

system which, she said, could work in two ways — by allowing interaction with a CRT and by using a special interface that would drive a small loom while she changes yarn colors and manipulates the treadles.

While Huff considers her computer designs more "fun" than "art," she does see some future for the use of computers as an aid to the artist. "I think there is one thing interesting that a computer can do, and that is to help an artist go more directly from the conception of what he would like to produce to that end product."

"I see the computer as being a tool of the artist, just as oil paints, canvas and paint brushes are tools," Huff said.

While she is enthusiastic about the positive aspects of such computer usage, Huff conceded that the computer output's lack of both color and texture — qualities germane to cloth weaving — point up its limited capabilities for producing art.

Huff hopes to continue using computers to help in hand-weaving design and is hopeful that she will again have access to a system. "I see it as a kind of interactive process where the computer can provide a rich visual environment for the weaver and perhaps do automatic things as well, but I'm principally interested in supporting weaving design by visual techniques, whether with plotter methods or CRT methods," she said.

Security Called More Than Issue Of Illegal Access

ATLANTA — Data security means keeping unauthorized people out of a computer system and protecting the system against fraud. But it also means protecting the computer from careless or malicious acts and "making sure a DP system will do what it's supposed to do," according to Dean R. McKay, IBM senior vice-president.

Speaking at a recent meeting of the Bank Administration Institute here, McKay said that while a large part of the responsibility for data security rests directly with the user who must employ available hardware and software technology, controls and physical security measures, IBM recognizes its responsibility as well.

McKay described steps IBM has taken over the past six years both in equipment and programming to help customers improve security in their systems, including new storage techniques, operating systems and cryptographic techniques.

IBM has built "journaling capabilities" into a number of its products to help create an audit trail that enables management to fix accountability and take corrective action, he noted.

McKay said these techniques were designed largely to prevent unauthorized people from accessing a system. However, he pointed out, IBM's experience has been that most problems were caused by authorized people and were the result of error, not intent.

Eighty-two percent of the people who use IBM equipment believe that errors and omissions are the greatest threat to the overall integrity of their systems, according to McKay.

Are Your DASD's Drowning . . . in a Sea of Data?



DMS/OS is the Wave of the Future in Data Management

In its first year, over 50 major banks, industries and government agencies have purchased DMS/OS. They are enjoying the benefits of having the most complete data management system available. Let us show you how they are controlling their DASD resources with DMS/OS.

Find out why DMS/OS is the wave of the future in data management. Just call or write for our free brochure or functional overview.

SOFTWARE MODULE MARKETING

Where Service and Software Come Together



Crocker Bank Building/Penthouse • 1007 7th Street • Sacramento, CA 95814 • Telex SMMSAC 377-314 • (916) 441-7234

Two HIS User Groups Plan Chicago Meets Next Month

CHICAGO — Two Honeywell user groups — one independent and one sponsored by Honeywell Information Systems, Inc. — will meet here the week of April 10. The Independent Honeywell Group (IHG), soon to be incorporated under the name In-House, Inc. (IHI), will meet on April 10 at the O'Hare-Hilton Hotel. The Honeywell User Group/Small and Medium Systems (HUG/SMS) will meet April 10-13 at the O'Hare Sheraton Hotel.

A special feature of the IHI meeting will be a six-hour maintenance seminar for in-house engineers, to be divided into five separate classes throughout the week, according to A.J. Nowotny, IHI president. Nowotny said the classes will be tailored to the interests of the participants. He asks that applicants, when registering, indicate their areas of interest, such as PC board technique, computer theory or computer room maintenance procedures.

Cost of the maintenance seminar to be held at a member site, is \$300. Additional information is available from Nowotny, who is president of Compunetics Corp., P.O. Box 486, Falls Church, Va. 22046.

Highlights of the HUG/SMS meeting will include an April 10 session on management and motivation, led by Leo McManus of Leo McManus Co., Inc., of Worcester, Mass. At a forum on the afternoon of April 12, users will be able to address questions to HIS representatives.

Fees for the HUG/SMS conference

NCC Attendees Get Travel Aid

MONTVALE, N.J. — A travel service has been established to accommodate attendees of the 1978 National Computer Conference (NCC) to be held June 5-8 in Anaheim, Calif.

The service, available only to NCC '78 attendees, reportedly offers savings of up to 40% on fares from New York, Philadelphia, Boston and Washington airports, a spokesman said. Individual savings are also extended to travelers from all major cities to the West Coast at a reduction of 28%, he stated.

The service was also designed to arrange discounts for special events group, night coach passengers and seven-day excursion travellers, the spokesman noted.

Information concerning air travel packages as well as applicable regulations can be obtained by calling the travel service toll-free at (800) 556-6882.

Call for Papers

EASCON '78, Sheraton International Hotel, Arlington, Va., Sept. 24-27, 1978.

The theme of the conference is Electronics: Key to the Information Age. The six technical areas to be covered are military and civil C³ systems, radar/sensor systems, satellite communications, electro-optical systems and technology/space systems, information systems and new horizons in electronics.

Send an abstract of about 200 words by March 17 to A.E. Babbitt, Eascon '78, technical program chairman, WWMCCS System Engineering Organization, 8th & Courthouse Road, Arlington, Va. 22204.

are \$110 for nonmembers, \$100 for preregistered nonmembers, \$70 for the first preregistered member from one company and \$85 for subsequent pre-

Societies/ User Groups

registered members from the same company.

Further information is available from HUG/SMS secretary Stephen Wiatrowski, Reed & Barton Co., 144 W. Britannia St., Taunton, Mass. 02781.

Older HIS Systems Supported

FALLS CHURCH, Va. — The Independent Honeywell Group (IHG), soon to be incorporated under the name In-House, Inc. (IHI), is an association of owners and users of older Honeywell Information Systems, Inc. small and medium-scale computer systems.

IHI was originally organized to help members wishing to handle their own maintenance — or at least maintain their systems without HIS maintenance contracts — by mass purchasing and stockpiling of repair parts, according to IHI president A.J. Nowotny.

IHI is presently seeking to organize maintenance chapters in various cities across the country. An IHI member would be eligible to

take advantage of the local maintenance chapter, which would retain a full-time specialists engineer, Nowotny said.

Nowotny feels a major benefit of IHI has been in the parts area. "In the past, before I began to meet people in the same situation in independent companies, I was kind of behind the eight ball, not knowing whether I'd be in trouble if I needed a major part," Nowotny noted. "Now I'd have no problems whatsoever with that. There are parts to satisfy any need," he added.

The subscription fee for IHI is \$150, with annual dues of \$100. Nowotny is president of Compunetics Corp., P.O. Box 486, Falls Church, Va. 22046.

CommFile makes any dummy smart, even intelligent.

You can cut line costs, lower computer time, plus eliminate errors in data entry and editing on your computer terminal.

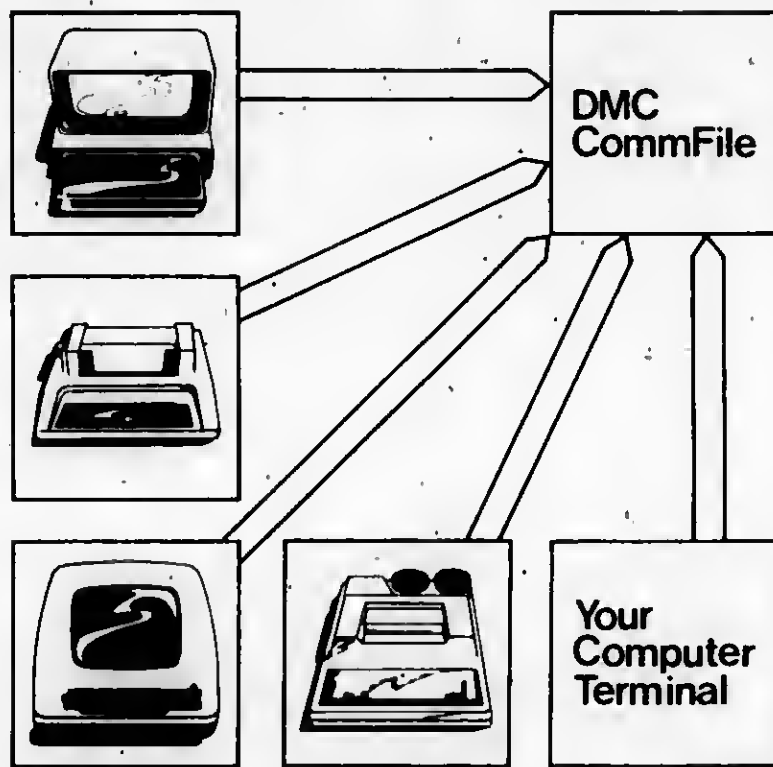
CommFile converts your free-standing display or printer terminal into a high speed data entry, editing and transmission station.

Plug any dumb terminal into the DMC CommFile. You immediately get a powerful text storage, processing and communication system that is uniquely simple to use.

With CommFile, you can:

- Collect and store text from your terminal or time-sharing system;
- Do comprehensive text editing and file management;
- Communicate these files to your timesharing system.

You can easily expand the basic turnkey system to a complete programmable CPU system with any or all of these features:



- Up to 60K of memory;
- Up to four floppies;
- Text editor;
- BASIC-Plus;
- Assembly language software;
- Word processing software for complex text formatting.

The CommFile is compatible with almost any data comm system.

Nationwide service (even for terminals you add on) through central dispatch, toll free.

For full information, contact Tom Bowden at DMC.



Send to Tom Bowden
DMC a Division of Colec Corporation
2300 Owen St. Santa Clara, CA 95051
Phone (408) 249-1111 Telex 357428

Name Title _____
Company _____
Phone _____
Address _____
City _____ State _____ Zip _____

Calendar

April 5-7, San Francisco — **Word Processing: Guidelines for Planning, Design and Implementation**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held in New York April 19-21.

April 10-12, Tulsa, Okla. — **1978 International Conference on Acoustics, Speech and Signal Processing**, sponsored by the Institute of Electrical and Electronics Engineers (IEEE). Contact: IEEE, 6411 Chillum Place N.W., Washington, D.C.

April 10-13, New York — **Eighth Conference on Computer Audit, Control and Security**, jointly sponsored by the Institute of Internal Auditors, Inc. (IIA) and Automation Training Center, Inc. Contact: Conference Registrar, IIA International Headquarters, 249 Maitland Ave., Altamonte Springs, Fla. 32701.

April 10-13, Chicago — **Data Entry Management Course**, sponsored by American Management Associations (AMA). Contact: AMA, 135 W. 50th St., New York, N.Y. 10020.

April 11, Boston — **Data Catalogue Users Group Conference**, sponsored

by Synergetics Corp. Contact: Alexander R. DeVito, President, Synergetics, One DeAngelo Drive, Bedford, Mass. 01730.

April 12-14, San Francisco — **Applied Data Communications System**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209. Also being held May 10-12 in Chicago, June 7-9 in Washington, and July 12-14 in San Francisco.

April 16-18, New Orleans — **Seventh Annual Symposium, EFT: New Horizons**, sponsored by Payment Systems, Inc. (PSI). Contact: PSI, Suite 2814, 100 Peachtree St., Atlanta, Ga. 30303.

April 16-19, Washington, D.C. — **National Information Conference & Exposition (Nice II)**. Contact: Nice Headquarters, Suite 904, 4720 Montgomery Lane, Bethesda, Md. 20014.

April 17-18, Atlanta — **Privacy and Security**, sponsored by the Theorem Institute. Contact: Michael E. O'Neill, vice-president, Theorem Institute, Suite 590, 1737 N. First St., San Jose, Calif. 95112. Also being held in St. Paul May 18-19 and Washington, D.C., June 8-9.

April 17-19, Palo Alto, Calif. — **Cryptography and Data Security**, sponsored by Martin E. Hellman Associates. Contact: Hellman Associates, 730 Alvarado Court, Stanford, Calif. 94305.

April 17-19, Chicago — **1978 Deltak International User's Conference**, sponsored by Deltak, Inc. Contact: Sharon Trube, Inc., Suite 50, O'Hare Aerospace Center, 9950 W. Lawrence Ave., Schiller Park, Ill. 60176.

April 17-19, New York — **Computer Performance Measurement: Tools and Techniques for Increased System Productivity**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 18-19, Phoenix — **Fourth Annual Computer Security and Privacy Symposium**, sponsored by Honeywell Information Systems, Inc. Contact: Jerome Lobel, HIS, P.O. Box 6000, M/S K95, Phoenix, Ariz. 85005.

April 19-21, Denver — **Distributed Minicomputer Networks**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209. Also being held in Chicago May 17-19, Washington, D.C., June 21-23 and San Francisco July 26-28.

April 19-21, Washington, D.C. — **On-Line Systems Audit Controls**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209. Also being held May 22-24 in Chicago, June 21-23 in Washington, D.C. and July 19-21 in San Francisco.

April 19-27, Hannover-Messege-lande, W. Germany — **1978 Hanover Fair**. Contact: Schenkers International Forwarders, Inc., Suite 1867, One World Trade Center, New York, N.Y. 10048.

April 20-21, Commerce, Texas — **1978 Computer Users Conference**, sponsored by East Texas State University. Contact: Donna Hutcheson,

Computer Users Conference Coordinator, East Texas State, Dept. of Computer Science, Commerce, Texas.

April 20-21, Hartford, Conn. — **New England Computer Conference (Necom 78)**, sponsored by the Hartford Chapter of the Data Processing Management Association. Contact: Association of Data Processing and Computer Management, Hartford Chapter, P.O. Box 562, Hartford, Conn. 06101.

April 20-21, St. Cloud, Minn. — **11th Annual Small College Computing Symposium**, sponsored by St. Cloud State University. Contact: Randy Kolb, Director, Academic Computer Services, St. Cloud State University, St. Cloud, Minn. 56301.

April 20-21, Chicago — **Structured Problem Solving: Bringing Productivity Improvements to DP**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 24-26, Washington, D.C. — **People: The Secret of Effective Systems Analysis**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209. Also being held in San Francisco May 24-26, New York June 21-23 and Chicago July 17-19.

April 24-26, Atlanta — **Forum's Spring Conference**. Contact: TRW, 4902 Tollview Drive, Rolling Meadows, Ill. 60008.

April 24-26, New York — **Automation of Manufacturing Operations**, sponsored by the New York University School of Continuing Education. Contact: Heidi E. Kaplan, Dept. 14NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017. Also being held in San Francisco June 7-9, Aug. 28-30 in Chicago, and Oct. 18-20 in Toronto.

April 26-28, Geneva — **Seventh International Computers in Banking Seminar**, sponsored by the Institut de Recherche Interbancaire. Contact: Institut de Recherche Interbancaire, Siege Social: 5, Rue Quentin-Bauchart 75008, Paris, France.

April 26-28, Washington, D.C. — **Effective Leadership of Data Processing Projects**, sponsored by the Institute for Professional Education (IPE). Contact: IPE Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209. Also being held May 22-24 in Denver, June 19-21 in Washington, D.C., and July 24-26 in Boston.

April 28-30, Long Beach, Calif. — **Percomp '78**. Contact: Percomp '78, 1833 E. 17th St., Santa Ana, Calif. 92701.

April 30-May 3, New Orleans — **Eighth Annual International NCR Users Conference (Nucon 78)** sponsored by the Federation of NCR Computer Users. Contact: Federation of NCR Users, Nucon 78, Box 2015, Kettering, Ohio 45429.

April 30-May 3, London, Ont. — **1978 College and University Machine Records Conference (Cumrec '78)**, sponsored by the University of Western Ontario. Contact: Bruce G. Hartwick, University of Western Ontario, Cumrec '78, Stevenson-Lawson Bldg., London, Ont., Canada N6A 5B8.

Proposal Book Rocks Industry!

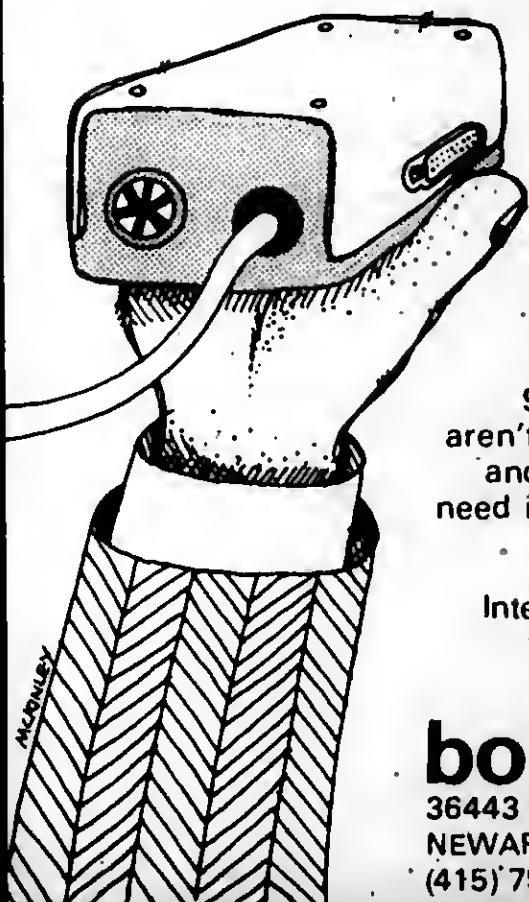
A California publishing firm has literally taken the computer industry by storm with a recently-published "how-to" proposal book. The book, a 4½ pound loose-leaf volume entitled *How to Create a Winning Proposal*, covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top West Coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in commercial, government and OEM proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

Using a step-by-step instructional technique, the authors provide a virtual roadmap to the entire proposal process... including section-by-section checklists to ensure the proposal team of covering all the important bases. Excellent guidelines are given on the contents, structure and methods of preparation for both solicited and unsolicited proposals. A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team, and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's, and IFB's are included.

Copies are available from Mercury Communications Corp., 730-CW Mission Street, Santa Cruz, CA 95060. \$65 (pre-paid) includes 3-5 day delivery inside USA. In Calif. add \$3.90. For outside USA, U.S. \$76 (Int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

THE \$99.00 MODEM*



You're suspicious aren't you? OK, we confess. Our M-1 asynchronous short haul modem won't do what a lot of other modems will do.

However, the M-1 will solve many of your local or in-house communication problems up to 10 miles or 9600 bps. And because you aren't paying for a lot of options and capabilities that you don't need in those situations, you'll be saving a bundle of money.

Interested? Write or call us now for a data sheet and complete price information.

bo-sherrel co.

36443 SHELLEY COURT
NEWARK, CA 94560
(415) 792-0354

*100 Quantity

IN DEPTH IN DEPTH

The Ten Great Software Myths

By Werner L. Frank

MYTH NO. 4

Software outlasts hardware.

Myth No. 3 seems to also support the notion that software outlasts hardware. Indeed, how often does a user replace his software on a specific piece of computing hardware?

Unfortunately, the impetus for changing software is a change in hardware. The latter action usually is taken to keep up with the technology or the pressures of the vendor's salesman. Even with a hardware change, the old software is often retained without change, if that is possible, as was the case of emulation of IBM 1400 series programs on the IBM 360 line.

But it isn't hardware so much that decays in time; rather, it is software.

Software needs more maintenance and tender loving care than does hardware. This peculiarity, and possible anachronism, of the material having a longer lifetime than the abstract is, nevertheless, true.

Software deteriorates for a number of reasons, among which are:

- Recognition of original design faults.
- Discovery of bugs/errors.
- Evolution of a learning user who develops his understanding of the "real" problem and upgrades his requirements based on operational experience.
- Changes in the application environment as a result of business, accounting and government requirements.
- Changes in computer technology — both systems software and hardware.

Hence, armed with this understanding, the smart user will develop cost-effective strategies to extend the half-life of his software on his current hardware by:

- (1) Implementing applications so they are built for change.
- (2) Maximizing use of modularity in

Software represents a growing proportion of total data processing expenditures.

* * *

Software is (necessarily) expensive.

* * *

Software must follow hardware.

* * *

Software outlasts hardware.

* * *

Software needs continuing change.

* * *

Software productivity can be enhanced.

* * *

Software product manufacturers are more efficient producers.

* * *

Software must satisfy the user.

* * *

Software systems require a data base management system capability.

* * *

Software is the result of programming.

* * *

The executive vice-president of Informatics, Inc. thinks its time to debunk some common myths about software. Last week, Frank attempted to clear up three of those misconceptions; this week, he explores seven more.

the architecture.

(3) Evolving the software system over time, employing a hierarchy of implementation systems that allow for quick and dirty solutions which can be plugged in and taken out, as well as provide the capability for more carefully coded portions that must optimize performance.

But, most importantly, the user must recognize he is no more committed to existing software than to existing hardware. The fact that a user is already operating with a specific implementation language, retrieval system or payroll program should not foreclose his option of replacing such software whenever a suitable improvement becomes available.

This user is obligated to spend as many resources continually investigating software alternatives as resources budgeted to keep up with the hardware technology.

MYTH NO. 5

Software needs continuing change.

This, on first glance, seems to contradict the position taken by Myth No. 4. In fact, we have shown software to be vulnerable to decay if not carefully nurtured.

In a recent *Computerworld* article, however, Dr. Ruth M. Davis scored this myth. Davis was quoted as stating to the annual management conference of the Association of Data Processing Service Organizations, "We've sold the world on the concept that frequent changes in software mean improvements in processing."

The negative impact of changes was illustrated by stating that a modification in a small portion of operating system software can be expected to induce 10 new errors.

(Continued on Page 24)

(Continued from Page 23)

Given that correcting errors in operational software often costs 10 times more than catching errors during design and coding, the consequences and rippling effect of "software tinkering" are apparent.

Limiting access to software, and hence the ability to make changes, leads to advocacy for hard-wired software and software generators, as well as "packaged" software products with which only the object code is supplied, the source code being maintained by the originators.

While upgrading of software over time is a necessity, the control of such changes is even more of a requirement.

MYTH NO. 6

Software productivity can be enhanced.

Somewhat, but not much! The small, incremental changes that accrue because of technological advances are offset by the continued labor-intensiveness of the programming trade (or

art) and the ever-present inflation rate.

There is, of course, a basic problem in how to measure productivity — be it lines of code per hour or some unit throughput processing. But that is an entirely different problem, one with which the software engineering groups must wrestle.

The issue of measurement is well identified in *Data Processing in 1980-1985*, written by T.A. Dolotta, M.I. Bernstein, R.S. Dickson Jr., N.A. France, B.A. Rosenblatt, D.M. Smith and T.B. Steel Jr., where it was stated in reference to evaluating productivity:

There is no available data on how much software is presently (or ever has been) maintained, nor do we have any idea of what the growth rate of this "inventory" of software is, nor of this inventory's distribution in terms of size and kind. Equally unknown is the amount of software that is discarded from the inventory or that never becomes part of the inventory.

We also do not know how much software is produced in support of developing an application or a system. If we are ever to properly measure the productivity of programmers, we must know how much undeliverable or noninstallable

software is created for the various kinds of software that is delivered and installed.

The reason for concern about productivity is expressed in the conclusion of this book, which states productivity must increase by a factor of 10

"The user must recognize he is no more committed to existing software than to existing hardware."

by 1985 if 1985 application problems are to be solved using computers.

There seem to be two important ways to increase software productivity. One, discussed for almost two decades, is the higher level implementation languages. The second is control of software production, which is aimed at increasing software reliability.

The *Data Processing in 1980-1985* study had this to say about the prospects of the salvation of productivity by higher level languages:

As new techniques have come into the programming world, they have been touted to contain the necessary ingredients to solve the cost (productivity) problem, sometimes to the point that they have become fads. Higher level languages were the first purported solution. There is no denying that they have been helpful, but it is not true that if a little bit helps, a lot more will be much better. There is no longer any reason to believe that a newer, better, general-purpose programming language will make a measurable difference in programming productivity.

This is not to say that all further language developments should stop, but just that it should be understood that there is no magic in new programming languages, that the best we can expect are small, incremental gains, and that, as such, new languages are acceptable (and sometimes even welcome), provided that their cost is not excessive.

Improvements in procedure-oriented languages such as PL/I, Cobol and Fortran do not have the potential for improving productivity by as much as a factor of 2, while an improvement of at least one decimal order of magnitude is a necessity, and more would be desirable.

But the real issue is not the availability of more powerful languages (there are some that claim improvement over Cobol by factors of 5). Rather, it is the

(Continued on Page 26)

Still squeezing data through the old-fashioned way?

Concentrate. It's cheaper!

If you would like to put several asynchronous terminals on one telephone line, read on.

MICOM's Micro800 Data Concentrator has obsoleted the good, old-fashioned TDM or time-division multiplexor. If you prefer to call it a statistical multiplexor or intelligent TDM, feel free. Either way, the Micro800 provides retransmission on error and, typically, double the efficiency of TDM. It's not a penny more than a TDM, and it's not a paper tiger.

Curious?

MICOM MicroComputers for DataCommunications

MICOM SYSTEMS, INC. • 9551 Irondale Ave. • Chatsworth, CA 91311 • Tel 213/882-6890 • TWX 910/494-4910

CBC COMPANIES

A new name in front of an old reputation for reliability: We have a CONTINUOUS INVENTORY OF TERMINALS and we STOCK AND INSTALL OPTIONS. Immediate delivery on most items.

The popular ones

DEC

-Writer II (LA-36 Printer Terminal) \$1,600 ea.
-Writer III (LS-120 Teleprinter) \$2,600 ea.
-Scope (Video Display Terminal) \$1,500 ea.
(Model VT-52)
-Printer I (LA-180 High Speed Printer) . . \$2,690 ea.

1. --- IAL (614) 461-5496.
2. --- DESCRIBE YOUR NEEDS.
3. --- DEPEND ON THOSE WHO USE
DIGITAL EQUIPMENT FOR YOUR BEST
ANSWERS, PRICE AND DELIVERY.

CBC COMPANIES
170 E. Town Street
Columbus, Ohio 43215
Call-614-461-5496

The new 1200 baud DECwriter III.



It already looks like a success.

Not only does the new 1200 baud interactive DECwriter III hardcopy terminal look like the successful DECwriter II on the outside, it also looks a lot like it on the inside.

Because the DECwriter III uses many of the same components and sub-assemblies that have proved so reliable in our DECwriters, it's, in a very real sense, already a mature, field-tested product.

But what you'll get that's different is speed. 1200 baud, 180 cps speed. Along with 1K buffer capacity.

That means you receive data four

times faster than conventional printers. And phone line charges can be reduced by as much as 75%. The 1200 baud speed of the DECwriter III also means you can combine the functions of a line printer and a CRT. Which saves you money and available office space without losing a bit of efficiency.

But the DECwriter III is more than fast and efficient, it's also very flexible.

For example, you can set operating modes—including four baud rates—at the touch of a finger. Plus, optional forms handling capabilities, including margins and tabs which can be set with

typewriter-like ease. And because you probably handle different size forms, it can handle different size forms—up to six parts and 132 columns.

The DECwriter III.

A new 1200 baud interactive terminal with a very successful look about it.

For more info, call 800-225-9220. Or write, Components Group, Digital Equipment Corporation, One Iron Way, Marlborough, MA 01752. Canada: Digital Equipment of Canada, Ltd. Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva, Switzerland. tel. (022) 93 33 11.

digital
COMPONENTS
GROUP

IN DEPTH

(Continued from Page 24)

reticence of decision makers in DP shops to consider the new and continue to cling to their Fortran and Cobol. Some diehards will still stand by assembly coding, even in this, the 30th year of the computer age.

Current practitioners may not know, and old-timers may choose to forget, how hard it was to "convert" the professional programmers to Fortran in the mid- and late 1950s. Cobol came on the scene in the early '60s; it took eight years to gain wide acceptance. What fundamentally new implementation language has emerged and received wide reception in the last 15 years?

Turning now to the second great hope — software production control — we note this approach would have us organize or reorganize away the problem through such modern techniques as top-down, structured programming, etc.

But, as is often the case, different organizations and different philosophies of operation can produce equal results. Further, the native capabilities and commitments of individuals appear to

be more significant, if any, software productivity enhancement. We have, unfortunately, good company with

"While upgrading of software over time is a necessity, the control of such changes is even more of a requirement."

this position as the authors of *Data Processing in 1980-1985* concluded:

Productivity of implementors could well remain one of the primary limitations to the industry's growth and to its ability to supply needed services.

MYTH NO. 7

Software product manufacturers are more efficient producers.

Of course not! The software houses operate under the same severe man-

agement and production limitations as the typical users. They have problems in requirements analysis, specification writing and, even worse, problems in implementation.

In fact, code produced for 100 or 500 users must be by an order of magnitude more soundly structured and quality controlled than code for a single user. Documentation, especially, must be even more carefully produced and with greater detail and clarity.

The magic is not that the professional software producers can do it better or operate with higher productivity. It is that they can do it cheaper and more effectively because of these factors:

- The product is typically two or three generations beyond a first attempt made sometime earlier at another's expense.
- The cost is spread over many users.
- The community of users provides the richest sounding board and source of continuing input leading to an ever-better product. This often yields benefits to the masses as a result of the demands of leading-edge practitioners who are more willing to take risks.

MYTH NO. 8

Software must satisfy the user.

This seems to conform to the popular notion that the customer is always right. But an open-door or overly responsive policy in regard to users can be the perfect invitation to disaster in building software.

Certainly, we do not advocate placing the responsibility for specifying functional requirements for application software on any party other than the user. Even through this stage of software implementation, the DP professional can make substantial contributions by always keeping in balance the cost/benefit equation, which relates scope of solution to practicality of implementation.

The classical 80/20 trade-off is operative in software implementation as it is in most situations, which is to say that the last 20% of what users want can take 80% of the effort.

To be more specific, the user's needs and wants should be heard but, in return, the cost and risk should also be made clear.

We know you've got everything

But... what happens to your schedule when the unexpected job hits you?



BCS can take the overload off your back... and help keep you right on schedule.

But... what do you do while you wait for the equipment you need to bring your capacity up?



BCS has the hardware you're waiting for... use it until yours is delivered, and up and running.

But... what do you do when you can't find people with the critical skills you desperately need?



BCS has the experts in all areas... they'll fill in until your search is ended.

THE TEN GREAT SOFTWARE MYTHS

IN DEPTH

Despite the present trend of giving the user exactly what he wants, DP professionals should endeavor to persuade the user as follows:

(1) Provide the user with a candidate solution to be used as a checkpoint or benchmark, rather than present an open invitation to include everything and anything the user ever wanted.

(2) Lead the user to exiting solutions (e.g., packaged software) which may be general-purpose, and not necessarily customized or an exact fit to the way the user is currently conducting his business or wants to conduct his business.

MYTH NO. 9

Modern software systems require a data base management (DBMS) capability.

A current test of the adequacy of a software application system and the progressiveness of a computer facility is to ask and hope for a positive response to the question, "Are you employing now, or will you be able to in-

terface in the future with, a data base management system?"

The DBMS is a tool that can be very useful in many a DP environment, but let the requirements of the user determine the need! In fact, "DBMS" is really a generic term referring to a number of general-purpose systems software implementations to handle storage and retrieval of data elements for user-written application programs.

Such user programs will refer to the data, through the DBMS, on a logical basis, while the DBMS will address the data on a physical basis. Given this, the DBMS embodiments will possess typical call and processing features, as well as access characteristics, which satisfy various response criteria — from very quick for inquiry, rapid for interactive and delayed for batch.

Many file and access systems which have existed for over a decade satisfy this general definition. Thus, there is no panacea in the more modern DBMS. Rather, the user should be warned that the advanced capabilities of more recent DBMS may well tax his:

- Hardware resources.

- Overall throughput performance.
- Understanding of operation.
- Ability to use features.
- Comprehension of complex file structures.

"But the real issue is not the availability of more powerful languages ... Rather, it is the reticence of decision makers in DP shops to consider the new and continue to cling to their Fortran and Cobol. Some diehards will still stand by assembly coding, even in this, the 30th year of the computer age."

For example, many users are not ready to integrate files from their various elements of operation, nor does it follow that elimination of data redun-

dancy through a DBMS is necessarily good. In fact, many DBMS features raise new questions and trade-offs, such as memory utilization, storage trade-offs, access time and performance. To this must be added the increasing problems of data and system security.

In witness to this position, we quote from Gilb's column in the Sept. 8, 1977 issue of the *British Computer Weekly* that took the following position:

"Most users are either too small to justify the fixed overhead costs, or too large to justify the cost multiplier for IMS or Cudasyll-like data base software. Presumably there is a group in the middle, but nobody has convincingly documented it."

MYTH NO. 10

Software is the result of programming.

This last of the 10 great myths might well be the most dangerous one, a myth which pales the significance of (Continued on Page 28)

under control

But ... where can you find time to check all the applications systems to find the ones best for you?



BCS has most of them in operation ... try us and see which ones work for you.

Most of the "Buts ..." are the result of things going so well that you need more capacity, more people, more software now.

We know your problems, because we've been there ... and solved them. We offer our experience and capabilities to help you when you need it the most. For example:

- MAINSTREAM®, our unique timesharing service. Only BCS offers you this choice:
- IBM 370/168's ... remote batch and interactive ... geared to large volume. MAINSTREAM-TSO.
- IBM 370/168's ... interactive and overnight processing. MAINSTREAM-CTS.
- CDC CYBER 175's ... interactive and remote batch for scientific and engineering applications, MAINSTREAM-EKS.

More than \$160 million in the latest hardware and peripheral equipment all linked by one of the world's largest privately owned telecommunications networks.

But, BCS offers you more than just time on MAINSTREAM. There's a range of products like PROJECT/2® to help you repeal Murphy's Law; SARA to diagnose your configuration ... and EIS, the most comprehensive and innovative management planning tool around. Plus people — to give you critical skills now ... and to train your staff for your future needs.

Now, while you have things under control, find out about the many ways BCS can help you when things get to be hard to handle. Maybe tomorrow?

The best reason to go outside.

BCS

BOEING COMPUTER SERVICES COMPANY

A Division of The Boeing Company

177 Madison Ave., Morristown, NJ 07960 (201) 540-7700

O.K. BCS, maybe you are an extra resource I should know about.

Name _____

Title _____

Organization _____

Address _____

City/State/Zip _____

Phone _____

IN DEPTH

(Continued from Page 27)

the other nine. To fully appreciate the point being made here, we refer to the "software life cycle" introduced by B.W. Boehm in a May 1973 *Datamation* article that identified seven important steps in software creation:

- (1) System requirements.
- (2) Software requirements.
- (3) Preliminary design.

- (4) Detailed design.
- (5) Coding and debugging.
- (6) Testing and preoperation.
- (7) Operation and maintenance.

The key to understanding where the real limits are in software development is to realize that ultimately most of the costs and most of the procedures are associated with operation and maintenance, not with the programming itself

(steps 2 through 6). It will be recalled, as stated earlier, that some 60% of the ongoing software efforts are now committed to maintenance and this amount threatens to increase as new applications emerge and as more complex systems are developed.

The success or failure of the seventh step, as highlighted by Boehm and others, is highly dependent on the effort expended in the first step — defining the problem (not the program!) to be solved.

Thus, more attention to the user requirements and the ultimate operation of the planned automated system may just change the software environment enough so that we might begin to entertain 10 new myths.

A very special company in search of very special people!

An Industry in revolution

We're lucky, if just once in a lifetime, we can experience a major reorientation of an industry. In the last score of years it has occurred in Aerospace from Kitty Hawk to rockets. Most of us are aware of the incredible advances in electronic technology. Within three years pocket calculators, digital watches, stereos, etc. have dramatically increased in powers of operation while they have decreased more than ten times in cost.

Technological advances have signalled the beginning of a new age in computer applications. Today's minicomputer outpowers last year's mainframe; the microprocessor competes with the mini; and the maxicomputer addresses a much broader range of applications at new cost effective levels.

The new age of computers produces entry level computer facilities under \$10,000 thereby opening the door for new users. These new users are materializing at a fantastic rate. They range from the small business that can now afford a computer for the first time to the small department within a large corporation that is now able to justify computerization of crucial systems.

People make the new tools work.

Technology is moving quickly, but it takes people to make these systems work. Systems professionals from the Project Manager to the veteran Programmer to the Programmer Trainee are still the keys to realizing the user's requirements into a functioning application system. The process of "making" a system now rivals the cost of the hardware needed to run it.

The different minis, maxis, and micros often use different tools to develop similar application systems. Standardization is diminishing. Confusion is on the rise. And, the need for intelligent outside assistance to avoid problems with the new tools is growing rapidly.

DSI responds to Industry's needs.

DEDICATED SYSTEMS, INC (DSI) is a full service EDP consulting firm that emphasizes helping its clients make computers work effectively.

We have a successful track record assisting small businesses mechanize for the first time, helping large corporations automate particularly difficult systems, and aiding in distributed processing while avoiding the DP "Pioneer's Syndrome" (the arrow in the back). We also assist major computer manufacturers in application package development, operating system design, and product specification. In all, DSI software and consulting expertise is widespread throughout the DP user community.

Successfully helping users move where the industry is going, we are GROWING, rapidly.

An organization of people

At DSI our product is our people. We deal in the skill and ability of our staff to effectively solve problems and meet the needs of making client systems work. As such, a primary concern of DSI management is to keep our people happy, and it is apparent that we've succeeded.

DSI has the lowest personnel turnover in the industry. In more than four years of operation NO ONE has left to join a competitor. This is a significant source of pride at DSI considering the personnel mobility in this industry.

There are good reasons for consistency of staff at DSI. Our progressive management offers each staff individual: an excellent compensation and benefits package; a variety of challenging work assignments; the opportunity to work at the "forefront" of technology; user contact; personal and professional advancement in both line and administrative capacities; and most particularly, the chance to see the results of their labors.

Who are we looking for?

We are looking for quality, the motivated individual, bright, eager-to-learn, aggressive, self-starting... the special person who will help us further our record of uninterrupted growth and quality service to the user community.

We seek team members spanning the full range of the EDP disciplines including: MARKETING and PRODUCT SPECIALISTS, PROJECT LEADERS, ADMINISTRATORS, SYSTEMS ANALYSTS, PROGRAMMERS, SYSTEMS PROGRAMMERS, and JUNIOR PROGRAMMERS/TRAINEES. You need not be a mini expert or a maxi master—just good. We will train you to apply your talents to the new directions in the Data Processing Profession. If you're good, this will come quickly.

Think about your future!

You're a DP Professional. Who should you work for?

At DSI our product is your skill. Your advancement is limited only by your ambition and ability, and is evaluated by the DP spectrum. You are a person working on small team projects where individual ability is stressed, recognized, and rewarded.

We are not a "body shop" renting short to long term people to fill "man hour" requirements; but a results-oriented firm which develops systems and helps companies effectively use them.

In an industry moving as fast as ours, can you afford not to be where technology is moving; you might become a dinosaur! Think about it. If it makes sense, call us.

- Systems Analysts
- Programmers
- Marketing and Product Specialists
- Project Leaders
- Administrators
- Junior Programmers/Trainees



Werner L. Frank is a co-founder and executive vice-president of Informatics, Inc., an independent supplier of custom and proprietary computer software products and services based in Woodland Hills, Calif. He is the author or co-author of 19 published papers on the numerical analysis and development of on-line, terminal-oriented software.

A graduate of the Illinois Institute of Technology and holder of a master of science degree in mathematics from the University of Illinois, Frank spent the early years of his professional life at the Thompson Ramo Wooldridge Corp., where he directed the development of some of the first trajectory and orbit determination computer programs for space vehicles.

At Informatics, Frank has been responsible for the development of several major divisions engaged in implementing military and commercial information systems that emphasize on-line technologies employing communications, data management and terminal devices.

He also headed a team that investigated the feasibility of forming a joint venture enterprise with the Equitable Life Assurance Society to provide software and data services to the insurance industry. Equimatics, Inc., the result, later acquired Informatics and the two merged.

Dedicated Systems, Inc.

180 N. Michigan Ave. (312) 372-4222
Chicago, Illinois 60601

You won't believe our **Ballistic™ Printer until you see one in print.**

And in person.



Unless you've been in hiding, you've probably heard about LSI's family of Ballistic Printers. Built with the same proven dependability of the Dumb Terminal and his Smarter Brothers.

Our latest matrix printer, the 200A, comes with standard features like a Space and Blank Character Compression Buffer. Tabbing over Blank Spaces ability. Half Duplex or Full Duplex Operation. And a fully buffered input, optionally expandable to 1024 characters. Not to mention its microprocessor versatility, and firmware flexibility.

To top it off, you can choose from options like Serial, RS232, Parallel, and Current Loop interfaces. Polling. X-ON, X-OFF. And elongated character capability with a choice of either 10, 12 or 16.5 Pitch.

The Printer's reliability lies in the simplicity of its patented Ballistic head. Which ballistically propels the matrix wires to assure longer head life. Eliminating tube clogging with inks, dust,

and paper fibers. Even wire tip wear is substantially reduced.

The Ballistic Printer uses a five-start lead screw and servo to print bi-directionally at 180 cps. Direct, simple, positive. And very accurate.

But, seeing is believing.

So, if you'd like to be amazed by our Ballistic Printer in person, write or call us toll free (800) 854-3805. Just ask for Tom Hudspeth.

If you haven't seen the Ballistic Printer in action, you haven't seen ballistic printing.

Ballistic™ Printer. Tougher in the long run.



**LEAR SIEGLER, INC.
ELECTRONIC INSTRUMENTATION DIVISION
DATA PRODUCTS**

Editorial

Interim Relief a Bad Idea

The Justice Department will soon decide whether to ask for interim relief when it finishes presenting its antitrust case against IBM, according to the head of the department's Antitrust Division, John H. Shenefield [CW, March 6].

Interim relief would entail some penalizing of IBM for its alleged monopoly practices before the firm presents its defense to Judge David N. Edelstein. Such a measure would be reversed should IBM win its suit and, while invoked, would not mean IBM has been guilty of monopolizing the computer industry.

Specifically, interim relief might require IBM to make interface specifications of new products available to competitors when the

products are announced or to make its installed base public by product and country on a quarterly basis to allow an accurate census of the industry to be made, according to the Computer & Communications Industry Association (CCIA) executive director, Jack Biddle.

Shenefield has said that he's very concerned about the trial delay an interim relief hearing would impose, and his concern is warranted. Much additional expense in time and taxpayers' money could result from the appeals IBM would probably make in the event relief were granted, following what would most likely be a slow and costly relief hearing.

For this reason, relief should not be granted now.

Follow This Leader

Users who have been unable to obtain mainframe contract provisions that match or nearly match their long- and short-term growth plans should look carefully at what Honeywell Information Systems, Inc. is doing with its contracts for the remodeled Level 64 line.

Users are now offered the choice of multiple and mixed terms on a single lease [CW, March 6] while receiving limited price protection in the form of an HIS-guaranteed maximum 5% escalation per year. For example, users can mix, on a single contract form, one-, three-, five-, six- or seven-year terms on a unit-by-unit basis. In addition, HIS claims price continuation at the end of lease terms with no automatic revision to one-year prices. These options should be of great value to users who are faced with a rapidly growing or changing operation.

Users' requirements for flexibility when deciding how long to lease individual pieces of equipment has been badly overlooked in the quest for "universal" or "standard" contracts and stable lease bases. While it is unquestionable that both parties in a lease cannot always have everything that they desire, it is important that users be able to meld lease terms with their long- and short-term operational expectations.

It is certainly refreshing to see one of the mainframers unwrap a lease program that appears to have some real benefits for the users. Hopefully, HIS will soon adapt this contract concept across its entire product line. And, if users are really fortunate, HIS will have started a trend other mainframers will follow.

Data Past

Five Years Ago March 14, 1973

WHITE PLAINS, N.Y. — IBM added three models to its 3420 magnetic tape system that could record data at the "densest recording capability yet offered," according to the company. Using a method called Group Coded Recording (GCR), the drives could handle tapes containing a data density of 6,250 byte/in., compared with 1,600 byte/in. on earlier models of the 3420.

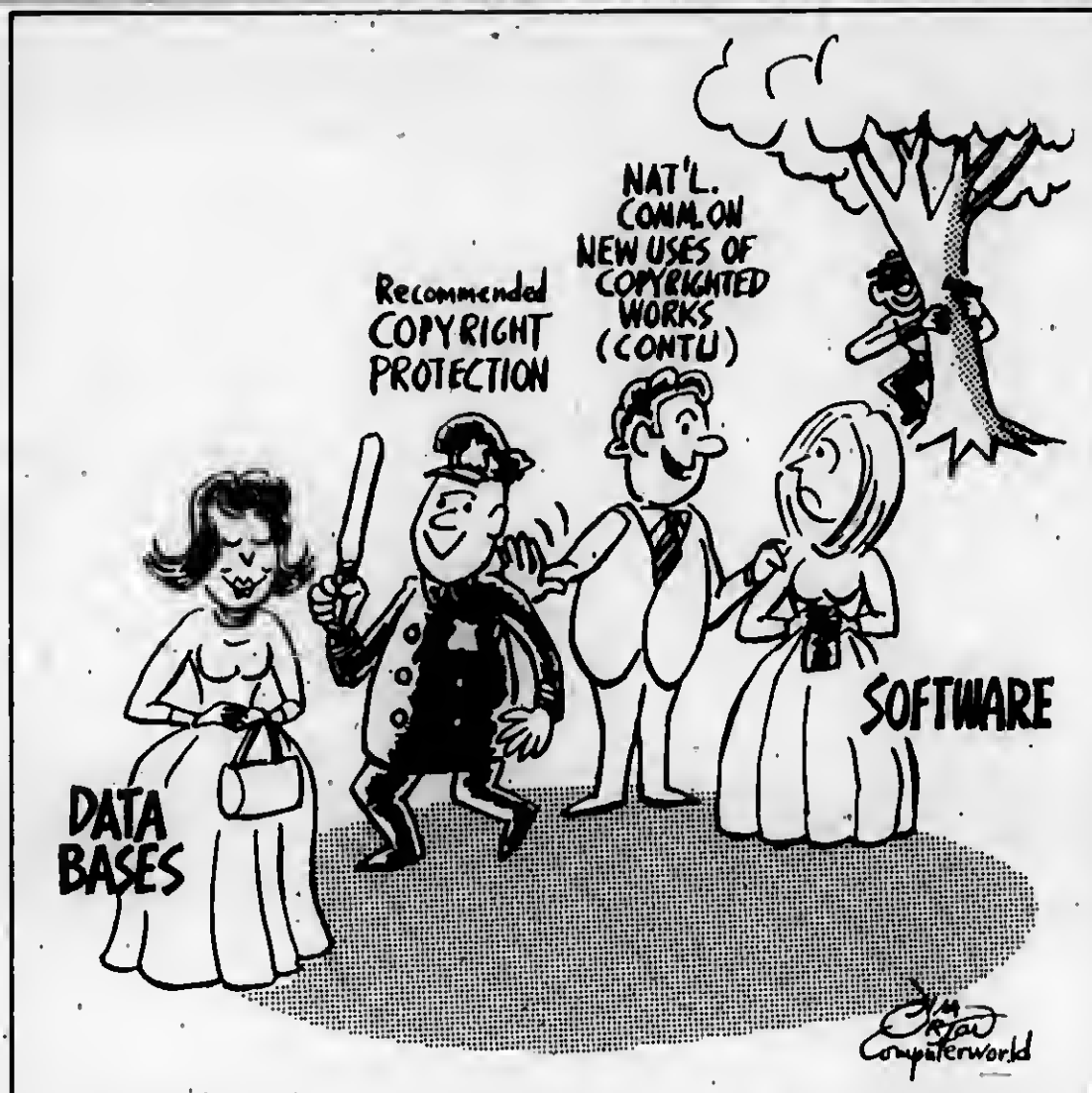
NEW YORK — IBM and its lawyers were sharply reprimanded by a federal district court judge here last week for their role in the destruction of the index or computerized data base compiled in the IBM vs. Control Data Corp. antitrust case. Chief Judge David N. Edelstein ruled IBM had violated a pre-trial order he had issued on March 16, 1972, "in that it procured the destruction of a data base created by attorneys for [CDC]." The judge,

however, rejected "at this time" the Justice Department request that IBM be forced to either reconstruct the data base or pay justice to reconstruct the files.

Eight Years Ago March 18, 1970

WASHINGTON, D.C. — The National Academy of Sciences began an investigation into the extent of computer data banks and their impact on individual freedom and due process of law.

COLEMBUS, Ohio — In a move described as a "major victory for the computer industry," Ohio Bell Telephone Co. rescinded a proposal that could have increased costs to time-sharing users by 400%. Ohio Bell decided to withdraw proposed Information System Access Line (ISAL) designations from intrastate lines being utilized by time-sharing firms that had fought to block the plan.



... And If You Get in Trouble, Dear, Just Bat 'Em With Your Eyelashes!

Letters to the Editor

Breaking Out of Chinese Box

As editor of the pilot issue of Abacus, I wish Joe Rigo had gotten the facts straight before lampooning the proposed American Federation of Information Processing Societies (Afips) magazine ["Societies Wrangling for Share of Readership," CW, Feb. 20].

Like Scientific American and Psychology Today, Abacus was created to bring the work of professionals to the attention of a broader public than can be reached by scholarly journals or trade magazines. We do not intend to steal away the readers of specialized publications or to publish watered-down versions of manuscripts that they might reject.

Right now, the computing profession is a Chinese box of enclaves within enclaves, whose denizens communicate mainly with their fellow specialists. Isn't it about time to begin telling our colleagues in other branches of computing — as well as scientifically literate laymen and decision-makers in the world at large — what we're doing?

William E. Boggs

New York, N.Y.

It's Not Standard Yet

There are several schools of thought about what type of data base management system (DBMS) provides the "best" data model and user facilities.

Computerworld has recently published articles by proponents of both Codasyl and non-Codasyl systems. I applaud this objectivity. But I must take issue with L. E. Towner's article ("Non-Codasyl DBMS a Bad Choice for Users," CW, Feb. 6).

He stated, "In 1975, the [Codasyl] Data Manipulation Language [DML] was submitted to Ansi for standardization. It has been ac-

cepted and is likely to appear in the next update of the Ansi Cobol standard." It is true the Codasyl DML has been before Ansi committees for years, but it has not been accepted as a standard. According to people who are active on these committees, there is no consensus on this subject at this time, and a standard cannot possibly emerge for at least three years.

Even if Ansi does provide a DBMS standard some day, I'll bet that a significant portion of DBMS users will stick with their nonstandard systems for the advantages they offer!

Jane Jodeit

Software AG
Reston, Va.

About User Mini Ratings...

In the Datapro Research Corp. survey on which the article "Users Rank Minis" [CW, Jan. 30] was based, the ICL System Ten received a poor rating, and I am writing to point out a serious error in your report.

Datapro canvassed opinions on equipment that was initially sold and installed by Singer (ICL acquired assets of Singer Business Machines in the U.S. in January 1977). In Datapro's detailed report on the ICL System Ten, it is quite clearly stated that the user ratings primarily refer to system performance prior to the ICL acquisition.

A further point worth noting is that ICL did not acquire the System Ten user base in the U.S. It did, however, buy the sole design rights for the on-ward development of System Ten and announced the enhanced ICL System Ten 220, last June.

Sue Croft

Public Relations Executive

ICL, Inc.
New York, N.Y.

How Far Will Computer Mail Battle Go?

By Jack Stone
Special to CW

"A scene at the battlefield. Inside the maze of cubicles, women sit at their typewriters, punching thousands of names and addresses onto their lists ...

"All around them, the automatic robot typewriters hum a concerto of hollow pops and clicks and dings. The machines are programmed to repeat the senator's letter about every 90 seconds ...

"Soon in this cubicle, which houses the staff of Sen. Alan Cranston (D-Calif.), they will be fighting the war with new weaponry — a computer that will produce the same letter four times as fast."

These excerpts from Ward Sinclair's article "Computer Mail Spews a Blizzard of Influence on Congress" [Washington Post, Jan. 29] barely raise the eyebrows of us hard-bitten DPers. After all, computer-generated letters (CGL) have been around for a long time. But what is rather fascinating is the writer's account of how he discovered that the mechanical typists are busily working both sides of the street.

"It has come to this: One of the American political system's simplest exercises, the letter to your representative or senator, has become a monster of sorts. Computers are talking to computers. Sophisticated mass-mailing techniques are producing a blizzard of cards and letters that threaten to engulf Congress."

Of course, what has happened is that well-heeled lobbyist organizations have introduced the miracle of computing technology to the political letter-writing process. They mass-mail to their constituents, enclosing a letter or card preaddressed to the recipient's own legislator and preprinted with a political message.

Thus, the idea of machine-produced letters has boomeranged on our beloved Congress. Not content to flail about in a sea of its own paperwork, it is now being drowned in a tidal wave of computer mail.

Rep. R.L. Mazzoli (D-Ky.) is seriously concerned. He said, "This mass mailing is about to wipe us out. It is easy to poke fun at, but I don't know how to respond. They go computer, we go computer. We've reached the crazy point of 1984 already. It is weird, upsidedown, expensive and almost not productive at all."

Fear not, Rep. Mazzoli! Although we in the computing industry may sometimes give the impression that we are too busy tending and feeding our machines to really care about the outside world, I can assure you that we act promptly when computers are accused of transforming our respected legislators into omnivorous fiends.

So I have risen to the occasion, studied the problem and developed a highly sophisticated system (concept, of course) to help Congress manage the CGL that it receives —

a system whose sophistication is marked by its stark simplicity. Let me introduce you the Computer-Read Letter (CRL) system.

The system design is based on the maxim of the early technology developers: "Don't fantasize — com-

puterize!" The uncontrolled flow of CGL has come about not because machines are used to generate the missives, but because of the lack of machines to read them.

The Human Connection

The system is developed in phases:

Phase 0: A national standard for CGL must be adopted so that CRL can properly function — you know, letter size, paper grade, type font, that sort of thing. (Since nobody is fooled anyway, we might as well save the 2% or 3% of the gross national product that is devoted to making CGL appear personalized.) In addition, each sender would have to submit a copy of its form letter for central registration and receive a federal code for it.

Phase 1: All CGL are encoded with a short character stream that identifies sender, addressee and form letter code. The computing industry will have to provide appropriate code imprinting and reading machinery. But this should present no real challenge to the ingenuity of

our hardware engineers. They could certainly repackage some second-generation cast-off magnetic ink character recognition (Micr) gear and ship it back to the field.

Phase 2: As CGL are received for CRL processing, they are first opened by hand in the good old-fashioned style. Now here's the pivotal point of the system strategy: the letters are not to be read by staff personnel, but diverted for CRL processing.

The potential for output reports is mind-blasting. We would easily obtain the number of letters generated by form letter code and determine ayes and nays on a specific issue very quickly. We could group the constituents by geographical area and speed of response. We could generate cross-reference reports to show form letters mailed from each sending organization.

Phase 3a: Code the envelope and forget the letter. 3b. Replace the envelope and letter with a coded card and no message. 3c. Replace the cards with tape sent directly from the CGL source machine to the Congressional machine. 3d. The two computers communicate with each other directly over the telephone lines. With this final strategy we have replaced CGL and CRL with CCC (computer-controlled correspondence).

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave., N.W., Washington, D.C. 20007.

System Could Fulfill Century-Old Dream

Prof. Stuart Peterfreund of the University of Arkansas at Little Rock has probably never heard of Elizabeth Taber, a cheroot-smoking, forward-looking investor of the 19th century. Yet they have much in common. They shared the belief that a basic course in English grammar should be available to interested business people.

Peterfreund may hold the key to a century-old puzzle.

Taber left hundreds of thousands of dollars (now grown to around \$10 million) to charity, particularly to young people anywhere in the nation who desired to learn practical business English and arithmetic. She did not expect that the money could provide such a service at that time, and she was first and foremost a practical person. She had taught school in Massachusetts in 1819, when America remembered Washington as a man, not a legend. Her investments in railways (which is where the cash came from) made her very conscious of the importance of distance.

So she did what she could by starting a school, but she wanted more young people to be able to benefit

from the charity, "at least as long as there is a need for such learning" and if the means were there.

Preterfreund's Idea

There still is a need for such practical training. According to Peterfreund, University of Arkansas faculty members had recognized that need for years. "We kept getting all these nibbles from the community ... It has to do with the overall decrease in literacy," he explained.

The Peterfreund solution was to set up a "writer's hotline," manned from 9 a.m. to noon, Monday through Friday, by volunteer faculty members putting in an hour on a little-used existing phone line. People can get quick answers to grammatical questions. Those with basic language problems are also referred to English classes.

What is important about this service is that it uses a central source (the school and certain faculty members) to service a general group (anyone who can call the telephone number.) This matches one of the requirements of Taber's dream. In addition, the service is on a voluntary basis, as needed. The only important question remaining is whether a computerized version of the Peterfreund solution could handle the training at a distance.

I think it can. There are now many computerized business arithmetic services, helping business people

keep accounts, price goods or services and write letters and brochures. A center with these services available could quickly and easily introduce a good training in business accounting to a teenager with a paper route.

A data base on applicants together with available courses by correspondence, cassette or time-sharing would provide individual yet automated review for spotting weaknesses and strengths. The combination of a personalized letter — keyed by date and activity — and auxiliary toll-free calling would attract participants.

The costs would not be enormous, either. Students who actually used

the facility on a continuing basis could be expected to pay for the services, perhaps by credit card. And the Taber money could provide both capital and basic operating expenses of at least \$200,000 a year.

The questions are, then, what sort of equipment would be used in 1980, what sort of training would the faculty need and what sort of backup services would be needed to provide a national business English and arithmetic service?

Your suggestions might help Taber's dream come true.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

The
Taylor
Report
By
Alan
Taylor
CDP

Any Design Ideas?

1. What hardware would you use to run English and arithmetic courses and keep track of students' progress?
2. What software packages are suitable for elementary, practical business work?
3. What communications systems would you use?
4. Do you know of any such systems in use now or in the design phases?
5. If asked, would you help design a National Computerized Business Education System?

Please return completed form to Alan Taylor, c/o Computerworld, 797 Washington St., Newton, Mass. 02160.

Name _____ Position _____
Address _____

Or They'll Lose Sales

Small Systems Vendors Better Learn English

By Robert S. Yount
CW Staff

I've been reading Computerworld for several months now, and I've come to the conclusion that the small systems people are a lot further from recognizing their market potential than they realize. The volume market is small businesses, and they need not be engaged in technical work.

While the potential of this market is generally recognized, it seems no one has made an intelligent and serious effort to capitalize on it.

Before you say "Balderdash," let me tell you of my recent experiences in looking into acquiring a

system for my business. Advertisements for Commodore's PET and other micromcomputers indicated that maybe we could use a computer to handle our accounting (general ledger, payroll, job cost, etc.) and some numbercrunching (mostly R&M predictions and some standard statistical work.)

A perusal of the yellow pages located two local computer stores that handle prominent brands such as Polymorphic and Apple. The first visit to the local outlets was a disaster. A cheerful salesperson, obviously knowledgeable in 8080s, Kluge and transmission rates, didn't have any idea of what size

system I would need.

In fact, he became less helpful when I explained in simple English what I wanted to do and the size of

Reader Commentary

our operation. He did, however, sell me two books so I could learn his language and offer to propose a system when I developed a data flow chart.

Visiting the second store produced essentially the same results, except

that the salesman told me that if I could provide him with my programs, he could tell me how much memory I needed. From him I purchased two magazines and went home to study.

Don't Need Another Hobby

It's now three months later and I've learned to use terms like "file merging," "loop" and "bootstrap," but I'm having difficulty with the flow charts and any thoughts about writing a program are out of the question because I have other hobbies.

My mistake seems to be in wanting a tool, not a hobby. I'm an engineer (mechanical) trying to run a business, and I'm seeking something to simplify — not complicate — my life. I've decided to postpone the purchase of any computer until the sales reps for this equipment learn to speak English.

I may be missing the challenge of learning programming and all the intricacies of computers, as the salesman in a third store said, but he is missing the sale.

Perhaps some of GW's readers have been down the same road I'm traveling and can save me the trouble of reinventing the wheel. The following is a brief outline of what we'd like to do with a computer:

- Payroll with standard deductions and job charges.
- General ledger, (three columns).
- Disbursements, (28 columns).
- Receipts (three columns).
- Job cost (30 current) from payroll and disbursements.
- G&A, compute from above (period and YTD).
- Overhead, compute from above (period and YTD).
- Numerics: arithmetic, numbers to powers, e to powers, loop for iterative processes, roots, etc.

We now employ 15 people, but the computer should be capable of handling as many as 30 people for payroll. Incidentally, our accountant isn't a programmer either, so the CRT should provide prompting. Obviously, a printer is required.

Questions: How much memory (read-only and random-access) is needed and how should the data be stored: single floppy, dual floppy or cassette? Can a system that will do the accounting and number

(Continued on Page 42)

A real eye-opener from macs®

Join macs for a morning of software testing talk. And go home with a test plan that works. Free.

There's tremendous potential for savings in software development by the use of a test data generator. Datapro Research Corporation says it, and our more than 400 datamacs® users worldwide agree.

Now we want to tell you about the savings in personnel and computer time that can be yours when you build a test plan. And while we have a highly successful proprietary product designed to help you do just that, our series of free seminars are offered in the name of quality software. Which means we will talk about building a test plan that will enable you to improve testing and save money. Whether or not you use our products.

*Here's what Datapro Research Corporation writes about test data generators:

Surveys of data processing installations reveal that — • About one half of the personnel resources used annually are devoted to program debugging and testing • About 50 hours of computer system time per month is spent in support of program test and debug • A further 10 hours per month is lost by the average installation on reruns due to program failure.

User experience with test data generators has revealed that — • Computer time expenditures for program test and debug may be reduced by more than 50 percent • With concomitant manpower expenditure reductions of more than 30 percent.

We know that no matter how good the testing tool, without a test plan, it is useless. We'll call on our experience to help you chart a simple, effective way to build a test plan that will get you more for your software dollar. And we will provide you an actual complete test plan that works. At no charge.

If you're responsible for the ways system analysis and programming are done in your company, then we'll show you how you can make a dramatic impact on the way new systems are developed and installed.

Spend a morning with macs. Learn how to improve programmer productivity, reduce testing costs, and make maintenance programming just plain fun. It'll be a real eye-opener.

Space is limited, so register now. Return this coupon today, or call macs (collect) at 215/265/2910.

macs 1978 series of eye-opener seminars.

March 21, Miami, FL	May 9, Seattle, WA
March 23, Boston, MA	May 10, Portland, ME
March 23, Tampa, FL	May 11, Vancouver, British Columbia
March 29, New Orleans, LA	May 16, Parsippany, NJ
April 6, Chicago, IL	May 18, Cleveland, OH
April 10, Los Angeles, CA	May 23, Cincinnati, OH
April 11, Philadelphia, PA	May 25, Milwaukee, WI
April 11, Phoenix, AZ	June 13, Indianapolis, IN
April 14, San Francisco, CA	June 14, Atlanta, GA
April 18, Dallas, TX	June 15, St. Louis, MO
April 20, Houston, TX	June 20, Calgary, Alberta
April 25, Washington, DC	June 22, Edmonton, Alberta
May 9, Hartford, CT	



macs
management and computer services, inc.
790 valley forge plaza
valley forge, pa 19482
215/265/2910

I want to wake up with your free seminar on software test planning

Please register me for the seminar in _____

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____
☐ Sorry, I can't attend any of your seminars, but I am interested in learning more about software test planning. Please send information

TERMINALS FROM TRANSET

COMPUTER TERMINALS

DECwriter II	 \$1,495
DECwriter III	 2,895
DECprinter I	 2,495
VT52 DECscope	... 1,695
VT55 DECscope	... 2,695
TI 745 Portable	 1,875
A3M 3A CRT	 675
ADDS Regent 100	... 1,325
Data Prod. 2230	... 7,900
Techtran 8400	 1,650

FULL OWNERSHIP, RENTAL
AND LEASE PLANS
AVAILABLE ON ABOVE
AND OTHER EQUIPMENT



TRANSET
CORPORATION

2005 Route 22, Union, N.J. 07083

201-688-7800

There are many measures of quality in an OEM module drive from Control Data.



Here are three of them.

Greater System Flexibility

Our Storage Module Drive (SMD) has removable media. Our Mini-Module Drive (MMD) has fixed media. And Our Cartridge Module Drive (CMD) has both. Capacities start at 12 megabytes and range to 300 megabytes.

But all share compatible interface software and firmware. That means easy system integration, simple field upgrades. Without expensive modification of your design. It's the type of flexibility that saves money—for both you and your customer.

Exceptional MTBF Reliability

Control Data has a reputation for building module drives that last. We're backing it up with continued testing and feedback. And we design and manufacture all critical components in-house. We can build reliability into our drives because we built it into our heads, servos and media.

And Value That Matches Performance

We know we have the best and most reliable drive for your application. But we also have

the competition beat on cost of ownership. Send us the coupon below. We will help you compare our lower cost-per-bit, our lower entry costs with others.

For more info on our SMD family, call us at 612/853-3399. Or, return coupon to:

D.C. Steiner, OEM General Manager, Product Sales
Control Data Corporation C 3/13
P.O. Box 0, Minneapolis, MN 55440

Please send info on your ☐ SMD ☐ CMD ☐ MMD

Name _____ Title _____

Company _____ Address _____

City _____ State _____ Zip _____

Area Code _____ Phone _____

CD CONTROL DATA
CORPORATION

More than a computer company

ADAS relieves the agony of "slipped disc"

Too much disc space can slip into wasteful reserve with IBM 360/370 DOS and DOS/VS installations. ADAS can make available this wasted space, increase your processing power, eliminate a DASD up-grade.

ADAS is a simple-to-use, highly transparent system for efficient disc space management. ADAS automatically assigns file space from available areas on disc, eliminating the manual task of locating unused space; returns to use up to 30% of overall disc space, up to 100% of SORT and compiler work space; prevents over-estimation of space needs by truncating space automatically after files are created. ADAS supports 2311, 2314, 3330, 3340, and 3350 compatible disc drives; supports all file types; reports when and where each file is used; offers disc pool management facility; provides automatic secondary allocation; prevents deletion of unexpired files; makes JCL completely partition independent. And new Version 3.0 of ADAS adds other major up-grade features. Write or phone for more facts and a free trial offer.

ADAS: chosen by the U.S. Army over competitive systems for 74 installations around the world.

GSA CONTRACT NO. GS-00C-01201



Universal Software Systems have earned the DATAPRO AWARD five times in the past three years

Universal Software

Main Office:
Brookfield Office Park
Brookfield, CT 06804
Tel: (203) 792-5100

RCA takes the mixups out of mixed-vendor maintenance.

Maybe your mixed-system headaches are systemic — caused by mixed vendor service personnel who are sometimes hard to get in touch with. Sometimes you don't know which one to get in touch with.

It means extra phone calls. Extra bookkeeping. Extra downtime. And extra hassle. It makes things tough on clients and manufacturers alike.

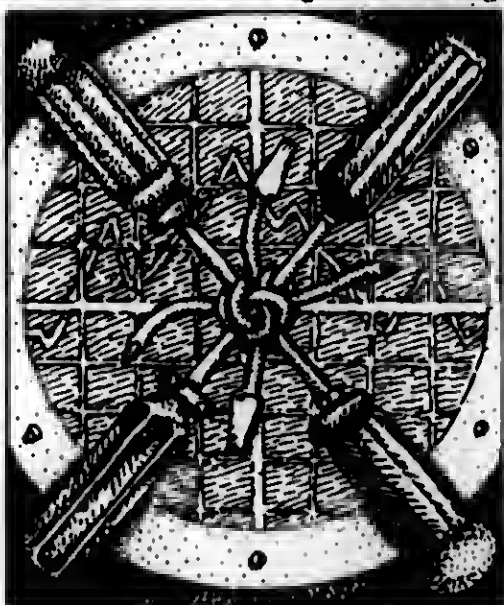
There's an easy way to end the problem. By calling RCA Data Services. The all-in-one service system that pinpoints problems fast — and solves them. RCA has 180 service locations all

across the country. And 15 strategically-located warehouses equipped for retrofitting or overhauling equipment on site.

Single-vendor maintenance for mixed-vendor systems makes sense. People with reservations systems know it. People with financial systems know it. And more and more manufacturers are finding out.

Find out more yourself. For full details and rates, call or write RCA Service Company, a Division of RCA, Data Services, Bldg. 204-2, Camden, N.J. 08101.

Or find out faster by calling (609) 779-4400. We'll fix up your mixups.



RCA Data Services

Letters to the Editor

Too Much Protesting?

As the publishers of CNReport, we would like to respond to J.W. Johnson's letter [CW, Jan. 30], which took exception to the Computerworld article "Fine Print Called Vendor Trick" [CW, Dec. 19].

The CW Commentary was based on an article that appeared in the September 1977 issue of CNReport entitled "The Psychology of Fine Print and Grey Ink." Interestingly, this article dealt with a major main-frame vendor's new form contract, as opposed to the "computer brokerage industry."

The vendor in question is now printing its contracts in the usual fine print, but with an additional new twist: The print has also been "screened" so that it appears grey, thus making reading more difficult.

Since the article did not deal with Johnson's segment of the industry, we find it difficult to understand why she felt compelled to react to it. To paraphrase Shakespeare, perhaps Johnson "doth protest too much."

As far as a "campaign to besmirch the reputations of computer dealers and leasing companies" is concerned, it is the purpose of CNReport to make computer users aware of what is going on in the marketplace and to advise them of any activities, techniques, ploys, "tricks," etc., that may not be in their best interest.

Whether this type of information is construed as positive or negative probably depends upon which side of the table you're on.

The various computer vendors (including mainframers, dealers, brokers and lessors) are more than capable when it comes to telling their story to computer users. On the other hand, International Computer Negotiations, Inc. will continue, through the pages of CNReport, to provide users with facts, figures, warnings and suggestions it feels are appropriate.

Kenneth C. Brindle
Vice-President

International Computer Negotiations, Inc.
Winter Park, Fla.

Defends Standard Contract

"Users Alerted to Vendors' Negotiating Tactics" [CW, Jan. 30] left the unmistakable impression that vendors in computer-related industries are unscrupulous in their sales techniques. Your readers could benefit from a review of the following points in defense of the "standard contract":

- The purpose of a good contract is to secure agreement between parties, never to put one party "behind the eight ball." It should by its purpose and intent ensure a harmonious relationship between the parties. For that reason, negotiating a contract with the intent to gain unfair advantage over the other party does neither party any long-term good. Since most companies in the U.S. rely on repeat business from their customers, it is vital that the contracts they write encourage fair-

ness and the customer's confidence.

- A reputable vendor will only put the minimum required to protect himself in his standard contract. Experience has taught him those things to which he would be ill-advised to commit himself and in so doing, protects his customer as well by ensuring his continued presence in the marketplace.

- Before a customer calls for legal counsel or debates every paragraph of a contract, he should stop and think about the contracts he writes with his own customers. Would he like to see such a procedure followed? What impact would this have on the way he does business?

- Why should the vendor involve senior management and legal personnel in the contract negotiations? Assuming that the customer is dealing with experienced sales personnel who know corporate policy, there is no need to involve others at the "corporate" level. Such involvement, particularly if both parties use legal counsel, will often make the deal less profitable for the vendor and far more expensive for the customer.

- Consider the source of the article, the CNReport, written by consultants. If there were no disagreements around, they would have difficulty making their living.

J. Norman Stauff
Director

Publications and Communications
Florida Software Services, Inc.
Orlando, Fla.

Ode to an Ace Programmer

This anonymous poem was passed around in one of the computer science courses at Sangamon State University last year by a class member who works for the State of Illinois. While the poem has nothing to do with compiler architecture, the subject of the course, it was well-received and I think others in the computer field may also enjoy it.

Thomas B. Knoedler
Springfield, Ill.

The Perfect Programmer

"No program is perfect."
They said with a shrug.
The client is happy ...
What's the one little bug?
But he was determined.
The others went home.
He dug out the flowchart
Deserted. Alone.
Night passed into morning.
The room was cluttered.
With memory dumps, microfiche;
"I'm close," he muttered.
Chain smoking, cold coffee,
Logic deduction.
"I've got it," he cried. Just
change one more instruction.
Then change two, then three more
As year followed year.
And strangers would comment
Is that guy still here?
He died at the console
of hunger and thirst.
Next day he was buried
face down, nine edge first.
And his wife through her tears
Accepted his fate.
Said, "He's not really gone.
He's just working late."

BOSTON

I'm interested in a personal
Career Design in Boston

Name _____ Home Phone _____

Home Address _____

City _____ State _____ Zip _____

I am involved in ☐ Software Systems Development
☐ Business Application Programming
☐ Other (specify) _____

Years' Experience _____ Degree _____

School _____ Year graduated _____

☐ CONTACT ME IMMEDIATELY ABOUT A CAREER DESIGN

HOUSTON

I'm interested in a personal
Career Design in Houston

Name _____ Home Phone _____

Home Address _____

City _____ State _____ Zip _____

I am involved in ☐ Software Systems Development
☐ Business Application Programming
☐ Other (specify) _____

Years' Experience _____ Degree _____

School _____ Year graduated _____

☐ CONTACT ME IMMEDIATELY ABOUT A CAREER DESIGN

SAN FRANCISCO

I'm interested in a personal
Career Design in San Francisco

Name _____ Home Phone _____

Home Address _____

City _____ State _____ Zip _____

I am involved in ☐ Software Systems Development
☐ Business Application Programming
☐ Other (specify) _____

Years' Experience _____ Degree _____

School _____ Year graduated _____

☐ CONTACT ME IMMEDIATELY ABOUT A CAREER DESIGN

FIRST CLASS
PERMIT NO. 44991
BOSTON, MA

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in The United States
Postage will be paid by:

perri•white
associates
50 Franklin Street
Boston, Massachusetts 02110

FIRST CLASS
PERMIT NO. 18853
HOUSTON, TEXAS

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in The United States
Postage will be paid by:

perri•white
and associates, inc.
5373 West Alabama Place
Houston, Texas 77056

FIRST CLASS
PERMIT NO. 20880
SAN FRANCISCO, CA

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in The United States
Postage will be paid by:

perri•white
and associates, inc.
44 Montgomery Street
San Francisco, California 94104

we'll design a career around the city of your dreams

BOSTON

Boston is humming with a new surge of technological activity. Long recognized for leadership in electronics and computer research, Boston needs data processing people in medicine, finance, insurance, manufacturing and many other areas.

HOUSTON

America's fastest-growing city, Houston has a geometrically increasing need for data processing professionals. Special benefits of Houston are an average yearly temperature of 68.1°F and—no state income taxes! Hundreds of high-salaried careers are open to business application programmers through Perri-White's Houston Career Designers.

SAN FRANCISCO

In addition to the fact that it's one of America's most beautiful cities, San Francisco is an exciting, challenging place to work, especially in the growing data processing field. Let Perri-White Career Designers prepare your path to the Golden Gate!

If you're a business application programmer or a software systems designer with two to five years in data processing, you deserve a personal career design... one that includes your choice of location as well as your choice of career opportunity. Perri-White can provide you with both.

But you're too much in demand. Employers don't know where to turn for needed talent, and... with so many opportunities to choose from, people like you are finding it difficult to make the best career path decisions.

at perri-white, you're a person

We begin where other consultants stop. The most important thing to us is your individuality, not just your education and experience. **We design careers for people, we don't locate bodies for jobs.**

so pick your city. . .

Our Career Designers make up to 800 contacts a week. They talk to top management in the most desirable companies. Without a doubt, we can offer you the largest data base of career opportunities in Boston, Houston and San Francisco.

two miles or two thousand miles: we can help

If you already work in Boston, Houston or San Francisco and like it, send us a card anyway. Career design can help you find better exposure, better working conditions, better access to state-of-the-art—even in your own backyard. Perri-White can eliminate confusion and guide you down the best career path for you.

just a card or coupon, never a cost

Perri-White Career Design never costs you a cent, and it's completely confidential. So send the card imprinted with the city of your dreams today.

(If your city has been removed, use this coupon)

I'm interested in a personal Career Design in:

☐ BOSTON ☐ HOUSTON ☐ SAN FRANCISCO

Name _____ Home Phone _____

Home Address _____

City _____ State _____ Zip _____

I am involved in ☐ Software Systems Development
☐ Business Application Programming
☐ Other (specify) _____

Years' Experience _____ Degree _____

School _____ Year graduated _____

☐ CONTACT ME IMMEDIATELY ABOUT A CAREER DESIGN



perri • white

associates

BOSTON

Perri-White Associates
50 Franklin Street
Boston, MA 02110
Phone (617) 423-1900

HOUSTON

Perri-White & Associates, Inc.
5373 West Alabama Place
Houston, TX 77056
Phone (713) 961-5500

SAN FRANCISCO

Perri-White & Associates, Inc.
44 Montgomery Street
San Francisco, CA 94104
Phone (415) 981-7000

Disagreement With Towner

Non-Codasyl DBMS Not Horrible Prospect

By Stephen L. Robinson

Special to CW

In a "Non-Codasyl DBMS a Bad Choice for Users" [CW, Feb. 6], L.E. Towner raised the specter of approval by the American National Standards Institute (Ansi) of the complete set of Codasyl recommendations for data base management systems (DBMS). Towner warned that a user "should not allow the vendor's salesman to blind him to the fact that buying a non-Codasyl DBMS will return to haunt him when he can least afford it."

Strong words indeed! Without getting involved in a dispute over the merits of specific Codasyl and non-

Codasyl packages, I would like to question some of Towner's comments.

For example, the analogy with Cobol was a poor one. There are many "nonstandard" Cobol compilers around today.

Further, organizations which now conform to a standard subset of Cobol did not run out and rewrite all of their old Cobol programs. The vendors of nonstandard Cobol compilers have not stopped enhancing their products. Instead, we are now seeing a new wave of "structured Cobol compilers," which, for the most part, are also nonstandard.

Further, when Cobol appeared on

the scene, it was the only English-like high-level programming language around (unless one wishes to count IBM's short-lived Comtran).

Reader Commentary

And, with regard to data base packages, there are alternatives around; more than 105 of all medium- to large-scale installations are using the alternatives. The Codasyl implementations are something less than 2% of such installations.

Therefore, the circumstances surrounding the "birth" of Codasyl Cobol are not at all similar to the birth of Codasyl standards for data base packages; since nonstandard Cobol systems are proliferating, why assume there would be no room for nonstandard data base packages?

Reloading/Reprogramming

Let us now consider Towner's contention that users will have to rewrite all their application programs and restructure all their data bases.

The latter would certainly be true — files will have to be unloaded and reloaded, much as many data base files have to be reorganized today. The cost here — a one-time cost — would be quite minimal.

The comment about reprogramming was too sweeping. While application programs written for some DBMS would need considerable revision, programs written for a large percentage of data base packages would require only minor revision.

This is especially true of "Codasyl-like" packages. For example, Cincom Systems Inc.'s total DBMS can be mapped rather easily into a Codasyl format. Master files in Total become CALC mode record types in Codasyl; master-variable entry file relationships in Total become set relationships in Codasyl; variable entry files become either VIA record types in Codasyl or, if the user wishes to get fancy, DIRECTS.

Mappings for inverted packages are similarly straight-forward (if not quite so simple as Total-Codasyl mappings). The main problem here is taking the powerful inversion capability from a package such as Software AG's Adabas and having to implement it somewhat clumsily in Codasyl, which has nothing of comparable power.

For example, if I wish to "relate" all of my customer records by state in Adabas, I would simply make the state field a descriptor. I would now "request" all records from any state I wished.

To accomplish a similar task in Codasyl, I would have to establish a new record type, called STATE, even if I had no data of interest about states. I would then implement a set relationship between STATE and customer records.

Clumsy, but it could be done. I

(Continued on Page 42)

EMM builds the most enhancements into add-on memories.

Enhancements make a big difference in add-on memories. And EMM has more new enhancements for more new ways to grow your 360 or 370 cpu.

First, there's an all-new EMM Backup Package for 370/158s and 168s — with both a backup memory and a backup power supply. (We call it RASI for Reliable, Available, Serviceable, Improved.) And, it is only possible because of our totally static IBM compatible technology.

Then there's a processor speed enhancement (PSE) for 158s, planned for 145s and 158s — offering faster thru-put. And a low cost memory speed enhancement (MSE) for 155s that also increases thru-put.

In addition, we can now expand 360/65 memory capacity to 8 megabytes. Add these new enhancements to those we already had and you get more performance and capacity than you ever dreamed possible from add-on memories.

EMM also offers the most user features for popular models like our extra standby memory and simple deferred maintenance... along with more good buyer features like our workable financial packages.

With new enhancements and excellent features like these, we expect our installed base of add-on memories to keep growing for a long time to come. Call or write today, for the complete EMM add-on memory story.

The difference in add-on memory

EMM

COMPUTER PRODUCTS

A Division of Electronic Memories & Magnetics Corporation
2311 W. El Segundo Blvd., Hawthorne, CA 90250

For more information, call your regional EMM sales office: Eastern (201) 777-4404, Central (312) 297-3110, Western (213) 777-4070, Canada: Toronto (416) 626-1160, Europe: Bad Homburg, West Germany 06172/6084

COMPUTER TERMINALS	
OWN BY LEASING	
36 MONTH LEASE PLAN WITH 10% PURCHASE OPTION AT END OF TERM	
DECwriter II	\$ 52 mo.
DECwriter III	99 mo.
DECprinter I	86 mo.
VT52 DECscope . . .	59 mo.
VT55 DECscope . . .	94 mo.
ADM 3A CRT	30 mo.
Ti 745 Portable . . .	65 mo.
ADD5 Regent 100 . .	48 mo.
Data Prod. 2230 . . .	275 mo.
Techtran 8400	65 mo.
PURCHASE, RENTAL AND 24 MONTH FULL OWNERSHIP PLANS AVAILABLE ON ABOVE AND OTHER EQUIPMENT	
 TRANSET CORPORATION 2005 Route 22, Union, N.J. 07083 201-688-7800	

Introducing SuperReel™ A new approach to computer tape reels. The approach that's right for today's drives here now, and for the new generations to come.

SuperReel gives you a uniquely-shaped I-Beam hub, making it 90% stronger than conventional reels, giving SuperReel the strength to withstand the higher tensions of both your current and future drives. SuperReel also has a specially-shaped tape wind surface, to prevent edge damage during rewinds. And all SuperReel components are ultrasonically welded—no glues or solvents—for improved strength, product uniformity, and lasting performance.

SuperReel is the only reel specifically designed to meet the demands of advanced drive technology. The one reel that surpasses all published specifications for high-performance drives. The one reel that performed reliably in stringent testing conditions at 15 ounces of tension and speeds up to 220 ips. The one reel with no flange expansion or contraction under stress conditions. The one reel balanced to prevent hub-to-drive fit problems.

Memorex SuperReel. A better reel, to give you better results. Better winding. Positive autoloading functioning. More accurate data transfer. Greater reliability. On the drives you're using now, and the new generations of drives to come.

Memorex SuperReel. The new shape that'll put your data processing in great shape.

Ask your Memorex representative to explain how SuperReel can dramatically reduce your data processing costs. Locations in principal cities worldwide. Or contact us at 1200 Memorex Drive, MS-0064, Santa Clara, CA 95052. Phone 408-987-1043.



MEMOREXCELLENCE

Tektronix 4020 Series

**When you make
your next investment
in terminals...**

**Get something
to show for it.**

The new Tektronix 4020 Series may be your first long-term terminal investment. It's a series of refresh terminals designed to fit your needs today... and your growth picture tomorrow.

For example: The 4025 terminal expands from smart alphanumerics...to forms ruling...all the way to graphics. You start with basics like expandable memory. Familiar typewriter keyboard with complete, easy editing. Scrolling. Easy-on-the-eyes green display with variable brightness.

Now or later, add forms ruling. You can construct separate on-screen workspace and monitor areas that scroll independently. You can recall complex forms with a single key.

Finally, you can add Tektronix graphics. The 4025's 34-line deep screen is the perfect proportion for graphics. Our PLOT 10 Easy Graphing software makes bar charts, pie charts and histograms easy to produce. Alphanumerics, graphics and forms can be positioned anywhere on-screen, in any combination.

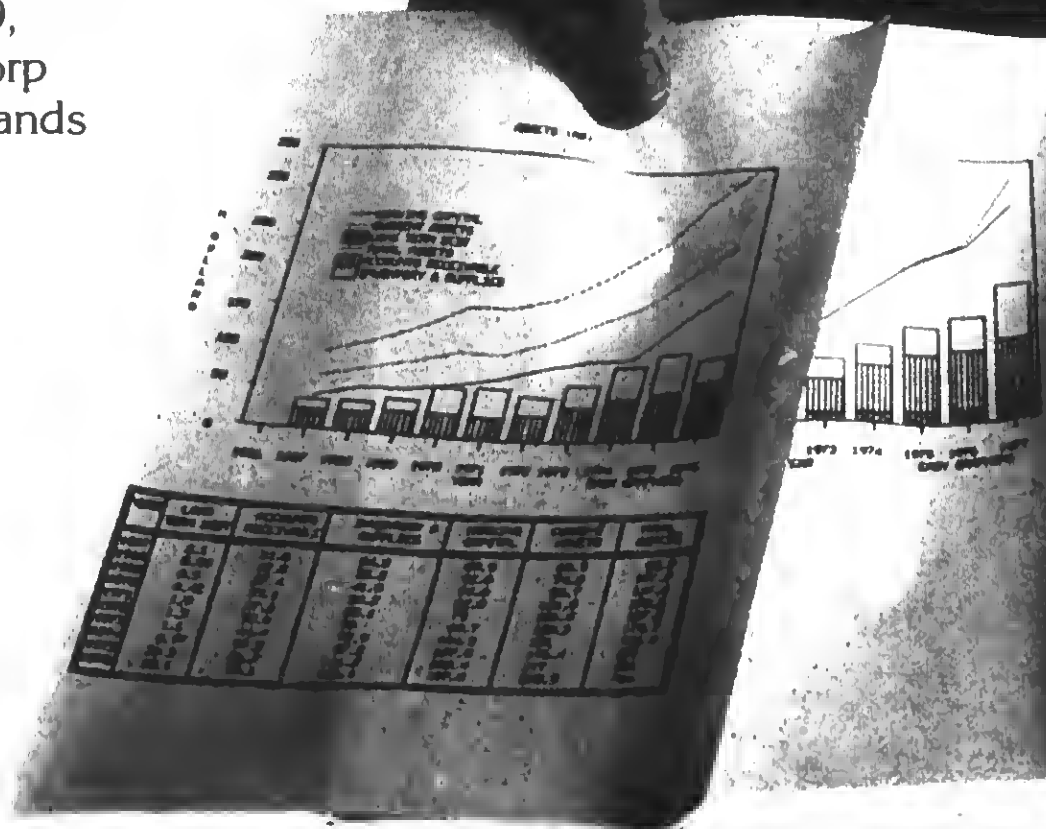
Our companion 4024 provides secondary growth... from alphanumerics to forms.

So you can closely plan and manage your terminal investment with optimum cost control.

Ask your local Tektronix Sales Engineer for a personal demonstration. We'll show you a priced-right, expandable approach to your input and display needs, with the promise of proven reliability and worldwide Tektronix support. The new 4020 Series. It's an investment you can grow with. Even when you're too busy for words.

Tektronix, Inc.
Information Display Group
P.O. Box 500
Beaverton, OR 97077
(503) 638-3411
Tektronix Datatek NV
P.O. Box 159,
Badhoevedorp
The Netherlands

OEM information available
Copyright © 1977, Tektronix
All rights reserved





Tektronix

ANALOG TEST EQUIPMENT

Non-Codasyl DBMS Not a Terrible Problem

(Continued from Page 38)

doubt, however, that many inverted package users would be interested in giving up their descriptor or key capability.

Pursuing this issue further and hearkening back to the Cobol analogy, the reason Cobol has gained the acceptance it has (notice I said "Cobol," not "standard Cobol") is that it has demonstrable advantages over assembly-level coding and/or other higher level languages.

No such clearcut advantage exists for Codasyl today. Indeed, virtually every nonstandard DBMS has something to offer that would markedly enhance the Codasyl standard.

If a Codasyl data base standard is to gain overwhelming acceptance, it

will probably have to adopt features from other packages. This is going on all the time. A recent Computerworld article on a study by Infodyne [CW, Dec. 5] 1977) pointed out quite correctly that the major data base packages are beginning to resemble one another.

For example, Adabas is acquiring a CALC mode (a la Codasyl); IBM's IMS (or DL/1, if you prefer) added secondary indexing (a la the inverted packages); MRI Systems 2000 instituted a file link feature that is probably a first step to a generalized interfile subscheme capability.

Towner stated that the "non-Codasyl DBMS vendor will be forced to upgrade [emphasis mine]

his system to meet the standard." The term "upgrade" seems hardly appropriate.

There are many users of nonstandard systems who would not change for a free Codasyl system. Towner's article did not give credit to the vendors of "nonstandard" packages for their excellent efforts in the development of truly useful and efficient systems.

Worse, the article also did not give proper credit to the vendors of Codasyl packages. They, too, have invested in system development, yet are now acclaimed the "winners" by virtue of being Codasyl.

My crystal ball is not necessarily any clearer than Towner's, but it would seem that the argument for

Codasyl is not nearly strong enough to send Cincom, IBM, Insyte Datacom, MRI, Software AG, etc. running for cover.

Of course, I could be wrong and Towner right. In this crazy world where people use operating systems that consume more resources than they save, where DP shops use 370/158s to simulate EAM logic and where people buy data base packages merely to replace Isam, anything is possible.

Robinson is an independent consultant operating as S.L. Robinson & Associates in Morrisville, Pa. He is also the author of the "Doto Base Corner" articles which appear from time to time in the Software & Services section.

Vendors Should Learn English

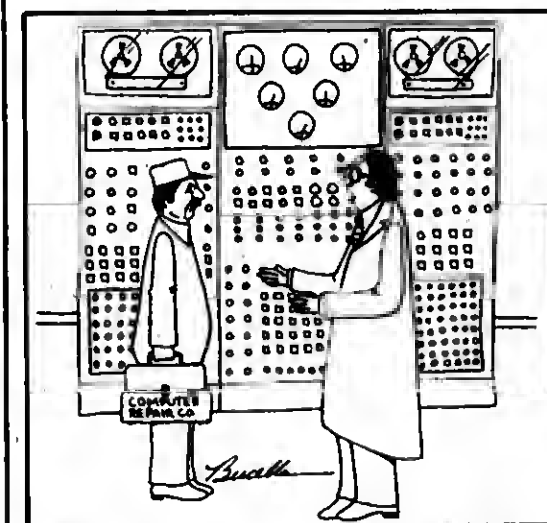
(Continued from Page 32)

crunching be expanded if dual floppies are used, to provide word processing (like Xerox 800 or 850) capability?

The important question for the small systems is whether they can work with a customer who provides an expanded version of the intended use given above or whether they really need flow charts and programs. Do they have a standard software package for this type of accounting?

If the manufacturers can't communicate with the yard goods, liquor store and other business owners in plain business English, it's going to be a long time before equipment orders reach expectations.

Yount is president of QRC, Inc. in Silver Spring, Md.



'Can You Get It To Stop Saying "I Told You So"?'

WALK AWAY LEASES
for
IBM
3031
3032
3033

158, 168 and most other
Processors and Peripherals

- Lowest Lease Rates
- Contract Flexibility
- Simple Documentation

Call or Write

alanthus leasing company

TERMINALS FROM TRANSNET

100% EQUITY RENTAL PLAN

DECwriter II	\$ 75 mo.
DECwriter III	\$145 mo.
DECprinter I	\$125 mo.
VT52 DECscope	\$ 85 mo.
VT55 DECscope	\$137 mo.
T1745 Portable	\$ 94 mo.
ADM3A CRT	\$ 45 mo.
ADD5 Regent 100	\$ 67 mo.
DATA PRDD. 2230	\$395 mo.

FULL OWNERSHIP AFTER 24 MONTHS

PURCHASE AND OTHER LEASE
AND RENTAL PLANS AVAILABLE

SIMILAR PLANS FOR
OTHER PRODUCTS

TRANSNET
CORPORATION

2005 Route 22, Union, N.J. 07083
201-688-7800

Newsletter Shows How Scoring Eases Evaluation of User Guides

By Brad Schultz
CW Staff

CHICAGO — Whether it is describing a system developed in-house or a package acquired from outside, the acceptance of a user's guide is determined by appearance, readability and how easy it is to use when seeking information, according to the editors of the *Sandra Pakin & Associates Folio*, a documentation newsletter.

Noting that "referenceability" is crucial to the worth of a guide, they outlined a scoring system for measuring this quality. In evaluating a guide — especially for a complex system — users should look for the following features, they said.

Section titles in the text. Score 10 points for at least three levels of text headings in each chapter (section, subject, topic); five points if there are two levels of text headings; two points if there is one level.

Table of contents "lists section titles and page numbers in the order in which they appear in the

manual and shows the structure and organization of the manual."

Score 10 points if headings to at least the third level are present; five points if only two levels of headings are shown; two points for one heading level; no points if only chapter titles are present. Subtract 10 points if there is no table of contents.

List of figures, illustrations or tables "lists page numbers for figures, illustrations and tables." Score five points if present.

Index tabs "divide the manual into units to make it easy to locate chapters." Score 10 points for tabs having titles front and back; five points for titles on the front; two points when only numbered.

Chapter tables of contents "show detailed contents for each chapter. Each chapter table of contents immediately precedes the chapter text."

Score 10 points if all headings are cited; five points if headings are shown to the third level; two points if only two levels of headings are indicated.

Figure captions. Score five points if figures are both numbered and adequately titled.

Reference appendixes "list information that the user needs to use the system, including error messages, special functions, codes, etc." Score 10 points if present.

Glossary of terms. Score 10 points if the number of glossary pages is 1% to 3% of the total count; five points for a limited glossary.

Index. Score 10 points if the number of index pages is at least 3% to 5% of the page count; five points for a limited index. Subtract 10 points if there is no index.

Pakin & Associates said the total point scores should be rated as follows:

- Excellent: 65 to 80 points. "You are giving your users a referenceable manual."
- Adequate to good: 35 to 65 points. "You are making attempts to provide the user with reference aids."
- Perfunctory at best: below 35

points. "You are shortchanging your users."

Published quarterly, *Folio* is available for an annual subscription rate of \$25, payable to Sandra Pakin & Associates, 6007 N. Sheridan Road, Chicago, Ill. 60660.

RT-11 Updated

MAYNARD, Mass. — Version 3 of RT-11, the smallest of Digital Equipment Corp.'s operating systems for its PDP-11s, includes both extended hardware support and additional software features, according to a spokesman.

Version 3 is optimized for real-time and program development applications. It runs on systems ranging from the microcomputer based PDP-11/03 through the near-top-of-the-line PDP-11/60 with cache memory, he added.

High-level languages available with RT-11 include APL, Basic, Dabol, Focal and Fortran IV. The Macro-11 language is also supported and the command sets permit a user to do such things as compile, link and execute a program, the spokesman noted.

One of the user options allows application programs running under RT-11 to access 124K words of main memory. Another supports 15 terminals through a foreground/background monitor facility, he said.

A HELP feature prompts users unsure of monitor commands; documentation provided with the \$2,760 operating system is said to include eight manuals written for different levels of users or managers.

'SAM' Simulates Latest IBM CPUs

LONDON — An updated version of SAM, the Systems Analysis Machine software originally developed by U.S.-based Applied Data Research, Inc., makes SAM the most sophisticated simulation system for large IBM and Univac CPUs, according to the vendor, Computer Program Products Ltd. (CPP UK).

SAM is made up of a library of mathematic models of various mainframes, peripherals and software systems and a language to help the user easily combine the component models in order to describe existing or proposed configurations, a spokesman said.

Once a configuration model is developed, simulated workloads can be applied to determine how

well it might handle the user's needs. Thus, plans for a data center can even be tested before any new hardware or software has been delivered, he added.

Hardware models in SAM Version 6 now include IBM's 3705 communications controller, the 3800 laser printer and both the 370/138 and 370/148 CPUs. The vendor also claims to have models for IBM's 3031, 3032 and 3033 processors.

OS/MVS and Vtm

On the software side, the new release is said to include models of IBM's OS/MVS, for both multiprocessor and attached-processor configurations, and of Vtm and the Network Control Program. In addition, there have

been "major enhancements" to the Information Management System model, the spokesman stated.

All support for users outside the UK is to be provided from CPP's technical center in Amsterdam, "which was specifically set up to handle international requirements," he said.

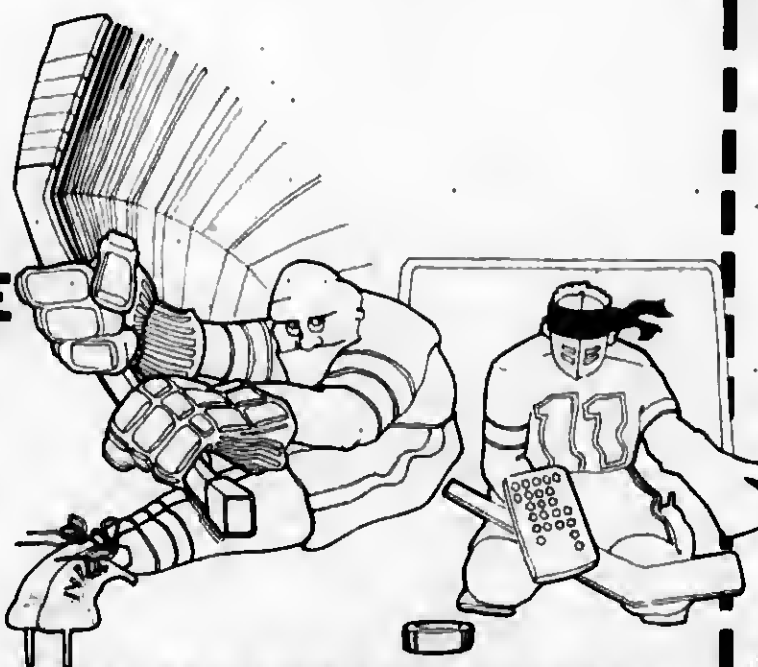
Overall cost of SAM Version 6 is \$65,000 but users may acquire a basic system for \$35,000 plus the cost of individual models for the overall SAM library. CCP UK also offers a study service, based on the use of SAM, other measurement tools and the experience of CPP technicians, the spokesman noted from CAP House, 14-15 Great James St., London WC1, England.

SAVE your financial decision-makers with our GENERAL LEDGER, ACCOUNTS RECEIVABLE AND ACCOUNTS PAYABLE Systems.

Don't let your company management face-off against tough decisions wearing information blind-folds. Give them a great assist with proven, reliable systems from the No. 1 company — Software International.

Our hard-hitting first line includes the famous GENERAL LEDGER and FINANCIAL REPORTING SYSTEM, powerful ACCOUNTS RECEIVABLE and agile ACCOUNTS PAYABLE Systems.

They know their way around the league, operating in DOS, O/S, IMS, IDMS, DL/I, TOTAL, as well as on-line under CICS.



Give your financial management the most effective power-play you can, the three-way combination of GENERAL LEDGER, ACCOUNTS RECEIVABLE and ACCOUNTS PAYABLE, only from Software International. SCORE!

We've been in the penalty box for too long, Software International. Shoot your latest information to me about:

- Large Computer Systems**
- ☐ General Ledger and Financial Reporting System
 - ☐ Accounts Payable
 - ☐ Accounts Receivable
 - Manufacturing**
 - ☐ Master Production Scheduling
 - ☐ Material Requirements Planning
 - ☐ Capacity Planning
 - ☐ Shop Floor Control
 - ☐ Comprehensive Report Generator
 - ☐ FILETAB

- Small Computer Systems**
- ☐ System/3
 - ☐ General Ledger and Financial Reporting System
 - ☐ Accounts Receivable
 - ☐ Accounts Payable
 - ☐ Burroughs B-1700/1800
 - ☐ General Ledger and Financial Reporting System
 - ☐ Accounts Receivable

Other small computer system application products available soon. Please specify computer and need.

Name _____
Title _____
Company _____
Address _____
City _____

State _____
Zip _____
Phone _____
Computer _____

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01810 (617) 475-5040

Atlanta • New York • Washington, D.C. • Philadelphia • Chicago
San Diego • Toronto • Houston • Columbus, OH • San Francisco
*Registered trademark of Software International, CW31378

Performance Handbook Ready

PHOENIX — The conceptual model of a performance management system described briefly in the *EDP Performance Review* ["Study Shows DP Management Flawed," CW, March 6] has been expanded into a two-volume *EDP Performance Management Handbook* published by Applied Computer Research (ACR).

Written by Barry Stevens and Phil Howard, the handbook was described as a guide to quantitative management of the DP function that showed how to review and audit the DP organization, how to build performance management into the department and how and when to use the tools and techniques of performance analysis.

The first of the handbook repeats the basic model, showing the interrelationships between the user and the planning, development and operations functions.

While Volume I includes suggestions for forms to use in the implementation of the system, Volume II contains detailed reference material on specific tools and techniques that can be used during various phases of the performance and enhancement process.

Loose-leaf in form for quarterly updates, each volume can be purchased for \$195; the set is available for \$350. All "bill me later" orders should include \$5 for handling. ACR can be reached through P.O. Box 9280, Phoenix, Ariz. 85068.

Packages on HIS Level 64 Outgrowths of Series 2000

WALTHAM, Mass. — Applications software for the revitalized Honeywell Information Systems, Inc. Level 64 hardware [CW, March 6] includes packages for the manufacturing and distribution industries in particular and a series of programs for basic business functions that span industry lines.

The general operations covered by the Financial Management Systems include payroll, accounts receivable, accounts payable and general ledger. Each of these application modules carries a monthly license fee of \$98; an HIS spokesman said.

For manufacturers, HIS introduced the Level 64 Production Scheduling

and Control (PSC) package to support capacity planning, job assignment, dispatching and control reporting. It is available under license for \$213/mo.

The modular Inventory Management System is also available to manufacturers to help them with planning, scheduling and controlling the flow of materials into, through and out of their facilities, the spokesman said. It includes modules for bill-of-material processing (including an inventory control subsystem), net-change material requirements planning (MRP) and standard costs.

The bill-of-materials processor costs \$110/mo, as does the MRP module; the standard cost module costs \$56/mo.

For the distribution industry, the on-line sales order processing system is said to handle the activities related to acceptance and shipment of orders, including inventory accounting and sales analysis. This package costs \$510/mo.

Reflecting HIS' intention to make Level 64 the replacement of the company's old 2000 series of CPUs, all the newly announced software has been adapted from programming available on the 2000s, the spokesman noted. The adaptations included substantial rewriting of code, however, to take advantage of the Level 64's native mode of operation.

'Extracto' Gets File Handling

MONTREAL — Optidata, a file handler option for the Extracto package, is now available from the vendor, Optipro, Inc. An extension of the option supports accesses to various data base management systems.

Extracto is an interpretive, table-driven report generator system that eliminates the need for its users to understand or specify the logic of the programming.

Features of the upgraded Extracto are said to include an integrated data dictionary, acceptance of existing Cobol record definitions, a procedures cataloging capability, intermixing of I/O and Extracto statements, automatic file opening/closing and high-level I/O call and execute commands.

Optidata was designed for IBM 370 OS and DOS environments. In its file-handling form, it costs \$5,000; the data base interfaces — for Cincom Systems, Inc.'s Total and IBM's IMS and DL/1 — cost an additional \$2,500.

Optipro's address is P.O. Box 615 Stock Exchange Tower, Montreal, Quebec H4Z 1J8, Canada.

PDP-11 RSTS/E users: QUODATA's new data management system saves you up to 80%

We call it QDMS. You'll call it unbelievable. Because QDMS gives you about 80% of the features of a full fledged data base management system at 20% of the cost — only \$5,000.

QDMS provides a general purpose, powerful solution to the continuing problem of creating, maintaining, and subsequently extracting meaningful information from large amounts of data. Here are some of the highlights.

SAVE UP TO 80% PROGRAMMING TIME

A library of macro level building blocks allows programmers to write sophisticated new applications in a fraction of the time you might expect.

ANYONE CAN USE IT

QDMS is video display oriented and greatly simplifies data entry, maintenance and retrieval. User friendly non-technical personnel was a major design consideration. Virtually anyone can feel comfortable with the system. Just try it.

COMPREHENSIVE REPORT GENERATION

The QDMS report generator also is easy to use. You can produce any report you want — anytime you want — with a minimum effort. Video display manipulation is guided step by step through the problem. You can define or describe the report contents and format in plain English.

Use of a standard report generator requires programming proficiency. In QDMS, you select a report format and the system automatically generates the report. You can format it with a variety of options.

quodata
Specialists in DEC Software

196 TRUMBULL STREET, HARTFORD, CONNECTICUT 06103

BAR CHARTS
enhance administrative reporting
\$150

- ANS COBOL
- EXCELLENT DOCUM.
- FULLY GUARANTEED

Utilize this subprogram with your application and print elaborate charts of any size on terminals or line printers. For info., contact:
ROBARCO, Dept. C38
P.O. Box 3043
Princeton, N.J. 08540
(609) 799-9470

TIRED OF WAITING FOR REPORTS?

With EASYTRIEVE, there is no need to wait for reports. In a matter of moments a program can be coded in English and run to provide exactly the information you require in a report you can read. EASYTRIEVE does the formatting, the figuring, the selection of just the data you need. Automatically. Quickly.

You don't have to be a wizard to learn to use EASYTRIEVE. Auditors, financial directors, secretaries, and other non-DP people use it every day. Yet, EASYTRIEVE is powerful enough to do systems housekeeping, create test data, do job accounting and forecasting. The system does multiframe processing, print jobs, mailing labels, bar graphs and more. EASYTRIEVE accesses most DBMS files as well. And all without coding forms, extensive training or high overhead.

EASYTRIEVE is one of several valuable software solutions for the IBM 360/370 environment provided by Pansophic, the leading software company dedicated to solving your software problems. Call or write today for further information on our complete line of proven software products.

PANSOPHIC

709 Enterprise Drive • Oak Brook, IL 60521

East (703) 821-8370

Central (312) 986-6070

West (214) 233-0486

If you're good, Boeing wants you to work on advanced business and scientific computing systems. Now.

If you're looking for career growth opportunities with a strong company, Boeing Computer Services could be the place for you.

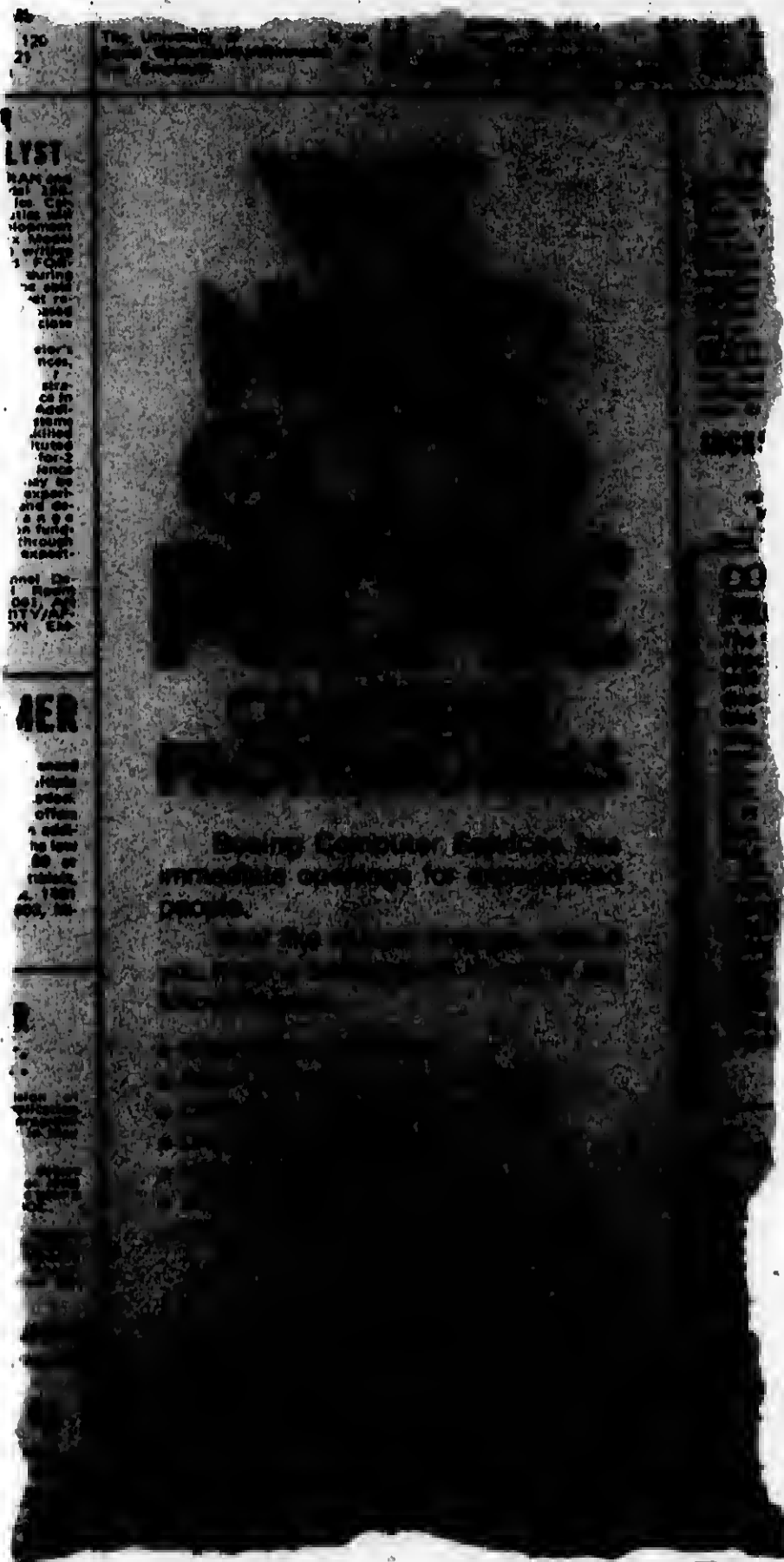
BCS provides local and remote computing, custom programming, application packages, training and consulting services to The Boeing Company and

a variety of commercial and government customers.

We're on the move with new ideas from innovative people, and if you're good, we'd like to hear from you. Mail your résumé to

Boeing Computer Services, P.O. Box 3707-JPD, Seattle WA 98124.

An equal opportunity employer.



'Ksam' Handles Micro Files

OAKLAND, Calif.— Users of micro-computers with floppy disk subsystems have the ability to work with keyed files under control of the Ksam80 utility now available from Efficient Management Systems Co. (EMS), a spokesman said recently.

Random storage and retrieval of records based on a key field is one of the facilities available to the Ksam user. The package also supports sequential access of records starting at any point within a file; random access by partial key; and random access by relative record number, he noted.

Space is allocated to a file when records

are added and reclaimed when they are deleted. Thus, Ksam files are self-reorganizing, the spokesman continued.

Any number of files can be processed simultaneously provided sufficient buffer storage is available. Ksam80's buffering techniques, incidentally, allow for a "significant reduction" in the number of physical disk accesses necessary to retrieve records, he said.

Ksam80 was originally developed under Zilog, Inc.'s Z80 OS 2.0 but can be implemented under many existing microcomputer operating systems, EMS said. It is available in object code for \$195, under a single CPU license.

Source code is available to OEMs, with rights to relicense the software to their customers, for \$25,000, the company said. EMS can be reached through P.O. Box 24766, Oakland, Calif. 94623.

Cincom Updates Interdata DBMS

CINCINNATI — A multitasking version of the Total data base management system is now available for Interdata, Inc. 7/32 and 8/32 CPUs, Cincom Systems, Inc. has announced.

A single-task version of Total for the Interdata minis was announced last spring [CW, May 9] and that is still available for those who don't need the capabilities of the newer packaging, a spokesman said.

Total and its associated modules are dynamically loaded; and the multitask version of the DBMS comes with multiple extents for each file, a record level lock-out feature, buffer pool sharing and automatic handling of concurrent tasks. The multitask version is consistent with all other versions, the firm said.

Total runs under Interdata's OS/32 MT, requiring 128K bytes of memory, and allows data base access through calls from Cobol, Fortran or CAL routines.

The multitask system costs \$18,500 plus a \$1,200 installation charge, the Cincom spokesman said from 2300 Montana Ave., Cincinnati, Ohio 45211.

Freight Bills Figured By TCS 'Compu-Rate'

METUCHEN, N.J. — The Compu-Rate programs from Transportation Concepts and Services, Inc. (TCS) were designed to enable a shipper to install a bill-of-lading rating system on an IBM 370, a TCS spokesman noted recently.

The system enables the user to maintain comprehensive and accurate freight rates, calculate charges and audit/pay correct amounts, TCS said.

Modules within Compu-Rate are said to maintain all freight rates for all modes of transportation to produce and maintain printed rate schedules or "ponies" and to rate bills of lading, freight bills or freight transactions for invoices for parcel, motor or rail shipments.

Written in Cobol and requiring a 256K environment, the software ranges from \$20,000 for the "pony" producing module to \$70,000 for the full system. The vendor is at 20 Highland Ave., Metuchen, N.J. 08840.

Precompiler Eases RPG Coding Chores

SILVER SPRING, Md. — A precompiler designed to simplify the writing of RPG-II Calculation Specifications for IBM System 32s and "most" models of the IBM 3 is available for \$498 or \$99/year from Standard Software Co., P.O. Box 1434, Silver Spring, Md. 20902.

'PC/70' Goes Interactive

PHILADELPHIA — Project control comes closer to being the real-time operation it should be with the interactive data entry system (Ides) module now available for the PC/70 package from Atlantic Software, Inc., according to a spokesman.

PC/70 enables the manager to plan, monitor and account for the progress and cost of any project, but its batch orientation has been a limitation on its overall effectiveness, he said.

Atlantic stressed that the system doesn't limit the user to any particular predefined set of project elements — phases or tasks — or project numbering scheme. The system is adaptive to user needs, the spokesman asserted.

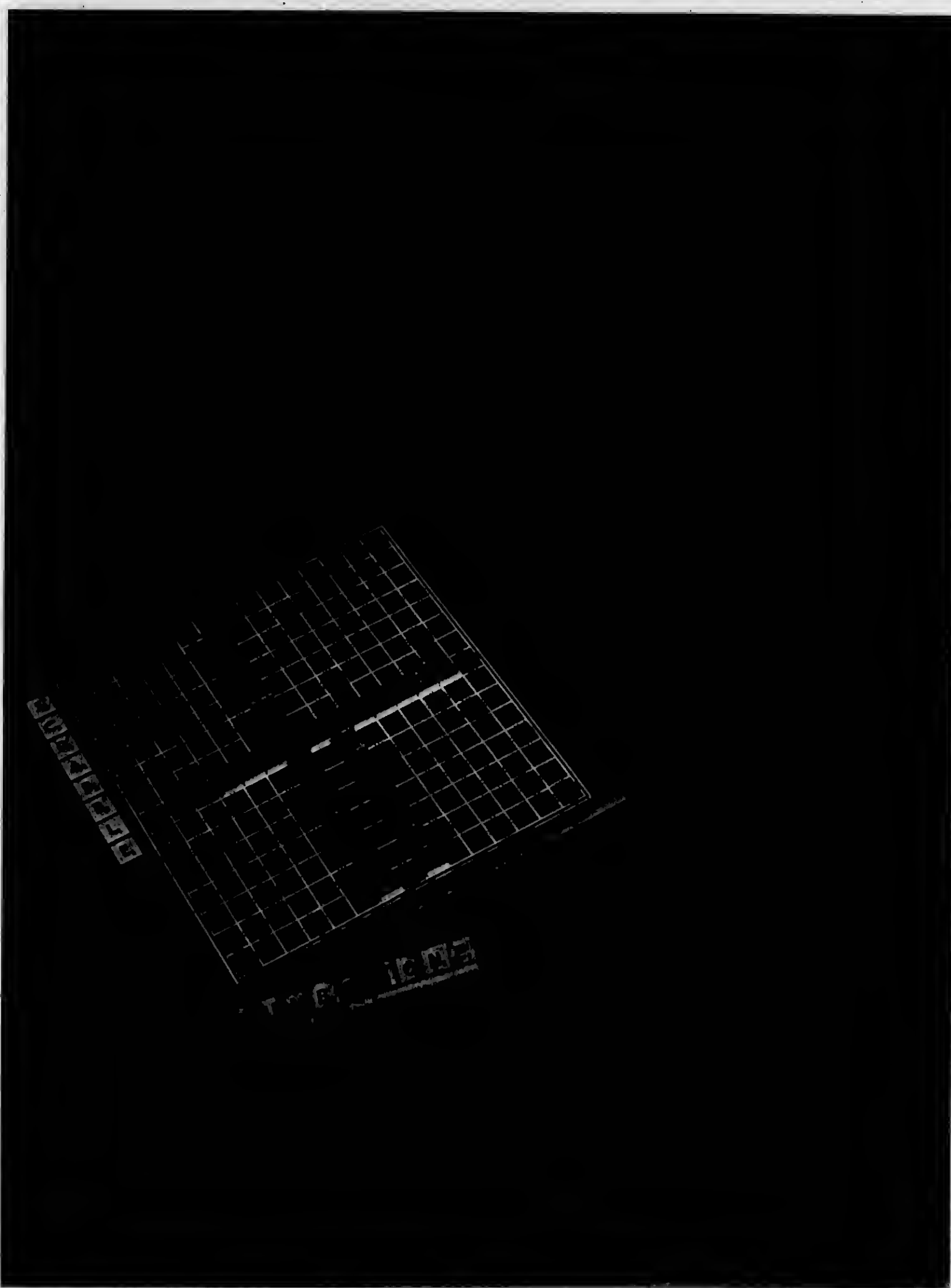
Ides supports entry of time reporting, project initialization and modifi-

cation from any terminal that functions under IBM's TSO environment. The interactive software will be available for use with CICS, the Conventional Monitor System and other teleprocessing monitors later, he said.

Ides provides editing and prompting in the event of an input error, the spokesman said.

Both Ides and the basic PC/70 are written in Cobol. In an IBM setting the system uses about 80K of memory. The Ides module is available to current PC/70 users for \$5,000, and PC/70 plus Ides can be licensed by new users for \$20,000.

Atlantic Software is at the Lafayette Building, 5th and Chestnut, Philadelphia, Pa. 19106.



Contents of Data Bases and Files Controlled by Stand-Alone 'IDD'

WELLESLEY, Mass. — Introduced a year ago as an adjunct to the IDMS data base management system, the Integrated Data Dictionary (IDD) is now available from Cullinane Corp. as a stand-alone package for use in data base or conventional file-oriented environments, according to a spokesman.

IDD allows IBM 360 and 370 users to create a centralized resource of information concerning all corporate data assets. Specific IDD facilities include a data dictionary definition language (DDDL), source language preprocessors and a report generator.

EMI Tracks Student Aid

DENVER — Financial aid officers at colleges and universities can ease their management chores and the handling of state and federal reporting and documentation requirements with a package developed by Systems Research, Inc. and now being marketed by Educational Methods, Inc. (EMI).

Modular in design and adapted to either batch or interactive operations, the software supports the tracking of student financial aid applications; evaluation of each applicant's need; packaging and notification of awards; and disbursement, accounting and management of funds, EMI said.

Written in ANS Cobol, the package can be installed on a variety of in-house CPUs — IBM and Harris now, with Burroughs Corp. and Digital Equipment Corp. versions due this summer — or used on a service basis.

The package generally requires 200K of memory for on-line use on IBM equipment, although the "packaging" simulation run may use up to 300K for large universities, EMI said.

Either the Harris or the IBM version of the in-house system can be licensed for \$50,000 or "about \$800/mo," the spokesman said. EMI's service offering is at a fixed price per application, he added.

EMI is available through P.O. Box 2908, Denver, Colo. 80201.

The DDDL is a free-form, English-like language used to describe all data elements, records, files, programs, systems and users within an organization. The systems covered may even be manual ones with no connection to DP, the spokesman noted.

Interacting with the central dictionary file, the preprocessors can COPY data elements

and record definitions from the dictionary to build virtually all the data descriptions required for any applications program, he said.

The stand-alone IDD costs \$15,000. Users with IDMS installed can acquire the dictionary package for \$12,500, Cullinane said from 20 William St., Wellesley Office Park, Wellesley, Mass. 02181.

Sea Structures Studied

KANSAS CITY, Mo. — Developed by Synercom the Marcs programs for the design and analysis of marine structures have been installed in the product library of the United Computing Systems, Inc. (UCS) remote computing network.

Marcs is made up of six integrated subsystems that simulate hostile marine environments so a user can evaluate either conventional or innovative structural designs.

The separate programs provide geometry generation and scaled drawings; stress and structural analysis; foundation analysis; generation of wind, wave, current and gravity loads; analysis of dynamic loads; and platform launch and flotation analysis, a spokesman explained.

The international UCS network is headquartered at 2525 Washington, Kansas City, Mo. 64108.

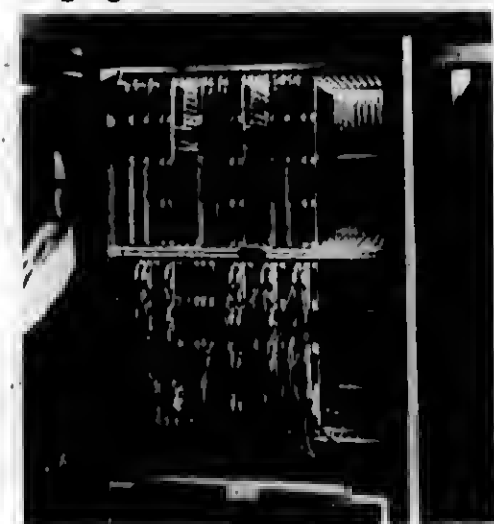
There's only one thing non-It's non-stop.

Where others fail. It's simple. You must have a non-stop system to have non-stop COBOL. And only Tandem has it. A unique multiple processor on-line system which ensures protection of the data base, and that no transactions are lost or duplicated, even if a processor, I/O channel, disk controller or disk should fail. Best of all, the system keeps running.

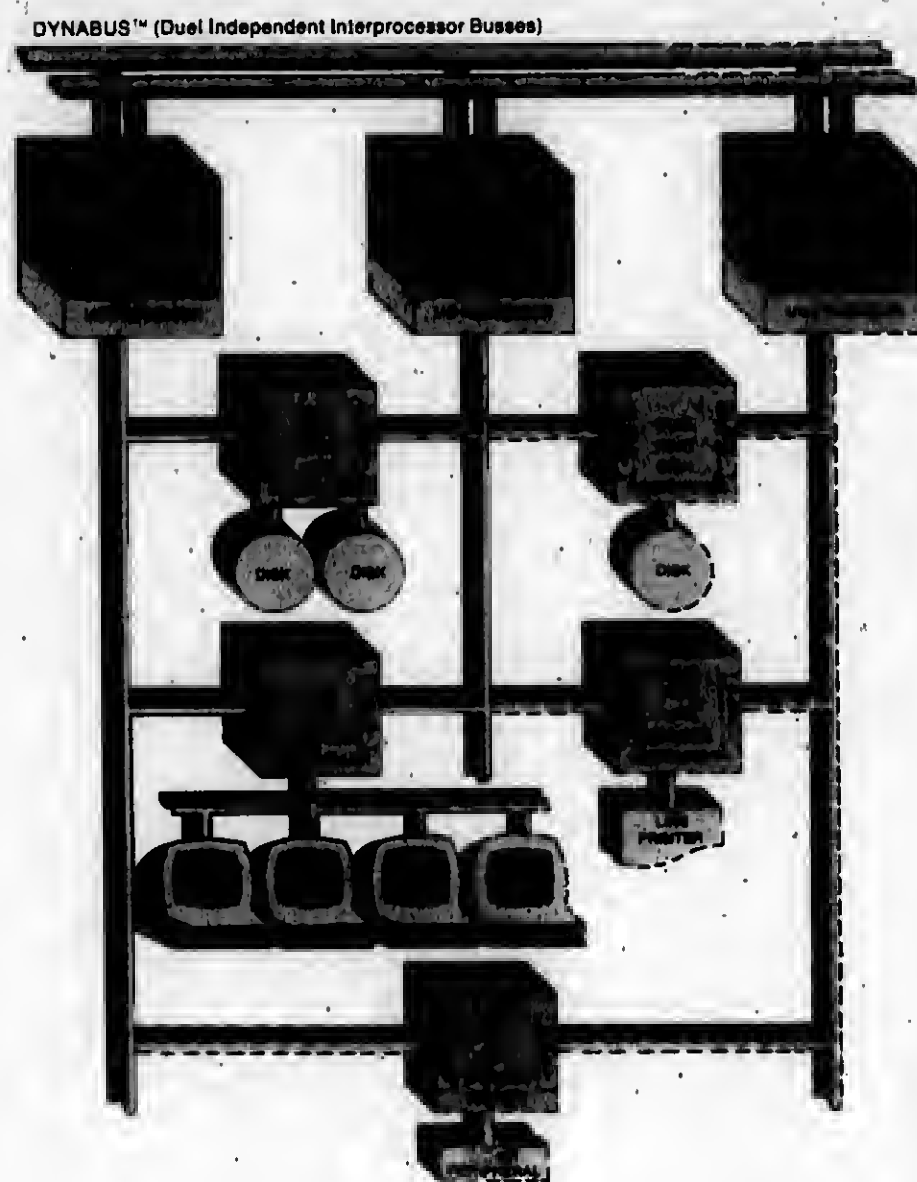
Multiple Processor COBOL. Easy.

Bearding the Lion. You'd think that programming for a multiple processor on-line system would put you in a jungle, but Tandem COBOL purrs. Completely standard.

Because Tandem COBOL runs under our Guardian Multiple Processor Operating System, no custom system software is required. No special development tools are required. None. Our COBOL program development is standard. Our run-time software is standard. Everything you've always liked about COBOL, easy to use and trouble-free. And COBOL programs can run concurrent with other languages.



Four BILLION bytes per file. With no limit on the total data base size. Key sequenced, entry sequenced or relative file structures. With up to 255 alternate keys per file. And optional mirror copy by disk volume. It's incredible storage and tremendous flexibility in a mini-based system. And of course, it's non-stop.



The Tandem NonStop System is composed of up to 16 multiple, independent processors with dual communications paths between all system modules. The result is not only continuous operation, but throughput unmatched by any other system of comparable cost.

Sharing a common data base. Three new verbs, LOCKFILE, UNLOCKFILE, and UNLOCKRECORD have been introduced to the Tandem COBOL I/O facility to permit the use of corresponding system file and record locking routines, and allow separate processes to share a common data base. READ and REWRITE verbs have been extended to allow specification of LOCK or UNLOCK operation. OPEN syntax has been

extended to specify the file access. EXCLUSIVE, SHARED, or PROTECTED, and to permit the SYNC-DEPTH for files opened in the OUTPUT, I/O or EXTEND mode.

With STARTBACKUP and CHECKPOINT. These are logical extensions of Tandem COBOL which implement the NonStop™ features of Guardian Multiple Processor Operating System. STARTBACKUP is called once at the

165-II

With a DAT this is almost a 168! Machines available now. With tie-in leases to your 3033

COMDISCO
312-698-3000

Internal DP Controls Aid Divided Management

There is a tremendous need for better controls designed more economically and reliably. Systems design personnel may be trained in "systems analysis," but rarely are trained in the design of controls. Many controls they institute are not even recognized as controls. They are just the way things are done... sometimes.

Auditors, who are supposed to be the control experts, will list off numerous controls they think should be provided, but rarely provide any explanations as to how they reach their con-

clusions. As a result, the systems designers repeat the same errors and omissions with the next system.

Three general areas of business operations generally provide concern: financial data, business assets and efficiency of operations. Accordingly, control and audit emphasis may be directed to any of these major concerns. The introduction of computers does not change these concerns, but it does change the things that may happen within these areas of concern.

First, the use of a computer usually

This article was excerpted from the book Computer Control & Audit by William C. Mair, Donald R. Wood and Keagle W. Davis of Touche Ross and Co. The book is available from Q.E.D. Information Sciences, Inc., 141 Linden St., Wellesley, Mass. 01281.

involves the storage of large amounts of information in one place. This information is in itself an asset. The record of a customer's account balance

may be one of the most important assets the organization has.

Second, the introduction of a computer has an impact on the basic organization of most businesses. Whereas the processing of a particular business function is usually centralized within one department under precomputer organizations, the introduction of a computer normally adds two more departments to this processing: a systems development and programming department and the information processing facility.

This may lead to a situation where the only executive having common authority over all phases of the application processing is as high as the president of the organization. This authority over all phases of processing may be termed "lowest level of common supervision." The phenomenon that we often observe with the introduction of a computer is an upward shift in this lowest level of common supervision.

Internal Auditor

This shift is the source of increased needs for effective internal audit. The internal auditor becomes the reconnaissance force for top management. Because no one below top management has authority over a complete process and because top management has limited time, the internal auditor is called upon to act as the eyes and ears of top management.

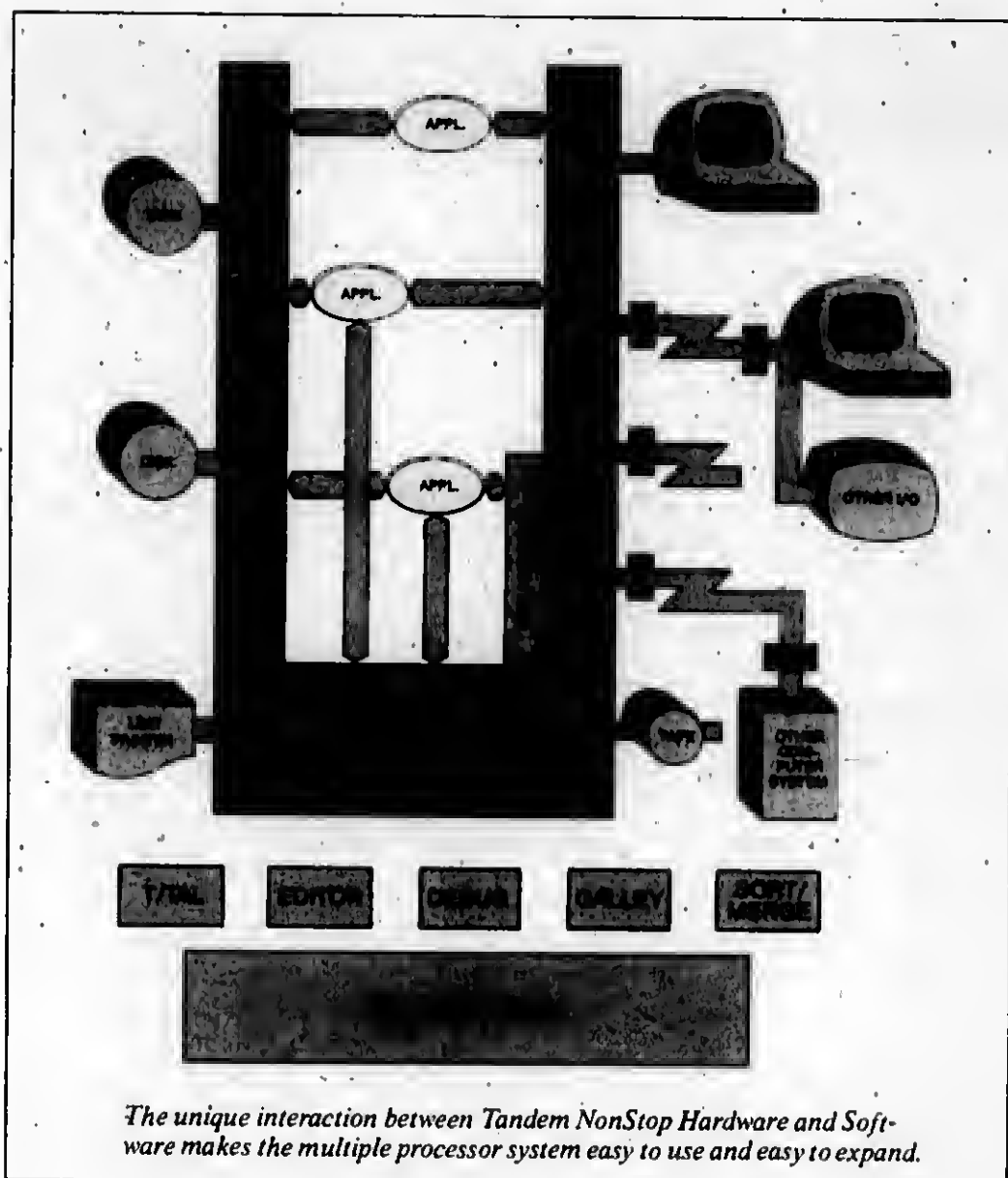
To effectively perform this role, the auditor must not only have the skills to evaluate the activities of the many functional departments, but also the technical skills needed to review the activities of the computer departments. Therefore, the manual auditor of old must grow and become the DP auditor of today — with all of the skills of before — plus!

We may define DP auditing as the verification of controls in three areas of the organization: applications, systems development and information processing facility.

With the managers of systems development, the information processing facility and user departments involved and with top management, external auditors and internal auditors also concerned, who is responsible for the controls of a particular operation? This

(Continued on Page 50)

standard about our COBOL.



beginning of the program to set the NonStop mode. From then on, CHECKPOINT controls passing information to the backup process at critical points. CHECKPOINTS occur automatically at any OPEN or CLOSE after the backup is established. These two simple instructions eliminate the downtime, restart, and revalidation which plague any user without the Tandem NonStop capability.

ANSI X3.23 '74 to Level 2 in Nucleus, Table Handling, Sequential I/O, Indexed I/O, and Sort-Merge right now. With Communications to Level 2 this Spring. Completely standard with CVSS and that means portability.

Compiles more than 1,000 statements per minute. And that's only average. In some benchmarks, we've topped 1,250 statements per minute. It's big system COBOL at mini-based prices. And non-stop, too. Not even the largest computers can match that.

It's working now. There are more than fifty Tandem NonStop Systems installed in a variety of applications. In banking, distribution, department stores, utilities, legal firms, hospitals, universities, steel mills, even a municipal network emergency system. Whenever downtime or a system failure means a potentially unrecoverable loss. There's only one NonStop System on the market today. It's expandable without penalty. Without reprogramming. Without one cent of loss on the original investment. And it's easy to use as COBOL. Good old standard COBOL without the operational difficulties or special expense you'd expect in an on-line multiple processor system which won't quit.

For further information, contact Tandem Computers, Inc., 19333 Vallco Parkway, Cupertino, California 95014 or Tandem Computers GmbH, Bernerstrasse 50, Frankfurt 56, West Germany.

TOLL FREE 800-538-9360 or (408) 996-6000 in California.

TANDEM

DEC

300 & 500 Systems

G/L A/R A/P P/R O/E

Medical Billing & Report Generator
Dibol® Applications Software

BUSINESS INFORMATION SYSTEMS, INC.

One Davis Blvd. Suite 509
Tampa, Fla. 33606
(813) 253-2796

® Registered trademark of
Digital Equipment Corporation

Package Real Asset for This International User

By Charles Broyles
Special to CW

Hewlett-Packard's decision to evaluate fixed asset packages offered by software companies was basically a cost

consideration. Our objective was to find a package that would satisfy our asset accounting requirements at a cost significantly less than the cost of developing one our-

selves.

Prior to reviewing any systems, we established several requirements the system must satisfy:

- The system's current design must support HP's asset accounting requirements.
- The system must support a multidivisional environment.
- It must be designed or easily modified to support an international operation.
- It must be well documented.
- Programs must be structured for ease of maintenance.
- It must be coded in Cobol.
- Customer recommendations must be very high.

After reviewing several asset accounting systems, the Data Design Associates package was the only one that met all of our selection criteria. An important factor in our decision to purchase the system was its ability to support two sets of books. Since a large part of our business is international, we felt this capability to handle two sets of books would be an ideal design to support two currencies: one book for U.S. depreciation and the second book to support the international or local depreciation requirements.

After we purchased the Data Design package, we assigned the implementation and support responsibility to our corporate accounting systems group. The first effort was to establish the system in several domestic divisions. Then after

sufficient experience with the system and further study of international requirements we would provide the system to our international divisions.

Our first effort was to review the system in detail and identify both system and documentation changes necessary to fully support HP needs and convert the system to our HP 3000 computer.

At the same time this was being accomplished we were generating test files, conversion programs and training class material. We selected a local division that typified our HP Operation for a pilot installation. In our pilot installation we were confronted with two problems:

- The pilot implementation was not made on a fiscal year boundary, but we wanted to take advantage of the annual reporting facility in the Data Design package. Therefore, we made an attempt to recreate all previous month's activity on the new system. We found this took more time than it was worth and the consolidation of old and new systems information at year end was far simpler.
- Our old asset accounting system calculated depreciation differently than the year-to-date depreciation calculation capability in the new system. As a result, we needed to either make an adjustment or

create a program that would load year-to-date depreciation information. We decided to make the adjustment as of the beginning of the fiscal year to make reconciliation easier.

Our pilot installation took two months, of which the majority of the time was spent trying to recreate previous month's activity. Since that time we have installed the system in 22 of our domestic divisions and our average installation time is now about four days.

The next major step was to analyze our international requirements and determine what specific changes needed to be made to support their needs. We found the design of the system allowed us to easily modify it and within 10 weeks we had made the necessary program changes, altered the documentation, trained employees and installed the system in two of our international divisions.

Currently we have had the system for over two years and have been highly impressed with both the system and vendor support. In fact, we have been so satisfied with the fixed asset package we have recently purchased the Data Design Associates accounts payable package also.

Broyles is manager of administrative accounting systems at Hewlett-Packard

The TDS SYNTHETIC JOBSTREAM

Jim Stephens
Trusco Data Systems
P.O. Box 4418
Atlanta, Georgia 30302
(404) 588-8497

Ask About our 30 Day Trial!

A Simple Approach for Verification of the Most Complex Functions in Your Installation

Trusco Data Systems

Need for DP Controls Vital to Management

(Continued from Page 49)
question has frequently been debated, but it is usually resolved that the users must be primarily responsible. Their performance is being affected by the computerized system; they have the most immediate knowledge of a computerized application; and they have the most to lose.

However, where the user manager cannot reasonably be expected to have adequate technical comprehension to exercise total control responsibility, higher levels of management should provide necessary support to assure proper technical controls. This is often provided by a separate quality assurance function.

The objective of an audit of compliance with controls is to predict the reliability and related exposures which should be expected from the system in operation in the future. The auditor shouldn't be a "cop."

Enforcement of daily operating controls is a function of line management. Of course, where such enforcement is lacking and would improve the reliability of the system, the auditor must call for implementation and enforcement

of proper controls. But this is a secondary function.

The internal auditor's primary function is to evaluate controls, verify their implementation and provide his conclusions to management.

In meeting the objectives of a financial audit, the certified public accountant seeks evaluations of reliability of controls so he may limit the extent of substantive audit work required to render an opinion on financial statements.

Controls, causes and exposures are the elements for evaluating the reliability of a particular function. Exposure is the financial effect of a cause times the probable frequency of its occurrence. Causes are the activities or circumstances that adversely affect a business. Controls are anything that acts upon causes so as to tend to reduce exposures.

The same general exposures exist for every business. The introduction of computerized information processing does not change the nature of the exposures but rather changes the nature and frequency of the causes. Accordingly, different controls must be adopted.

When You've Got It... Flaunt It!

JASPER JOB ACCOUNTING

FEATURING:

- WIZARD REPORT GENERATOR
- FREE CICS BILLING CAPABILITY
- RJE ACCOUNTING

NAME _____ CO. _____

TITLE _____ TEL. _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

COMPUTER MODEL _____ OP. SYSTEM _____

DATACHRON CORPORATION
174 FIFTH AVE.
NEW YORK, N.Y. 10018 (212) 675-5333

Series/1 Turnkey Package

Mini Saves User 65% of Cost of 3704

By Ronald A. Frank
CW Staff

WHARTON, N.J. — Is it possible to have the capabilities of an IBM 3704 front end at 35% of the cost? Yes, according to Gary Sullivan, president of ICC Computer, Inc., a time-sharing service here.

The system that reportedly provides ICC Computer with 3704 capabilities at only a fraction of the cost is a turnkey IBM Series/1 minicomputer with communications software from Series 1 Plus, Inc., also of Wharton.

The Series/1 front end operates at ICC Computer with an IBM 360/50 CPU and controls a network of 150 Hazeltine, Inc., CRT terminals. The Modular One terminals are operating at about 75 sites, which access ICC for time-shared services.

The Hazeltine CRTs operate at 2,400 and

Three Smart CRTs From Zentec Boast 'Video Flexibility'

SANTA CLARA, Calif. — The Zentec Corp. has introduced a family of user-programmable CRT terminals, called the ZMS 50, ZMS 70, and ZMS 90.

In addition to sharing the same 8080 microprocessor bus architecture, the three terminals also share a list-driven structure that reportedly provides video flexibility. In such a structure, data that may be distributed in bits and pieces throughout the random-access memory (RAM) is displayed as contiguous data on the screen. Each line or segment is defined by an entry in a program control list, which directs the data to be screened. Therefore, data to be displayed does not have to be contiguous in memory, the firm said.

Zentec CRTs provide programmable synchronous or asynchronous communications interfacing without a hardware change. A programmed chip controls the output port under program control, a spokesman said.

A carry-over design feature from the company's earlier Model 9003 is the "25th line" for operator messages and system status information. The terminal can bypass the display screen using this feature, allowing communication directly with the host computer and display of messages from the host to the Zentec terminal, the firm said.

The ZMS family shares many of the same technical features, yet each relies on specific design applications that make them best suited for a particular use, Zentec noted.

The ZMS 50 is "a smart editing CRT,"
(Continued on Page 52)

4,800 bit/sec with modems supplied by Penril Corp. The network uses the Binary Synchronous Communications protocol and the Series/1 emulates an IBM 3270 terminal that is directly connected to the CPU, Sullivan said. The front end uses IBM's Basic Telecommunications Access Method (Btam).

The Series/1 does all network polling and message switching and only interrupts the host when it has some processing to be done on the mainframe.

ICC Computer provides a time-sharing service for businesses that includes such business applications as inventory control and accounts receivable.

Its previous system included a Memorex Corp. 1270 controller, but there were some in-house problems in programming this unit, Sullivan said. The user therefore decided to get the Series/1 on a turnkey basis.

One of the key reasons for this decision was the 360 interface that Series 1 Plus had developed, Sullivan said, explaining a Series/1 "in its native state" cannot be attached to a 360.

"You don't have to be U.S. Steel" to operate this type of network, Sullivan said. Right now most smaller communications users are running 3704s and many of them handle only local mode traffic. The Series/1 solution is lower cost and provides the flexi-

bility to expand, he said.

The Series/1 will be used as a remote processor in the network. In the next four months, the IBM mini will be installed in Boston, he said.

The front-end software added by Series 1 Plus has been "coded pretty much in line with IBM" and can run under RTPS, the real-time monitor. The Series/1 has 128K bytes of storage, and Sullivan estimated the network can expand up to about 300 terminals before additional capacity has to be added.

Implementation of the IBM front end began about five months ago; at the time, there was no firm other than Series 1 Plus that could provide the same features in the Series/1, Sullivan said.

The Modular One CRT includes an Intel 8080 microprocessor with a binary synchronous interface that is programmed to look like an IBM 2780 to the front end.

Although ICC Computer would not disclose the exact cost of its Series/1 front end, a spokesman at System 1 Plus, the supplier, said the turnkey offering ranges from \$35,000 to \$100,000 depending on the number of communications lines, the processor's memory size and the size of the disk storage. The ICC Computer system is priced at the upper end of this scale, he said.

Handling Two Jobs on One Net Gets Smart Multiplexer an 'A'

By Marguerite Zientara
CW Staff

NEWCASTLE, Del. — The Alexis I. DuPont School District is operating two separate applications on one network — the Computer Project for itself and Project Direct for the entire state of Delaware — by using Smart/Network multiplexers from Digital Communications Associates, Inc.

According to Carl Hauger, the school district's computer services director, the Computer Project uses a Digital Equipment Corp. PDP-11/34 minicomputer running under the RSTS operating system and a Hewlett-Packard Co. 2000 to provide a computer science program offering four courses.

In addition, Computer Project provides aid to students in areas such as math, social sciences, science, business administration and home economics.

On the statewide level, Project Direct connects 48 schools and institutions to a Cincinnati-Milacron processor for computer-aided instruction, to a DEC PDP-11/50 running RSTS and to the A.I. DuPont computers. "The goal of Project Direct is to pro-

vide concentrated remedial help for students having problems in reading, math and language arts," Hauger explained.

The Smart/Network System connects up to 87 remote users to any of the four geographically dispersed host computers. It uses Vadic Corp. modems and primarily Teletype Model 43 terminals, rented from the local telephone company.

Users throughout Delaware can connect to the nearest Smart/Mux multiplexer, from which they are routed to the desired host computer.

The terminals operate at 300 bit/sec, according to Hauger. Information from the terminals is concentrated into each of a series of four communication processors and then transmitted at either 2,400- or 4,800 bit/sec to whichever host the user has selected.

A.I. DuPont chose the Smart/Network for its ability to switch terminals easily throughout the network and for its "uncanny ability to be reconfigured during operation," Hauger said.

COMMUNICATIONS

BUDGET DOWN?

DECWRITER II & III 3 MONTH LEASE

THEN ONLY MONTH TO MONTH TO MONTH TO
WE SHIP FROM OUR NEW STOCK IN 1 DAY.

AMERICAN TERMINAL LEASING • 617-261-1100
P.O. BOX 68, KENMORE STATION, BOSTON, MASS. 02215

On-Line Terminals Track and Control Inmates

CHICAGO — The Cook County, Illinois, Department of Corrections (DOC) has instituted one of the world's most comprehensive and extensive inmate tracking and control systems. Called the Correctional Institution Management Information Systems (Cimis), the terminal-based system is reportedly helping the jail staff provide a more just and responsive correctional institution, improve security, decrease prison tensions and generally make day-to-day operations more efficient.

The key to Cimis is an on-line, mid-sized Hewlett-Packard Co. 3000 computer configured with a front-end HP 21MX minicomputer. This arrangement is equipped with advanced proprietary transaction processing and

network management software supplied by Systems Research, Inc. of East Lansing, Mich., that permits up to 209 point-to-point terminals or 40 multi-drop data lines to be interconnected throughout the large correctional facility.

In addition, the Systems Research transaction processing software system enables Cimis to handle up to 60 transactions per minute.

Large Population

"At Cook County, we have a daily population of 4,000 inmates," Sheriff Richard J. Elrod explained. "Each day about 400 of them go to court, and after a holiday weekend as many as 1,000 go before the judges. About 55,000 persons enter this department

annually.

"Because of its size and extent, it is vital that we run this transient community of ours in the most business-like fashion," he pointed out.

Cimis tracks each inmate as he is moved from the receiving areas to a certain tier, cell, chapel or court. This ability to find an inmate quickly is especially important when lawyers are seeking their clients for consultation.

The system also keeps track of court dates and clinic appointments. Additionally, through the use of CRT terminals it is building a data base for research purposes, and Cimis makes accurate and current records accessible to all within the institution who have a need to know, the sheriff said.

"The essential problem with the old

manual record system was that it never helped the line decision makers in their daily work," according to J. David Coldren, director of Cimis. "We were running the facility under 20th century pressures with 18th century techniques."

"Our goal was to have 64 terminals, and eventually as many as 120, but not one minicomputer vendor could support the number of on-line terminals we anticipated. Finally, we located Systems Research, which had already developed software that expanded the HP terminal capability tremendously," Coldren noted.

Systems Research is primarily
(Continued on Page 54)

Zentec Unveils Smart CRT Line

(Continued from Page 51)

which reportedly distinguishes itself from other terminals by its customization of read-only memory (ROM) chips. The ZMS 50 incorporates a "system specializing" chip set that is compatible with current ROM technologies.

The unit has expandable RAM memory, and the basic configuration calls for 4K bytes, used for refresh memory for up to two pages of video display. For larger display applications, extra RAM is available for execution and storage of user-supplied downline-loaded programs. The ZMS 50 can be configured with 16K bytes of RAM, extending the capability for downloading programs, the firm said, and it costs \$2,395.

The ZMS 70 software-oriented design is said to provide a high degree of flexibility with its self-contained mini diskettes. It uses a list-driven structure with up to 65K bytes of memory and can off-load and store data.

In addition, the ZMS 70 has a video circuitry for control and attribute definitions of characters on the screen.

The ZMS 70 has a programmable character generator. When the unit is powered up and the operating system is loaded, the standard 128-character set is displayed.

Zentec provides an optional utility program that allows the user to alter or define characters. Using the program, an operator can call up any character he wishes to change into a 10 by 8 matrix within a 10 by 10 cell. Characters can then be restructured and placed back in the character set. This flexibility is especially suited for foreign language application or data coding for security purposes.

The ZMS 70 software structure reportedly accommodates a variety of Zentec-supplied programs including an operating system, utility programs, software development tools and applications software. The unit costs \$6,495.

The ZMS 90 has a "building block" design that reportedly can be anything the customer wants, within the basic parameters of bus architecture and the card cage size. It accommodates customer user-design interfaces and boards, can be configured as a firmware or software terminal and costs \$3,795 from Zentec Corp. at 2400 Welsh Ave., Santa Clara, Calif. 95051.



T-BAR 4x12 Channel/Peripheral Switch Installation

For more efficient use of peripherals

T-BAR's 3915/3916 matrix switches for use with ITEL, AMDAHL and IBM 360/370 type computers permit load balancing by sharing printers, tape drives, discs and front ends between CPU's. Greater configuration flexibility is attained by using the larger T-BAR matrix sizes — up to 12 computer channels and 12 strings of up to 4 peripherals each — 12x12.

The 3915/16 computer switch speeds system restore when mainframe trouble occurs. Pushing a button interchanges peripherals between a failed and back up system or reconfigures a computer room for multiple tasks on the same mainframe.

T-bar INCORPORATED
COMPUTER SWITCH DIVISION
141 Danbury Road, Wilton, CT 06897.
Telephone: 203/762-8351. TWX: 710/479-3215.



The secret to success is a little bit of selfishness. And Perkin-Elmer peripherals.

We're a little bit selfish.

Let's face it.

You want to be successful. We want you to buy Perkin-Elmer peripherals.

The more successful you are, the more Perkin-Elmer peripherals you buy.

That's why we set up our entire peripherals operation to help make you more successful.

It's really quite simple. And a little bit selfish. Here's the way it works.

We make you really price competitive.

At Perkin-Elmer, we know a "stripped down" peripheral doesn't always make you competitive. And a peripheral with more features than you need can be just as bad. So at our Terminals and Wangco Divisions, we build peripherals with only the features you want, and you pay only for the features you need.

Using our peripherals in your product means your product hits the market sooner and stays on

the market longer. Because, together, we thought it out. And matched it to the application. From the very beginning.

Over 200,000 quality products.

When you buy Perkin-Elmer, you buy proven quality. Right now, Perkin-Elmer has over 200,000 terminals, printers, and disk, tape, and floppy drives out there. Working. In systems just like yours. That's quality.

Support when you need it.

And, when it comes to support, we're available. For consultation. Product planning. Training (your people or your customers). And especially for service. In fact, one call to our No-Hassle Toll-Free 800 number gets you service. When you need it. Where you need it. Day or night.

QC to stretch your service dollars.

Uncompromising QC. That's how we became a Fortune 500 company. Perkin-Elmer QC people and their test proce-

dures are the best in the industry, which means your product is more reliable and your service dollars go a whole lot further.

Now you be a little bit selfish.

In fact, why not get started right away? For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free (800) 631-2154.

Here is my business card. Tell me how to be a little selfish with ☐ terminals ☐ printers ☐ disk drives ☐ tape drives ☐ floppy disks.

PERKIN-ELMER

Data Systems

On-Line Terminals Enter Cook County Prison

(Continued from Page 52) engaged in the development and sales of computer software systems especially oriented to on-line transaction processing. The company offers the MCS3000 (Message Control System) system which consists of a front-end communications processor complete with its own software, firmware, message routing software for the HP 3000 and all required interfaces.

MCS 3000 defines, manages and controls the terminal network, application processors and provides a modular structure for application programming, enabling application software to be written as if for a single user and terminal of unspecified type.

The Cimis project in the Cook County Jail was designed by seven programmers over a period of about four years. The actual coding of the

the DOC facility entailed about a year's work.

The current operations staff consist of Cimis manager Jim Bongovanni, one systems analyst, one user trainer, four others for field support and a computer operator.

Cimis hardware includes the HP 3000 system with 512K bytes of internal memory; the HP 2888 50M-byte disk drive; and two HP 7905 15M-byte disks. The front-end proces-

sor is an HP 21MX with internal memory of 64K bytes.

The 41 HP 2640 terminals connect through dedicated telephone lines up to the HP 21MX processor. An HP 2644 terminal is used for program development.

Selection of HP in the Cimis project was based on several factors, according to Larry Meyers, director of marketing for minicomputer systems:

"The HP 3000 system in-

cludes a time-sharing operating system, a good Cobol compiler, the Image/Query data base management system, reentrant code and good hardware reliability," Meyers commented. "MCS 3000 adds these features: ease of programming, high throughput and expanded data communications capability without mixing hardware vendors or modifying HP software."

Daily Use of System

The system keeps track of inmates from the receiving room to the cell. Each inmate coming through the receiving room is assigned a number, answers personal and medical history questions and has aliases, other identification numbers, charge and sentence information entered on the records.

When the inmate arrives at the tiering officer's area, a cell is assigned based on the information called up on the officer's CRT.

The inmate is brought to a cell and along the way there are checkpoints where the CRT terminals are used to enter the inmate's arrival and other pertinent information. This information automatically ripples through the data base, updating all pertinent files on the inmate.

The transaction processing system works in such a way that if a court date is changed for a certain inmate, for example, the CRT in the records office is used to enter the new information. A formatted screen is displayed (some fields are protected) and the operator makes the change.

Under the former method, records were kept on handwritten cards. It took eight staff members four days to arrive at a population analysis, according to Bongovanni.

Today, the analysis is produced in 30 minutes by the processor.

The best gauges of the overall performance of the MCS 3000/HP 3000 combination are the 3- to 5 sec response time on the active terminals which simultaneously access the large Image data base and the one to two man-week period required to write, test and place application software for a new transaction into production, according to Meyers.

If you want to get the word on COM with Datagraphix, you haven't talked to us yet.

When you evaluate computer products, get the word from the people who started it all—Datagraphix. We invented COM back in the 50's. Today our new on-line, off-line, and minicomputer-controlled models give you the performance you need at a price you can afford. Cost of a complete system of recorder and duplicator starts as low as \$85,000*. And Datagraphix offers more than equipment, you get backed by the largest, most experienced service, software and supply network in the industry. When you decide to implement COM, call us from Datagraphix.

Datagraphix

Datagraphix, Inc., a General Dynamics subsidiary
P.O. Box 82449, Dept. C3A
San Diego, CA 92138, Phone (714) 291-9960
Please send me the word on COM.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Phone _____

*Purchase price FOB San Diego, applies only to continental U.S., subject to change without notice. Maintenance available at additional charge.

BULL!

Subscribe to:

The General Bull News Sheet, a quarterly compendium of computer satire, irrelevant nonsense, and outright lies.

24 pages/issue. Good stuff... back issues available.

\$3/single issue, \$10/year.

BULL, Box 2623
Menlo Park, CA 94025

GAIN CONTROL OF

TSO IN MVS

Managing a TSO/MVS Network?

TSO/MON is the only product which presents a unified and easily understood approach to TSO management from both a technical and non-technical point of view.

Migrating to MVS?

TSO/MON, which operates in MVT and SVS, provides the only method for evaluating the TSO migration impact through before-and-after performance comparisons.

TSO/MON in MVS provides you with the following capabilities:

- Capacity Planning
- Standards Enforcement
- TSO Accounting
- Workload Tuning
- Performance Evaluation
- Management Reporting
- Programmer Productivity Analysis

If you want to gain control of TSO in MVS, do what 65 major installations have done in the past several months . . . use TSO/MON on a daily basis.

Yes, I'm interested in TSO/MON.

Please send me the following PRODUCT DESCRIPTION:

☐ MVS

☐ MVT

☐ SVS

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Telephone _____

MORINO ASSOCIATES, INC.

1401 Wilson Boulevard • Suite 101 • Arlington, Virginia 22209

(703) 524-5500



For Data Collection Project

Europe's Largest Brewer Installing Terminal Net

WEST BROMWICH, England — In the UK, Bass Charrington (BC) brews about 20% of all the beer produced annually. Each year its production expands as consumption continues to rise, despite increasingly heavier taxation on beer.

BC resulted from a merger in 1971 between two major UK brewing groups — Charrington United Breweries, and Bass Mitchells and Butlers. The company's 70 brands of beer are distributed through some 50,000 retail outlets in the UK.

Keeping track of BC's widespread and growing operations is the Computer Services Department, headed by John Henderson, management systems controller. "We operate in much the same manner as a service bureau, supplying our expertise in DP whenever possible to expedite all phases of the company's business operations," Henderson explained.

When the merger occurred in 1971, one of the major tasks in knitting together the two large organizations was to unify computer equipment and systems.

Bass Mitchells & Butlers had an IBM 1440 computer while Charrington was in process of installing two Honeywell Information Systems, Inc. 200 systems for its batch applications. After the merger, the Bass part of the new group decided to switch all its work to a third HIS 200. Eventually a fourth HIS 200 system was acquired on a rental basis to cope with an increasing workload.

Merged Data Vats Grow

It was about this time, that company executives began planning for the company's future growth. In the computer applications area, the direction was toward a real-time system that could handle order entry on-line.

"With such a system," Henderson noted, "the big benefit would be better and faster customer service in addition to a more efficient operation for the company. To accomplish this, we projected a number of minicomputers feeding information into a large central processor."

The company embarked on

an investigation of vendors using the services of the Logica consultants group. In the end the choice lay between HIS and Univac.

"At this point," Henderson explained, "we used a weighted ranking system to evaluate the systems by the two vendors with special emphasis on hardware, software, communications capabilities and

other users' opinions."

The evaluation resulted in an order placed in March 1974, for two Univac 1110 computer systems.

The 1110 systems were installed in two new and separate computer centers. The first one was delivered in March 1975 to the center in West Bromwich near Birmingham and the other to the

second computer center in Glasgow, Scotland, in September of the same year. If one system should go down, the other can act as a backup.

The four BC subsidiary companies in Northern Ireland, Scotland, and the North of England are linked to the Glasgow 1110 system, while the other firms are tied to the West Bromwich 1110 systems.

Each 1110 system has an identical configuration with a main memory of 64,000 words, extended storage of 131,000 words, one high-speed FH-432 and one high-speed FH-1782 drum subsystem and five Univac 8440 disk storage subsystems providing a total mass storage capacity of 102.3 million words.

(Continued on Page 57)

DIGITAL, MARCH, 1978.

DECNET PHASE II OFFERS 9 NEW PRODUCTS TO NETWORKERS.

Put DECnet together with Digital's computers and you get the best, and the least expensive, distributed computing networks in the world. And



never more so than now, with the introduction of nine new DECnet products.

Realtimeers talking to timesharers talking to RSXers talking to VAXers talking to DECsystem-10s. That's networking between 16 bit, 32 bit, and 36 bit architectures, and across the range of operating systems for the PDP-11! DECnet now offers the only second generation networking products in the industry.

Three categories of support, for do-it-yourself installers, and for those who need application help. Get the details in a free "Progress Report" which also describes the products, new and old, and their inter-relationships. Check the coupon.



VAX PRICE-PERFORMANCE MAY MAKE IT THE BEST FORTRAN NUMBER-CRUNCHER EVER BUILT.

Benchmark after benchmark is showing the new VAX-11/780 to be the hottest FORTRAN machine ever made.

Benchmarks for VAX double precision are at 711K Whetstone instructions per second. Single precision benchmarks are at over a million. Running all kinds of programs, including some in the tens of megabytes, VAX tested twice as fast as another prominent FORTRAN machine, and it costs about one-tenth! Another tester describes VAX

as one-twentieth the speed of a CDC-7600 — but one-fiftieth the price!

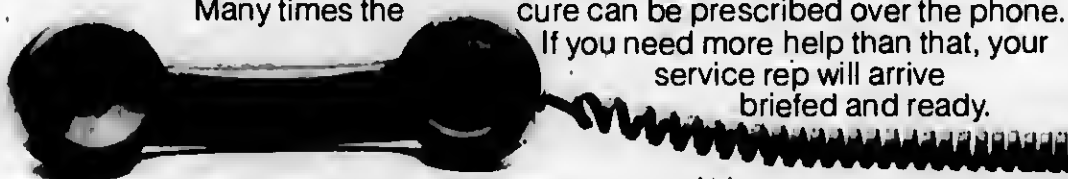
VAX handles real-time applications in incredibly fast compute time. The VAX instruction set, the floating point performance, the same UNIBUS as the PDP-11, more bandwidth than anybody needs, fast priority scheduling, and its interrupt-response capabilities make it a real-time superstar.

Other features reported from the field: easy to use, easy to get up and working, good development tools.

"DOCTOR, THERE'S A SICK COMPUTER ON THE PHONE."

A whole new concept in computer care is at work at Digital's new Remote Diagnostic Center. Now when your PDP-11/70 gets sick, you can find out what's wrong over the phone. Our remote diagnostic computer is programmed to check your computer's vital signs, and tender a diagnosis.

Many times the cure can be prescribed over the phone. If you need more help than that, your service rep will arrive briefed and ready.



IMMEDIATE MEMORY!

Digital memory, with Digital quality, Digital reliability, and Digital compatibility, is ready for immediate delivery now! And at lower prices than ever before. Check the box.

DECwriter II & III

FOR SALE

• LA36 • LS120

800-323-2288

CALL 312-794-1960

CE INC

100 N. LAKE ST. CHICAGO, IL 60601

Book Aids Businesspeople

CHERRY HILL, N.J. — Management Information Corp. has published *Datacomm for the Businessman*, a concise volume about the data communications industry aimed at businesspeople.

The 60-page report covers the following topics:

- "An Overview of Data Communications."
- "The Modem is More Than Just a Translator."
- "Multiplexing and Concentrating: What Actually Happens?"
- "Packet Data Communications."
- "What Is a Wats Line and Who Can Benefit From It?"
- "Commercial Communications Satellites Facilities."

The book is priced at \$25 from Management Information Corp., 140 Barclay Center, Cherry Hill, N.J. 08034.

Brewer Gains Smart Network

(Continued from Page 56)

Also part of each system are eight Uniservo 12 magnetic tape units, a high-speed printer, a Univac 9300 subsystem and a Communications Symbiont Processor. A total of eight Uniscope 100 CRT terminals are used at the two centers for program development.

Equipped for multiprogramming and multiprocessing, the 1110 system has the capability of performing more than three million calculations per sec-

ond.

The usual trauma of program conversion was not a major problem. In fact, the HIS programs were converted to the 1110 systems ahead of schedule by a joint Univac and BC Team, Henderson said.

When the UTS 400 intelligent terminals become operational late this year in the subsidiary companies, they will take over the transmittal of order entry information from the present paper tape system.

Nevertheless, initial preparation of the order will be done locally as before.

A general-purpose, programmable, microprocessor-based remote CRT terminal the UTS 400 can be used for data entry, data processing control and monitoring, conversational interaction and off-line monitoring. A major advantage of the UTS 400 terminal is that it facilitates more economical use of data communications networks by cutting line costs through the connection of a large number of terminals on a single line, Henderson said.

Brewing Changes

The initial stage of the network implementation is the installation in each of the seven major BC subsidiary companies of a single UTS 400 cluster consisting of a controller, two or three terminals a magnetic tape cassette and a printer. Additional CRTs and diskette storage units will be added as the companies become ready to take on their full input load.

"We would rather discover any 'teething' problems in a training exercise than wait until we are in an actual operating situation," Henderson noted. "In that way we can discover potential problems and correct them in good time before we go 'live.'"

One of the developments in the pipeline is a Special Retail Accounting Package, which will incorporate all types of statistics on usage and performance as well as purchase ledger and nominal ledger programs. The package will first be applied to the Crest Hotels operation. Subsequently it will be applied to all the subsidiary companies.

Information on the business operations of the Crest Hotel chain will be transmitted over a Univac DCT-1000 terminal from Crest headquarters in Banbury to the 1110 system in West Bromwich.

One of the current tasks for the 1110 system is processing sales ledger and statistical information concerning the soft drink operations — involving some 25,000 accounts. Information on these operations is prepared on magnetic tape and delivered daily to the West Bromwich center by a security service for processing.

DIGITAL INTRODUCES THE LOWEST PRICED MAINFRAME IN THE WORLD.

DECSYSTEM-2020, a full, general purpose mainframe computer system, with concurrent interactive time-sharing, multi-stream batch, and transaction-oriented processing has been announced at a price of \$150,000 for its minimum configuration. The system is the low end member of the DECSYSTEM-20 family with identical operating system and languages. It is the lowest priced, most compact, and consumes the least power of any mainframe system in the world. It is also the only mainframe that can be plugged into an ordinary 110-volt outlet.

DECSYSTEM-2020 features 36 bit word length, MOS memory in 64K

word units to a total of 512K words, 1.05 microsecond cycle time, single-bit error correction, double bit error detection, low power Schottkey TTLs, 512 word virtual address cache memory, microprocessor-driven console, microprogrammed central processor, 2K (96-bit) word writable RAM microstore, basic micro-instruction cycle time of 300 nanoseconds.

Also, 67 megabyte disk system minimum, expandable to 1.4 billion bytes, UNIBUS compatibility with peripherals, 8 asynchronous communication lines, expandable to 32. Mainframe housing 5 feet high by three feet wide.

HIGH END DECSYSTEM-2060 EXTENDS FAMILY LINE.

Digital has introduced a new mainframe at the high end of the DECSYSTEM-20 line. Called the DECSYSTEM-2060, the new mainframe has an advanced version of the KL central processing system used on the previous high end DECSYSTEM-20s, but offers twice the memory capacity of previous systems.

The DECSYSTEM-2060 has more terminal capacity, and more disk capacity than any previous system in the family. Its minimum configuration sells for \$600,000. Check the coupon for details.



Digital Equipment Corporation, Maynard, MA 01754. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada, Digital Equipment of Canada, Ltd.

digital

Tell me more about: ☐ VAX-11/780 ☐ DECSYSTEM-2020 ☐ DECSYSTEM-2060 ☐ DECnet ☐ Add-on Memory

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Mail to: Digital Equipment Corporation, 129 Parker St. (PK 3-2/M18), Maynard, MA 01754.

3350 DISK DRIVES

Wanted to purchase using your IBM Option Credits

COMDISCO
312-698-3000

Dial for Bill Paying

SUNNYVALE, Calif. — Buscom Systems, Inc. has announced a bill-paying telephone dial designed for use by customers of banks and thrift institutions.

Soft Touch is a tone dial that screws onto the mouthpiece of a regular rotary dial telephone, converting it into a pushbutton telephone. Upon dialing up the bank computer, the customer taps in his account number on the touch-sensitive device, then his code number, the merchant code number and amount of money he wishes to pay.

Soft Touch costs \$34.95 per unit, delivery from stock. It is available from 1230 Mountain View-Alviso Road, Sunnyvale, Calif. 94086.

IEBCOMPR IS DEAD

If you've always wanted IEBCOMPR to

- Underline Unequal Bytes
- Print Hex and/or Character
- Compare Specific Records or Fields
- Predefine Error Record Quantities
- Compensate for Missing Records
- Print Portions of a Record
- Process VSAM Files
- Compare an entire PDS

Then call us for a free 30 day trial of ACCUCHEK.

ARKAY COMPUTER INC.
24 Manor House Road
Newton Centre, MA 02159
(617) 964-1894

Modem Has Transmit Filter

SUNNYVALE, Calif. — An acoustic coupler/modem designed to enhance clarity and accuracy of telephone-line data transmission to and from terminals has been introduced by the Information Products Division of Omron Electronics, Inc.

Omron's Series 8300 data modem incorporates transmit filters, which are said to help prevent outgoing data from becoming lost or garbled in transmission. Transmit fil-

tering produces signals that are center-matched to Bell specifications, reportedly improving the performance of telephone interfaces at the receiving end of the communication link.

The modem's acoustic interface is designed to receive standard handset signals; Data Access Arrangement (DAA) interface, designed for Bell CDT or equivalents, allows the unit to be hard-wired for operation over the dial-up

telephone system. Plug interface, compatible with 25-pin EIA RS-232C connector, allows direct connection to private telephone lines, and 20 mA current-loop interface is included, the firm said.

The series 8300 modem is offered with switch-selectable originate-and-answer capability.

Single units are priced at \$275, with shipment in 30 days from 432 Toyama Drive, Sunnyvale, Calif. 94086.

Volker-Craig Unwraps CRT Line

WATERLOO, Ontario — Volker-Craig Ltd. has introduced a line of asynchronous data terminals for use in small business systems, computer time-sharing, with mini and micro-computers, and OEM/end user computer applications.

The VC404 standard terminal features a detachable upper/lower case typewriter keyboard, 1,920-char. display on 12 in. anti-glare screen, data rates to 19,200 bit/sec, cursor addressing, RS-170 composite video output and a transparent/tape mode switch to allow the operator to display all 128 Ascii characters, the firm said.

A keyboard option package includes a 16-key numeric pad

Ann Arbor 400E Gets Display

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc. has added an upper/lower-case character display option to its Model 400E CRT terminal which uses Ann Arbor's Smart Monitor.

The terminal is RS-170-compatible and displays 20 lines of 80-character alphanumeric. Five additional lines remain hidden in memory and can be accessed in either roll or scroll modes, according to a spokesman.

Characters are written in a 7 by 10 dot matrix in a 10 by 12 dot field. Blinking characters for accent purposes are standard; the cursor is displayed as a blinking field, he noted.

The Model 400E utilizes a low number of components so that display and monitor electronics, plus power supply, have been mounted directly on the monitor chassis. A 15-in. nonglare screen is included in the unit.

The terminal includes a 72-key detachable keyboard which is standard with a separate numeric pad and individual cursor control keys.

All command and control functions reportedly can be executed from the keyboard.

Single-quantity prices begin at \$1,310 from 6107 Jackson Road, Ann Arbor, Mich. 48103.

and six operator function keys.

Other available options include a bidirectional serial peripheral interface controlled from the CPU or keyboard, parallel input for bar code readers or peripherals, APL and other keyboard-character fonts (French, German and Swedish are standard), the firm added.

The VC414 Editor display terminal is microprocessor based and offers terminal features such as character-by-character, line or page mode transmission, line/character insert and delete, editing, horizontal tabs, format mode, pro-

tested data fields, multilevel video display and line drawing capability.

Optional terminal operating systems are available for VC414 compatibility with other manufacturers' models, Volker-Craig said.

Unit price is \$1,650.

The VC424 Termulator display terminal offers all the standard features of the VC404 and VC414 data terminals in addition to polling capability and independent printer port, the firm said.

Its unit price is \$1,850.

Volker-Craig is at 266 Marsland Drive, Waterloo, Ontario N2J 3Z9, Canada.

For Sale

\$299.00 each

(in quantity)

Numeric Data Entry Batch Communication Terminals

Over 300 available (used)

Call Toll Free 800-323-2288
in Illinois 312-279-1960

Available Immediately For SHORT TERM LEASE

370/138 370/148 370/145
3330's and OEM 3330's
360/30 360/40 360/50 360/65's
Greyhound Phoenix ICA's

CALL US COLLECT

United States		
Austin	Ron Geil	(512) 451-0121
Boston	Tom Ryan	(617) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dava Hyland	(415) 283-8980

International		
Canada	Don Maundar (Toronto)	(416) 366-1513
Mexico	Andres Contreras	(905) 543-6850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joe Gold (Geneva)	(022) 61-27-54
Ausiro-Asia	John Hallmark (Dallas)	(214) 233-1818

Non-IBM:		
UNIVAC or)	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**
GREYHOUND TOWER, PHOENIX, ARIZONA 85077



Save \$500,000/Year

One System Enough, Counties Discover

By Tim Scannell
CW Staff

GREELEY, Colo. — Proverbially, two may be better than one, but realistically, as demonstrated by two counties here, one system can be more than enough.

Weld and Boulder counties, located in northern Colorado, save \$500,000 annually by using the same IBM 370/138 to handle their administrative duties. A little more than two years old, the system serves up to 15 departments in each county on an on-line basis, according to Leon Dlug, director of computer services for the two counties.

"Rather than each county having its own computer department, we have one department, one director and one staff," Dlug said.

County clerks and recorders use the system to register motor vehicles, voters and property deeds and titles, while assessors can store and retrieve information about legal descriptions of property, both real and personal.

Treasurers use it to levy, extend and collect taxes that support local units of government, Dlug explained, and the system processes social services checks for both counties.

Operating expenses and maintenance fees for the system are apportioned between the counties according to population and tax rolls, Dlug stated. Boulder pays 57% of the costs while

Weld county is responsible for 43%.

"Those figures have been close to the actual proportion of usage between the two counties," Dlug observed.

The center is actually run like a private or

Some firms may have more in common than they think when it comes to DP. See story on Page 63.

non-profit organization and "until we come up with some good job accounting," the budget is set along these percentage lines, he said.

Previously, most of the DP workload was handled by a combination bank/service bureau that processed the material in a batch mode. Residents of both counties "... were used to having their records somewhere off on a disk

or on a tape ... but felt more secure with the adoption of their own center because of the central location, security" and the benefit of having "... more [memory] bank for the buck," Dlug explained.

The 370/138 has 500K bytes of core memory. Peripherals include three IBM tape drives, a 3344 and a 3340 disk drive with storage capacities of 560M bytes and 140M bytes, respectively, a 2501 card reader and a high-speed printer. Both counties are on-line via CRT terminals "so whether [a county] is a mile away or 10 miles away, it doesn't make too much of a difference," Dlug stated.

Policies and procedures for the DP center are established by a nine-member advisory council of elected and appointed officials from both counties and the leadership alternates each
(Continued on Page 62)

Add-Ons Help Insurer Boost Throughput Value \$150,000/Mo

VANCOUVER, B.C. — The Insurance Corp. of British Columbia (ICBC), a government operated automobile and general insurance firm, has reported an increased

throughput of about \$150,000/mo in internal user billings as a result of installing add-on memory for its two large-scale CPUs.

The reason stemmed from ICBC's birth only four years ago, when the government of the Canadian province of British Columbia set up ICBC. Its mandate was to operate and administer a comprehensive plan of universal automobile insurance for the province.

Rapid Delivery Needed

ICBC had less than a year to provide complete insurance to every licensed driver in this vast province, set up 20 claim centers, hire and train 2,200 staff members and generally administer all the functions necessary to operate a huge organization effectively.

Today, ICBC is a profitable organization, providing Autoplan, a complete auto insurance program at low rates, to the motorists of the province. Also, the corporation provides a variety of nonlife insurance through ICBC's General Insurance Division, which is now the largest general insurer in British Columbia.

Part of the reason for the corporation's move into the black this year for the first time has reportedly been the improvement of the cost-performance of its large com-
(Continued on Page 62)

Two CDC Subsystems Added

MINNEAPOLIS — Two disk subsystems capable of providing up to 38.4 billion bits of data storage for users of Control Data Corp. Cyber 176, 76 and 7600 systems were unveiled here by that firm.

The subsystems incorporate the CDC models 819-11 and 819-21 disk storage units and the models 7639-21 and 7639-22 single- or dual-access controllers, the firm said.

The 819-21 unit is a fixed media storage device that records data on 22 magnetic disks, a spokesman said. The unit has a storage capacity of 4.8 billion bits with data stored at the rate of 6,000 bit/in. on each of the 40 disk surfaces, the firm noted. The 819-21 also has a surface density of 384 track/in.

The Model 819-11 is similar to the 819-21 except that it has 50% of the storage capacity, or 2.4 billion bits, the spokesman stated.

The 7639-21 and 7639-22 controllers allow an intermix of disk storage units in the subsystem and will recognize the unit type and

address accordingly, the firm noted. The 7639-21 will interface one to four storage units and permits multiple-overlapped seek operations concurrently with one read or write operation, while the 7639-22 controller will interface a maximum of eight drives and provides two simultaneous data transfers (read and/or write) to any two drives while retaining the multiple-seek feature, the firm said.

Both subsystems transfer data between the drive units and the host computer at a rate of 37.2 million bit/sec, it added.

Prices for the 819-11 disk storage unit are \$53,550 for purchase or \$1,650/mo on a three-year lease. The Model 819-21 can be purchased for \$75,000 or leased for three years at \$1,965/mo, the firm said.

Single- and dual-access controllers are priced at \$103,000 and \$107,000, with three-year leases costing \$2,700 and \$4,457, the firm said from Box 0, Minneapolis, Minn. 55440.



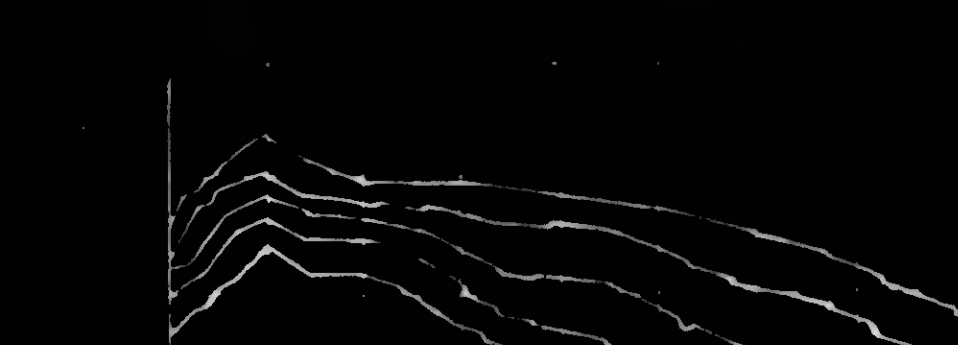
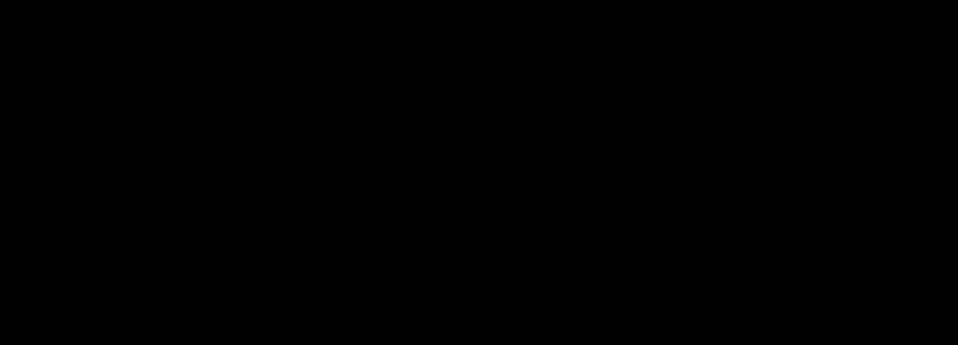
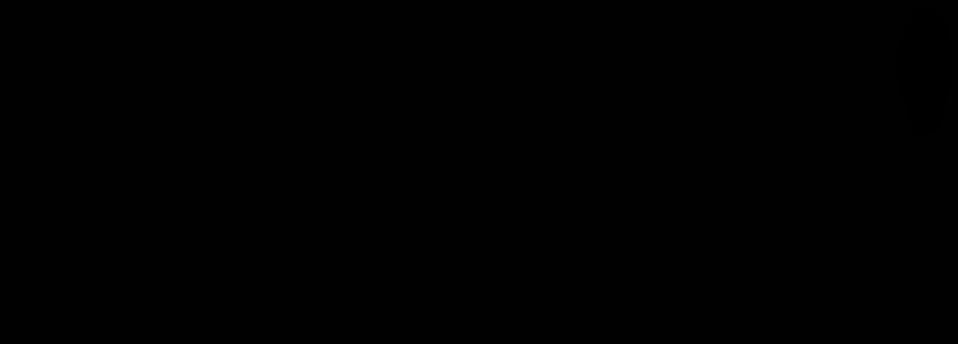
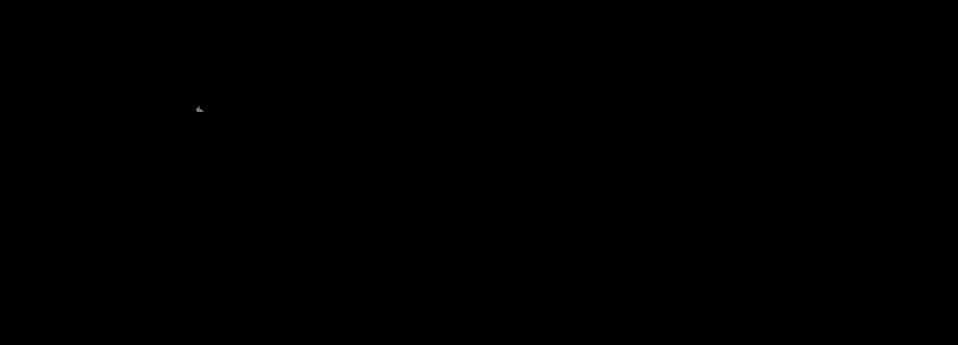
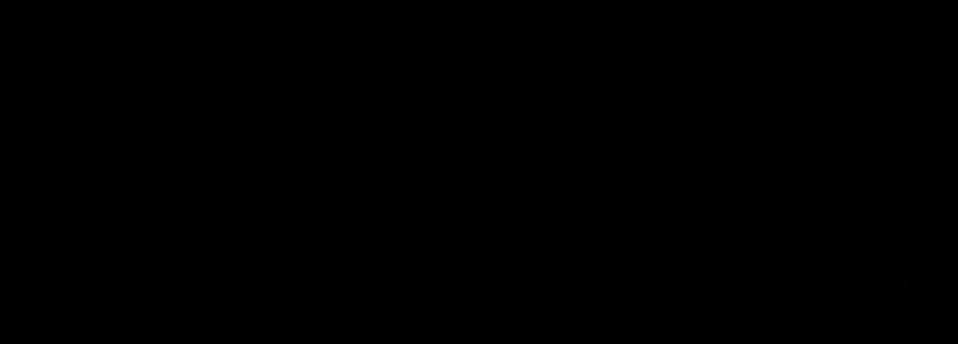
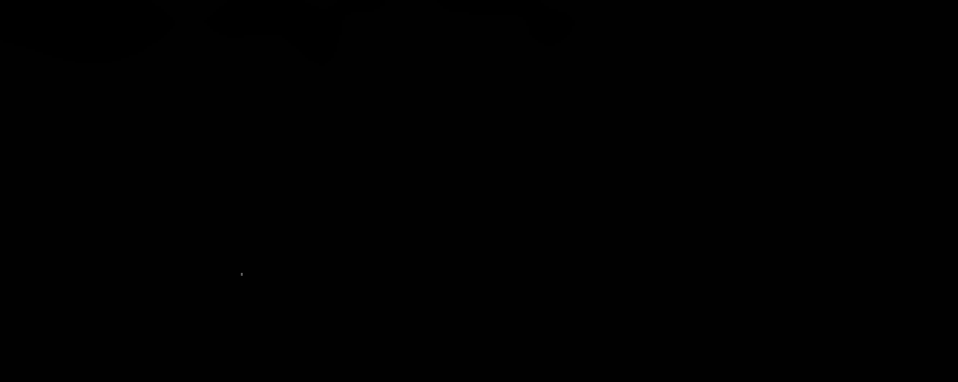
**"Noise reduction is just too important
to let us wait six weeks for it."**

Dick McMullin, Lead Engineer, System Implementation, Noise
Airplane Company, Seattle, Washington



important at Boeing test results."

Technology Lab, Boeing Company



At Boeing, noise reduction research is a top priority, demanding fast turn-around of complex data analyses.

Prime computers are tied into over a dozen research facilities serving Boeing's 300-man noise technology staff, and mobile computers travel to remote sites for aircraft fly-bys and jet engine ground tests.

The on-line Prime computers can provide a "quick look" while the test is still running, and a complete acoustic analysis in hours — versus up to six weeks for Batch processing. The payoff has been more efficient noise reduction research for Boeing, and quieter skies for everyone else.

Prime's family of interactive computer systems offers industry standard software including FORTRAN IV, BASIC, RPG II, COBOL, and a CODASYL-compliant Database Management System. They also have greater memory capacity than any other family of small computers: up to 8 million bytes of high-speed main memory, 2.4 billion bytes of disk storage, and 32 million bytes-per-user of virtual memory.

Prime computers are also true multi-user systems: one computer can handle up to 64 simultaneous users in such diverse activities as RJE communications, forms processing, on-line data entry, computational time-sharing, and database management. And the PRIMOS Operating System allows any user to use any language at any time.

For the detailed story of how Prime is helping Boeing, and for more on how we might help you, contact David R. Johnson, Marketing Manager, Prime Computer, 40 Walnut Street, Wellesley Hills, MA 02181.

PRIME Computer
"Prime is helping"



Add-Ons Boost Canadian Insurer's Throughput

(Continued from Page 59)

puter facility.

"Not only was the number of insurance customers increasing, but the computer applications have grown too as we wrote the application software for such things as payroll, personnel records and the management information systems," Alan Garland, director of computer services, explained.

According to Garland, CPU memory became the bottleneck on the system. The paging rate was approaching the tolerable limit because the number of jobs to be performed had doubled. To keep pace in the most cost-effective manner, ICBC's IBM 370/158 and the 370/168 CPUs, both operating under MVS, have had Memorex Corp. add-on memory attached.

As a result, the 370/168 now has 6M-bytes (2M bytes of Memorex), while the 370/158 has 4M bytes (with 2.5M bytes of Memorex memory).

Moreover, the increased throughput made possible by the add-on memories has been converted to dollars. About \$150,000 each month in internal user billings is directly attributable to the add-ons.

Counties Find One Is Enough

(Continued from Page 59)

year, Dlug said. Weekly and monthly meetings are held to discuss problems or upcoming projects concerning either Weld or Boulder county.

Budgeting is done on a project-by-project basis. When users submit a proposal, the DP department looks at it,



A clerk in the Weld County's treasurer's office finds lost property tax bill for resident of nearby Greeley County.

puts a dollar amount on it, decides what the equipment will cost and how much manpower will be needed. The council then compares this project with others and selects the one that will result in the greatest return both financially and administratively. The council provides this "overall guidance" so that DP doesn't get "caught in the middle" by servicing one county more than another, Dlug explained.

Long-range plans for the system include servicing the elections department, the department of motor vehicles, the district attorney's office, the sheriff's office and the communications center, Dlug said.

The 370/158 normally operates the teleprocessing system. A shared-spool feature of the CPU's software package allows the operator to assign jobs between the two CPUs so that the 370/158 can be instructed to hand off a given job to the 370/168. User software packages available on the 370/158 include APL, IMS, CICS and RJE, which has six batch terminals.

Two Memorex 1270 terminal control units are being used to control the communications network. Each of them is switchable between the two CPUs. There are 46 lines coming into the 1270s — 44 of which usually are used to handle communications with the 370/158 at speeds of 130 bit/sec (four liens); 200 bit/sec (five lines); 9,600 bit/sec (one line); 19.2 kbit/sec

(one line), and the rest operate at 4,800 bit/sec. All communication is in Ebcidic transmission code. The other two lines operate with the 370/168 system at speeds of 4,800 bit/sec.

Continual User Growth

The growth in the number of terminal users has been continual, ICBC said. Less than one year ago, for example, there were an average of eight time-sharing users at any one time; today, the average is 18. There are 120 time-sharing users who interface with the system over leased lines or via directly attached terminals.

The terminals in use at ICBC include 47 Memorex 1377 display stations, which are used by programmers to develop and test new programs. The

CRTs are also used to text-edit documentation such as various insurance manuals and the motor vehicle regulations, and they are used for on-line inquiry into auto insurance claims files, drivers' files and vehicle registration files.

ICBC is also using eight Memorex 3675 double-density disk drives, with a capacity of 1.6 billion bytes. And 16 of Memorex's 3650 direct access storage subsystems have been ordered to replace the equivalent IBM 3350s for use with ICBC's Integrated Storage Control (ISC) central processors.

The disks contain several huge files, including 1.5 million vehicle insurance files and a multitude of other corporate records. All disks are addressable by both CPUs.

Are you a user?

Sophisticated?
Becoming experienced?
First time?
Or still thinking it over?

Whatever your level, one thing is certain. You'll be more of a computer user in the near future. And Computer Expo 78's Conference* has vital information you can't afford to miss. At least one of these days should be a must on your calendar.

TUESDAY

You're on the executive level. You deal with data processing personnel, problems, payments and plans. Today is yours.

The Executive Briefing

- Keynote speech: "Strategic Systems Planning, a View from the Top," by an official of the consulting firm, Booz, Allen & Hamilton
- Case Studies: Data Base and the Executive; Potentials of Distributed Data Processing
- Presentations: Trends and Opportunities in System Financing; The Computer Resource of the Future

WEDNESDAY

Double Conference Day

(Two simultaneous conferences)

You're bringing in a first computer system for a small company, you're involved in light, inhouse use of computers (maybe about to trade up), or just thinking of your own system. You'll want to attend the Program on Small Business Systems.

You're interfacing with computer personnel on a day to day basis. The Program on Managing People Problems is designed just for you.

Here's your schedule:

Small Business Systems

- Keynote Speech: "Data Processing in Small Business Today," by an official of Arthur Andersen and Company
- Case Studies: Computer Uses in Financial Reports; Computer Uses in Operations Planning & Reporting
- Presentation: How to Negotiate with Vendors • Days end panel that includes you, your questions, views and comments.

Managing People Problems

- Keynote Speech: Given by a recognized expert in data processing personnel management • Case Studies: Career Pathing for Operators and Programmers; Improving the User/DP Relationship • Presentations: Testing for DP Competence, Coping with Security/Privacy Regulations

THURSDAY

You're a manager or technician, and your organization is thinking of distributing its computer resources to regional offices and plants. This is your can't-miss day.

Distributed Data Processing

- Keynote Speech: "Critical Issues in DDP" • Case Studies: Applications for DDP; Equipment Selection
- Presentations: Networking Aspects of DDP; The Data Base Question.



Anaheim

Southern California Computer Expo

March 21, 22, 23
Disneyland Hotel

San Francisco

Northwestern Computer Expo

March 28, 29, 30
San Francisco Civic Aud.

Houston

Southwestern Computer Expo

April 11, 12, 13
Astrohall

Atlanta

Southeastern Computer Expo

April 18, 19, 20
World Congress Center

St. Louis

Gateway Computer Expo

April 25, 26, 27
Gateway Convention Ctr

Chicago

Midwestern Computer Expo

May 2, 3, 4
McCormick Place

New York

Mid Atlantic Computer Expo

May 9, 10, 11
New York Coliseum

Detroit

Great Lakes Computer Expo

May 23, 24, 25
Cobo Hall

Boston

New England Computer Expo

May 30, 31, June 1
Northeast Trade Center

Each Conference day is just \$55. All three days only \$135. The Exposition is FREE.

Take one, two, or all three days. And send your key personnel to the days that will benefit them most! You'll profit! Come to Computer Expo 78's Conference and Exposition, and come away a smarter user.

*All conferences will be held from 9AM to 1PM

COMPUTER
CARAVAN'S



REGISTER EARLY!
RETURN YOUR
REGISTRATION
FORM NOW!

For Daily Transactions

Restaurant Chain, Bank Share On-Line Service

By Tim Scannell
CW Staff

LAFAYETTE, La. — A national restaurant/fast-food corporation and a bank might, at first, seem to have little in common. One measures profits in the sale of hamburgers and french fries while the other concerns itself with checking accounts, municipal bonds and loan portfolios.

However, Chart House, Inc. and the First National Bank of Lafayette share the same large-scale computer system in managing their daily transactions.

MSD, Inc., a wholly owned subsidiary of Chart House, provides DP services to both companies via a Honeywell Information Systems, Inc. Level

66/20, a spokesman said. The diversity in each company's style of business keeps the computer running at a high capacity, 24 hours a day, he added.

Chart House, owner of steak and seafood restaurants under the Chart House, Bodega and Cork 'N Cleaver names, is also the largest independent franchise-holder of Burger King hamburger outlets, the spokesman said. Point-of-sale terminals at the more than 300 hamburger outlets and 60 steak division restaurants are linked to six geographically dispersed regional centers by a network of HIS System 700 remote job entry (RJE) and communication processors. The System

700 RJE's handle regional DP chores and provide on-line communications to the host Level 66/20 system in Lafayette, according to the spokesman.

The Chart House information system keeps a running record of the return on investment for each unit, updates the company five-year plan by profit center and projects the profitability of new outlets, he added.

MSD also provides on-line account balance and daily financial reporting capabilities to the seven branches and head office of the First National Bank of Lafayette, a spokesman said. All accounts have to be closed by 6 p.m. every day so the bank can file its cash letter or transaction amount with the

Federal Reserve Bank in New Orleans before midnight of that day. If the letter and supporting out-of-state checks fail to leave with the 6 p.m. courier, the bank loses credit for the funds they represent until processed and delivered the next day, the spokesman pointed out.

On-Line Inquiry

Software packages developed by HIS, MSD and other banking-industry suppliers facilitate on-line inquiry for loan information, checking-account balances and other demand-centered customer information, in addition to typical banking routines, an MSD official noted.

MSD originally started as an independent service bureau but was purchased by Chart House and is now "oriented toward its DP needs with state-of-the-art processing requirements," according to Joe Fain, an MSD official.

"We're currently looking at methods of distributed DP (DDP) which will replace our systems in the field and allow our separate divisions and companies to do local batch processing and transmit general ledger-type data to us on a monthly basis," Fain stated.

Companies Offer Free Brochures

The following firms are offering free literature:

A brochure detailing ECRM, Inc.'s line of optical character recognition (OCR) equipment is available from that firm at 205 Burlington Road, Bedford, Mass. 01730.

Datacorp is offering a pamphlet describing how computer output microfilm (COM) can aid insurance companies. The firm is at P.O. Box 3460, Portland, Ore. 97280.

A pocket-sized compatibility guide for digital cassettes, disk packs, disk cartridges, diskettes and magnetic cards is available from the Wabash Tape Corp., 2700 Des Plaines Ave., Des Plaines, Ill. 60018.

A six-page booklet describing Columbia Ribbon & Carbon Manufacturing Co., Inc.'s line of DP supplies, including an illustrated guide to 31 mini-computer ribbons, has been released by the firm at Glen Cove, N.Y. 11542.

A 100-page illustrated catalog containing more than 2,500 supplies used in the DP field is being offered by the Visible Computer Supply Corp., 9855 Derby Lane, Westchester, Ill. 60153.

Intronics, Inc. has released a two-page bulletin describing its series

(Continued on Page 64)



CONFERENCE REGISTRATION FORM

(No advance registration or fee is required of qualified professionals for the Exhibition portion of COMPUTER EXPO 78.)

COMPLETE AND RETURN THIS FORM TODAY TO:

COMPUTER EXPO 78
The Conference Company
60 Austin Street
Newton, Mass. 02160

FOR "IMMEDIATE" REGISTRATION

Call toll-free (800) 225-4242.
In Massachusetts call 964-4550 (collect).
Ask for COMPUTER EXPO Registrations.
We'll bill you later.

Register me for ☐ Tuesday — Executive Briefing
☐ All 3 days, or: ☐ Wednesday — Small Business Systems
☐ Wednesday — Managing People Problems
☐ Thursday — Distributed Data Processing

Name _____
Title _____
Company _____
Street and Number _____
City _____
State _____ Zip _____
Telephone () _____
Industry Number _____ Function Number _____
Company Size: A ☐ or B ☐ or C ☐ or D ☐
See box listing codes

Register this person for
☐ All 3 days, or: ☐ Tuesday — Executive Briefing
☐ Wednesday — Small Business Systems
☐ Wednesday — Managing People Problems
☐ Thursday — Distributed Data Processing

Name _____
Title _____
Company _____
Street and Number _____
City _____
State _____ Zip _____
Telephone () _____
Industry Number _____ Function Number _____
Company Size: A ☐ or B ☐ or C ☐ or D ☐
See box listing codes

Register this person for
☐ All 3 days, or: ☐ Tuesday — Executive Briefing
☐ Wednesday — Small Business Systems
☐ Wednesday — Managing People Problems
☐ Thursday — Distributed Data Processing

Name _____
Title _____
Company _____
Street and Number _____
City _____
State _____ Zip _____
Telephone () _____
Industry Number _____ Function Number _____
Company Size: A ☐ or B ☐ or C ☐ or D ☐
See box listing codes

The complete 3-day COMPUTER EXPO 78 Conference Program — including Workshops, Exhibits, Exhibitor Seminars — plus Workbook/Notebook is \$135.

Single Days are \$55 each. (Entitles you to attend all sessions on any single day of your choice, plus exhibit area all 3 days.)
You May Charge Registration To Your American Express, VISA/BankAmericard, or Master Charge Credit Card. (See Check Box Below.)

CHECK DATES YOU PLAN TO ATTEND:

☐ March 21, 22, 23 — Anaheim
☐ March 28, 29, 30 — San Francisco
☐ April 11, 12, 13 — Houston
☐ April 18, 19, 20 — Atlanta
☐ April 25, 26, 27 — St. Louis
☐ May 2, 3, 4 — Chicago
☐ May 9, 10, 11 — New York
☐ May 23, 24, 25 — Detroit
☐ May 30, 31, June 1 — Boston

Total Number of COMPUTER EXPO 78 Conference Days Registered For All People On This Form _____

1 Day @ \$55, 2 Days @ \$110, 3 Days @ \$135 = \$ _____ per person

☐ Check Enclosed ☐ Purchase Order Enclosed ☐ Bill Me
☐ Charge Registration to my credit card: ☐ American Express
☐ VISA/BankAmericard
☐ Master Charge

Expiration Date _____

Cardholder Signature _____

INDUSTRY AND FUNCTION KEY

Business/Industry	Title/Occupation/Function
10 Manufacturer of Computer or DP Hardware/Peripherals	11 President/Owner/Partner/General Manager
20 Manufacturer (other)	12 VP/Assistant VP
30 DP Service Bureau/Software/Planning/Consulting	13 Treasurer/Controller/Finance Officer
40 Public Utility/Communication Systems/Transportation	21 Director/Manager of Operation/Planning/Administrative Service
50 Wholesale/Retail Trade	22 Director/Manager/Supervisor DP
60 Finance/Insurance/Real Estate	23 Systems Manager/Systems Analyst
70 Mining/Construction/Petroleum/Refining	31 Manager/Supervisor Programming
75 Business Service (except DP)	32 Programmer/Methods Analyst
80 Education/Medicine/Law	41 Application Engineer
85 Government — Federal/State/Local	42 Other Engineering
90 Printing/Publishing/Other Communication Service	51 Mfg. Sales Representative
95 Other	52 Other Sales/Marketing
	60 Consultant
	70 Lawyer/Accountant
	80 Librarian/Educator/Student
	90 Other

Company Size

A Under 50
B 50 to 200
C 200 to 500
D Over 500

Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3

BEST PRICE
FAST DELIVERY
CALL TOLL FREE
800-323-2288

IN ILL. CALL 312-279-1960
Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

Micrographics Group Sets Five-Year Objectives

By Frank Vaughan
CW Staff

WASHINGTON — The National Micrographics Association (NMA) will be stepping out to promote greater visibility and use of micrographics as an information-handling technology. NMA is also setting "realistic" growth objectives and "forward-looking" programs for the future, according to a spokesman.

The association is basing its future on a long-range plan that was adopted "in principle" by the NMA's board of directors. The plan sets the course for NMA activities through 1983.

The impetus behind the creation of the long-range report was the feeling that NMA has a "unique potential for greatly expanding the micrographic

industry and for increasing services to micrographic users and specialists," the spokesman added, noting that the NMA Board felt that it will take more aggressive, effective action to take full advantage of the association's potential.

In explaining its rationale for seeking an expanded role for micrographics, the task force that developed the long-range plan noted that micrographics is but one of several information-handling technologies. Paper is reaching its limits of effectiveness while electronics, computer and telecommunication applications are booming.

"Micrographics has not kept pace with these changes. Part of the reason is an outdated, negative impression of micrographics held by many nonusers.

Part of the reason also lies in the absence of aggressive, effective action by NMA to sell micrographics to non-users. Both can be changed for the better," the task force charged.

Broad Mission Statement

In recognition of this requirement, the task force recommended a broadened mission statement for the association, which was accepted by the group at its 1977 business meeting. The revised statement reads: "The purpose of the National Micrographics Association is to serve its professional and trade members in fostering applications of micrographics, including interfaces with other information-processing technologies which facilitate the effective storage,

transfer and use of information."

With its mission statements, NMA has staked its claim to a larger portion of the information-processing field, the report said.

The task force also recommended 10 general objectives in keeping with the revised mission statement. They include:

- To promote expanded and innovative applications of micrographics.
- To foster the interface of micrographics with other image-processing technologies.
- To provide a forum for the analysis and communication of issues, trends, opportunities and accomplishments in micrographics.
- To interpret and report on changing social, governmental, economic and technological conditions affecting micrographics.
- To represent the interests of the micrographic field in government activities.

Professional Advance

- To advance the educational and professional qualifications of persons working in micrographics.
- To foster good business ethics and social responsibility throughout the micrographics field.
- To develop and promote standards required for effective usage of micrographics, including interfaces with other technologies.
- To develop and maintain comprehensive data on the field of micrographics.
- To stimulate coordinated activities with other organizations in pursuit of NMA's mission.

"Program planning, the task force feels, also has to be based on a realistic annual business plan. This plan should rest upon research that can produce an accurate revenue forecast and provide data on the cost effectiveness of alternative programs in meeting the association's objectives," the report said.

Users Offered Free Brochures

(Continued from Page 63)

DCW power converters and related specifications. The firm is located at 57 Chapel St., Newton, Mass. 02158.

A 24-page catalog detailing the firm's line of crash-imprinted "custom-look" business and office forms is available from Printcraft Systems, Inc., 11-17 Beach St., New York, N.Y. 10013.

Datel Details

An 8-page brochure presenting performance data on Datel Systems, Inc. HDAS-16 and HDAS-8 data acquisition systems is being offered by that firm at 1020 Turnpike St., Canton, Mass. 02021.

A 16-page catalog describing books, magazines, games and other items of interest to the computer professional and novice has been released by Creative Computing, P.O. Box 789-E, Morristown, N.J. 07960.

The Morley Co. is offering New England area users literature detailing its line of DP, word processing and dry copier supplies. The firm is located at 909 Islington St., Portsmouth, N.H. 03801.



SARA...for fast, effective relief.

MORE BIG TALK ON ECLIPSE SYSTEMS.



First, we brought you AOS, the most intelligent multiprogramming operating system to be found on a small computer. Now we bring you the fastest, largest and most efficient version of PL/I ever implemented on a minicomputer. And that's not just talk. It's available now on all multiprogramming Data

General ECLIPSE systems. So now you can take advantage of the sophistication and efficiency of big computer PL/I without having to buy a big computer. PL/I is just one more reason why Data General is the computer company that really talks sense. Call (617) 366-8911, Extension 4735. Or write.

 **Data General**
We make computers that make sense

DDP Collars Shirt Maker's Inventory Woes

Special to CW
LOUISVILLE, Ky. — Not far from the site of the Kentucky Derby, a shirtmaker is racing to bring its inventory under control.

Turning out some 6,000 styles of dress and sports shirts each season, in every conceivable color, pattern, fabric and size, keeps Enro Shirt Co. busy.

The firm sells those styles in more than 4,000 department stores and men's specialty shops around the country. Accurate order writing is therefore an essential part of Enro's business.

Moreover, the company

produces knits, pajamas and robes, and the products — some \$40 million dollars in sales annually — are manufactured, stored and shipped from four separate plants in Kentucky and the Carolinas.

Controlling inventory with that volume of transactions in a growing business is a challenge. To meet it, Enro recently took steps to create inventory control procedures by placing an order with Cybernetics and Systems, Inc. (CSI), the Louisville-based distributor of XL40 distributed processing systems.

Enro expects, after suitable testing, to place more XL40s,

manufactured by Pertec Computer Corp., in a distributed data processing (DDP) network tying the Louisville headquarters together with the company's warehouses, according to William A. Wacker, DP director.

At each warehouse, Enro's order takers will enter sales orders, update inventory, generate shipping documents and make on-line inquiries on the XL40 files. These local files, a subset of the master customer and inventory file maintained at Enro's headquarters, will be transmitted after each day's transactions to the central XL40 here in Louisville.

Following the telecommunications from the warehouses' XL40 disk files, the central XL40 will produce a magnetic tape for entry into the headquarter's Honeywell computer; where invoices will be created and master files updated. Next morning, the central XL40 will transmit updated master file subsets to the XL40s at the various remote warehouses.

Using the DDP system, telephone orders may be entered directly on XL40 CRT terminal keyboards by Enro order takers as the order is discussed with the customer.

The XL40's on-line file inquiry capability will allow order takers to immediately determine quantities on hand by size, pattern, fabric or style, a decided advantage in on-the-spot adjusting of an order mix to avoid unnecessary back orders, he noted.

No More Manual Updates

Enro's previous procedure was to send a weekly inventory report printout to the remote warehouses. Order takers were then responsible

for manually updating the warehouse inventory status, a situation made difficult because they were generating corrected quantities on several different copies of the same report.

As the inventory status grew progressively inaccurate, orders were frequently placed for stock that was already allocated to earlier orders, resulting in incorrect back orders and incomplete shipments.

Now order takers entering data concurrently at the remote warehouse locations will know they have up-to-the-minute inventory status because their sales order entries will adjust the warehouse XL40 inventory files immediately, Wacker pointed out.

Complete Control

Each warehouse will have complete on-line control of its inventory status; new stock can be added, stock returned from customers can be checked in and physical changes, such as changes in bin location, can be recorded.

When new stock is added, the XL40 will generate a new record. When a style is discontinued, it is deleted from the file so it cannot be ordered.

The data retrieval application software used by Enro allows the operator an inquiry index key of 19 characters. In addition to style name and number, the department, season, cloth pattern and sleeve length can be used as index keys, the resulting display showing the operator available quantities in collar sizes from 13-1/2 to 20 in increments of one-half.

The system accepts garment industry-standard terminol-

ogy of whole number dozens and fractions of a dozen by maintaining two-column data entries, Wacker noted.

Already Beginning

Through these inventory control procedures, Enro will have distributed its data base to its warehouses for local data entry and local file management and inquiry at the source. At its headquarters in Louisville, the DP department has already distributed a data processing function — accounts payable — to a source department.

Using the Pertec-built XL40 System, Enro's accounting department personnel operate payables independently of the central DP system, still maintaining proper control. They transfer files in a batch mode each week to the central computer for recordkeeping and management information purposes.

"We're stepping from a second-generation batch system to a modern on-line operation conveniently at very little cost," Wacker said.

CSI, which developed the accounts payable software package for the XL40, views Enro's move toward DDP functions as a practical way to get more effective local results while still protecting the integrity of central system data files.

"It's all part of staying in competition," Wacker added. "We've got to be as modern in DP as we are in shirts."

NAME and ADDRESS

CAPTURE TYPE/SCAN

.025 Per Name

DATA-MIDWEST (A Division of DATA SYSTEMS INC.)

3050 Metro Drive, Minneapolis, Minn. 55420

612-854-1800

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call and per-call field service at rates much less than the competition.

NEED FAST TURNAROUND? CALL OR WRITE:

COMPUTER SYSTEMS SUPPORT CORPORATION
9112 Gaither Road

Gaithersburg, Maryland 20760

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

the Computer StoreTM

Offers

A Unique

Profit Opportunity

For

Software Companies

Systems Houses

Computer Retailers

The Computer Store's Dealer Affiliate Program features the Data General microNOVA® product line and established professional business applications software for resale to the explosive small business computer market. Sales and technical training included. Call for details:

Paul Conover

the Computer Store, Inc.

120 Cambridge Street

Burlington, MA 01803

(617) 272-8770

NOVA is a registered trademark of the Data General Corporation

Gould Has Printer/Plotter For C and D Drawings

CLEVELAND — Gould, Inc. has introduced an electrostatic printer/plotter that is reportedly capable of producing C- and D-size drawings with a resolution of 5 mil (.005 in.) at paper speeds of up to .72 in./sec.

The Gould 5300 printer/plotter uses 22-in.-wide paper and features a closed-loop toning system that produces dry hard copy 5.5 in. from the toning head, overlaps dot printing for high-contrast images and utilizes a time-phased imaging technique, a spokesman said.

DMA Links

On-line direct memory access (DMA) interfaces are available for Digital Equipment Corp. PDP-11, Hewlett-Packard Co. 2100, Data Gen-

eral Corp. Eclipse and Nova and IBM 360/370 systems, the firm stated. The unit also operates off-line with the IBM 360/370, Univac 1100 series and Control Data Corp. 6000, 7000 and Cyber series of computers.

The unit was designed for such applications as computer-aided design, seismic data plotting and business graphics projects such as Pert/CPM, Gantt, pie, bar and line charts and CRT hard copy.

Prices for a typical mini-computer-based system containing a DG Nova or DEC PDP-11 computer range from \$23,000 to \$24,000. IBM 360/370-based systems, on-line or off-line, are priced between \$34,500 and \$40,000, the spokesman said, from Gould, Inc., 3631 Perkins Ave., Cleveland, Ohio 44114.

CRT PRICE BREAK!

HAZELTINE 1500

HAZELTINE
MODULAR 1

OEM
Distributors
for

Data Printer
Line Printers

ADL

Mini Bits

Mini/Micro Conference Scheduled Next Month

PHILADELPHIA — The Mini/Micro Computer Conference and Exposition will be held at the Civic Center here April 18-20.

According to session organizers, the conference will cover such topics as "Microcomputer Software Development: Choosing Among the Different Methods," "Small Business Systems," "Minicomputer Application Languages," "Criteria Used in Selecting and Evaluating a Minicomputer" and "Alternative Minicomputer System Architectures."

An exhibit featuring about 100 product and system manufacturers will be held concurrently with the sessions. In addition, the Institute of Electrical and Electronics Engineers (IEEE) will offer a one-day course on "Minicomputer and Microcomputer Applications" on Monday, April 17.

On Wednesday, April 19, the International Society for Mini and Microcomputers will present a course entitled "Step-by-Step Design of Microprocessor Systems."

Registration in advance costs \$25 per day or \$60 for all three days for the conference and exposition. Those registering at the door will pay \$30 for one day and \$60 for all three days. The exposition itself costs \$5.

Additional information is available from Mini/Micro Conference and Exposition, Suite 1, 5528 E. La Palma Ave., Anaheim, Calif. 92807.

HP 3000 Machines Get \$11,000 Markdown

PALO ALTO, Calif. — The prices of the Hewlett-Packard Co. 3000 minicomputers were slashed by \$11,000 last week.

The HP 3000 Series I now costs \$64,000, down from \$75,000, for a system that has 128K bytes of memory and 50M bytes of disk.

The HP-3000 Series II Model 6 now costs \$99,000 for the basic configuration, down from \$110,000. The Model 8 now costs \$129,000 compared with \$140,000 previously.

HP said a typical 3000-II with 320K bytes of memory, two 50M-byte disks, a 1,600 bit/in. magnetic tape unit, CRT console, 300 line/min printer, 16-port controller, 9,600 bit/sec synchronous communications controller and software including Cobol, Basic and multileaving remote job entry costs \$153,560. It formerly carried a \$164,560 price tag.

HP is located at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Office Environment Poses Problem With Dirty Disks

By Esther Surden
CW Staff

You are a small systems user and your system is set up as part of the office's regular decor. The people in your office are normal—they sometimes spill coffee and soda, drop cigarette ashes and keep the windows open.

Do you have a problem? You might, if all these conditions lead to dirty disks — and therefore to lost information and lost money.

An office environment is "an order of magnitude or two dirtier" than a computer room and the disks used in it require cleaning, according to John Read, principal engineer for Digital Equipment Corp. in Colorado Springs, Colo.

Several vendors are now offering portable disk cleaners for small systems users. These cleaners can be helpful not only to those users in normal office environments, but also to those with facilities that are normally a bit dirtier because they are located in smog-filled areas, near manufacturing plants or in industrial neighborhoods.

One such facility is the Tire Service Co. in San Jose, Calif. "Being a tire warehouse, we have rubber dust mixed in with the normal smog off the street," Joan Scott, computer systems manager, said. "The mixture of these two substances caused a deposit to get

into the disk and on the disk," causing the firm problems with its drives.

The user first noticed something was wrong "when our printouts started showing strange figures," she said.

A Burroughs Corp. B700 user, Scott had Burroughs look at the disks. The vendor sent an affected disk to its laboratory in Pasadena. The lab analyzed the material on the disk and told the Tire Service Co. exactly what the problem was.

Because the disks needed to be cleaned and refurbished, the user took them to a professional disk cleaning service, completely replaced a few of the platters and cleaned the rest.

At that point Burroughs began to sell a disk cleaning system manufactured by Innovative Computer Products of Tarzana, Calif., and the tire firm decided to buy the unit.

"Because it is handy and in the office, we are in the position to clean the disks as often as we like and, in doing so, we have not had the problem," Scott noted.

She pointed out that almost anyone can clean the disks because all one has to do is to slip the disk into the unit and press a button. Mechanical arms with rubber pads slide across the top and bottom of the disk, cleansing them with a chemical solution.

(Continued on Page 68)

Crocker Banks on Time-Sharing, Installs In-House User Service

Special to CW

SAN FRANCISCO — A mini-based internal time-sharing service has been established at Crocker National Bank here to reduce costs and provide an improved level of service to interactive time-sharing users.

Crocker, the 12th largest bank in the country, found the demand for time-sharing growing dramatically. Users in all areas of the bank were requesting time-sharing services from many firms to satisfy their immediate requirements for interactive DP.

"Our expenditures in the area of financial modeling and reporting were exceeding \$40,000 per month," according to William Reid, vice president of financial planning. "We wanted a system that would reduce our costs, yet would provide us with as useful and flexible a system as we had with the commercial time-sharing services that we were using."

"It was of primary importance that our users be able to exercise the same degree of control over our systems and that they re-

ceive the same level of support that we previously had," Reid added.

Each month, Crocker prepares a comprehensive set of financial performance reports for each of its business areas. These reports comprise the Organizational Profitability System (OPS). The base information for OPS comes from the bank's general ledger program, which is run on a large IBM mainframe.

The Finance Division extracts this information, feeds it via magnetic tape to the time-sharing service and then uses the service's "financial language" to manipulate the information to prepare various analytical reports and consolidations. In addition to this main application, Crocker uses financial languages for numerous other smaller tasks, many of which are derived from information in the OPS data base.

The hardware selection phase for the time-sharing system ensued after a "user came forward with a dedicated mini production

(Continued on Page 68)

There's a simple reason why we're the largest independent supplier of disk systems:

We make the best disk drives work better.

Improving the performance of the best available disk drives is what our business is all about. We've been doing it since 1971. By constantly evaluating advances in drive technology, developing new disk controllers, and supporting systems with proper user-oriented software. So when you start shopping for disk storage, start by talking with us. You may learn that we've handled a similar application in the recent past. One thing is certain—you won't have to re-invent the wheel. Or wait for the inventors to deliver. Just think of us as The Disk Store. We have the product breadth and years of experience to help you select the very best price/performance in minicomputer disk storage. For proof, you can ask our customers. Even better, you can become one.

The DISK STORE
System Industries

Please send disk storage details for the following mini(s):
My storage capacity need is:
☐ 10 Mbytes ☐ 80 Mbytes ☐ 300 Mbytes
Name _____
Position _____
Company _____
Address _____
City/State/Zip _____
☐ Please add my name to the mailing list for your quarterly newsletter, "The Bit."
☐ Please also send me a "Disk Store" lapel button to remind me of your product breadth.

System Industries
an equal opportunity employer

525 Oakmead Parkway, P.O. Box 9025, Sunnyvale, CA 94086
(408) 732-1650, Telex: 346-459

Washington Set as Site For Minicomputer Courses

WASHINGTON, D.C. — One course on engineering applications for minicomputers and another on minicomputer programming and interfacing techniques will be given at George Washington University here this spring.

Designed to provide a better understanding of minicomputer engineering applications to systems engineers, engineering managers and others, the engineering applications course, slated for April 26-28, will cover all aspects of systems implementation, a spokesman said.

Hardware selection and configuration, peripheral equipment, interfacing with special equipment and

operations management will be other topics covered. This course costs \$410.

The course on minicomputer programming and interfacing techniques, to be presented April 24-25, is designed for engineers, technicians and others. It will cover the organization, operations and programming of minicomputers. This course costs \$275.

People wishing to take both courses can do so for \$600, the spokesman noted from the Continuing Engineering Education Division, George Washington University, Washington, D.C. 20052.

Crocker Adds In-House T/S

(Continued from Page 67)

accounting system" he wanted to implement, according to Shirley Moore, assistant vice president, Computer Services Department. The user suggested a Hewlett-Packard 3000 system.

At the same time, the Computer Services Department was pursuing its own objective of implementing an internal time-sharing system. The department decided the accounting application would fit into its scheme and began looking at alternatives.

It looked at the HP system suggested by its user and the Digital Equipment Corp. PDP-11/70; it also considered putting an interactive monitor on its current mainframes, IBM 370/168s.

The DEC unit was chosen because Crocker felt it was reliable and had a good reputation. The HP was elimi-

nated because while it had a good software reputation, it appeared not to be as reliable in hardware, Moore said. "We weren't happy with the interactive monitor" alternative, she added.

Crocker's in-house time-sharing service is based upon the PDP-11/70 running the RSTS/E operating system. The system is configured with 756K bytes of memory and two 88M-byte disk drives.

Ross Systems, Inc., a Palo Alto-based services firm, was chosen to provide the financial modeling software and to convert the controller's applications. The firm provided its mini-based financial modeling and reporting language, Maps, to convert OPS.

"Maps was selected," Reid recalled, "because it provided the same functions as the financial languages available from the other time-sharing firms."

Once OPS was successfully converted, Reid's department selected other related, financial systems for conversion, using the experience gained with OPS. Reid's staff has generally been able to convert these applications to Maps without any consulting assistance, he said.

Crocker is also adding two larger applications to the internal time-sharing service — a Customer Account Profitability System (Caps), which will measure the profitability of its corporate banking customers, and a Branch Performance Indicator (BPI) system, which will measure the performance of its 358 branches throughout California.

Dirty Disks Pose Problem in Office

(Continued from Page 67)

Users of small systems in an office environment should be aware of the potential hazards of allowing their disks to get dirty, she indicated, adding her firm didn't realize it had a problem until it began to feel its effects.

According to DEC's Read, the tire Service Co. was lucky: "No one wants to have to re-create the whole accounts receivable file, for instance."

When DEC first decided to look into the dirty disk problem, Read recalled, it took a portable disk cleaner to the Los Angeles area to check some 4,000 cartridges, both by looking at them and cleaning them. Not many of the disks were crashed because small system users usually replace the disk.

"The big system user with a computer room is much more careful about his information," generally insisting that the place be kept clean. "There tends to be a different attitude in preserving the data," he said.

However, even users in office environments get aggravated at the loss of a disk, so DEC recommends that its field service organization be on the lookout for users who have high-risk environments.

"If a person has 10 active cartridges, the retail value of those cartridges is on the order of \$1,500, but the information might be worth several hundred thousand dollars," he pointed out.

"If you look at it from the value of the information rather than the retail value of the cartridges, it's well worth expending 10% of the value of your information to have the ability to clean."

MODEM USERS:

PUT
A
COMPUTER
IN PLACE
OF
YOUR
MODEMS,
THEN
WATCH
WHAT
HAPPENS.

The MP-48 is the industry's first computer made into a modem. What's so good about that. Plenty.

Other modems control circuit paths under rigid hardwired tolerances. The MP-48 emulates them in a constantly adjusting mode that comes close to a line's actual theoretical performance. The result: nearly total elimination of ambient errors.

The MP-48's computer is program-controlled. That means its filters and

- Tell me more about the MP-48.
☐ I have an immediate need for 4800 bps modems.
☐ I have a longer-term need, and would like to speak with a salesman.
☐ Please send me literature.

Name: _____
 Title: _____
 Company: _____
 Street: _____
 City: _____ State: _____ Zip: _____
 Telephone: _____

digital equalizers "learn fast" in adapting to line conditions.

The result: a 35 millisecond train time for multi-drop networks.

The MP-48's computer is

powerful. It allows you to run four-wire full-duplex multi-drop, two-wire half-duplex multi-drop or point-to-point networks — with a two-wire dial-up capability — using the same modem. At 4800 bps. The results: more drops per line and more freedom to alter networks.

The MP-48 is reliable. Ultra-reliable. Its computer's LSI chips are perfectly repeatable in manufacture and performance. Its all-digital circuitry permits operation on unconditioned 3002 lines and general switched networks. An MTBF of 20,000 hours is unmatched in the industry.



The MP-48's computer is adaptable. Its read-only memory can be field-altered to meet most geographic or international standards. It has alternate voice capability option, and two-call manual dial back-up option. The result: it becomes what you need right where you need it — on-site.

The MP-48's computer is inexpensive. The result: you can buy an MP-48 for under \$3,000, lease one for less than \$75, and get delivery in about 30 days.

The MP-48 from Paradyne. The next generation of modems has begun.

THE
MP-48
LETS YOU
DO IT
RIGHT
NOW.

paradyne

Paradyne Corporation, 8550 Ulmerton Road, Largo, Fla. 33541 (813) 536-4771

Sales Offices: Atlanta (404) 588-0875 • Boston (617) 965-4850 • Chicago (312) 692-5950 • Cincinnati (513) 793-2853 • Cleveland (216) 656-2629 • Dallas (214) 661-0242 • Detroit (313) 559-5360 • Hartford (203) 563-8105 • Houston (713) 977-7102 • Los Angeles (213) 437-0613 • New York (201) 461-3700 • Philadelphia (609) 662-3049 • Pittsburgh (412) 343-9133 • San Francisco (415) 574-0902 • St. Louis (314) 739-2322 • Tallahassee, Fla. (904) 877-3896 • Washington, D.C. (703) 548-4453

Cartridge Disk PDP-11-Compatible

ANAHEIM, Calif. — A cartridge disk fully software and media compatible with Digital Equipment Corp. PDP-11 minicomputers is now available from Rianda Electronics, Ltd.

Either complete subsystems, including a selected disk drive, or only the controller with cable can be supplied. Equivalent to the DEC RK05 disk system, the Model 14XX controller is

software compatible with DEC operating system software, the firm said.

When DEC software compatibility is not required, the Model 14XX controller will interface with up to four 10M-byte dual disk drives, either 5440 or 2315 systems (40M bytes total on-line storage), the company added.

Installed in Chassis

The controller is said to be supplied with a system unit suitable for installation in the PDP-11 computer chassis. Also included in the price is a cable to the first disk drive, a software diagnostic routine with listing and an instruction manual.

The controller costs \$3,300 from Rianda Electronics, Ltd., 2535 Via Palma, Anaheim, Calif. 92801.

Jacquard Offers Rental Program

SANTA MONICA, Calif. — Jacquard Systems has announced a rental program for its J50 and J100 systems.

Users can choose from one-to five-year plans for the system, which can be used for either word or data processing applications.

A three-station system costs about \$9,260 per station; monthly rental per station is \$370 on a one-year contract. A larger system with seven CRTs, multiple printers and 12M bytes of disk costs about \$7,500 per workstation. Such a system rents for less than \$250/mo on a two-year contract, the firm said from 1639 11th St., Santa Monica, Calif. 90404.

HP Adds Plot/Print Unit

PALO ALTO, Calif. — A desktop plotter/printer designed to work in systems interconnected with the Hewlett-Packard Co. interface bus is available from the vendor.

The microprocessor-based HP 7245A uses a bidirectional paper drive to advance the chart for plots with Y axes as long as 5,000 mm (16.4 ft). The charts can then be returned to the starting point. Using thermally sensitive roll paper 61 meters (200 ft) in length, the unit is equipped for unattended plotting applications, the firm said.

Varied Applications

Intended for such applications as engineering design, production testing, data acquisition, process monitoring and analytical plotting, the unit features a thin-film printhead. It has 12 resistors to print 7 by 9 half-shifted matrix characters at 38 char./sec in four orthogonal directions. This font allows 88 columns to be printed across

Payroll System Fits on Desktop

DAYTON, Ohio — The Reynolds and Reynolds Co. has developed a desktop-sized payroll system using a microprocessing unit.

The system computes paycheck amounts, all tax and voluntary contributions, net pay and all other payroll data, the firm said.

Compeg 2001 is primarily designed for small businesses that do not have computers or prefer not to use an out-of-house automated payroll service.

The processor contains a 5,000-step preprogrammed firmware memory.

The system eliminates the need to add and cross-foot the payroll journal because it gives payroll totals at the push of a button, the company said.

The company recommends that the micro-based system be used in conjunction with a manual payroll writing system it has designed. Compeg costs less than \$1,000; the manual payroll writing system costs about \$150 to \$200. Reynolds and Reynolds can be reached through P.O. Box 1005, Dayton, Ohio 45401.

LeBlond Unveils DG-Based System

CINCINNATI — The LeBlond NC Systems Microapt hardware/software unit is a self-contained, numerically controlled part-programming system that can also be used for general DP work, according to its vendor.

The system is based on a Data General Corp. mini with floating-point hardware and 96K bytes of memory. The system controller is the LeBlond DPS-4000 tape preparation center with standard features, the firm said. It costs about \$60,000.

LeBlond NC Systems is located at 6761 Bramble Ave., Cincinnati, Ohio, 45227.

the 216 mm (8 1/2 in.) wide paper. A larger 14x9 matrix font is used to print titles at 19 char./sec in a 44-column format.

Featured is a 128-character Ascii set with 96 upper and lower case characters and 32 printable control characters to ease program debugging, HP said.

The 7245A plotter/printer costs \$4,600 from 1507 Page Mill Road, Palo Alto, Calif. 94304.

What to look for in your hospital business computer system

Basic/Four Medifacs™

Basic/Four Corporation offers MEDIFACS, the most powerful hospital financial accounting system available, for 50-beds and up. At surprisingly low cost.

The cost is so low because MEDIFACS does so much. It's a total system, hardware and software, especially designed to take care of all "paperwork" for admitting, business office, nursing stations, controller, ancillary departments, accounting, medical and patient statistical reporting and payroll/personnel.

That's just the start.

Cost effectiveness

MEDIFACS also helps optimize your cash flow. With MEDIFACS on the job you immediately reduce lost charges. Once entered they constitute a permanent part of patient records. In this,

as in all other functions, an instantly available and retrievable audit trail is established. The computer offers total internal audit controls—visually on the VDT, internally in the system and externally, on command, as printouts.

You are in total control as never before!

Design for growth

The system is modular, which means it can easily and inexpensively expand with your needs. And the simplicity of operation means you never need to surrender control to outsiders; a clerk can learn to run MEDIFACS quickly. What's more, you can call on us for support and service 24 hours a day, if needed.

In all, it's the most complete system you can find, for the least cost. If you are a hospital administrator, you owe it to yourself to see MEDIFACS. Let us show you. Call the nearest Basic/Four Corporation office. Or write Basic/Four Corporation, P.O. Box C-11921, Santa Ana, CA 92711.

Government reporting

With Basic/Four MEDIFACS at work for you, you'll actually stay abreast of government reporting.

The system keeps track of each Medicare and Medicaid claim, processes them all, and prints the right forms. It performs insurance proration—for both direct and patient billing. And automatically adjusts a patient's financial classification—simultaneously updating all records!

basic / four corporation
an MAI company

Albuquerque • Anchorage • Atlanta • Baltimore/Washington • Birmingham • Boise • Boston • Buffalo • Charlotte • Chattanooga • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fresno • Grand Rapids • Hartford • Honolulu • Houston • Kansas City • Indianapolis • Las Vegas • Los Angeles • Lubbock • Madison • Memphis • Miami • Milwaukee • Minneapolis/St. Paul • Nashville • New Jersey • New Orleans • New York • Orange County • Philadelphia • Phoenix/Tucson • Pittsburgh • Portland • Richmond • Sacramento • Salt Lake City • San Antonio • San Diego • San Francisco • San Juan • Seattle/Tacoma • St. Louis • Syracuse •
Basic/Four Systems are also marketed in more than 30 foreign countries.

Slashes Reporting Time

System Gives Metal Manufacturer Control

CHELMSFORD, Mass. — A metals fabricator here is keeping ahead of its ever-increasing workload with the help of a small business system.

Electro-Metals, Inc. manufactures cabinets and chassis for computers. The 100-employee main plant has one sister operation in Manchester, N.H.

During recent years the customer base and corresponding workload of Electro-Metals has grown to such a degree that automation of the primary administrative tasks associated with production control and costing became a necessity. In order to keep ahead of the increased workload, the user purchased a Wang Laboratories, Inc. WCS-30 system.

"Prior to acquisition of the WCS-30, our production control procedures were handled manually by two people, with many difficulties and inefficiencies," Roland LaCroix, president, recalled.

"Since we've had the system, our business volume has in-

creased by 30%, yet we now have only one computer operator handling production control — and doing it with improved efficiency and effectiveness," he added.

A variety of hard-copy reports are available and are printed on the firm's high-speed line printer. Included are job history, job status, shipping, estimating and inventory reports.

Bonnie Clark, company operator, handles about 30,000 jobs per year at the Massachusetts plant. Her day begins by creating a history of each job. To obtain the history, she enters pertinent information such as a job descriptor, shipping dates, parts numbers, quantities, estimator, estimated time and dollars and estimated materials.

After the job history information base is established, daily time progress is input; estimated time is constantly compared with actual time spent.

One of Electro-Metal's most frequently used computer programs produces the Job Infor-

mation Report. This is typically generated five or six times per day as needed.

The operator inputs header file information; the inputs are received from the estimator and used as header record data, which is keyed into the system.

Input data includes part description, customer, drawing number and a sequence of scheduled and actual shipment dates and shipment numbers describing partial deliveries. Not only is this information used in the Job Information Report, it is also stored for future use to generate the automatic printouts of several other of the firm's reports.

A printout of estimated materials for every job is produced as part of the Job Information Report. A CRT displays a prompt which asks the operator for a specified work center, operator and job description.

When this information is input, a listing of the estimated required labor parameters is

printed. This includes hours required, piece/hour, direct rate, remarks, standard cost and an estimated figure for total labor dollars.

The second portion of the Job Information Report produces a listing of all estimated materials per job.

The final segment of the Job Information Report is a printout of actual labor and actual materials costs for each job.

Shipping Reports

The system also produces a monthly shipping report listing shipping backlogs. Every backlog job is listed in increasing order of job number.

A weekly report lists all shipments which are overdue. "This is the 'bad-news-only' report," Clark explained.

The work-in-progress (WIP) report lists job number, customer, total order value, piece cost (estimated and actual), total to-date cost, total cost of shipped goods to date, current

WIP dollars, allowable WIP dollars and a flag.

If the current WIP dollars significantly exceeds the allowable WIP dollars for any job, there is a major problem with that job. A flag in the far right-hand column of the report helps an observer locate trouble areas.

Reporting Time Cut

"It used to take us three weeks to complete all monthly reports. Now that time has been reduced to one day," LaCroix said.

"We are also producing more reports with increased accuracy. In addition, the reports are customized to our specific needs," he noted.

Prior to installing the Wang system, preparation of the Job Information Report required eight hours; it now takes 30 minutes. To adjust backlogged job information required more than eight hours; this now takes less than half an hour, LaCroix said.

Unusual Product Constraints

Mini Triad Meets Brewer's Needs

HENLEY, England — A brewer of organic beer here has installed three minicomputers to keep track of its product, which has a short shelf life.

According to Tom Moran, managing director of W.H. Brakspear and Sons Ltd.'s Computer and Services Co., genuine organic beer produces a greater strain on its manufacturing and distribution system than chilled and filtered beers. The beer ferments in the barrel until the last pint is consumed, he pointed out.

The three systems in use at Brakspear handle order entry and sales ledger applications as well as general business problems.

The systems — Data General Corp. Novas — all have 32K-byte core memories, a paper tape reader, a line printer, two 2.5M-byte cartridge disks, teletypewriter-compatible CRTs and Teletype Corp. Teletypes.

Preparing Data

Data preparation is handled via the Teletypes. The CRT units are used for program development and general interrogation purposes and also serve as system consoles.

Until recently the firm ran under the original DG disk operating system, not the diskette operating system it now uses. It converted to DG's RDOS in 12 weeks, including the conversion of 20 major systems comprising over 70 programs.

The main peak period is in the morning to satisfy the order entry requirements. Since delivery is rarely expected until the next morning, the data entry super-

visor can input small run order groups for fast processing and reporting. Inquiry is carried out on demand. The application packages are written in Fortran IV.

Quick Delivery

The first minicomputer, installed handled order entry and sales ledger. Brakspear is now able to deliver against a fully priced invoice within 24 hours of receipt of order, a time believed to be unique in the brewing industry.

Over 1,100 items are carried, each with different price levels: retail, cash-and-carry, own trade sales prices and cost price are held in the computer.

The pub manager receives faster delivery and gets a fully priced invoice with the goods, Moran pointed out. In addition, the system stars any price variation so that the pub manager can make immediate changes to his sales price.

Variety of Jobs

The other two systems handle a variety of business jobs including rents receivable and payable, purchase ledgers, repairs accounting, etc. The system also provides a full budgeting and business planning capability.

The equipment is used to provide external services for local companies. Brakspear intends to expand this external service to companies in the Berkshire, Buckinghamshire and Oxfordshire areas.

The third system is also used for program development work and to provide the demon-

stration capability for Brakspear's new business venture, the computer and services company.

The full-year issue of the 1977 Computerworld Index is now available.

WHO'S WHO

In EDP management for the largest US users? Consult the

1978 DIRECTORY OF TOP COMPUTER EXECUTIVES

All new for 1978

- Geographic organization
- Industry cross reference
- Government now included

Over 5500 senior EDP user executives in:

Manufacturing	Utilities
Banking	Education
Finance	Health Care
Insurance	Federal Govt
Retailing	State Govt
Transportation	Local Govt

Published semi-annually in Spring and Fall.
Single copy - \$75.
Annual Subscription - \$120.

Applied Computer Research
P. O. Box 9280
Phoenix, AZ 85068
(602-944-1589)

PDP-8E, 11/04, 11/34, 11/35, 11/45, VT50, VT52, VT60,

digital

Now you can get factory refurbished equipment for the same price as used.

If you've been looking for a bargain, we've got the bargains you've been looking for:

- Complete systems
- Processors
- Peripherals
- Accessories

All Digital equipment. All with complete documentation. All quality tested and warranted by the people who made them.

To find out how much you can save, call toll-free* any time between 9:00 a.m. and 5:00 p.m. EST 800-258-1728. *(New Hampshire residents call 603-884-5736.) Or clip the coupon and send it to Digital Equipment Corporation, Traditional Products Group, 125 Northeastern Boulevard, Nashua, New Hampshire 03060.

Digital Equipment Corporation,
Traditional Products,
125 Northeastern Boulevard,
Nashua, New Hampshire 03060.

- ☐ Please send me more information.
- ☐ Please call, I'm specifically interested in:

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

CW3138

RP05 PDP-8E, 11/04, 11/34, 11/35, 11/45, VT50, VT52, VT60, VT61/t, VT71, RP04, RP05, RP06, RK05, RK06,

VT61/t, VT71, RP04, RP05, RP06, RK05, RK06, RX01, 11/04, PRS01, LA36, BA180, MFI1U, MM8E, 11/34,

11/35, 11/45, VT59, VT52, VT60, VT61/t, VT71, RP04,

Library Picks Micro Over Mini as It Automates

Special to CW

EAST MEADOW, N.Y. — At the public library here, the task of quickly sorting books to be placed on the reserve list, often given to a minicomputer, has been assigned to a microcomputer-based data collection system.

The Automated Library System, designed by Decicom Systems, Inc. of Farmingdale, N.Y., was installed in the East Meadow library for a price estimated by library officials to be one-third that of comparable minicomputer-based equipment.

The micro-driven hardware not only handles the chores associated with the library's reserve-book service, but also deals with the problem of "hot-borrowers" — delinquent library patrons with long-standing fines for overdue books or with long-overdue books in their possession.

Red Light Alert

Each of the library's patrons is given a wallet-sized plastic card punched with a unique six-digit identifier. Whenever a borrower checks out or renews a book, the librarian inserts this card into a terminal located at the front desk, along with a paper card found in the back pocket of the book. This punched paper card carries a seven-digit number identifying the book being checked out.

The librarian keys in whether the book is to be borrowed or renewed and for how long. The on-premises system, powered by a Processing and Control Element (PACE) 16-bit microcomputer card from National Semiconductor, then searches its 5K random-access memory (RAM) to see if the borrower is on the delinquent list.

If so, the system sends back an audible tone to the librarian, and a red light comes on.

If the borrower's number is not on the delinquent list, the transaction proceeds normally. Data from the two cards, along with information concerning the length of time for which the book is being borrowed or renewed, is recorded onto a 9-track magnetic tape mounted on a drive installed just beneath the librarian's desk.

Once a week — or sooner, if required — this tape is sent to a central inventory and circulation control system maintained by a number of libraries on Long Island.

This system, based on a Univac mainframe, uses the data collected on the 9-track tape to generate "past due" notices and to set up inventory lists of books on the shelves.

"This central system also provides us with our lists of delinquent borrowers," Coleman said. "Unfortunately, before the installation of the system, this information came to us in the form of sheafs of 8-1/2- by 11-inch pages, totalling 200- to 300 names."

As a result, delinquent borrowers were apprehended at the library only if one of the librarians happened to have read over the list and remembered someone's name as a book was being checked out.

The weekly lists from the center are still used in East Meadow's operations. From them, operators using the branch's ASR-33 Teletype terminal update the micro-based system's memory with the numeric identifiers of patrons classified as delinquent, keeping

a paper tape record as back up.

Reserved Books

In the area of reserve books, however, the system is paying for itself at East Meadow. If all copies of a book have already been loaned out, a library patron can put the book on a "reserve" list.

At East Meadow, this list can average 700- to 1,000 books; before installation of the Decicom system, sorting the 2,000 to 3,000 books that come in each day was done on a "batch" basis by library pages — part-time high school students.

"With the Automated Library System, however," Coleman said, "we've been able to eliminate the significant amounts of overtime needed."

"We first considered various stripped-down minis to power this system," Alan Rosenthal, director of engineering at Decicom, said. "In our judgment, none could be cost-justified when compared to the power available from microcomputers."

"In addition to concerning ourselves with higher minicomputer CPU costs — even in large quantities — we had to look at memory hardware costs in terms of what we could get vs. what we needed at a specific site."

With the micro, memory could be tailored to meet the specific capacities required at East Meadow. "If another library, however, requires 1K more RAM — or 1K less — then we can easily configure the system as required," Rosenthal said.



The system can nab delinquent borrowers as they check out books.

USER DOCUMENTATION...

You know you need it. But do you know what it is?

Announcing a one-day workshop on the business impact of user documentation in three practical segments:

- ☐ **Documentation Needs Analysis**...user support during marketing, installation, conversion, training and system use varies depending on your system, your corporate objectives and your user's environment. We'll show you how to reconcile these variables.
- ☐ **Documentation Planning**...based on thorough needs analysis, a formal plan involves cataloging and outlining information units, identifying sources, assigning responsibilities and budgeting. We'll work through a sample plan together.
- ☐ **Executing the Plan**...good documentation is organized by user function; clearly presented; written in friendly, concise language; illustrated with meaningful graphics; and attractively packaged in durable, maintainable media. We'll show you how that's done.

Each segment is divided equally between lecture and small-group discussion to assure that ideas are delivered in application as well as concept. Lecture and discussions are

supported by exemplary handout material. So, you'll leave the workshop with a headful of ideas and a pocket of useful tools to help you put your documentation back to work — educating, informing and selling your users.

Who's Behind The Workshop? Unlike academic workshops, this one is based on business experience, not theory.

The workshop is designed and presented by Progressive Communications, Inc. (PCI), a national leader in Documentation consulting. Because we specialize in user documentation, we're confident your organization — and your users — will benefit from our experience. Our clients include such systems giants as Citibank, Hewlett-Packard, ITEL, and Western Union Teleprocessing, plus many software and applications companies throughout the U.S.

Our services include user reference/training packages, corporate documentation standards, system marketing programs and software documentation. Our management and staff has packed over 50 years of collective documentation consulting experience into a one-day program that converts the business problems of user documentation into bottom-line benefits. Larry Gress, president of PCI, will personally conduct the workshops, sharing our experience with your firm.

Who Should Attend?

Your documentation is the hardcopy, representative of your systems. Shouldn't you do all you can to make it perform at least as well as your systems? Of course. If you represent one of these areas, this workshop will show you how:

- ☐ Design/development
- ☐ Installation/training/service
- ☐ Documentation/publications
- ☐ Marketing/sales

What Does It Cost?

Individual enrollment fee **\$165**
Multiple enrollments from some firm **\$160 each**

Amount includes workshop fee, lunch and refreshments. All applications must be accompanied by a check for the full amount and postmarked by March 30. You'll receive a written confirmation/receipt prior to the workshop.

Enroll Early, Space Is Limited

Because space is limited, applications will be processed on a first-come, first-served basis. Fill out the application blank now and mail it with a check to the address below. And if you can't attend, send someone else. It's the first step in converting your documentation problems into benefits — for you and your users.

Where and When Can I Attend?

We're bringing our experience to you in these cities:

Atlanta, Georgia World Congress Center, April 18
Baltimore/Washington, D.C., Northwest Sheraton Inn, April 20
Philadelphia, Philadelphia Marriott, April 24
New York, Marriott-Essex House, April 26
Boston, Boston Park Plaza, April 28

Also watch for our May workshops in Dallas, Houston, Los Angeles and San Francisco, and our June workshops in Denver, Chicago and Minneapolis.



**PROGRESSIVE
COMMUNICATIONS
INCORPORATED**

The Alamo/310
128 South Tejon Street
Colorado Springs, Colorado 80903
303/471-9874

My firm needs your workshop. Please reserve _____ seats in the

_____ workshop to be held on April _____.
(city)

My check is enclosed for \$_____.

Registrants (name and title)

Company name and address

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Risks, Rewards Balanced

DDP Impact on User Organization Seen Major

HOUSTON — "There is an emerging view within the banking industry — as well as most other industries — that distributed systems can increase the return on investment of the entire information processing system, from initial data capture to final management information generation. "Experience is showing that these systems, when appropriate, can be implemented more quickly to meet immediate local operations needs, often at lower cost," Donald T. Winski, manager of management advisory services at Price

Waterhouse Co. told a recent banking conference here.

Certain business characteristics are present when the distributed data processing (DDP) approach is found appropriate. "These characteristics fall into four major categories: the information processing logic, the data base, the information timing requirements and the deployment of the end-user personnel," Winski explained.

Unique Logic

If the logic needed for a specific banking operation is unique, it is more likely the application can be effectively distributed. Further, if a data base is subject to limited access by a small number of users rather than wide-ranging access by a large number of people, it can be more effectively distributed, he pointed out.

"Where there are dissimilar timing needs, for example, a real-time necessity at the branch level but a daily or weekly necessity for information at the central office, it will likely be less costly to provide on-line distributed processing for the daily real-time applications while providing centralized batch processing for the more concentrated information needs," he said.

If the end users of a system are dispersed, geographically distributed processing tends to be more of an alternative. "There is a greater tendency toward keeping application systems on a single large mainframe when all people are within one location," Winkler noted.

When people discuss distributed systems, confusion arises, according to Winski. "We often encounter a preponderance of one-dimensional reality," he said, because people tend to put central control at one end of a spectrum and decentralized systems at another.

However, distributed processing really has three dimensions:

- The degree of centralized organizational responsibility.
- The extent of physical computer deployment.
- The number of DP functions that are to be handled.

"The DP responsibility dimension ranges from total centralization to total decentralization; the computer deployment dimension ranges from a single consolidated mainframe to a totally distributed minicomputer network," he said.

Actually, Winski noted, extremes are not likely to occur. At some point, the systems architecture will become synchronized with the overall organizational architecture.

Possible Environments

According to the consultant, four major DP environments can be represented within the two-dimensional responsibility/deployment matrix:

1. In the centralized responsibility and consolidated computer equipment situation, "we are basically defining the current classic management information system (MIS) environment."

2. In situations where the equipment is consolidated but responsibilities are totally decentralized with the end user, "we have what we normally view as a service bureau environment."

3. In a number of banks "we are seeing a balance between distributed and consolidated computer equipment with the responsibility for the data processing functions still within a centralized MIS group. We call this a virtual MIS environment."

4. There have been some cases where total end-user orientation exists. "In these cases, the end-users are being held responsible; as part of their total profit-center responsibility, for the development, operation and control of their systems."

In many cases, minicomputers are being placed into the user environment and the user is held responsible for the system operations. Local users are also doing some systems development, Winski said.

"In almost all cases there is either a formally defined or implied management policy of centralized control," he stated.

"This control considers such factors as cost-benefit justification, adherence to necessary standards and proper interfacing between adjoining application systems."

Impact on Organization

For top management, DDP's impact will primarily be one of "risk analysis," with management trying to balance risks and rewards. For every potential advantage, "there will also be a potential shortcoming," Winski said.

An MIS organization will be reshaped by DDP, transformed into a "higher quality, less populated elliptically shaped MIS organization," he predicted. All operational responsibilities and much of the programming as well as the maintenance will revert to the user; the MIS department will have a "greatly expanded" technical support and quality assurance function, becoming an "internal consulting organization," he said.

Will users be able to handle the new responsibilities? To get them ready, "some planned turnover may be necessary" in order to assure an adequately trained and "conditioned" user population, Winski believes.

Users will have to turn to the MIS organization, their own staff or outside contractors for programming and system design help. The technical knowledge required in implementing a particular system will be the controlling factor, he said.

Internal auditors will also be impacted by the distributed approach. "Paper-oriented auditors ... are being replaced with highly sophisticated DP-oriented individuals. These auditors must know mini/microcomputer technology and network communication systems."

"The key to the successful use of distributed systems involves the proper organizational blending of centralized controls and decentralized responsibilities," he summarized. "This will provide the entire organization with the means to properly exploit the use of distributed systems in a timely fashion so a significant increase takes place in the return on the systems investment."

"By properly aligning our systems architecture with the architecture of our particular banking organization, we can provide the necessary synchronization required to provide management with better information, while breaking down the service barriers that are preventing us from expanding our business in a more profitable manner," he concluded.

LOCATE MINICOMPUTER SOFTWARE

—NOW TWO VOLUMES—

MINICOMPUTER SOFTWARE QUARTERLY

WITH

• Over 500 detailed program descriptions
• Indexed by: Application —
Hardware — Language

Subscription Includes:

Base Volume Set + 4 up-dates
\$85. US/Can (+5% Tax in Mass.)
\$110. Foreign (prepaid only)

INTERNATIONAL MANAGEMENT SERVICES, INC.
215 Oak Street, Dept. C, Natick, Mass. 01760



DG Eclipse, Nova Word Processing?

Not quite, but would a text formatter solve your documentation bottleneck? Using simple format instructions imbedded in a source text file created by the standard DG editors, or any other method, DORIS produces an attractive upper and lower case document, letter or report. Features such as page numbering, title centering, margin adjustment, page headings, columnization and right-hand justification are just some of the capabilities of DORIS.

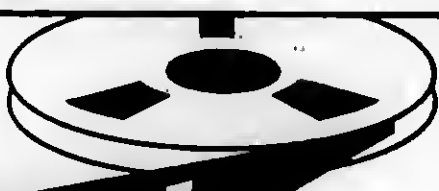
Contact David N. Langley

FINNING

FINNING COMPUTER SERVICES LTD.

555 Great Northern Way, Vancouver, B.C., V5T 1E2, (604) 872-7474

REMOTE BATCH PROCESSING ON IBM'S FASTEST CPU 360/195



TIME FOR SALE

GUARANTEED
TURNAROUND
only
50¢ a second

OS/MVT, HASP/RJE, 2 Meg, 3330's and 2314's — United Airlines operates a Cost Efficient service featuring High Speed Processing and Quick Turnaround. Through Auto Answer WATS or leased lines (at speeds of 2000 to 9600 BAUD) you gain access to one of the most complete data centers in the United States.

Dial our number and execute your own programs or utilize a wide range of software — ICES, MARKIV, OSIRIS, BMD, PANVALET, GPSS, HEC1, HEC2, SWMM, all standard compilers and more.

If you are using an outside computer service, United can offer you a substantial savings and an unbeatable service.

COMPARE — call or write today to request a benchmark or additional information.



UNITED AIRLINES

Computer and Communications Services Division
Denver Technological Center
5350 South Valentia Way
Englewood, Colorado 80110
Call Collect (303) 779-2000 — Ask for Jon Burley

Predicted Koch Election to .5%

Pollster With Micro Gets Fast Results

By Tim Scannell
CW Staff

NEW YORK — A polling firm with a micro-computer system predicted last November's election of Edward Koch as New York City mayor within .5% of the tabulated vote.

Penn & Schoen Associates used the micro to analyze data received in countless random telephone calls and through hours of door-to-door canvassing. Combining the system with traditional polling techniques meant it could get results the same day a poll was taken, according to Mark Penn, a partner in the firm.

"It's ridiculous to wait a week while raw data is being keypunched and fed into a large computer to be analyzed," Penn remarked. "If there is a flaw in a question or a poll taker doesn't understand what to do, you might not see the problem until a week of mistakes has occurred."

Because "all the results that follow have to be suspect until the problem has finally passed," the credibility of the entire survey can be damaged, he explained.

Although Penn, who is also a law student at Columbia University, felt an interactive computer system could be of great use in monitoring the poll and determining problems in advance, he was at first hesitant to purchase a computer because of the cost. Political campaigns are notoriously strapped for cash and polling, because of the labor involved, is already very expensive, he noted.

Retail Solution

The solution, Penn found, was to purchase a personal computer system. He chose a Sol Terminal Computer Model 20 with a North Star Computers, Inc. minidisk drive after looking over several systems at the Computer Corner, a computer store in nearby White Plains, N.Y.

"We decided upon the Sol 20 because it's a complete computer with a keyboard and printer output built in," he said. "The North



Soon-to-be-elected New York City Mayor Edward Koch (left) joined Mark Penn to analyze polling data before last November's contest.

Star disk, although low in storage capacity, had the lowest price for any disk system . . . and it also had a good extended disk Basic interpreter."

The programs used to analyze the polling data were written by Penn using the language contained on the disk system.

The computer was used weeks in advance of the election to keep track of the various percentages and results being received. It was also programmed to uncover unusual surges in popularity that might occur because of "extraordinary media coverage" or exposure of a candidate, Penn said.

"Instant poll results are almost unheard of in our profession, but with our personal computer we achieved it," he stated. "We used [the system] to run the whole show that week be-

fore the election and continued to use it as the major data processing element throughout the rest of the campaign.

"The computer was busy, even on election night, tabulating results from sample precincts," he continued.

Hardware problems that might have been disastrous, were overcome with the Computer Corner's assistance, Penn said. "We had two hardware failures, one of which happened on the Sunday before the election. The Computer Corner opened the store Sunday night just to repair a defective memory board and also replaced the disk drive," which had stopped operating.

"Had we not purchased our computer from a computer store, we would have been in real trouble," he added.

Course on Micros Set for Anaheim

SANTA MONICA, Calif. — A five-day series of courses designed to acquaint participants with the fundamentals as well as the technical aspects of microcomputers will be offered in Anaheim, Calif., on May 1-5 by Integrated Computer Systems, Inc.

The series will discuss technical definitions, software development, documentation, component and product reliability and criteria for choosing the right microcomputer, a spokesman said.

Also covered will be interfacing techniques, control logic, system testing and programming languages, he added. Software design and development as well as documentation will be detailed.

Emphasis will be placed on a step-by-step teaching approach so participants can apply methods to their own projects.

The courses can be taken individually or in combination. Tuition ranges from \$195 for a one-day seminar to \$695 for the complete sequence.

The series will also be held in Philadelphia on May 8-12, Washington, D.C., on May 15-19, Toronto on June 5-9, Boston on June 12-16 and at various other locations across the country. Additional information can be obtained from Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Book Surveys Available Gear, Offers Acquisition Guidelines

NEW YORK — A book that details the hardware and software presently available in the microcomputing field as well as the guidelines necessary for selecting the right equipment has been published by the Van Nostrand Reinhold Division of Litton Educational Publishing, Inc.

G.V. Rao's *Microprocessors and Microcomputer Systems* discusses such topics as the use of silicon in microcomputer technology, the organization of low-cost computer systems, bubble memories, charge-coupled devices and data communications, according

to a spokesman.

The book features numerous reference charts containing comparative data along with over 150 illustrations and diagrams, he added. It was published to facilitate communication between hardware and software specialists, marketing and training personnel, students, faculty and laymen alike, the publishing firm noted.

The 286-page book is priced at \$24.50 from the publisher at 450 W. 33rd St., New York, N.Y. 10001.

Dispenser Holds Wire Solder

DANBURY, Conn. — Micro Electronic Systems, Inc. has a universal wire solder dispenser, suitable for hobbyist applications that can reportedly accommodate solder sizes ranging from .015- to .062 in.

Hand-Y-Feed comes in two versions: with a magazine, in which the solder is wound around a coil in the unit and fed from the bottom up through the center; and without a magazine, in which the solder is fed directly from the spool to the unit.

A metal nozzle is included to protect the unit should a soldering iron get too close, the firm noted.

Hand-Y-Feed is priced at \$7.50 for the nonmagazine version and \$8.65 for the mag-

azine version from the firm at 8 Kevin Drive, Danbury, Conn. 06810.

Hobbyist Plugs Fit DIPs

BRONX, N.Y. — The OK Machine and Tool Corp. has unveiled a line of 14- and 16-pin plugs designed to fit into DIP sockets for hobbyist and prototype applications.

The plugs, included with covers, feature glass-filled thermoplastic bodies and solder lugs with slots on the top side for attachment of cable leads, the firm said.

Packed two to a package, the plugs cost \$1.45 (14-pin units) and \$1.59 (16-pin version). OK Machine is at 3455 Conner St., Bronx, N.Y. 10475.

MICROCOMPUTING

M **MODE, BURST** — The movement of a continuous bit stream between devices until an interruption or completion of the stream occurs.

MODE, BYTE — Refers to the movement of one byte at a time between devices, separated by an interrupt and release of channel control. Used in multiplexing, the byte mode permits the handling of data from several low-speed devices simultaneously.

MODEM — Refers to a MODulation/DEModulation chip or device that enables computers and terminals to communicate over telephone circuits.

MPU — Microprocessor unit.

MTBE — An abbreviation for mean time between failures.

MULTIPROCESSING — 1. Refers to various computer configurations consisting of more than one independently initiable processor, each having access to a common, jointly addressable memory. 2. Processing several programs or program segments concurrently on a time-share basis. Each processor is only active on one program at any one time while operations such as input/output may be performed in parallel on several programs. The processor is directed to switch back and forth among programs under the control of the master control program.

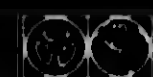
MULTITASKING — Refers to procedures in which several separate but interrelated tasks operate under a single program identity; differs from multiprogramming in that common routines and data space as well as disk files may be used. May or may not involve multiprocessing.

N **NANOSECOND** — A measurement equivalent to one billionth of a second (10^{-9} second).

N/C SYSTEM (NUMERIC CONTROL) — Refers to a system which uses prerecorded intelligence prepared from numerical data to control a machine or process. The N/C system consists of all elements of the control system and of the machine being controlled that are, in fact, a part of the servomechanism.

NETWORK — 1. A combination of elements. 2. An interconnected system of transmission lines that provides multiple transmissions between loads and sources of generation. 3. A series of points connected by communications channels. 4. The switched telephone network is the network of telephone lines normally used for dialed telephone lines. 5. A private network is a network of communications channels, confined to the use of one customer.

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc. 207 Kenyon Road, Champagne, Ill. 61820



COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

IMSAI 8080, 8K, ADM3, MIO, plus misc. INVESTED \$3000; sell for \$1500/best offer. Joe Fiore, WKND/EVES (209) 239-1717 DAYS (209) 823-7881

OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS. California Microcomputer Company's (CMC) previous ads in Computerworld has resulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved business software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927 (918) 891-1420.

MICRODATA MEMORYs 1800 CPUs, SELECTRIC #735 I/Os (new), PC Bd REPAIR; Shabesta 1 (513) 474-1880

EXPERIENCED MICROPROCESSOR CONSULTING ENGINEERING TEAM Available to place any product into COMPLETELY DOCUMENTED PRODUCTION in less time than anybody ICESYS Computing Corporation, 1820 Union Street, San Francisco 94123, (415) 922-7775, 2158 31st Street, Santa Monica 90405 (213) 450-0505

ATTENTION RADIO SHACK TRS-80 OWNERS: Perpetual Inventory Management System (PIMS) Release 1.0 now for sale. Written in BASIC, the program holds 30+ products in 4K, 300+ products in 16K. Each product has its own unique 18 character description. Tape transaction processing has been eliminated! Package includes program cassette, program hardcopy, and complete 12-page user's manual. Extremely useful and easily customized system sells for only \$29.95. To order simply mail your payment to Micro Medle, 131 N. State Street, Suite 220, Lake Oswego, Oregon 97034

RADIO SHACK-TRS-80 USERS SOFTWARE AVAILABLE ON CASSETTE — FINANCIAL PROGRAMS, DEPRECIATION, INCOME TAX, REAL ESTATE PROJECTIONS, LOAN AMORTIZATION, AND OTHERS. WRITE THE ACCOUNTANT'S COMPUTER COMPANY, 3390 PEACHTREE ROAD, N.E., ATLANTA, GEORGIA 30326

FOR SALE: IBM SYSTEMS/32 COMPUTER, call Norman Smith (509) 455-8160, L.E. Spitzer Co., Inc., P.O. Box 2867, Spokane, Wa 99220

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your

order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 60¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at \$5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

ORDER FORM: To: Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, MA 02160. I have read the rules, and would like to place my ad as follows:

Date of first appearance (or "next available issue"): _____

Number of weeks ad is to run: _____ Box number desired (add \$5.00): _____

COPY: (Attach copy on typed or printed page.)

Total words at 60¢ each equals: _____ Plus Box Charge (if any): _____

Equals total cost per insertion: _____

Times total number of insertions: _____ Equals total enclosed: _____

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Phone where you can be reached during day (____) _____

Mini/Micro

THE MINI/MICRO COMPUTER CONFERENCE AND EXPOSITION

APRIL 18-19-20 • CIVIC CENTER • PHILADELPHIA

Tuesday

APRIL 18

MORNING: 9:30 A.M. — Noon

1. PROGRESS IN MICROPROCESSOR GAMES AND HOME COMPUTERS

Organizer/Chairman: Jerry Eimbinder —
Electronic Engineering Times

2. HOW TO MAKE IT AS A MINICOMPUTER DISTRIBUTOR

Organizer/Chairman: W. McNamara —
Randel Data Systems

3. MICROCOMPUTER SOFTWARE DEVELOPMENT: CHOOSING AMONG THE DIFFERENT METHODS

Organizer/Chairman: Carol Anne Ogden —
Software Techniques, Inc.

4. DISTRIBUTED PROCESSING

Organizer/Chairman: Roger Billings —
Billings Computer Corp.

AFTERNOON: 1:30 P.M. — 4:00 P.M.

5. SMALL BUSINESS SYSTEMS

Organizer/Chairman: Don Schnitter —
Basic/For Corp.

6. PHILOSOPHY OF COMPUTER NETWORK TROUBLE SHOOTING

Organizer/Chairman: Frank Urban —
Hewlett-Packard

7. 16-BIT MICROCOMPUTERS

Organizer/Chairman: Edward J. Zander —
Data General

8. DESIGN APPROACHES TO SELECTING PRE-FABRICATED PACKAGES

Organizer/Chairman: George Benoit —
Zera Corp.

Wednesday

APRIL 19

MORNING: 9:30 A.M. — Noon

9. INDUSTRIAL MICROCOMPUTER NETWORKS: FACT OR FICTION

Organizer/Chairman: Dwight Carlson —
Process Computer Systems

10. MINICOMPUTER APPLICATION LANGUAGES

Organizer/Chairman: Michael Labeda —
Computer Automation

11. GRAPHIC DISPLAYS FOR THE OEM SYSTEMS BUILDER

Organizer/Chairman: John LeVera —
Taktronix

12. CRITERIA USED IN SELECTING AND EVALUATING A MINICOMPUTER

Organizer/Chairman: John P. Gallagher —
A.O. Smith Corp.

AFTERNOON: 1:30 P.M. — 4:30 P.M.

13. MICROCOMPUTERS AND THE ENERGY CRISIS

Organizer/Chairman: Al Vitale — Control
Logic Corp.

14. GETTING INTO THE SMALL SYSTEMS BUSINESS

Organizer/Chairman: Michael Levy —
Jethro

15. THE MICROCOMPUTER SOFTWARE CRISIS

Organizer/Chairman: Andrew A. Allison —
Consultant

16. COMPUTER GRAPHICS WITH MINIS/MICROS

Organizer/Chairman: Carl Mechover —
Carl Mechover & Associates, Inc.

Thursday

APRIL 20

MORNING: 9:30 A.M. — Noon

17. THE EMERGING ROLE OF THE MICRO- PROCESSOR IN MATERIAL HANDLING

Organizer/Chairman: John M. Hill —
Computer Identities Corp.

18. ALTERNATIVE MINICOMPUTER SYSTEM ARCHITECTURES

Organizer/Chairman: Malcolm Stiefel —
Mitra Corp.

19. BUSINESS AND ENTREPRENEURIAL OPPORTUNITIES IN MINIS AND MICROS

Organizer/Chairman: Stanley Klein —
Mini-Micro Systems

20. SMALL DISK MEMORY TRENDS

Organizer/Chairman: Robert Hager —
CalComp

AFTERNOON: 1:30 P.M. — 4:30 P.M.

21. MINI/MICRO INTERFACE TESTING

Organizer/Chairman: (To be announced
from Hewlett-Packard)

22. FIXED DISK TECHNOLOGY FILES vs. REMOVABLE DISK TECHNOLOGY FILES

Organizer/Chairman: Bud Blainiger —
Microdata Corp.

23. MICRO-BASED CUSTOM TERMINALS AND SYSTEMS

Organizer/Chairman: Martin S. Albert —
Custom Terminals Corp.

24. NEW DIRECTIONS FOR THE SMALL SYSTEMS USER

Organizer/Chairman: Ed Bride —
Hewlett-Packard

MINI/MICRO AUDIENCE PROFILE (By Areas of Interest)

Year: 1976	Year: 1977
Location: San Francisco, CA	Location: Anaheim, CA
Attendance: 9,949	Attendance: 9,917
Areas of Interest	Percent
Components	7.56
Comp. Sys. — Digital	12.73
Comp. Sys. — Spec. Purp.	6.23
Consulting Services	2.46
Data Comm. Equip.	6.14
Data Conv. Equip.	3.36
Per Equip.—CRT Disp.	9.21
Per Equip.—Mag Tape	5.62
Per Equip.—Mem. Sys.	7.10
Per Equip.—Plotters	4.32
Per Equip.—Printers	6.32
Per Equip.—Punch/Rdts	2.49
Source Data Collectn.	2.67
Supplies/Accessories	2.20
Test Equip.	2.97
Time-Sharing Svcs	2.20
Not Specified	16.43

In less than two years the MINI/MICRO COMPUTER CONFERENCE has attracted attendees from virtually every state in the country, plus many foreign countries. The MINI/MICRO EXPOSITION has also earned the prestigious "trade fair" designation by the U.S. Department of Commerce.

LIST OF EXHIBITORS (As of February 15)

Mini-Micro Systems Magazine	Taltype Corp.	General Robotics	Cipher Data Products, Inc.
Minicomputer Accessories	Talpar	Datapro Research	Dikdata
Computer Devices	Texas Instruments	Tally Corp.	Monolithic Systems Corp.
Computer Magazine	Triple I, Inc.	Data I/O Corp.	Computer Automation
IEEE Computer Society	Bell Brothers Research Corp.	Infosystems	Computer Design
Micro Peripherals Inc.	Applied Digital Data	Datamation	3M Co. — Data Recording
Memorex	Anderson Jacobson	Houston Instruments	Products Div.
Megatek Corp.	Taktronix, Inc.	Data 100 Corp.	3M Co. — Minicom Div.
MOB Systems	Talos Systems	Honeywell Information	Banwill Publishing Co.
Computer Operations, Inc.	Summagraphics Corp.	Systems	Electronic Memories &
Computerworld	Blomation	Dataram	Magnetics
Conrac Corp.	Digi-Log Systems, Inc.	Digital Equipment Corp.	Systems Furniture
Leasiegler	Small Systems World	Digi-Data Corp.	Hewlett-Packard (Colorado
International Microsystems	Raymond Engineering Inc.	Compucorp	Springs Div.)
Intermec	Printonix	Florida Data Corp.	Basic Business Systems
Control Logic Inc.	Calax Manufacturing Co.	Electronic Engineering Times	Qantax
Dataflux Corp.	CalComp	Able Computer Technology	Small Business Computers
Data General Corp.	Cahners Publishing Co.	Victor Data Products	Magazine
Intel Memory Systems	Praxis Ltd.	Amcomp	Hayden Publishing
Intelligent Systems Corp.	Plessey Peripheral Systems	Ampex Corp.	Electronic Representatives
Data Systems Design	CMC Marketing Corp.	Anadex Inc.	Association

ADVANCE REGISTRATION OFFERS MONEY AND TIME SAVINGS

Attendees to the MINI/MICRO COMPUTER CONFERENCE AND EXPOSITION may save up to \$15 by utilizing the Advance Registration Plan.

Following is the registration fee schedule:

	Advance	On-Site
3-Day Conference and Exposition	\$60	\$75
1-Day Conference and Exposition	\$25	\$30
Exposition Only	Not Available	\$ 5

Please use the form provided for advance registration. Your completed credentials will be prepared and waiting for you at the special Advance Registration Center in the Philadelphia Civic Center on the day you specify.

ADVANCE REGISTRATION FORM

MINI/MICRO COMPUTER CONFERENCE AND EXPOSITION
PHILADELPHIA, PENNSYLVANIA, APRIL 18-19-20, 1978

NAME	
TITLE	
COMPANY	
ADDRESS	
CITY	

INDUSTRY CATEGORY (check one)	AREA OF INTEREST (check all that apply)
AA Computer/DP/Peripheral Equip. Mfg.	1 Computer Systems — Digital
AB Technical/Electronic	2 Computer Systems — Special Purpose
AC Component/Equip. Mfg.	3 Consulting Services
AD Other Mfg.	4 Data Communications Equip.
AE Government	5 Data Conversion Equip.
AF Education	6 Peripheral Equip. — CRT Displays
AG Computer/DP Services	7 Peripheral Equip. — Mag. Tape System
AH Wholesale/Retail	8 Peripheral Equip. — Memory Systems
AI Medical/Legal	9 Peripheral Equip. — Plotters
AJ Transportation	10 Peripheral Equip. — Punch and Read
AK Utilities	11 Source Data Collection Equip.
AL Construction	12 Supplies and Accessories
AM Research/Development	13 Test Equipment
AN Other Business Services	14 Time Sharing Services
AO Other	

☐ Please send hotel reservation information.

PLAN: ☐ 3 Days ☐ 2 Days ☐ 1 Day Please circle days you will attend.

Check payable to: MINI/MICRO COMPUTER CONFERENCE
MAIL TO: MINI/MICRO COMPUTER CONFERENCE — Advance Registration
5528 E. La Palma Avenue, Suite 1, Anaheim, California 92807

Your completed credentials will await you at the Advance Registration Desk in the Philadelphia Civic Center.

Please Note: ADVANCE REGISTRATIONS MUST BE RECEIVED BY APRIL 12.

PAYMENT
MUST
ACCOMPANY
ADVANCE
REGISTRATION

Short Course, Workshop Set for Washington, D.C.

WASHINGTON, D.C. — Two three-day courses covering the basic principles of microcomputers and micro-processing systems will be held here at George Washington University on April 19-21 and May 24-26.

The first course, "Microprocessors," will deal with the technology and specifics of the Intel 8080 and Motorola M6800 microcomputer systems. Through the detailed study of these machines, participants should acquire a working knowledge of basic microprocessor terminology, concepts and applications, according to a spokesman.

The "Microprocessors and Microcomputers Workshop" will be divided

between lectures and hands-on practice. The workshop will focus on the hardware, structure, architecture, software, capabilities and limitations of the average microprocessor, the spokesman noted. An M6800 system will be used to demonstrate principles.

A basic knowledge of at least one programming language is the only prerequisite suggested for attending these classes, the spokesman added.

The fees are \$405 for the in-depth course and \$390 for the workshop. Additional information and registration materials are available from Martha Augustin, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Intel Doubles SBC Program Memory

SANTA CLARA, Calif. — Intel Corp. has announced the 80/10A, a single-board computer (SBC) with up to 8K bytes of nonvolatile read-only memory and a programmable parallel and serial I/O capability.

The 80/10A, constructed on a 6.75- by 12-in. printed circuit board, contains the Intel 8080A MPU, system clock and 1K byte of read/write random access memory, a spokesman said.

Using either the 2758 erasable programmable read-only memory (Eeprom) for a 4K-byte capacity or the 2716 Eeprom for 8K bytes, the 80/10A's board power consumption is 10% less than that of its predecessor, the 80/10, the firm noted.

Because of the 80/10A's I/O capabili-

ties, different equipment and configurations can be accommodated by changing a few program instructions and plugging in the appropriate line drivers and terminators, the firm claimed.

The SBC 80/10A sells for \$495 from the firm at 3065 Bowers Ave., Santa Clara, Calif.

Intel Cuts Costs Of SBC Devices

SANTA CLARA, Calif. — Intel Corp. has announced several price reductions effective immediately on its SBC 80/20 and related single-board computer (SBC) products.

The SBC 80/20 has been reduced from \$895 to \$735; the 80/20-4 from \$995 to \$825; and the 80P20 prototype package from \$1,495 to \$1,350.

The system 80/20-4 has also been cut from \$1,895 to \$1,725, a 9% reduction.

The SBC 016, 032, 048 and 064 random-access memory (RAM) boards have been reduced from \$975 to \$825; \$1,650 to \$1,360; \$2,300 to \$1,860; and \$2,950 to \$2,200, respectively.

The SBC 104, 108 and 116 combination RAM, erasable programmable read-only memory (Eeprom) and I/O expansion boards have been cut from \$775 to \$715; \$895 to \$815; and \$1,100 to \$985, respectively. The SBC 517 combination I/O board has been reduced from \$425 to \$400.

Memory Board Built for 6800

WESTLAKE VILLAGE, Calif. — A 16K by 8-bit semiconductor memory system designed for use with Motorola Semiconductor Products, Inc.'s Exorcisor and Motorola Corp.'s 6800 evaluation module has been released by Chrislin Industries.

The CI6800 can be expanded to 32K, 48K or 64K by interchanging the 4K by 1-bit dynamic memory chip with its 16K equivalent, the firm stated. The memory board plugs directly into existing Exorcisor connectors, a spokesman said.

The CI6800 features a hidden refresh control logic and offers a data access time of 300 nsec and a cycle time of 750 nsec, he said.

The board is priced at \$390 for the 16K by 8-bit version and \$1,230 for the 64K by 8-bit model. Quantity discounts are available, Chrislin said from 31312 Via Colinas, Westlake Village, Calif. 91361.



These are but a few of the true values you get from National Computer RENT - LEASE - BUY

Find out for yourself why National Computer has almost 2,000 customers and is one of the fastest growing companies in the terminal business.

Most Products IMMEDIATE DELIVERY from Stock



DIABLO 1620 \$2,785

Single Unit 90-Day Warranty



NCC 1043-II

- (TTY-43 with Modem Coupler)
- 30 CPS Transmit-Receive-Print
- Fully Buffered
- Bell 103 Type Modem Coupler
- Complete On-Site Maintenance

\$7500 PER MONTH

COMPLETE

Month-to-Month Thereafter No Joke - No Tricks - No Gimmicks

LEAR SIEGLER



ADM-3A

ADM-1A

ADM-2

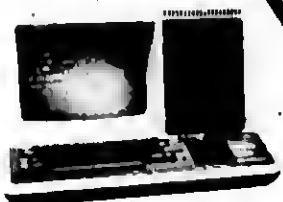
VDT-400

DEC

LA-36

LS-120

LA-180



VT-52

TI-745



\$9200 PER MONTH

1 YEAR RENTAL

- Month-to-Month Thereafter
- 30 CPS Print-Transmit-Receive
- 13½ Pounds Including Paper and Carrying Case
- TI Coast-To-Coast Service Included

Also Available with APL

FOR THE GREATEST TERMINALS WITH THE GREATEST SERVICE CALL



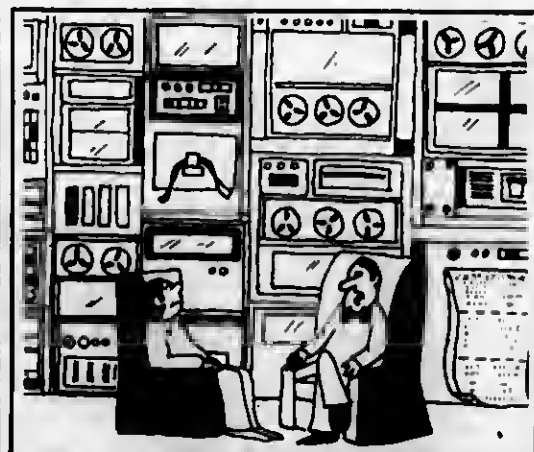
Communications Corp

The Greatest Name in Terminals

800-243-9006

IN CONN
NEW YORK
BOSTON
NEW JERSEY
CHICAGO

203-325-3831 (Stamford)
212-354-9866 (42nd Street)
617-235-7055 (Wellesley)
201-766-4662 (Bernardsville)
312-296-0830 (Des Plaines)



'Actually It Started Out As a Hobby.'

CCIA-Type Firms Targeted

SBA Promises Help to Capital Seekers

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — An official with the Small Business Administration (SBA) recently assured members of the Computer & Communications Association (CCIA) they can expect more help from the agency in their search for capital.

Addressing the association's Fifth Annual Caucus here, Peter F. McNeish, deputy associate administrator for investment at SBA, noted that few CCIA members currently fall into the agency's definition of a "small business." "But you are small within your own industries. You are in direct competition with billion-dollar giants," McNeish said.

"You have the same disadvantages the typical small company has in obtaining capital, the same struggles with government regulations and paperwork, and some of the same discriminations in tax law to contend with," he added.

'One of Us'

The SBA official pointed out that not one of CCIA's members has as much as 1% of the computer or communications market. "So you are, in effect, one of us, and you are entitled to ask why SBA doesn't do more about your predicament. Why don't we use more liberal standards to define 'small'? Why do we hold to size standards of our own making which exclude some of you from our support programs?" he asked.

McNeish promised help, but said it is likely to come slowly. When SBA was created 25 years ago, Congress intended it to bring economic justice to the "Mom and Pop types of enterprises," he explained.

At that time, "nobody could conceive of a time... when multimillion dollar companies would be kicked around by even bigger businesses and bigger government and need SBA's help," McNeish said. As a result, the agency's basic concepts and procedures need realignment, and that will take time, he suggested.

In addition, SBA's lack of involvement in the computer and communications industries to date is attributable, in part, to the fact that many industries are dominated by a handful of companies. McNeish told the CCIA that while the imbalance in their industries is extreme, it is not unique.

"I would be the first to agree that your needs generally deserve high-priority attention. You are caught between the devil and

the deep blue sea when you are too big to get support from SBA and not big enough to make it on your own in case some big competitor decides to put the squeeze on you," he stated.

To assure his audience that SBA is aware of their problems, McNeish enumerated them. He said the agency knows CCIA-type companies are outcasts on Wall Street when it comes to raising equity capital through the organized securities markets because of the preference there for big name company stocks; that they are frozen out of much of the institutional investment market under the "prudent man rule," which operates on the theory that "bigger is safer" and that investments of pension funds should not be made outside the top 50 companies; and that they are the recipients of a "high risk" rating because of their vulnerability to price-cutting attacks by the big competitors.

The SBA official cited a task force report commissioned by his agency to look into the



CW Photo by E. Holmes

Peter F. McNeish

difficulties associated with raising equity and venture capital.

Quoting from the report, McNeish said, (Continued on Page 78)

Carter's '79 Tax Plans Offer Little Relief for CCIA Types

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — President Carter's proposed economic package for fiscal year 1979 calls for a reduction in taxes on business that would benefit computer and communications firms, the Computer & Communications Industry Association (CCIA) was told at its Fifth Annual Caucus here recently.

But the President's program offers little else for the small and medium-size firms represented by the CCIA, according to its president, A.G.W. (Jack) Biddle.

If Congress approves the Carter tax proposals, corporate tax rates would drop — effective Oct. 1 — from 20% to 18% on the first \$25,000 of income, from 22% to 20% on the next \$25,000 and from 48% to 45% on taxable income over \$50,000 according to Emil M. Sunley Jr., deputy assistant secretary of the Treasury for tax policy.

In 1981, an additional 1% would be lopped off taxes on income over \$50,000, making that total tax 44% annually. If adopted, these rates would be permanent, Sunley stated.

While these changes in tax rates will lower

the overall business taxes paid by about \$6 million, the same tax reduction applies to companies of all sizes, according to CCIA member Raymond P. Kurshan, chairman and president of Management Assistance, Inc.

Kurshan, who on behalf of the CCIA attended a recent White House briefing for groups representing small and medium-size businesses, noted the Administration "had no coherent response" when asked why a greater tax break wasn't given to smaller enterprises along the lines of individual income tax rates.

Appearing at the caucus from the Small Business Administration (SBA), Peter F. McNeish, deputy associate administrator for investment, said his agency believes Carter's plans for the double taxation of dividends and the investment tax credit "are one-sided propositions favoring big business and offering very little relief to small business."

"Elimination of the double tax on dividends means nothing to the owners of a typical small company because every dime of earnings is being plowed back into the busi-

(Continued on Page 80)

COMPUTER INDUSTRY

InSci
Information Science Incorporated

Personnel

Payroll

ERISA

EEO

OSHA

InSci Headquarters 95 Chestnut Ridge Road Montvale, New Jersey 07645 201-391-1600

Memphis TN 901 761-1845 Manito Park CA 415 854-1903 Newport Beach CA 714 752-7672 Oak Brook IL 312 986-6460 Raleigh NC 919 781-6095 San Antonio TX 512 690-0110 Waltham MA 617 890-1518 West Palm Beach FL 305 689-8777

Member SIA Software Industry Association

SBA Promises to Help Venture Capital Seekers

(Continued from Page 77)

"A hypothetical company moving through the system must reach a revenue level of up to \$10 million before public financing becomes even remotely possible. Moreover, it is not until a business reaches revenues of \$25 million to \$40 million that all sources of public and private financing become, in some measure, available."

SBA is "pressing for action" on task force recommendations that would involve the agency in multimillion-dollar range companies, such as those belonging to the CCIA, he said.

Among SBA's attempts to unclog the flow of capital to small and medium-sized businesses is its proposal to raise the ceiling on the amount of money firms can raise in the public securities

markets from \$500,000 to \$3 million. The Securities and Exchange Commission (SEC) is considering this move and additional restraints on the fees that lawyers, certified public accountants and the like can obtain during this fund-raising process, McNeish reported.

Loan Selling Urged

The agency is also trying to channel institutional funds into small business by encouraging commercial banks to get more deeply into selling loans that are 90% guaranteed by the federal government, thus freeing more bank funds for additional loans.

McNeish has particular hope for this "secondary market approach" to raising venture capital. Most of SBA's

lending is done with a 90% guarantee to a bank, making the loan guarantee almost the equivalent of a government bond, he explained.

The brokerage community is willing to buy that 90% guarantee from the bank and include payment to the bank for its services. The broker can then turn to one of its customers and require a premium for the customer's purchase of the government-backed paper.

A bank that makes a loan of \$100,000 under the auspices of SBA, for example, can then sell \$90,000 of the loan. The brokerage community pays the money right into the bank's coffers, and the bank can go out and make another \$100,000 loan where 10% of the risk is the bank's and 90% is

the government's, McNeish explained.

Banks are just beginning to catch on to this secondary market for loans, he added. This kind of cooperation between the banks and government will enable the banks to lend nine times more than they could if they held on to the government-backed paper. The government is interested in the program because it is a way of helping to reduce unemployment.

SBIC Source

SBA's Small Business Investment Companies (SBIC) are yet another source of long-term loans and equity capital for small business, McNeish said.

Combining private capital and government leverage, SBICs can obtain SBA-guaranteed debentures amounting to three times their paid-in capital and surplus. Those SBICs which offer venture capital financing can get four-to-one SBA support.

SBICs are also permitted to buy into the ownership of a firm, McNeish stated.

Congress has shown particular interest in the SBIC program, and new legislation governing SBIC lending arrangements proposes that more money be directed into high-technology companies, especially where innovation is involved, the SBA official said.

McNeish's agency is also trying to help reduce the burden of government regulations and red tape on small enterprises. Key targets of this program have been Occupational Safety and Health Administration (Osha) regulations and those rules accompanying the Employment Retirement Income Security Act (Erisa).

McNeish hopes SBA's efforts contributed to Osha Head Dr. Eula Bingham's and Labor Secretary Raymond Marshall's recent declaration of "an end to Osha's frivolous nuisances." Bingham has appointed a small business assistant in her office and cut down Osha regulations by nearly one-third, he reported.

Meanwhile, the Internal Revenue Service has embarked on a simplified plan for small business compliance with Erisa regulations, McNeish noted.

Your top competition is going to meet your prime prospects. What are you going to do about it?

They've made a smart decision. Last year the nine computer market areas on our itinerary drew 42,178 qualified buyers.

This year we expect more than 50,000. Can you afford to miss this chance to present your products and services?

There's still room for you. But it's going fast. Get complete information with this coupon now, on how Computer Expo 78 can work for you. Or save time by calling Kim Wichert collect at 617-964-4550.

These companies have already signed to exhibit at Computer Expo 78:

NCR	Computerworld	Trac Associates
Varian Graphics	NCI	Sperry Univac
Informatics	AT&T	Xerox
Honeywell	Kodak	Sykes Datatronics
Datamation	BASF	Cummins Allison
Communication News	IBM	American Microprocessor
McCormack & Dodge	Anderson Jacobson	International Data Corp.
Data Rentals	Computer Input Services	Programs, Inc.
Computer Sales International	Paradyne	Beehive International
Intel	ComData	Intertec Data Systems
Electronic Ventures	Genesis One	Software AG
Computer Roomers	Data Processing Sciences	Creative Engineering
Customer Priorities	Applied Computer Systems	Graphic Controls
Computer Software Solutions	Agile	Mini-Computer Systems
Systems Marketing	Woodford Systems	Tandem Computer
S.E.A.	American Used Computer	PCC/Pertec
Tri-Data	Business Forms Service	Computrend
Midwest Marketing	Intel Corporation	Extel
Logabax	Deltak	Mentel
AAA Chicago Computer	Peripheral Products	Sycor
Intelligent Systems	General DataComm Industries	Digitronics
Shasta	Continental Peripherals	Computer Services
Mostek	Computer Associates	Datamart
DIVA	Qantel	Courier Terminals
SBC Magazine	Diablo Systems	Modems Plus
Tele-dynamics	Marketechs	Software Design
Control Data	Racal-Milgo	Curtis-1000
National Semiconductor	Data Systems Specialists	Spectron
Printronic	Key Tronic	K&K Associates
Codex	Administrative Management	Applied Digital Data
E.M. & M	Small Systems World	Epic Data
The Morley Company	American Terminal Leasing	Terminal Rentals
Vanier Graphics	Journal Systems Management	Applied Data Communications
Total Typography	Optical Business Machines	Data Forms Company
Wang Labs	McGinn Safe	Imperial Technology
Computer Devices	Allstate Computer	Mathematica
Ann Arbor Terminals	H/G Professional Forms	Rianda Electronics
Datapro Research	Nichols & Company	Computer Corp of America
Inforex	Datapro	Cullinane
Perkin-Elmer	Input Services	Hewlett Packard
Telcon Industries	Plessey Services	Pansophic Systems
Versatec	Industrial Computer Controls	
Computer Performance	Vincent Data Products	
Advanced Systems	World Info Systems	
Delta Data Systems	DP Power	
Inform	Conrac	
Computer Decisions	Educational Data Systems	
Infosystems	Cybertek	
T-Bar	Cosmic	
Corporate Systems	Business Automation	
Dynatech	Insyte Datacomm	
Western Union	YE Data	
Calcomp	Arcus	
General Computer	St. Louis Info	
Atlantic Research	Digilog	
Telefile Computer Products	Herrera Kirby	
General Electric	Foto-fun	
Qume	Hamilton Sorter	
Moore Business Forms	Dispotech	
DataMedia	Consolidated Computer	
Texas Instruments	Cybersearch	
	Wolfe Computer	

COMPUTER
CARAVAN'S



I'm Interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
- ☐ Have Sales Representative call me
- ☐ Send Reservation Agreement
- ☐ Send Copy of 1977 Attendee Analysis

- | | | |
|--|---------------|---------------|
| ☐ Southern California Computer Expo | Anaheim/LA | March 21-23 |
| ☐ Northwest Computer Expo | San Francisco | March 28-30 |
| ☐ Southwestern Computer Expo | Houston | April 11-13 |
| ☐ Southeastern Computer Expo | Atlanta | April 18-20 |
| ☐ Gateway Computer Expo | St. Louis | April 25-27 |
| ☐ Midwestern Computer Expo | Chicago | May 2-4 |
| ☐ Mid-Atlantic Computer Expo | New York | May 9-11 |
| ☐ Great Lakes Computer Expo | Detroit | May 23-25 |
| ☐ New England Computer Expo | Boston | May 30-June 1 |

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone: (____) _____

Expansions

Mohawk Data Sciences has opened a software development laboratory in Los Gatos, Calif.

The Computer Products Division of Electronic Memories & Magnetics Corp. has expanded its facilities to more than 60,000 sq. ft. Its mailing address is now 2311 W. El Segundo Blvd., Hawthorne, Calif. 90250.

Computer Performance Instrumentation, Inc. of Waterloo, Ont., has opened its European marketing and support office in Frankfurt, West Germany. The firm's address is Justinianstrasse 22, Am Holzhausen-Park.

Perkin-Elmer Corp.'s Terminal Division plans to increase its Morris County, N.J., operations with a 105,000 sq-ft building on a 37-acre industrial site on Rt. 206. This facility will house the division's administrative and development offices and its manufacturing operations.

DECstation is Digital's new full-fledged computer system in a configuration so small you could mistake it for a terminal. But make no mistake about it. DECstation means business. Not even a year old, DECstation is already up and running in over a thousand installations. And commercial OEMS across the country are touting it as one of the most successful business investments you can make.

The hardware's good for business.

DECstation fits small jobs in big companies and big jobs in small companies because it's compact, mobile and powerful.

Packed into its small volume are an LSI CPU with 16K words of MOS memory, dual diskette drive and a DECscope video terminal. Then comes I/O. Two serial asynchronous ports, a disk port, a parallel port for printers and interfaces. And all of it so simple in its design that it can be hooked up in minutes with just a screwdriver.

The software's good for business.

Digital's new improved OS/78 operating system offers a choice of languages including BASIC, FORTRAN IV, Assembler, and a full feature Commercial BASIC.

DECstation's Commercial

BASIC functions include commercial decimal arithmetic to 15-digit precision, a PRINT USING statement for formatted printing of numeric strings, record-oriented random access I/O, three data formats and cursor positioning at specified coordinates for data/entry forms-filing applications. And OS/78 even offers you a multi-function capability that permits parallel operation of tasks while the normal job stream runs. So you can do concurrent printer-spooling, customized real-time jobs, or communications.

The price is good for business.

The fact is DECstation offers just about everything you need to help you make money. Including a money-making price. Just \$5,436 in OEM quantities of 50.

So if you're looking for a big business opportunity, consider the smart little business system. Consider DECstation. From Digital. For more information circle the reader service number. Or fill out the coupon for immediate attention. Digital Equipment Corporation, Maynard, Massachusetts 01754. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital

DECstation.

A very big business opportunity in a very small package.



DECstation Marketing Communications,
Digital Equipment Corporation,
129 Parker Street, PK3-1/M34, Maynard,
Massachusetts 01754.

☐ Please send me more information.

☐ Have a salesman call

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

OEM _____ End-User _____

Application _____

CW3138

Carter's '79 Economic Plans Hold Little Relief

(Continued from Page 77) ness, without declaring dividends," he maintained.

"On top of that," McNeish continued, "what happens when any tax is eliminated is that the people over at the Treasury Department always come up with some new kind of a grab to make up for lost revenues. Whatever they come up with is sure to hit small business in some new spot, so the small firm pays more and gains nothing."

McNeish added that the investment tax credit is similarly valuable to the big company able to invest heavily in such fixed assets as private jet aircraft for corporate executives. The smaller firm with meager capital resources has a much harder time enjoying this tax credit's benefits.

One-Year Benefit

The SBA does not oppose the elimination of the double tax on dividends or the investment tax credit. The agency is arguing that these tax relief proposals be balanced with some kind of relief in which small business can share, the SBA official said.

Enacted in 1977, the employment tax credit serves such a purpose, according to McNeish. Small and big companies alike can reap benefits from this measure, which gives companies a tax credit for every addition they made to total employment in 1977 over 1976.

But the employment tax credit, which McNeish contended has potential for relieving hard-core unemployment, was authorized for one year only, and the Treasury Department has opposed its renewal. "its loss will increase the tax law's imbalance against small business," McNeish said.

Capital Gains

An allowance for capital gains is another form of relief that applies to small business as well as big business, he stated.

The Carter economic proposals would include some tax relief to companies experiencing capital gains, but the Administration "was reasonably oblivious to the fact that by diluting the capital gains provision in its tax plan, it has

created a deterrent to capital investment and formation," Kurshan said.

The SBA's McNeish also expressed concern about the tax-free merger provision on the basis that it "is responsible for some of the gobbling up of small firms by big business."

"Take the theoretical example of a successful small business owner who reaches retirement age and finds no one in the family interested in tak-

ing over the reins. The owner has a choice: merge the business tax-free with a larger company or sell it to someone outright and pay a tax," he said.

"In many cases, the bigger company is interested only in taking over the small firm's product or perhaps even intends to discard the product and just take the surplus," McNeish added. "The tax then becomes a penalty for

keeping the business alive."

SBA is critical of the provision, fully realizing that small business itself sometimes wants the tax-free merger.

"We must find more and better ways of making such mergers unnecessary and getting real liquidity for the equities of small companies," McNeish said.

Kurshan reported to the CCA members that the Carter Administration expects to

achieve a moderate annual economic growth of between 4% and 5% after inflation, with unemployment decreasing by .5% each year.

The Administration will establish no "grandiose public work projects to sop up unemployment," relying on the private sector instead.

The President hopes to reduce inflation through selective tax cuts and increases.

**Documation's
new breakthrough
gives you all
the advantages of
impact printing
at laser graphic
throughput rates**

BLIS/COBOL
MULTIUSER OPERATING SYSTEM

**HARDWARE
FLEXIBILITY**

For information call today...



Phone (305) 647-2200 USA
TWX/Telex 810-853-5033
1850 Lee Rd., Winter Park
(Orlando), Florida 32789

Eyes Nontraditional Markets

DEC Set to Explore New Waters With Its 2020

By Esther Surden
CW Staff

NEW YORK — With its introduction of the Decsystem-2020 — a low-end mainframe that doesn't require special power or cooling considerations — Digital Equipment Corp. expects to explore some waters rarely charted by mainframers.

In particular, the firm is

looking at "emerging" nontraditional marketplaces for this system, according to William Kiesewetter, product line manager for the system introduced two weeks ago [CW, March 6].

Possible Niche

One of these emerging areas is turnkey systems. "We anticipate commercial systems

houses will add value" to the 2020 and remarket it, taking advantage of the system's capabilities, Kiesewetter said. Although DEC is heavily in this market area with its minis, it is not an area in which most mainframes thrive.

Another market not usually attacked by mainframers is government, especially in

such areas as defense. DEC anticipates the system's use in command, communications and control applications.

Services Application

Because of its distributed data processing capability, the small mainframe may also find a niche in the computer services area.

"By using the 2020 as a dis-

tributed host on their networks, it becomes possible [for computer services] to allow their customers to run all of their application software previously supplied from central facilities on their local system," he noted.

Traditional market areas for the system include the installed base of Decsystem-20s and Decsystem-10s, Kiesewetter continued. Because the system runs both the Tops-20 and Tops-10 operating systems and will operate under Decnet, it will be useful in distributed processing applications and save the user's investment in software, he pointed out.

Other Market Areas

Educational, governmental, engineering, scientific and commercial market areas, long the bailiwick of DEC's mainframes, will also be served by this system, he noted.

Because it is a "general-purpose" machine, DEC expects the system to replace the batch systems of those who want to add interactive capability. The vendor also expects the system to be used as an in-house time-sharing system by users needing that capability.

DEC has pointed to the system's general-purpose nature, its 36-bit word length, its multiple language capability and its software compatibility with the larger members of the Decsystem-20 line as the reasons it is being called a mainframe rather than a minicomputer.

Particular Target

Minis, one spokesman said, are generally targeted at a particular application which they do very well, such as real-time processing, while mainframes must do all applications well.

Competitors for the 2020 will only "occasionally" be high-end minicomputers, according to Kiesewetter, and DEC does not anticipate too much overlap between its PDP-11/70 and VAX and the 2020. Most frequent competitors in the marketplace would be the Honeywell Information Systems, Inc. Level 62, Univac 90/30, IBM's high-end System/3 models and the IBM 370/115.

Introducing IMPACT 3000



AKD

(402) 392-2606

VOLUME DATA ENTRY
SERVICES ...
TAPE OR CARDS

"QUALITY AT A LOWER COST"

AMERICAN
KEY DATA

Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Seven reasons why you will benefit from DYNAM/D...

reasons that make it the fastest selling Disk Space and Catalog Management System in the World.

DYNAM/D solves the most vexing and time-consuming design deficiencies of IBM 360/370 DOS and DOS/VS systems.

Here are just 7 reasons for testing DYNAM/D in your installation:

- 1) Automatic disk space allocation** - full recovery capabilities when the file is opened, not before the job is initiated.
- 2) Catalog Management** - let's you control the physical attributes of the disk file separately from job control.
- 3) Total file security** - assured by matching password that prevents both accidental erasure and unauthorized access to confidential data.
- 4) Device independence** - makes it easy to add new DASD devices without modifying existing programs.
- 5) Utility programs** - allow disk and catalog management and comprehensive reports on disk space usage.
- 6) Automatic secondary allocation** - provides additional disk space if original extent is used up.
- 7) DYNAM/D is developed and maintained by Computer Associates** - (the CA-SORT people) with a world-wide network of offices to serve you.

MAIL THE COUPON OR CALL TODAY:

800-221-4767
[NY State Call: 212-355-3333]

YES! Please rush the free DYNAM/D Information Kit and details of the FREE 15-day trial.



Name _____
Title _____
Company _____

Address _____
City _____ ST _____ Zip _____
Telephone (_____) _____
Computer Model _____ System _____

655 Madison Avenue, New York, NY 10021

COMPUTER ASSOCIATES

U.S. OFFICES: New York, Connecticut, Virginia, Ohio, Georgia, Illinois, Michigan, Missouri, Texas, California
31 OFFICES WORLD-WIDE

Israel Seen Good Site for DP Firms

By Jeffrey Beeler
CW Staff

HAIFA, Israel — Low labor costs and a strategic location make Israel an attractive setting for U.S. computer companies to develop, manufacture and market their products abroad, according to Dr. Alan Reiter, managing director of Reiter Software Systems, Ltd. here.

During a recent visit to the U.S., Reiter, whose firm supplies data base management systems, noted that Israel's location places the country at the doorstep of the still infant but promising computer markets in Asia and Africa. Thus, foreign vendors with Israeli production or marketing facilities will have easier access to those markets than companies without offices in the Jewish state, he concluded.

Although he could cite no specific figures, Reiter also argued that American vendors can manufacture their products more inexpensively in his country than in their own because labor costs in Israel are relatively low compared with those in the U.S. Moreover, the Israeli labor force provides an "extremely high" level of education and technical skills, he said.

"We have probably the highest proportion of university graduates in the world, even higher than in the U.S.," he claimed. "In fact, manpower and expertise are probably the only natural resources we have."

Research Subsidies

Another factor favoring U.S. investment in Israel's computer industry, he added, is an Israeli government policy of subsidizing any domestic research and development project that ultimately results in exports. The subsidy plan applies both to foreign and indigenous firms, and, in the computer industry, affects both hardware and software suppliers, Reiter explained.

Israel's computer industry has experienced "explosive" growth since it emerged in 1954 with the development of the first Israeli-built computer. Expansion has been particularly rapid during the last five years when the rate of increase totaled an estimated 30% per year, he said.

To a great extent, the growth in the

Israeli computer industry reflects recent trends in the world DP market in general, Reiter explained. But the industry has also benefited indirectly from the continual warfare that has otherwise plagued the country since its founding about 30 years ago.

"War forced us to develop a domestic computer industry because a country can't defend itself adequately in modern times without computers," explained Reiter, who said the military provided the impetus for developing much of Israel's indigenous DP technology.

Boost From Iran

In recent years, Israel's computer business has also gotten a boost from, of all places, the government of Iran, which has contracted for the services of Israeli firms in several fields, including the computer industry.

Thus far, the flow of trade between the two unlikely business partners has amounted to little more than a trickle. But Reiter predicts the arrangement could lead to expanded commerce.

Chances are also good, he noted, that Israel will someday open similar trade channels with Egypt — a development he said would aid both sides, especially the technology-starved Egyptians.

For the moment, however, Israel's computer industry consists primarily of a large contingent of major foreign vendors complemented by a smattering of indigenous firms. Among the foreign companies are most of the principal U.S. hardware manufactur-

ers, including Intel Corp., which operates a major production plant in this city, Reiter said.

Among the native computer companies are several peripherals manufacturers and El Bit Ltd., a maker of 16-bit minicomputers, which is owned partly by Control Data Corp.

Kibbutzim Involved

The indigenous computer industry also includes a handful of kibbutzim that make most if not all their living from DP products or services. One such high-technology kibbutz subsists entirely on the income it earns as a software house and service bureau, Reiter remarked.

For the most part, Israel remains slightly behind the U.S. in computer technology, though comparable in the state of the art to Western Europe, Reiter said. But in a few areas like computer-aided agriculture, the Israelis are probably the world leaders, he claimed.

Israel is particularly advanced in the use of computers to control crop sprinkler systems and manage resources in small agricultural units. The country also excels in computer-based medical electronics and is quickly turning that field into an export market, Reiter said.

Again as in the U.S., the defense establishment forms one of the major sectors of Israel's user population. Outside the military, the country's installed base totals about 600 computers in various industries.

Immediate delivery on 3270 replacement systems.

Computer Optics offers immediate delivery on displays, controllers and printers, in any system configuration, for either local or remote installation.

Computer Optics systems are plug-to-plug compatible with IBM 3270 equipment. And they cost substantially less in nearly all configurations, whether you buy or lease.

Call today for prices and specifications.



Computer Optics Inc.
Berkshire Industrial Park, Bethel, CT 06801

Toll free: 800/243-1314 In Connecticut call 1-744-6720 collect.

STC Launches Market Facility

NEW YORK — Storage Technology Corp. (STC) has formed a subsidiary to manufacture and market telecommunications equipment, company president Jesse I. Aweida announced at a meeting with security analysts.

Called STC Communications Corp., the subsidiary will be headquartered in Broomfield, Colo. — about five miles from STC's headquarters in Louisville.

Aweida said the first products of STC Communications Corp. would be introduced this April. He added that the new subsidiary will have little effect on this year's earnings but would make a "significant" contribution by 1980.

At the meeting, Aweida also confirmed that STC is exceeding its growth projections made in September of last year before the New York Security analysts.

Shenefield Says Antitrust Not Stretching Resources

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — Conducting massive antitrust suits like those now under way against IBM and AT&T is not stretching thin the resources of the U.S. Justice Department, although some people believe these two cases are "bleeding the Antitrust Division dry," Assistant Attorney General John H. Shenefield said here recently.

Speaking at the Fifth Annual Caucus of the Computer and Communications Industry Association (CCIA), Shenefield attempted to destroy the myths and outline the status of the Justice Department's antitrust efforts in the computer and communications fields. Among the first myths he tackled was the size of the Antitrust Division's resources.

"I expect that less than 10% of the public has the foggiest idea about how big an animal the Antitrust Division actually is," he said. "For fiscal 1978, the division's vast resources consisted of about 850 employees, 420 of which were lawyers. About 650 people are located in Washington, and the rest are in our eight field offices or working on out-of-town cases."

Shenefield put the division's budget at about \$40 million — \$10 million of which is earmarked for state attorneys general as grants. The balance, \$30 million, is what the government spends to police a \$1.8 trillion economy, he said.

Except for its cases against IBM and AT&T, the Antitrust Division has the equivalent of two or three full-time employees in the Special Regulated Industries Section assigned to computer and communications matters, according to Shenefield.

"The conventional wisdom is that

Adapso Planning Move to Capitol

MONTVALE, N.J. — The Association of Data Processing Service Organizations (Adapso) plans to move its executive offices to Washington, D.C., in early 1979.

The move to Washington is based on Adapso's current program that places greater emphasis on advocacy and governmental relations. Both activities, according to Jerome L. Dreyer, Adapso's executive vice-president, would best be served by relocation.

While offices have not as yet been selected, Dreyer indicated they would be situated in either downtown Washington or the adjacent suburbs. Before relocating to Montvale in 1974, the association had its executive offices in New York City.

Dreyer said the move, which has been considered for the past several years, is also a result of the association's growing commitment to issues like data and telecommunications and privacy and security.

"With our offices in Washington, we can expand our efforts in behalf of our 330 member companies with Congress, the regulatory agencies and other quasi-governmental organizations that are also headquartered in the areas," he said.

these two cases are bleeding the Antitrust Division dry," he stated. Although the suits are "obviously significant matters," the resources devoted to them are surprisingly modest.

The IBM case involves 45 Justice Department employees, 25 of whom are attorneys, earning a total of \$872,000 in salaries each year. The total budget for the trial effort runs between \$2 million and \$2.5 million.

The AT&T case is about half the dimensions of IBM, with 26 employees, including eight lawyers, and a \$1 million to \$1.5 million budget.

"How much are the defendants spending on defense? I doubt if anyone really knows," Shenefield stated.

Semi Testing Revitalized

SAN JOSE, Calif. — The rapidly growing market for LSI and memory devices is revitalizing the semiconductor testing sector of the automatic test equipment (ATE) market, Prime Data found in a recent study of the semiconductor testing field.

The ATE market, which had experienced declining sales as recently as 1975, grew from a \$55.5 million industry in 1970 to \$131.5 million in 1977 and could total as much as \$260 million by 1982, Prime Data forecast.

Growth in individual market sub-segments ranges from less than 6% to almost 50%.

The two most significant market segments, according to the report, are LSI device testers and memory

testers, forecast to more than double in sales by 1982.

The ATE market for semiconductor testers is dominated by four manufacturers with combined sales representing 76% of the total in 1977, but several new companies are making successful entries into the market, the study said.

Sales to semiconductor users have "significantly" increased in market share during the last five years and now equal those of semiconductor manufactures, Prime Data said.

The current study is the second in a two-volume analysis of the ATE market. The \$795 second volume is available from the company at Suite 203, 4000 Moore Park Ave., San Jose, Calif. 95117.

INFONATIONAL RUNS FIRST*

*IN DATAMATION'S 1977 USER RATINGS



CHECK OUR TRACK RECORD . . .

. . . INFONATIONAL'S General Ledger and Accounts Payable systems finished first in overall satisfaction in the prestigious Datamation/Datapro software package ratings.

INFONATIONAL ran ahead in the 1977 race because our integrated accounting packages —

- are easy to implement and modify
- are supported by professional consultants
- run on most major hardware
- are installed in 600 leading companies

To keep our systems ahead this season, INFONATIONAL —

- introduces on-line data entry for all systems
- provides greater throughput & efficiency for G/L
- adds custom report writing for all systems

RUN WITH THE BEST IN INTEGRATED ACCOUNTING SYSTEMS!

For the most cost-effective, easy-to-operate, integrated accounting systems, call (714) 560-7070 or mail in this coupon.

NAME: _____
TITLE: _____
COMPANY: _____
ADDRESS: _____
CITY: _____
STATE: _____
ZIP: _____ PHONE: _____

INFONATIONAL

A Division of United Computing Systems, Inc.

6626 Conroy Court San Diego, CA 92111 (714) 560-7070

I AM INTERESTED IN:

- ☐ GENERAL LEDGER
- ☐ ACCOUNTS PAYABLE/
PURCHASE ORDER
- ☐ ACCOUNTS RECEIVABLE/
SALES ANALYSIS
- ☐ FIXED ASSETS

CW 3/13

Executive Corner

• John F. Carlson has been elected vice-president of finance for Cray Research, Inc.

• Charles L. Haycraft has been named vice-president of marketing and Rex O. Gregory has been named vice-president of operations at Azurdata, Inc.

• Benjamin F. Mathews has been appointed vice-president of finance and controller by Bowne Time Sharing.

• Anthony B. Coburn has resigned as president and chief executive officer of Computer Optics, Inc. to devote full time to finding additional sources of capital to support projected growth and product development. He will continue as chairman of the board of directors. Lawrence M. Smith was named to fill Coburn's old posts.

• At Computer Sciences Corp., Werner Schaer has been promoted to president of Computer Sciences Europe, a division of the Data Services Group; Marvin L. Pulliam has been named vice-president for applications and product development of the Group's Infonet Division; and M.R. Rusch has been promoted to vice-president for software development for the Data Services Group.

• Paul L. Bouchard has been appointed director of operations for DBA Systems, Inc.

• Donald E. Anderson was named vice-president of computer services at McDonnell Douglas Automation Co.

• Edward J. Phillippe has joined Quantor Corp. as financial vice-president.

Micros Seen Spurring Sales In Process Control Abroad

By Jeffrey Beeler
CW Staff

NEW YORK — Microprocessors will totally reshape the European process control market during the next eight years, Frost & Sullivan, Inc. (F&S) predicted in a newly released market study.

Entitled "The Process Control Instrumentation Market in Europe," the 234-page report forecast that the microprocessor value of European process control equipment will total \$40 million by 1981 and \$200 million by 1986.

European shipments in all categories of process control equipment totaled \$1.5 billion in 1976.

An anticipated 10% annual growth in shipments, however, will boost the market for process control equipment to \$2.5 billion in 1981 and \$3.8 billion in 1986, according to F&S.

CRT terminals will also influence hardware architecture, with future control rooms containing "many more screens than they do now," the report added.

Six countries will account for about 97% of process control equipment sales in the European Common Market and as much as 80% of the total West European market.

Of those six nations, West Germany will experience the fastest market growth with a 186% increase in process control equipment sales between 1976 and 1987, F&S predicted.

During the same period, Belgium will achieve the second greatest market increase with a sales jump of 182%, followed by France with 147%, Italy with 143%, the UK with 120% and The Netherlands with 92%, the market research firm continued.

Breaking down expected sales by equipment category, the report predicted digital systems and recording devices will experience faster growth than any other sector of the process control equipment market, with anticipated sales increases of 262% between 1976 and 1986.

Other leading categories of process control hardware will include tele-metric equipment, with a projected market growth of 217%, and sensing equipment, with a 100% sales jump, F&S said.

By 1986, the power generation field will displace the chemical industry as the chief marketplace for process control equipment. Sales of the hardware for power generation applications will grow 250% during the next eight years, the study forecast.

Once identified almost exclusively with the chemical industry, the process control field will also gain additional markets in the textile, leather production and raw materials industries.

Other typical applications for process control technology will include printing, water and treatment and distribution, sewage handling and discrete manufacturing, according to F&S.

In other findings, the market report noted that "the dividing line between an electronic controller and digital system is no longer very clear," primarily because of the increasing use of mini-computers and microcomputers, programmable controllers and other intelligent instruments.

In its study, F&S described software as a "bottleneck" in the sale of process control systems.

The full report is available for \$850 from F&S, 106 Fulton St., New York, N.Y. 10038.

These countries represent three quarters of the worldwide computer market



And you can advertise in all of them through us.

The International computer market is incredibly concentrated. More than 40% of the world's general purpose computer systems are found in the United States alone, and another 30% can be found in the next four largest computer using countries (Japan, Germany, United Kingdom and France). Add Italy (8th) and Brazil, and you get more than 75% of worldwide general purpose computers. (1)

All of these foreign countries are also heavy importers of U.S.-made computer products and services, with almost a billion and a quarter dollars of imports from the United States in 1976. (2)

As publishers of *Computerworld*, *Computerwoche*, *Computer Management*, *Shukan Computer* and *Data News*; and U.S. representatives of the French and Italian publications, we can give you one-stop advertising service in all of them — including translation and production services. We can also send you one bill — in dollars. So it's as simple as placing space in U.S. publications.

We'll be glad to send you a free market brief with more facts on the international marketplace for computers, as well as information on each publication. Just send in the coupon or give us a call.

Notes:

(1) Measured by value, based on data from International Data Corporation, the world's leading EDP market research company. General purpose computer systems do not include mini-computers or small business systems.

(2) U.S. Commerce Department figures.

These publications reach key computer executives in all of these countries



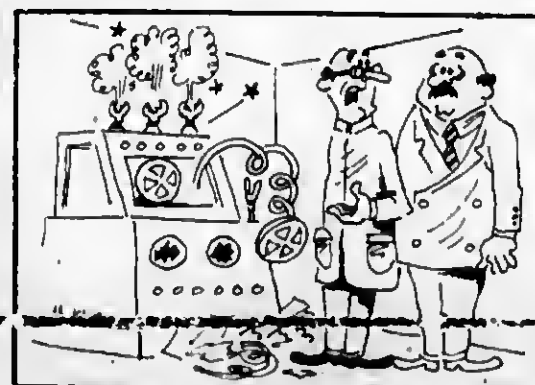
CW COMMUNICATIONS/INC.

To: Roy J. Elnreinhofer, Vice President, Marketing
COMPUTERWORLD, 797 Washington Street
Newton, MA 02160 (617) 965-5800

I'd like a free copy of your marketbrief, "The International Marketplace for Computer Products and Services" as well as information on your publications in the countries I have checked.

Germany United Kingdom Italy Brazil
France United States Japan

Name
Title
Company
Address



'A Classic Case of Overload ...'

Intertec's **SuperDEC**

"pull out the guts & screw in the brains"



While we'll admit the difference in appearance between the DECwriter II and our new SuperDEC is difficult at best to see, the difference in performance is astounding! The SuperDEC is our new Throughput Optimizer designed to be easily installed in your existing DECwriter II teleprinter. Not only can our SuperDEC Optimizer increase the print speed of your DECwriter II by as much as six times its original speed, it also gives you the features offered only by our famous SuperTerm teleprinter. Features you couldn't get on your DECwriter until now.

You've undoubtedly already heard of our SuperTerm. It's the 1200 baud teleprinter that has been replacing DECwriters by the thousands. And while you may have purchased your DECwriter prior to the introduction of our state-of-the-art SuperTerm, you can now have all of the SuperTerm's incredible features without having to throw out your DECwriter.

With the SuperDEC Optimizer installed, you will have such nifty features as bidirectional printing, manual and automatic top of form, full horizontal and vertical tabs (adjustable and absolute), adjustable right and left margins, an RS-232C interface, a double wide character set and up to 32 user programmable characters. You can also add an APL character set, selective addressing and an answer back feature at nominal cost.

The SuperDEC Optimizer is designed to replace the digital electronics in your existing DECwriter II. In less than five minutes, your DECwriter can be transformed into a SuperDEC. The SuperDEC Optimizer is completely "plug-compatible" with the cables in your DECwriter. The only installation tool required is one that we give you—a screwdriver. Just pull out the guts and screw in the brains. No special technical skills are required. And if you get bored watching your DECwriter print faster than you can read, the old digital electronics may be reinstalled in a matter of minutes. It's really just that simple.

Every SuperDEC Throughput Optimizer carries a full one year warranty on all parts and workmanship. But our commitment to excellence in service goes beyond the warranty. Intertec can also offer on-site service contracts for all of your upgraded SuperDEC equipment. So, when you're ready to "pull out the guts and screw in the brains", contact us at one of the numbers below and we'll give you the name of your local SuperDEC dealer. He'll show you what a difference \$395 can make.

\$395.00
and
your old DECwriter

INTERTEC DATA SYSTEMS

Eastern Regional Marketing
19530 Club House Road
Gaithersburg, Maryland 20760
301/948-2400

Corporate Headquarters
1851 Interstate 85 South
Charlotte, North Carolina 28208
704/377-0300

Western Regional Marketing
17952 Sky Park Blvd.
Irvine, California 92714
714/957-0300

The SuperDEC and other Intertec products are represented in these cities: Albany, NY Albuquerque, NM Atlanta, GA Baltimore, MD Boston, MA Buffalo, NY Charlotte, NC Chicago, IL Cincinnati, OH Cleveland, OH Columbia, SC Columbus, OH Dallas, TX Dayton, OH Denver, CO Detroit, MI Hartford, CT Huntsville, AL Houston, TX Indianapolis, IN Jacksonville, FL Kansas City, KS Los Angeles, CA Louisville, KY Madison, WI Memphis, TN Miami, FL Milwaukee, WI Minneapolis, MN Nashville, TN New Haven, CT New Orleans, LA New York, NY Oklahoma City, OK Omaha, NE Philadelphia, PA Phoenix, AZ Pittsburgh, PA Portland, OR Providence, RI Raleigh, NC Richmond, VA Rochester, NY Sacramento, CA Salt Lake City, UT San Antonio, TX San Diego, CA San Francisco, CA Seattle, WA St. Louis, MO Syracuse, NY Tampa, FL Tulsa, OK Virginia Beach, VA Washington, DC. International offices located in Australia, Austria, Canada, Denmark, England, France, Germany, Holland, Switzerland, Taiwan.

Orders & Installations

Newton County, Ga., has ordered a Honeywell Level 62 system to run property assessment and tax-billing applications.

Western Auto Supply Co. has ordered TRW's 2001 retail system, including more than 1,000 point-of-sale terminals. The system, valued at more than \$6 million, will be used to improve merchandise information for headquarters and store management.

Ohio Valley Data Control, Inc. of Belpre, Ohio, has ordered a Burroughs Corp. B4800 system valued at \$750,000 for on-line processing, inquiry for batch updating.

First Federal Savings and Loan Association of Annapolis, Md., has ordered

a Burroughs Corp. B1860 valued at \$300,000 to maintain 50,000 savings accounts and mortgage, home improvement, construction and participation loans as well as prepare management reports.

An order for 20 remote batch terminal systems valued at approximately \$850,000 has been awarded to Harris Corp.'s Data Communications Division by Allegheny Ludlum Industries, Inc., Pittsburgh-based producer of specialty steels and other metal products.

Midwest Advanced Computer Services, Inc. of Southfield, Mich., has ordered two Burroughs Corp. B4800 systems valued at \$2 million.

Want more from your Remote Computing Service?

See how MMDS can fit your needs.

If you're now a remote computing user, consider Martin Marietta Data Systems' Remote Computing Services (RCS). For a number of reasons:

If you need more computing power, or if you're concerned with what you're not getting from your present RCS supplier, we have a lot to offer.

- ... Economy of use
- ... Unequalled service
- ... State-of-the-art hardware and software
- ... Plus much, much more.

To get the full story on how our RCS can fit your needs, send for our free RCS brochure by filling out the coupon. Or call Dick Nemerson at (301) 321-5744.

Martin Marietta Data Systems
We  Build & Run Systems

See how MMDS can fit your needs.

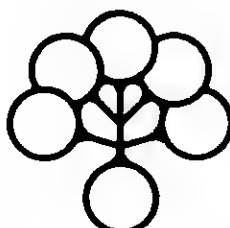
Dick Nemerson
Martin Marietta Data Systems
300 East Joppa Road
Baltimore, Maryland 21204

Name _____
Co. _____
Title _____
Address _____
City _____
State _____ Zip _____
Phone _____
RCS currently using _____

Announcing RTP

The DOS/VS Resident Transient Program...

- ☒ Eliminates the Main DOS/VS Bottleneck
- ☒ Increases throughput 10 to 20%
- ☒ No changes to JCL
- ☒ No need to Re-IPL
- ☒ Not release dependent
- ☒ Runs without operator intervention
- ☒ Also runs under VM



Value Computing Inc.
The Computer Operations Company

Please send me more information about RTP
— The Resident Transient Program

NAME _____ COMPANY _____
TITLE _____ PHONE _____
ADDRESS _____ CITY _____ STATE _____
ZIP _____ CPU _____ OPERATING SYSTEM _____

Mail to: VALUE COMPUTING INC.
300 VCI Building, W. Marlon Pike
Cherry Hill, New Jersey 08002

Or Call toll-free
800-257-8242

2078

But 11% Growth Seen

Federal Constraints Hurting Spending for Medical DP

By Jeffrey Beeler
CW Staff

WALTHAM, Mass. — Federal attempts to limit hospital spending have dealt a serious blow to the once-thriving medical electronics field, International Data Corp. (IDC) said in a recent edition of its biweekly report for the automated transaction equipment industry.

Hospitals have found sophisticated electronics hardware like computerized body scanners increasingly difficult to buy since Congress passed the National Health Planning and Resources Development Act three years ago, the market research firm said.

Enacted to help hold down the country's rapidly escalating health care costs, the law requires each state to establish a health planning board to authorize all purchases of medical equipment costing \$100,000 or more. Before a hospital can acquire such a piece of equipment, it must first submit a purchase proposal to the board for independent review. If the hospital cannot prove sufficient need for the hardware, the board can reject the application.

Unfortunately for suppliers of medical electronics equipment, the review boards have shown little reluctance thus far to exercise their veto authority, IDC reported. In fact, in the last year and a half alone, boards in 34 states have spurned 190 proposed scanner purchases worth an estimated \$50 million, and the refusal rate jumped to 35% to 40% between July 1976 and July 1977, the report added.

Financial Pinch

Predictably, the rejection of many applications for large-scale purchases has stunted sales growth in the medical electronics industry and thrown diagnostic equipment vendors particularly into psychological if not financial depression, the report noted.

London-based EMI Ltd., the leading supplier of computerized body scanners, reported its 1977 U.S. revenues fell 50% from their 1976 level, and Ohio-based Technicare, another scanner manufacturer, reported similar results during the same period.

What's more, the financial pinch could soon become even worse if Congress passes the proposed Hospital Cost Containment Act of 1977, which would strictly limit the funds the nation's acute care facilities could allocate each year for new capital expenditures. The bill already has the Carter Administration's backing and, although Congressional debate on the subject will not begin until this spring, the law still stands a reasonable chance of passing, IDC said.

Pressure to curb spending for new hardware is also being placed on the health care industry by insurance companies, the report added.

11% Growth Forecast

Even with the prospect of increased government and private-sector regulation, however, the medical electronics market will continue to grow an average of 11% per year at least through 1990, IDC predicted.

As if to demonstrate that spending for large-scale medical electronics systems will not succumb entirely to legis-

lative cost-cutting pressure, the Hewlett-Packard Co. recently announced it had received a \$2.5 million order for electronic patient monitoring systems. Described by an HP official as the largest domestic order of its sort ever received by the company, the shipment will go to the 1,280-bed Walter Reed Army Medical Center in Washington, D.C., IDC reported.

The order includes seven patient data management systems, six arrhythmia monitoring systems and instruments that will simultaneously collect EKG, respiration, temperature and blood pressure data for 125 patients. The shipment also includes a continuous monitoring system for 112 patients.

Quoting the findings of another market research outfit — Cleveland-based Predicasts, Inc. — IDC predicted hospitals would exhibit at least three major trends in their future purchases of large-scale medical electronics systems:

- A move toward patient care systems that can both cut costs and relieve personnel shortages.
- A growing interest in increasing services rather than bedspace.
- A growing tendency to regard computerized medical equipment as an institutional status symbol.

Predicasts divided medical electronics equipment into three categories: diagnostic, therapeutic and monitoring, IDC continued. At present, diagnostic equipment claims more than 40% of the non-DP medical electronics market, primarily because of the rapidly growing computerized scanner sector.

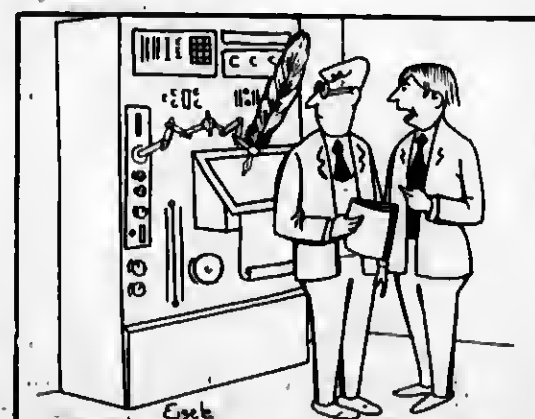
By 1980, diagnostic equipment will account for \$1.2 million or almost 62% of the nearly \$2 million market, and by 1990 the share will rise slightly to more than 63% of the \$4.6 billion total, IDC forecasted.

Therapeutic equipment sales will reach \$615 million or almost 32% of the non-DP medical electronics market in 1980 and \$1.3 billion or 29% of the total in 1990, the report added.

In the monitoring equipment sector, revenues will total \$135 million or about 7% of the market in 1980. Ten years later, sales in the sector will jump to \$315 million and represent an 8% market share, IDC said.

The DP sector of the medical electronics market, meanwhile, will capture sales of \$875 million in 1980 and \$2.6 billion in 1990, the report predicted.

Some of the products besides scanners that will spearhead sales growth in the medical electronics field will include on-line medical DP systems, electronic limbs and pain control equipment units.



'This one computes historical data.'

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION

ANNOUNCEMENTS

**NORTHWEST
MINNESOTA****USER-TRAINER
COORDINATOR**

Organizes schedules and coordinates all user training activities, oversees the general operation of input to various financial and record systems. Team leader to provide assistance and training for implementation of MIS. Communication skills, financial and student record or teaching experience desirable.

ACCOUNTING COORDINATOR

Provides training and assistance in financial accounting practices for computer users. Modified accrual accounting, school financial records and computer based financial experience desirable.

USER SPECIALIST

Works in a team to train users in operation of MIS, including financial, payroll, personnel and student record systems. Trouble shoots user problems. Communications skills and financial and student record experience desirable.

Interested applicants should send their resumes and salary requests to:

JAMES E. JOHNSON

Executive Director

REGION I - ESV

116 E. Front St.

Detroit Lakes, MN 56501

MODLINE

modular online systems
the "Un-hardware" Company

MODULAR ONLINE SYSTEMS, COMPANY (MODLINE) is an organization of dedicated computer programming professionals successfully pursuing projects covering the entire spectrum of computer technology: micro-processors, mini-computers, communications processors, business systems, data base applications, and time sharing.

We are presently seeking experienced career oriented

**BUSINESS ANALYST/
PROGRAMMERS**

responsible for analysis, design and programming utilizing RPGII, COBOL, and BASIC Languages.

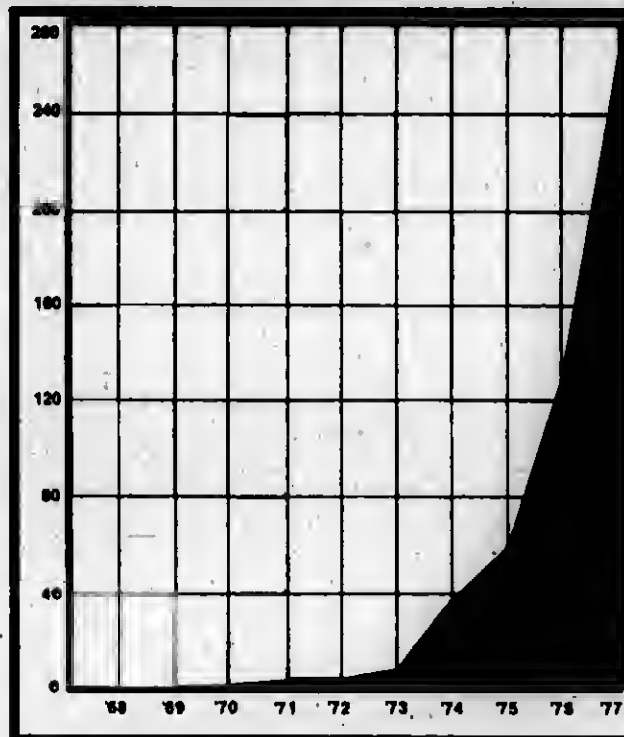
Our modern facilities are located in the heart of the beautiful Pacific Northwest. We offer an excellent working environment and employee benefits package.

Be a PROFESSIONAL in your chosen field. Join one of the fastest growing computer software corporations.

Please reply with resume including desired salary requirements to: MODLINE, 3836 N. Ballast, Portland, OR 97217.

DATA PROCESSING PROFESSIONALS

LET'S TALK ABOUT GROWTH...



1977 revenues of more than \$250,000,000 (est.)
more than doubled 1976 revenues.

YOURS and OURS.

Houston Oil & Minerals is unquestionably a "GROWTH SITUATION" company. This is best illustrated by our performance shown in the above chart.

Plans for future growth include building an information Systems Department. We have on order a new IBM 3031. This is an opportunity for you to develop your career as you help develop our Information Systems Department. We are seeking both experienced technicians and managers in the following areas:

**TELEPROCESSING
SYSTEMS PROGRAMMING
DATA CONTROL ANALYSIS
DATA BASE ADMINISTRATION**

**SYSTEMS
COMPUTER OPERATIONS
APPLICATION PROGRAMMING
DEVELOPMENT AND AUDIT CONTROL**

If you feel you are a professional who would enjoy working in a challenging and creative environment, please send your resume (with salary history) to: Mr. R.T. Fowler, Manager of Information Systems,



**HOUSTON
OIL & MINERALS**
242 THE MAIN BUILDING
1212 Main
Houston, Texas 77002

An Equal Opportunity Employer M/F

data processing

PROGRAMMERS

Key Positions with Our Winning Computer Consulting Team in Springfield, IL., Indianapolis and Chicago.

If you're skilled in COBOL, ALC and/or PL-1 and have at least a 2 year success record of accomplishment with large scale IBM systems under IMS... we have the programming and system challenges to match your expertise (also DEC with mfg. applications). These positions require high productivity.

As a member of our professional staff, you'll be rewarded with an excellent salary and benefits. For details call Don Breitfelder collect, from 10AM to 5PM at (312) 786-0220.



INDECOR, INC.
300 South Wacker Drive
Chicago, IL 60606
since 1966

An Equal Opportunity Employer M/F

SYSTEMS PROGRAMMER

The Computer Software Company is expanding, and is accepting applications for the position of system programmer. Candidates must have a minimum of five years experience using the Assembler Language for the IBM 360/370 series of computers, and should have substantial knowledge of and experience with DOS/VS internals. Candidates will be expected to be able to meet the public, and to relocate to our corporate office in Richmond, Va. The position to be filled will be involved with both maintenance and development of enhancements for our products EDOS, EDOS/VS and PDMS. Excellent salary and benefits. EOE. Please direct resumes to:

Jack East

**THE COMPUTER
SOFTWARE COMPANY**



6517 Everglades Drive
Richmond, Va. 23225

COMPUTER HARDWARE INSTRUCTORS

Openings Available in SUNNY SOUTHERN CALIFORNIA

Pertec Computer Corporation, one of the fastest growing computer equipment corporations, located in Southern California, has an immediate opening for an individual to instruct service personnel in the maintenance and repair of mini-computer systems. Must have at least 4 years experience teaching digital computer systems and peripherals. Must have completed military or civilian instructor training school.

We offer an excellent salary and benefits which include profit sharing/retirement plan, stock purchase plan, medical, dental and life insurance, and 25% paid days off per year. For immediate consideration send resume and salary history to:

Personnel Department



**SERVICE
DIVISION**

a division of Pertec Computer Corporation

P.O. Box 92300
Los Angeles, CA 90009

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

CALL TOLL FREE

PARTICIPATE IN MAJOR PROJECTS FROM SPECIFICATION THROUGH DESIGN, EVALUATION & TESTING.

CALL TOLL FREE

(800) 323-1966

In Illinois (800) 942-0491

Monday thru Friday from 8 am to 5 pm cst

Major changes will be sweeping the domestic and international telephony and related communications field in the next decade, and in large part, the technology will be generated right here... at GTE Automatic Electric Laboratories. Talk with us about becoming an integral part of the team that will make it happen. We're looking for professionals in the following areas:

APPLIED RESEARCH

Performs research on circuits, systems and subsystems and related hardware and software in order to provide management with information on concept feasibility and estimated system cost for design and development. Efforts involve providing existing services with new techniques and/or new services on existing equipment.

LONG RANGE PLANNING

Long Range Planning activities involve research studies on a wide variety of subjects related to the telephone communications industry. These studies include such areas as data communications, new technology, new services, future switching networks, evaluation of new switching techniques and review of the impact of political, economic and regulatory considerations. Intent is to provide well founded counsel and recommendations to upper management on future development programs and courses of action.

SYSTEMS DESIGN

New Feature Design — Plan and develop the future hardware and software evolution of current large scale fully stored program controlled switching systems. Develop new features for existing equipment, study new features impact on existing systems, and estimate the development costs and requirements.

Product Design — Design advanced fully stored program controlled systems for telecommunication application. Develop large scale software programs in an on-line, real-time environment and related digital hardware using CMOS, Shottkey, TTL as well as Static and Dynamic MOS.

International Design — Develop design philosophy and Architecture Definition of switching systems for international markets. This involves high level design structure development and detailed studies of critical problem areas. Define specific design implementation tasks, review progress and coordinate developments with implementation teams abroad.

SOFTWARE DESIGN

Data Base Software — Responsible for logical and physical data base design and implementation related to telecommunications systems. Develop programs which automate the generation of data base contents for these systems in an IBM 370 environment using PL/1.

Support Software — Involved in compiler, assembler, simulator maintenance and enhancement as well as other IBM 370 software developments. Support effort is related to micro and large processor developments.

Application Software — Large scale development in telephone system real-time control. Diagnostic and fault recognition software, administrative software involving real-time data base administration, switch and network overload procedures as well as executive software.

SYSTEMS CONTROL AND TESTING

Development and execution of comprehensive test plans to evaluate the performance of large stored program switching system prototypes. Execute configuration management on all hardware, software, and components and maintain project control for all activities. System evaluation performed on both laboratory prototypes and initial field site locations.

If you have in-depth expertise in one or more of these areas, and a BS, MS, or PhD in Electrical Engineering, Computer Science, Math or other appropriate engineering discipline as well as an interest in moving forward with challenging new frontier in computer technology, talk with us.

If unable to call send resume including recent salary history to:

Manager of Technical Employment • Dept. 471 A6

400 N. Wolf Road
Northlake, IL 60164

An Equal Opportunity Employer M/F

GTE AUTOMATIC ELECTRIC LABORATORIES

MAKE THE SWITCH

DATA PROCESSING PROFESSIONALS

Atlantic States is a national recruiting firm searching for Programmer/Analysts, Systems Analysts and other EDP specialists at all experience levels. Many openings nationwide, salaries ranging to \$30,000. Fees paid. For selective handling, WITHOUT PRESURE, mail your resume to: ATLANTIC STATES PERSONNEL, P.O. Box 9928, Savannah, GA 31402.

LIVE WORK & PLAY IN

NEW HAMPSHIRE

Are you tired of high taxes and expressway jams? If so, listed below are only some of the many openings we have in N.H. and Northern New England.

Jr. Prog.-Ins.	To \$14K
Applic. Prog-Portran	To \$14K
Prog/Anal-RPG, Cobol, BAL	To \$18K
Applic. Prog. COBOL, BAL	To \$18K
Soft Prog	To \$18K
Sys Prog-Mint Cptrs	To \$18K
Sys Anal-Insur	To \$18K
Sys Analyst-Mfg	To \$20K
D.P. Mgr	To \$24K

For immediate, confidential consideration call or send a resume to David J. Osgood, CEC, Vice President.

overABILITY

Personnel Consultants
160 S. River Rd., Bedford, N.H. 03102
603/669-4440
An Exclusively Employer Paid Service

PROGRAMMERS ANALYST

"Free Resume Service"

NORTHWEST • SOUTHEAST
SOUTHWEST • MIDWEST

- Scientific and commercial applications
- Software development and systems programming
- Telecommunications
- Control Systems
- Computer Engineering

Send resume or rough note of objectives, salary, location restrictions, education and experience (including computers, models, operating systems, and languages). Our client companies pay all of our fees.

- NATIONAL
- PLACEMENT
- FOR PROFESSIONAL
- WOMEN
- P.O. Box 834
- HARTFORD, CT. 06142

We Aggressively Support Affirmative Action

EDP OPPORTUNITIES GALORE!

COME TO:

MA, NH, VT and ME

We are seeking: 1. PROG. 2. PROG/ANAL. 3. ANAL. Our needs cover all applications and hardware. Salaries to \$26,000 and all expenses assumed by client companies. Please call or forward your resume to: Phil Hill

CORICO CORP.

EDP RECRUITERS 301 South Broadway Salem, N.H. 03079
(603) 893-4511

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

SENIOR LEVEL PROGRAMMERS

We are searching for Senior Level Programmers with good design background and previous heavy project responsibilities. The ideal candidate would have DLI, data communications, on-line experience, and strong in Internals. Our client is putting together a corporate data base; i.e., IMS.

Near Charlotte, N.C., all relocation costs and fees paid by our client.

CREATIVE PERSONNEL SERVICES

Attn: M. Sullivan
Data Processing Division
512 Charlottetown Mall
Charlotte, N.C. 28204
(704) 372-8393

DIRECTOR OF COMPUTER CENTER

The University of Detroit is a multi-racial, urban university with a residential student body of 800 students and a total enrollment nearing 9,000. The main campus of the University is located in northwest Detroit with the Dental and Law Schools situated in the downtown area. We are seeking candidates for the position of Director of Computer Center. Qualifications include 3-5 years administrative experience in a data processing center, preferably in a university setting, plus an advanced degree in Computer Science or a related field. Should be familiar with Burroughs equipment.

The Director reports to the Vice President for Business and Finance. Will be responsible for the effective planning, policy development, management and budgetary control of all academic and administrative computing services to faculty, staff and students.

Send resume and salary history by March 24, 1978 to:



Employment Manager, Office of University Personnel
UNIVERSITY OF DETROIT
Detroit, Michigan 48221
an equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

Mohawk Data Sciences...

The most intelligent choice for a dynamic career

The success of MDS is well-known worldwide. From our modest beginning, we have grown to a \$150 million, multinational corporation with the 2nd largest customer base in the industry in 14 short years.

And the bulk of the credit for our achievements must go to our people. Highly intelligent, highly motivated, dynamic professionals who have not only helped make us what we are today, but have also, in the process, carved out exciting and rewarding careers for themselves.

Today, Mohawk Data Sciences is one of the world's major factors in the data processing industry. Our solid, highly diversified product line encompasses all phases of data capture, data entry, and data communications. We also are an acknowledged leader in intelligent data entry and communications for use in distributed processing.

To make certain our customers get the most out of our systems and to insure that our systems perform at their highest level of efficiency, MDS also maintains an advanced software development laboratory.

And where do we go from here? Everywhere... everywhere our research and development programs take us... everywhere advanced technology, engineering and design are needed. Everywhere new solutions are needed to solve new problems as well as old ones.

If this sounds like your kind of company—you're our kind of person. Due to growth and current expansion programs, these exceptional opportunities are immediately available at **choice locations throughout the United States.**

SALES MANAGERS—If you have proven sales management experience and are seeking outstanding earnings potential plus an excellent career path, this is the growth opportunity you have been searching for.

SALES REPS—If you are success-oriented and have experience in selling data processing systems to end users, this is your opportunity to make more of your abilities as well as more money.

SYSTEMS SPECIALISTS—If you are a marketing-oriented professional with experience in data entry systems, communications, distributed processing networks, assembler and higher level languages, this is your opportunity to advance by working in a creative atmosphere and by contributing to the development and marketing of new, advanced systems.

CUSTOMER SERVICE ENGINEERS—If you are customer-oriented, have experience servicing data processing systems and have the desire to grow professionally, this is your opportunity to obtain expanding responsibilities and personal recognition as part of a highly motivated Customer Service organization.

In addition to excellent compensation and fringe benefit programs, we offer the opportunity to grow with us as we continue to introduce significant new systems.

For immediate, confidential consideration please send resume including present salary and choice of work location to:

MR. D. P. McCONNELL, Director, Corporate Personnel

MDS Mohawk Data Sciences

1599 Littleton Road, Parsippany, N.J. 07054 / (201) 540-9080

An Equal Opportunity Employer (M/F)

position announcements

position announcements

position announcements

position announcements

position announcements

Engineers and Programmers

NCR's Engineering & Manufacturing Division in Millsboro, Delaware is a leader in the design and manufacture of ECR/POS intelligent terminals. Ground floor opportunities exist in the design and development of our new C-2140 multi-microprocessor retail system.



REAL-TIME PROGRAMMERS

- Microprocessor software (Assembly Level)
- Operating Systems Design
- I/O Drives
- Diagnostics
- Communication Protocols (SDLC)

Other requirements include Component-Reliability Engineers and Quality Engineers. All positions require a BS in EE, CS or a related discipline.

In addition to excellent career opportunities with NCR, our Millsboro location is right in the heart of the Delmarva Peninsula, better known as the "land of Pleasant Living". We're just minutes from marine recreational areas, wildlife preserves and the nation's finest beaches, and within a 3-hour drive of such major cities as Philadelphia, Baltimore and Washington.

Please send resume with salary requirements or call:

collect, (302) 934-8111

Ron Tull, Dept. CW-313
Engineering & Manufacturing-Millsboro
NCR Corporation
P.O. Box 607
Millsboro, Delaware 19966

DEVELOPMENT ENGINEERS

- State-of-the-art mass memory devices and technology such as PMOS, NMOS, CMOS, MSI and LSI
- 8080 Based microprocessor design
- Multiprocessor systems architecture
- I/O devices, (wand readers, cassettes, CRTS)
- Computer controlled test systems design

NCR

An Equal Opportunity Employer

PROGRAMMING

Systems Applications Programmer

Will design and implement terminal-oriented applications programs. Should be experienced with high-level languages, terminal systems, and interfacing terminals with host computer application programs. BS or MS degree in Computer Science, Math, Information Systems, or equivalent required.

Systems Programmer

Design and implement software on a multiple microprocessor system. Requires a good understanding of high-level languages, experience with interrupt processing and an interest in systems architecture. An appropriate bachelor's or master's degree and one to three years of applicable experience or equivalent required.

Software Designer Senior

Opportunity to become a part of a group designing microprocessor based systems. Should be capable of providing technical leadership in the development of software tools and techniques and be interested in problems of human engineering. An advanced degree and related experience desired.

These positions within our Advanced Systems Development Organization located in Carlsbad, California, offer challenging assignments and excellent progression opportunities. Our comprehensive benefit programs include free medical and life insurance, a stock purchase plan, retirement plan, educational assistance, paid holidays, vacation plan, and sickness and accident benefits.

Please send resume including salary history in confidence to:

BURROUGHS CORP.

Professional Employment
TSG/ASCO
P.O. Box 1216
Carlsbad, California 92008
Equal Opportunity Employer M/F



Wherever There's
Business There's Burroughs

PROGRAMMERS

For the most individualized job search offered in the Data Processing field today, on a local or national level, Send resume to:

SEARCH E.D.P., INC.

Personnel Consultants
13773 N. Central Expwy.
Suite 1305
Dallas, TX 75243

ALL FEES PAID BY
EMPLOYER

OUR STANDARDS ARE HIGH THEY HAVE TO BE

Our vice presidents personally hire each programmer/analyst (over 100 will be in 1978) because they know that a professional service firm's FUTURE IS YOU.

Immediate openings in Miami, Houston, Washington, D.C., and Philadelphia areas. Call collect or send resume with current salary requirements to:
Mr. Fred Trimble
Data Technology Industries, Inc.
6811 Kenilworth Ave., Suite 413
Riverdale, Maryland 20840
(301) 779-8828

DATA BASE PROJECT LEADERS

Florida is still the sunshine state! Leading software and service bureau is expanding. 10+ years DP experience with IMS, OS, manufacturing and prior programming. Full responsibility for project assignments. \$30,000 FEE PAID

ROBERT HALF PERSONNEL SERVICES, INC.

822 Fifth Avenue
New York, N.Y. 10036
(212) 221-4500

Software Professionals

Caution:
Digital enthusiasm is contagious!
CHICAGO OPENINGS

We guarantee that once you've talked with us about our openings for

SOFTWARE SUPPORT PROFESSIONALS
you'll come down with a good case of DIGITAL MOMENTUM. If you want to become part of our success story, talk to us and we'll tell you how Digital outperforms and outsells its competitors. Our people have more than just a name behind them... they have a support team that they can depend upon, and a superior product line to brag about. At DIGITAL, we know where we're going... and just how to get there.

Requirements:
(experience in one or more of the following)

- *Real Time application software
- *Business application software
- *Operating systems development
- *RSX 11, RSTS, RT 11, TOPS 10
- *Assembly, Fortran and Cobol

In a customer environment you will be responsible for:

- *Systems analysis
- *Technical presentations
- *Software consultation
- *Software design and implementation

Call (COLLECT) or write to: Ed Kaplan, (312) 640-5564, Digital Equipment Corporation, 5600 Apollo Drive, Rolling Meadows, Illinois 60008. We are an equal opportunity employer m/f.

digital

Software and Hardware Engineers

**If you're looking for
more responsibility,
better advancement opportunities,
and professional growth...
We'll exceed your expectations.**

The tremendous acceptance of the LEVEL 6 minicomputer systems exceeded even our expectations. And this success has created opportunities that could exceed yours!

Honeywell's Small/Medium Information Systems Division (S/MISD) is continuing to expand and is seeking outstanding professionals who want more challenging and rewarding careers. Based in our Billerica, Massachusetts facility, you'll be involved in the stimulating activity that the LEVEL 6's success has brought about... and contributing in an atmosphere of real accomplishment and pride. If this is what you have been looking for in your career, come to Honeywell S/MISD.

Software Analysts

We're searching for Analysts to design and implement sophisticated software with state-of-the-art techniques in a variety of on-going projects such as networking, communications, IBM emulators, data entry systems, compilers, interfaces, etc. You should have 2 or more years on the job experience in several of the following areas: HASP, RJE systems, multifunction environments, communications/networking and a BSEE or computer science preferred.

Systems Engineering

The Software Systems Design Group has several immediate openings for experienced systems professionals whose responsibilities will include independent analyses of systems. You should have 5 or more years of experience in several of the following areas: definition and design of software in a distributed system environment, operating system design, data base design, communications and terminals. A BSEE/MSEE or computer science or equivalent is desirable.

Senior Analyst

Special SW Engineering also has several openings for experienced professionals whose responsibilities will include the translation of minicomputer software conceptual design objectives into specific subsystem parameters and requirements. You should have 6-8 years software experience with at least 3 years system level programming background, along with significant knowledge and experience related to computer system software and technology utilized in conjunction with digital communications networks linking 360/370 hosts with minicomputers and terminals.

Software Support Analyst

We're searching for a self starter to be a key member of our team of Software Support Specialists. You will provide customer support in a distributed network architecture environment in problem analyses, technical presentations, and field interface. You should have three to five years experience with IBM communications protocols; recent experience with SNA a big plus. A degree in a related discipline is desirable. Some travel required.

Software Product Support

Software Engineering needs professionals to support new software designs with emphasis on networking and communications environments. If you have one to three years on-the-job experience in multifunction environments, communications, networking; hold a degree in a related discipline; and are able to travel. — this is a key opportunity!

Programmers

We're searching for Programmers to design and implement sophisticated software with state-of-the-art techniques to qualify minicomputer communications networks.

Must have 1-4 years on the job software development experience with communications background highly desirable.

Communications/Networking Systems Design

Special Engineering has openings for Software Analysts with experience in Communications and Network system design and/or software development. You will be responsible for evaluating customer requirements for Level 6 minicomputer based systems and networks; and responding to RFP's with conceptual system designs. You will also participate heavily in customer interfacing activities by providing technical support to Marketing. Particular emphasis is placed on interfacing to IBM systems.

These positions require combined hardware and software experience with at least 3 years in Communications and Networks. Experience with IBM Communications systems is desirable.

Software/Firmware Professionals

Immediate openings exist at all levels in the design of a family of microprocessor based video terminals. Specific assignments include the design and implementation of the software/firmware for our new terminal products. This exciting work includes a close working relationship with the hardware and hardware designers.

Specific experience should include either assembly language programming with communications or microprocessor background or word processing design experience. This experience could be your key to entry into our expanding line of interactive end word processing terminals.

Diagnostic Programmers

As a Diagnostic Programmer you will have responsibility for developing diagnostics for computer peripheral and central subsystem equipment of Honeywell's new line of mini-computers, analyzing new hardware designs and developing programs to verify operations. Opportunities exist particularly in the area of digital communications, network testing and on-line diagnostics running under an operating system.

If you are interested in any of the above positions please forward your resume, including salary history and indicating position or positions of interest, to Blanca Hurt, HONEYWELL, SM-302, 300 Concord Road, Billerica, MA 01821.

Hardware

Positions are also available at most levels in the following areas:

Terminals and Communication Definition

Minicomputer Hardware Systems

Minicomputer Definition Circuit Design

Special Products Hardware Development

If you are interested in any of the above positions please forward your resume, including salary history and indicating position or positions of interest, to Jerry Haynesworth, HONEYWELL, SM-302, 300 Concord Road, Billerica, MA 01821.

An Equal Opportunity Employer M/F

**THE
SEARCH
IS ON**

Honeywell

position announcements

position announcements

position announcements

position announcements

position announcements



SWING INTO AN EXCITING NEW CAREER WITH NASSCO!

*There's a dynamic future waiting
for you in beautiful San Diego.*

The Information Systems Department at National Steel & Shipbuilding is expanding to keep pace with our corporate growth. We are one of the world's leading shipbuilders, and place a great deal of emphasis on maintaining a state-of-the-art data processing environment. Here's a rare opportunity for you to advance your career, as well as enjoy San Diego's ideal location and climate.

One of Southern California's recreation centers, San Diego offers year-round sunshine, golf courses, ocean and mountain sports, and numerous sightseeing attractions. Why not make your move for a better life today?

PROJECT LEADERS/TELEPROCESSING SYSTEMS ANALYSTS/PROGRAMMERS

We're looking for self-motivated, results-oriented professionals with a proven record of accomplishment. You may qualify for one of these positions if you have at least 3 years of experience designing and implementing manufacturing applications on medium to large scale computers. Equipment support is IBM 370/148 upwards, with an over 100-terminal on-line CRT network. You should have a good working knowledge of COBOL and DS-JCL, plus a background in structured programming techniques. In addition to your technical expertise, you must have a solid understanding of business systems. Experience with on-line data base management systems would be a plus.

You can expect to receive an outstanding compensation package, including generous fringe benefits.

YOU MAY ARRANGE FOR A TELEPHONE INTERVIEW BY CALLING TOLL FREE

(800) 821-3777, EXT. 604 AT ANY HOUR

Our Manager, Systems and Programming, will return your call at your convenience; or, if you prefer, mail your resume including salary expectations, to D.W. Shuett, National Steel & Shipbuilding Co., Harbor Dr. at 28th St., P.O. Box 80278, San Diego, California 92138. We are an equal opportunity employer M/F.

NATIONAL STEEL & SHIPBUILDING CO.

Manager Time Sharing Services

Immediately needed in the home office of our Real Estate Development & Management business in Columbia, Maryland.

If you have:

- a BS degree in Business Administration or Computer Science,
- 5 years of varied DP experience,
- exposure to Time Sharing principles,
- knowledge of APL,
- customer/user liaison experience

... YOU may be the person we are looking for.

We offer a \$20K+ starting salary and a full company paid benefits program. Write, outlining experience and salary history to Christine A. Pettingill.

The Rouse Company

Columbia, Maryland 21044

An equal opportunity employer M/F

DIRECTOR OF MEDICAL COMPUTING

Applications are sought for Director of Medical Computing, Office of Computing Activities, University of Virginia.

The position heads a Center providing computer support for the University of Virginia Hospital and Clinics. Primary hardware includes a Burroughs 4840 and Tandem telecommunications processors. Full-time staff numbers 49.

The successful candidate will have an advanced degree in Computer Science or related field, at least two years experience in computer center management, and a record demonstrating technical expertise, administrative skills, and an ability to work effectively with a wide variety of computer users, preferably in a medical environment.

Send resume stating salary requirement and names of three references by March 24 to the Director of Computing Activities.

University of Virginia
P.O. Box 3856
Charlottesville, VA 22903
An EEO/AA Employer

Make The Most Of Your Abilities

... as we continue to grow at a rapid pace and maximize the importance of our MIS function. We offer a sound career opportunity to the highly motivated professional qualified to contribute to the development of new manufacturing systems. Our advanced environment utilizes 370/138 using DOS/VS, DL/I, CICS.

We seek candidate with three years systems and programming experience in a manufacturing environment. Must be knowledgeable in design and implementation of major systems including cost justification, systems studies, scheduling and project reporting. Bachelor's degree or equivalent experience required.

Diamond Power is a major subsidiary of Babcock & Wilcox, a pacesetter in the energy industry and offers compensation commensurate with background and excellent benefits. Please send resume to Mr. J.A. Renard, Ref. 317.

Babcock & Wilcox
Diamond Power

P.O. Box 415, Lancaster, Ohio 43130
An Equal Opportunity Employer M/F

New! 1978 Computer Salary Survey



Call for your Free copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

This comprehensive free report also gives you expert advice on a variety of important career topics such as: when you should consider a job change; what you need to do to break into management; how to make sure you're getting the proper exposure; why timing is so crucial in your long range career development; how you can avoid stagnation ... and much more.

The 1978 Computer Salary Survey has been compiled by Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

For your Free copy, call the Source Edp office nearest you.

East:	Midwest:	St. Louis:	West Coast:
Boston 617/482-7613	Chicago 312/782-0857	314/862-3600	Encino CA 213/995-8866
Hartford 203/522-6590	Cleveland 216/771-2070	St. Paul 612/771-0544	Irvine CA 714/833-1730
New York City 212/736-7445	Detroit 313/963-0510	South/Southwest: 404/325-8370	Los Angeles 213/386-5500
Philadelphia 215/865-1717	Kansas City 816/474-3393	Dallas 214/367-1600	Oakland 415/444-5955
Stamford CT 203/329-8411	Minneapolis 612/544-3600	Denver 303/773-3700	Palo Alto 415/328-7155
Union NJ 201/687-8700	Northfield IL 312/448-8395	Fort Worth 817/336-9300	San Francisco 415/434-2410
Washington DC 703/790-5610	Oak Brook IL 312/966-0422	Houston 713/628-8705	Seattle 206/454-6400
Wellesley MA 617/237-3120	Rolling Meadows IL 312/392-0244	New Orleans 504/581-6000	Torrance CA 213/540-7500
	Southfield MI 313/352-8520		Canada: Toronto 416/364-2919

source edp

If unable to call, write: Source Edp, Department C3
721 Enterprise Drive, Oak Brook, Illinois 60521

(When writing, please be sure to use home address and indicate position title.)

position announcements

position announcements

position announcements

position announcements

position announcements

ACCOUNT SUPERVISOR FOR AD AGENCY

If you know the computer business and can take charge of a blue chip computer account, we have an attractive job for you. We'll start you at \$35,000 and offer fully paid medical plan, profit sharing and pension plans, and key employees enjoy the benefits of stock options. We are a top rated New England agency with over 100 people. We afford our clients full service and have a well-reputed creative and marketing staff. But we'll even talk about you bringing good creative people with you if you feel they too can make a significant contribution. Write in strictest confidence to Gilbert Bass at CW Box 1478, 797 Washington St., Newton, MA 02160.

Southeast Missouri State University COMPUTER SCIENCE ASSISTANT PROFESSOR/ INSTRUCTOR

Full-time, tenure track position in an expanding department. Progressive, teaching-oriented state university. Current enrollment of 8,500 students. Located in one of the most scenic parts of the U.S. Pleasant small city living. Convenient access to metropolitan areas.

Position involves undergraduate instruction and curriculum design. Masters required; Ph.D. desirable. Previous teaching and/or industrial experience helpful. Available Fall 1978. Application deadline: March 24, 1978.

Send resume to: Dr. La Verne Thompson, Chairperson; Computer Science; Southeast Missouri State University; Cape Girardeau, MO 63701 phone: (314) 651-2113.

Southeast Missouri State University is an Affirmative Action/Equal Opportunity Employer.

SENIOR PROGRAMMER ANALYST OREGON LIFE INSURANCE COMPANY

Excellent opportunity for programmer/analyst with some experience. We are looking for a professional to work with a team involved in the development and installation of two major on-line systems (Life Com III - and an in-house group system). Life insurance experience preferred but not required.

PROGRAMMER ANALYST

Excellent opportunity for programmer analyst with 2-3 years experience in group or individual life systems to join major development effort. Experience in BAL, COBOL, CICS and ODS desirable. Please send resume to:

Personnel Department
STANDARD INSURANCE CO.
P.O. Box 711
Portland, OR 97207
Equal Opportunity Employer

SYSTEM DEVELOPMENT CORP. HAS EMPLOYMENT OPPORTUNITIES FOR QUALIFIED AND EXPERIENCED SYSTEM DESIGNERS - SYSTEM ANALYSTS SYSTEM PROGRAMMERS

THE COMPANY

SDC has been the industry leader in Systems Software Development for over 20 years. We are undergoing rapid expansion due to our demonstrated technical excellence.

THE ACTIVITY

SDC has initiated a large Research and Development project to design an advanced standard architecture for the U.S. Navy's computer based Real-Time Command and Control Systems. Our R&D effort will utilize top down design techniques, structured analysis and structured programming. Additionally, we will define and design new automated techniques for producing operating systems software.



THE LOCATIONS

We have employment opportunities in fabulous San Diego, California and Virginia Beach, Virginia. Sun belt living by the sea.

THE FUTURE

Your opportunity is now! SDC offers top compensation and liberal fringe benefits including paid relocation. As one of our Software Professionals, you will enjoy our technically challenging but casual work environment. For consideration or information contact T.W. Salmon, Personnel Administrator, (804) 461-6662.

System Development Corporation

13 Koger Executive Center, Norfolk, Virginia 23502



WE NEED QUALIFIED
DATA PROCESSING
PROFESSIONALS
BIG SKY COUNTRY

See What Montana Has to Offer

• OUTDOOR RECREATION AT IT'S BEST ...
FISHING
HUNTING

CAMPING
SKIING
HIKING

• GLACIER NATIONAL PARK...
• YELLOWSTONE NATIONAL PARK...
• LEWIS AND CLARK CAVERNS...
• AND MUCH MORE

RAPIDLY EXPANDING MONTANA CORPORATION HAS POSITIONS AVAILABLE FOR:

COMPLETE ENGINEER

SOFTWARE ENGINEERS (LEVELS II & III), WITH A WORKING KNOWLEDGE OF DISK AND TERMINAL ORIENTED COMPUTER SYSTEMS PLUS A SOLID BACKGROUND IN FORTRAN AND PL-1 PROGRAMMING. BACHELOR'S DEGREE WITH 2-7 YEARS EXPERIENCE IN SCIENTIFIC OR COMMERCIAL ENVIRONMENT.

COMPUTER OPERATOR

PROFICIENCY IN THE OPERATION OF KEYBOARD-TYPE DEVICES, WITH 1-2 YEARS DIRECTLY RELATED EXPERIENCE IN THE OPERATION OF ELECTRONIC DATA PROCESSING EQUIPMENT.

WE OFFER COMPETITIVE SALARIES, LIBERAL RELOCATION ALLOWANCES, AND AN EXCELLENT BENEFIT PROGRAM.

SEND RESUME IN COMPLETE CONFIDENCE TO:

MERDI
PERSONNEL MANAGER
P.O. BOX 3809
BUTTE, MT 59701
An Affirmative Action/
Equal Opportunity Employer

Director-Systems and Programming \$1918-2316

Supervise and train programming and systems personnel in administrative systems. 4 yrs experience in responsible professional areas such as organization, administrative surveys, fiscal, and procedural studies or research projects involving preparation and submission of reports/recommendations. Technical analysis of major computer systems installed or considered for installation at the University. Computer experience in business and education desired. Send cover letter outlining background, with detailed resume to include salary history, names and addresses of 3 recent work references before April 15, 1978 to: Director Information Systems & Analysis, Adm/Room 551, S.F.S.U., 1600 Holloway S.F. 94132
An Affirmative Action Employer

FIELD SERVICE

SYSTEMS 370/360, H-200, XOS, Univac, COC All Large & Medium CPU's
MINI's POP, NOVA, G.A., HP, etc. All Mini Systems
I/O STC, TELEX, COC, ITEL, CALCOMP, etc. All Peripheral Experience



(312) 344-6780
MTR ASSOCIATES
1107 Mannheim Road \$12-30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

CAREER OPPORTUNITY IN DATA BASE ADMINISTRATION PROGRAMMER ANALYSTS

Excellent opportunities for Programmer/Analysts with 1-2 years experience in Data Base design or 3-5 years applications experience. Positions available on the Data Base Administration staff of the largest privately owned electric utility company in Texas. Applicant must have good communicative skills and solid experience in two or more of the following areas:

*COBOL *IDMS *OS
*ALC *TOTAL *DATA DICTIONARY
*JCL *IMS *TELE PROCESSING

Excellent benefits and opportunities with a growing Company. Prefer individuals with a Bachelors Degree in Computer Science or Math with a concentration in CS. Salaries commensurate with experience.

For more information, contact:

THE EMPLOYMENT OFFICE
HOUSTON
LIGHTING & POWER COMPANY

Houston, Texas
(713) 228-9211, Ext. 2202
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

CSC

PROGRAMMER/ANALYSTS DIGITAL SYSTEMS ENGINEERS & TECHNICIANS

Share Our Future In Space ...

Computer Sciences Corporation, with over 8,500 computer professionals, knows how to develop and reward computer expertise.

CSC's System Sciences Division is meeting new project demands in support of our Space Tracking Data Network Project at the NASA Goddard Space Flight Center, located in suburban Washington, D.C. If you want to share our future in Space and feel you fit the requirements listed below, please investigate immediately.

PROGRAMMER/ ANALYSTS

Positions require a degree in Computer Science, Math, Physics, or Engineering with programming experience on any hardware configuration. Opportunities include design and development of real-time and non real-time telemetry communications systems, satellite command and communications systems, operating systems, distributive network systems AND design and development of hardware diagnostics for communications, operator, and data storage devices.

DIGITAL SYSTEMS ENGINEERS

DIGITAL TECHNICIANS

Will participate in a wide range of activities from hardware installation, modifications, and diagnostic testing to analysis and resolution of software/hardware related anomalies. These technical support services are required on mini and medium size mainframes, disc and drum storage units, CRT terminals, magnetic tape units, data transmission units, stored program decommutators, timing systems and other peripheral devices. We require a BSEE or technical/military school training (as applicable to the position) and 3-6 years related experience.

CSC offers an excellent benefits package including a liberal relocation policy and competitive salaries. For immediate consideration, please send resume or call:

Gary Johnson
Toll Free: 800-638-0842 OR Call Collect: (301) 589-1545

**COMPUTER
SCIENCES
CORPORATION**

System Sciences Division
8728 Colesville Rd.
Silver Spring, MD 20910

MIS SOFTWARE DESIGN

Staff Opening at the NCR Worldwide Headquarters in Dayton

A leading force in the data processing industry, and recognized innovators, the NCR technical team is continuing to expand. There are career opportunities with our MIS operations involving design and development of advanced communication environments, on-line data capture application interface functions, and enhancements to current processing applications. If you have a degree, plus in-depth knowledge of COBOL and experience in systems design including specification, documentation and communications, this could be the rapid-rising opportunity you've been seeking.

We offer competitive salaries, comprehensive benefits, and significant growth potential with one of the most respected firms in data processing - serving Business, Industry, Government and Education worldwide.

For confidential consideration, please call:
800-543-2388
Monday - Friday
8:00 AM - 4:00 PM

An Equal Opportunity Employer M/F

NCR

PROGRAMMERS

Large urban university in New York City has immediate openings for programmers in data processing center. Capabilities in COBOL and/or FORTRAN required. Familiarity with DEC equipment desirable. Salary competitive and commensurate with experience. Contact: Director of Administration.

Long Island University

Brooklyn Center
1 University Plaza
Brooklyn, N.Y. 11201

OPPORTUNITIES FOR EDP PROFESSIONALS

Our clients, located from Florida to Texas, are currently seeking highly motivated EDP professionals to assume responsible and growth positions as programmers, systems analysts, project leaders and managers. New systems development, planning and R&D functions are currently underway in systems technology, banking/finance, manufacturing and mini computer software.

Minimum qualification for programmers is two years of business oriented COBOL utilizing medium to large scale main frames. Strong plus factors include degrees, OS, CICS, or IMS. Salary levels range from \$15K for programmers to over \$30K in management.

We are executive recruiters that specialize in the placement of EDP personnel. To candidates, all fees, relocation and interview expenses are assumed by client corporations. If your desire is to leave the cold north for a healthful sunny South location and to join a progressive, dynamic corporation, send your resume and salary history to:

DAVE STANWICK & ASSOCIATES
5300 S. Dadeland Blvd.
Suite 505 Dadeland Towers
Miami, FL 33156
Dade (305) 554-8551

Immediate Career Opportunities

Morrison Incorporated in Mobile, Alabama is growing rapidly and needs the following career EDP positions filled as soon as possible:

Systems Engineer — 3 to 5 years functioning as a systems engineer/programmer with knowledge of DOS/power/VS; ANS COBOL; DATA COMMUNICATIONS/DATA BASE (CICS); Requirements definition and systems design of financial and merchandising applications.

Senior Systems Analyst — 3 to 5 years functioning as a systems analyst with experience including DOS/power/VS; ANS COBOL; DATA COMMUNICATIONS/DATA BASE (CICS); Requirements definition and systems design of financial and merchandising applications.

Programmer Analyst — 2 years functioning as a programmer writing program specs and designing COBOL programs. Specific experience should include DOS/POWER/VS, ANS COBOL, CICS and developing programs for financial, merchandising and inventory control applications.

Competitive starting salaries, excellent benefits program and opportunities for career growth.

Call now or send resume to:

MORRISON INCORPORATED



Human Resources Department
First National Bank Building
P.O. Box 2608
Mobile, Alabama 36625
205/432-9711 Extension 263

UCC

UNIVERSITY COMPUTING COMPANY
(DATACOM) LTD.

Requires Top Computer People FOR IRELAND

Like to return home? UCC Datacom, Ireland's biggest independent Computer Service Bureau, offers just that opportunity to skilled Programmers and Analysts for its computer centres throughout IRELAND.

We need the following additional personnel to join our young enthusiastic and highly skilled team to meet the fast growing demand for our services.

SYSTEMS ANALYSTS:

Applicants should have at least four years experience in data processing with strong commercial background in the design and implementation of commercial systems.

PROGRAMMERS:

With at least two years experience. Knowledge of COBOL an advantage.

ANALYST PROGRAMMERS:

Applicants must have at least two years experience of COBOL programming.

These interesting and challenging positions in an ideal working environment offer first class salaries and generous fringe benefits.

Our Divisional Director Keven C. Murphy will interview all applicants in the week commencing Monday, March 20, at the Industrial Development Authority offices, 200, Park Avenue, New York, NY 10017. Telephone (212) 972-1000.

Applications in writing, together with a telephone number at which you can be contacted, should be forwarded to Mr. Murphy, c/o the IDA offices, at the above address.

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS MIS INTERNAL CONSULTANT \$30,000 PLUS

Fortune 300, suburban based, internationally known manufacturing firm needs understudy for MIS Manager. Must have systems design background in either Manufacturing, Financial, Marketing or Communications areas. Varied duties include Special Projects Manager, Feasibility Studies, Hardware & Software Evaluations & Proposals. (Large Scale to Mini's), Systems Planning & Development. Must be effective communicator oral & written. Will travel (Nationally), consult with top level users, corp & divisions. Someone with five years experience earning \$20-\$28,000 can expect 25% increase. Plans for expansion offer excellent career growth to serious minded, ambitious and industrious candidate. Resume not required, to discuss contact:

DAVE TAIT &
FRANK McGINTY
EDP SPECIALISTS

TRI-STATE STAFFING
ASSOC.

1 N.BWAY,
WHITE PLAINS, NY 10601
NO FEES AGENCY

FLORIDA

Programmers, Analysts, EE's software and hardware. Career positions for IMPLEMENTORS in BANKING, MFG, and SCIENTIFIC. Need highly skilled individuals with OMB, T.P. on line, INTERNALS and APPLICABLE. Large scale and minis. Submit resume with present salary and position for immediate consideration by best client firms in FLORIDA.

FRANK LEONARD
PERSONNEL

1211 N. Westshore Blvd.
Suite 100
Tampa, FL 33607
(813) 872-1853

DATA PROCESSING EXECUTIVE

An established Portland, Maine area service bureau specializing in utility and municipal services, is seeking an individual who possesses a successful record in Data Processing management. Should also be knowledgeable in: systems, programming, and marketing. This position is to carry full responsibility for the EDP Division and its expansion. Please forward resumes to Mr. J.H. Hosmer, Telephone Service Company, 305 U.S. Route #1, Falmouth, Maine 04105.

Career Opportunities At



MARKETING

Highly motivated persons are needed to represent ACS in the data center services market. Previous experience in the marketing of computer services or applications services is required. We offer an excellent compensation plan based on performance.

SYSTEMS SUPPORT

Experienced, imaginative systems programmers are needed to support our system of multiple IBM 370/158's running under MVS multi-access spool. Challenging and rewarding work is available to persons having experience in any of the following areas: MVT/SVS/MVS, HASP/JES2, Communications, TSO.

CUSTOMER SUPPORT

Technical support for our diversified and growing user community requires individuals who enjoy communicating with other people and staying technically current. Activities include consulting, education, conversions, benchmarks, troubleshooting, demonstrations, and program product support. At least two years experience in IBM OS/VS JCL and Utilities, and FORTRAN, COBOL, or PL/I is required. Experience in using TSO is a big plus.

COMPUTER OPERATIONS

Experienced computer operators are needed to operate our expanding computer center. Experience in an IBM 370 environment, operating under OS/MVT or MVS, is required. Experience with an MP370/158 configuration is a definite plus. Work is available on all shifts.

TECHNICAL WRITING

Technical writers are needed to write and publish our user guides, newsletters, and technical updates. Positions require at least two years experience in technical writing, including writing in support of computer software. Experience using an IBM 370 system, especially programming experience, would be helpful.

Avco Computer Services is one of the largest and fastest growing computer centers in New England. Located in a pleasant suburban area north of Boston, we supply data center services to clients throughout the United States. Our operation is based on a very large IBM 370 computer system. Expansion of our business is creating new opportunities for data processing professionals to engage in challenging and rewarding work in these areas:

GRAPHICS SUPPORT

ACS has recently upgraded to an Information International FR80 Graphics COM System and is seeking both FR80 system support and customer support personnel. ACS will provide FR80 training. At least two years experience in FORTRAN and graphics programming, preferably on an IBM system for drum or CRT plotters, is required. Programming experience in DISSPLA, Calcomp, and minicomputer software is a definite plus.

APPLICATION SYSTEMS

Applications analysts and programmers are needed to assist our users in applying data processing technology to specific problems. Working in teams, these persons will design, develop, and maintain application systems built to individual user specifications. Opportunities are open to middle and senior level systems analysts and programmer/analysts. Must have at least two years experience in business management applications implemented in COBOL or MARK IV and operating in an IBM 370 OS/VS environment. Experience in interactive or TSO-batch applications and in FORTRAN applications is a plus. Some positions require travel.

ADMINIST. PROCEDURES

Our expanding business requires an experienced procedures analyst to assist ACS management in organizing and controlling our internal workflow. At least two years experience in procedures and forms design and implementation is required.

Avco offers a liberal benefit program, including aid for advanced education, and excellent salary commensurate with your educational and professional background.

Kindly send your resume including salary requirements to:
Mr. Peter C. Dowd, Employment Supervisor



201 Lowell Street, Wilmington, Massachusetts 01887
Tel. 657-3714

An Equal Opportunity Employer

AVCO CORPORATION

SOFTWARE ENGINEER PROJECT ENGINEER

Top level design people needed to design and supervise the development of real-time industrial control systems for material handling, automotive, and metals industry applications. 3-5 years experience required. Applicants should have real-time process control experience - D.E.C. or G.A. minicomputer experience desirable.

Top salary commensurate with experience, liberal benefits package, and a rural southeast Michigan location. Send resume and salary requirements in confidence to Employment Manager at:

CUTLER-HAMMER, INC.
9475 CENTER ROAD
FENTON, MI 48430

An Equal Opportunity Employer M/F

COMPUTER OPERATIONS MANAGER

You'll coordinate all maintenance activities for all Graduate School of Business computer and communications hardware such as DEC, 20/50, HP 200F and DATA 100. You'll also supervise operational aspects of part-time staff and interface with University Computation Center and physical plant. You should possess excellent communication skills and computing/electronic hardware background, preferably with a technical degree and previous operations experience. Outstanding benefits. Send resume with salary requirements to:

Mr. Louis J. Rose
Employment Manager

THE UNIVERSITY
OF CHICAGO

958 E. 58th St.
Chicago, IL 60637
An AA/EOE

370/115 and/or
370/125 F. E.
370/155 158 F. E.

F.E. specialist caliber people are needed to fill the above positions. Salary 30K plus O/T, or if you prefer an exempt position with incentives can be negotiated. Duties include comprehensive knowledge in M.E.S. installation, removal and debug. All replies will be strictly confidential. Company paid benefit program and relocation is included. Write or call collect:

INDEP INC.

1690 Republic Road
Huntingdon Valley, PA 19006
(215) 322-0222

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER PROFESSIONALS:

Come enjoy the good life in San Diego!

Move ahead with one of the world's most successful computer manufacturers while living in one of America's most acclaimed vacation centers. San Diego offers you the climate of your choice, from the cool, mild breezes of the ocean to the constant dry warmth of true desert—and every gradation in between. Create your special lifestyle in a hilltop hacienda, an

urban highrise, a country club condominium. Explore mesas and canyons, 70 miles of local beaches and bays, the byways of Baja. Continue your professional education in one of the area's many major colleges and universities, enjoy sports all year, from tennis to whale-watching. NCR—for a good living and a good life.

Immediate openings in these areas

- FIRMWARE
- DIAGNOSTIC PROGRAMMING
(Design, develop programs to support software testing, release and repair.)
- SOFTWARE DEVELOPMENT
(Design/implementation of multi-program O/S in a high level language. Experience desired in data base or telecommunications, distributive processing, virtual machine, time sharing compilers)
- MICR APPLICATION SOFTWARE
(Experience desired in both Transit and Proof of Deposit applications plus features such as CRT Reject-Reentry.)
- MIS APPLICATIONS

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

Please send resume immediately including salary history, training and experience to the Professional Placement Office at the address below

NCR

Engineering and Manufacturing
16575 W. Bernardo Drive, San Diego, Calif. 92127

An Equal Opportunity Employer

A poorly written resume is like wearing jeans and sneakers to an interview.

Send for our free resume kit. It's more help than a Brooks Brothers suit.

In an interview, personal appearance means a lot. But before you get that interview, you're going to be judged by your resume. In a resume, form, appearance and content are everything.

If you'd like one of our kits, complete the information below, and return the coupon. Or if that's too much trouble, just pick up the phone and call. We will get your kit out in the next mail.



NAME _____
ADDRESS _____
CITY _____ STATE _____
ZIP _____ PHONE () _____
HARDWARE _____
LANGUAGES _____
APPLICATIONS _____
NO YRS EXPERIENCE _____
Dept. 71

Scientific Placement, Inc. has many exclusive Data Processing positions available — locally and nationwide.

Scientific Placement, Inc.
EMPLOYMENT SERVICE P.O. BOX 42127
HOUSTON, TEXAS 77042 (713) 621-9811



PROGRAMMERS PHILA. LOVES YOU

Yes, PHILADELPHIA LOVES talent. Ask a Philadelphian about our orchestra, our universities, our teaching hospitals, our pro teams. Philadelphians love talent and if you are a talented PROGRAMMER, PROG/ANAL w/1-10 yrs exp & current in the state of the art, our clients are ready & anxious to meet with you. (Depending upon exp; salary \$11,000-\$25,000).

For immediate confidential attention; please call or forward resume to:

ROBERT HALF PERSONNEL AGENCIES

2 Penn Center, Suite 706
Philadelphia, PA 19102
(215) 568-4580



WHY EDP SEARCH?

Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

Bell & Howell needs ANALYST PROGRAMMERS

We are one of the West Coast's leading electronics manufacturing firms with exciting, challenging projects for Analyst Programmers in our Data Processing Department.

Prefer a strong background in COBOL, DOS/VS and 3 years data processing experience in a manufacturing environment including design, programming and instrumentation of data based systems.

If you want to join us in a creative environment with upward mobility, excellent salaries and fringe benefits including flexible working hours and profit sharing retirement program, call COLLECT or send your resume TODAY with salary history to:

Helen Duner
(213) 796-9381



BELL & HOWELL

360 Sierra Medra Ville

Pasadena, CA 91109

Equal Opportunity/Affirmative Action Employer

COMPUTER SOFTWARE SPECIALISTS

For Advanced Programs in Nuclear Power Research

Babcock & Wilcox's leadership in the nuclear power industry is built upon pioneering research, using sophisticated computer technology. Working at our Lynchburg R&D facility, you will utilize your ingenuity and imagination to apply computer techniques to our advanced research projects. Candidates chosen will enjoy professional recognition and career advancement opportunity in addition to salaries reflecting your capabilities and many company paid benefit plans. Location in the foothills of Virginia's beautiful Blue Ridge Mountains offers an abundance of recreational attractions.

GROUP SUPERVISOR

Nonlinear process dynamic modeling

Requires MS or PhD/ChE, other engineering discipline or physical science. Experience in nonlinear process dynamics modeling using digital computers and conservation laws a must. Will supervise construction of power plant models and other processes using conservation laws, and then simulate these processes on a digital computer.

RESEARCH SPECIALIST

Real-time software systems for process control

Requires MS or PhD/EE or Computer Science. At least 5 years experience in real-time software systems for process control desired. Power plant background would be an asset. Position interfaces with personnel throughout the company and will be charged with planning, conducting and evaluating process control programs using advanced software and systems technology.

RESEARCH ENGINEER

Requires MS in EE or Computer Science. Graduates interested in working with sophisticated software technology would be considered. Will be responsible for data acquisition, reduction and display programs to support on-going experiments. Must be familiar with FORTRAN, BASIC and HP Assembly languages.

Please rush credentials stating current salary and specific position of interest to: Mr. L.B. Comp. Ref. 317.

Babcock & Wilcox Research and Development Division

P.O. Box 1260, Lynchburg, VA 24505

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

ADDS KEEPS GROWING!

Applied Digital Data Systems, leader in computer terminal equipment, offers exciting positions in the expanding field of intelligent data entry and processing. If you are a successful DP professional, these openings in our New York City office represent a ground floor opportunity in the fastest growing field in the industry.

DISTRICT SALES MANAGER

Candidates should have 5 to 10 years of sales/marketing experience, including at least 2 years of sales management in the OEM computer peripheral, CRT or minicomputer industry.

SALES REPRESENTATIVES

Candidates should have a minimum of 5 years experience including 2 or more years selling data entry, computer peripheral, or related equipment to OEM's.

SYSTEMS ENGINEERS

Candidates should have at least 5 years experience as an analyst, including 2 or more in telecommunications. Additional background in intelligent data entry and commercial applications desirable.

For prompt and confidential consideration, please submit resume including salary requirements, or call:

Personnel Department (516) 231-5400

ADDS

Applied Digital Data Systems, Inc.
100 Marcus Blvd., Hauppauge, N.Y. 11787
An Equal Opportunity Employer M/F

Data Processing Professionals

Control Data Cybersearch®
DOES make a difference.

HERE ARE SOME OPPORTUNITIES YOU MAY WANT TO CONSIDER:

If you're exploring career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS • SOFTWARE SPECIALISTS and SALES REPRESENTATIVES for companies nationwide, at no cost to you.

Systems Programmers-MVS	To \$30K
Systems Programmers-IBM "OS"	To \$25K
Mini-Programmers-Scientific	To \$22K
Mini-Programmers-Business	To \$22K
Programmer Analysts-CICS	To \$22K
Programmer Analysts-Business	To \$19K
Programmer Analysts-Insurance	To \$19K
Real-Time Mini Sales-Sci.-Comctns, Potential	To \$35K
Sr. Systems Analysts-Mfg-Ins.-DL-1+Deg.	To \$24K
Mini-Computer Analysts-All levels	To \$24K
Software App. Anal.-Exp.DBS, Telecom, Op Sys	To \$26K
Software Anal-Exp. CDC Prog. Scope	To \$26K
3.4 or NOSBE	
Programmers-Exp. In Telecommunications	To \$20K
EDP Audit Admin-MBA + 5 Yrs. Exp. Auto. Sys	To \$30K
Systems Designer-New Systems Implementation	To \$25K
Instructor-2 Yrs. Exp. Cobol, BAL or Fortran	To \$18K
Operating System Consultant-5-8 Yrs. Exp. IBM S.E.	To \$30K

For more information, please contact our local office.

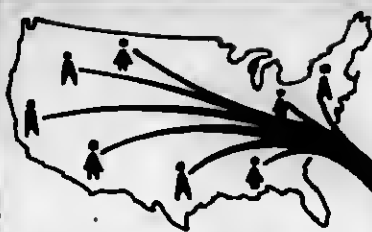
CONTROL DATA CYBERSEARCH INC.

a subsidiary of
CONTROL DATA CORPORATION

CHICAGO, IL 214 North Michigan 60601 312-454-8490	IRVINE, CA 17744 Sky Park Boulevard 92714 714-754-7701	PHILADELPHIA, PA Two Balacynwyd Plaza 19004 215-667-2400
DALLAS, TX 8585 Stemmons Freeway 75247 214-686-5470	LOS ANGELES, CA 8616 La Tijera Boulevard 90045 213-642-2462	SAN JOSE, CA 2025 Gateway Place 95110 408-366-3186

HOUSTON, TX 2000 West Loop South 77027 713-965-5666	MINNEAPOLIS, MN 6800 France Ave South 55435 612-830-6650
--	---

COMPU SEARCH



specializes
in careers
for you...

See us in your city

Since 1968, CompuSearch has sought out exceptional individuals with data processing related skills for large and small companies throughout the United States. We also have been very successful in locating challenging new positions for thousands of people who have requested our assistance. If you are a talented achiever interested in learning about situations that will best meet your goals, contact our office nearest you in complete confidence. We keep a close watch for the best available opportunities locally and nationally.

Appleton, WISC	(414) 731-5221
Arlington, VA	(703) 841-1700
Boston, MASS	(617) 282-5050
Breintree, MASS	(617) 848-1666
Cincinnati, OH	(513) 651-3500
Cleveland, OH	(216) 623-1037
Dearborn, MICH	(313) 338-6650
Indianapolis, IND	(317) 257-4261
Jacksonville, FL	(904) 356-8513
Los Angeles, CA	(213) 930-1313
Louisville, KY	(502) 456-4330
Milwaukee, WISC	(414) 273-4430
Omaha, NEB	(402) 397-8115
Pittsburgh, PA	(412) 343-7410
Rochester, NY	(716) 325-1680
Rockford, ILL	(815) 968-1552
San Francisco, CA	(415) 382-0911
Southfield, MICH	(313) 569-2828
Stamford, CONN	(203) 324-2232
Troy, MICH	(313) 585-4200
Tulsa, OKLA	(918) 622-6632

COMPU SEARCH®

Division of
Management Recruiters

EDUCATIONAL DATA PROCESSING SENIOR SYSTEMS ANALYST (Director)

7,500 pupils • 800 staff school district seeks highly competent individual to plan, recommend, operate total system (district has no current system). Starting salary \$21,551/22,271.

Educational experience desirable. Glendale, Arizona Elementary Schools, 5734 W. Glendale Ave., Glendale, Ariz. 85301 c/o Personnel Services, (602) 931-9311, Mr. Polhemus.

ANNOUNCEMENT OF VACANCY

The Center for Technology and Administration of The American University seeks to fill one faculty position in the field of Computer Systems Applications. Faculty members in the Center are engaged in teaching and research.

The Center is one of the few multi-disciplinary academic units in the United States which has a permanent faculty and offers degrees in both the bachelor's and masters levels. Programs are presently offered in six areas: Computer Systems Applications, Management Information Systems, Environmental Systems Management, Operation Research, Science/Technology Policy and Administration, and Scientific and Technical Information Systems.

Applicants should have a doctoral degree in some field related to the Center's programs and objectives. Interest and experience in teaching and scholarly achievement is expected. Candidates should also provide evidence of experience, interest and training in computer systems applications, some research ability in quantitative approaches to modeling and decision-making, experience in managing and conducting research.

Rank and salary will be dependent upon qualifications. The American University is an equal opportunity/affirmative action employer.

Applicants should send resume before April 1, 1978 to:
Dr. John M. Richards, Jr.,
Director, Center
for Technology
and Administration
The American University
Washington, D.C. 20016
(202) 686-2513

SHELL OIL COMPANY TECHNICAL APPLICATIONS PROGRAMMING

Shell is expanding its Technical Applications Programming (TAP) department and currently has several openings for applications oriented professionals. TAP is housed in the modern Shell Information Center near the Houston Astrodome and supports Shell operations throughout the country.

Excellent career opportunities exist for both new graduates and experienced programmers/analysts. In addition to competitive salary and benefits, Shell offers:

- Primarily short term projects with total-project responsibility
- Opportunities to work with top engineering, computer science, and business professionals on a wide variety of projects
- Extensive data processing education available in-house.

All candidates must meet the following requirements:

Education

- Bachelor's or Master's degree in Computer Science or
- Bachelor's degree in Chemical or Electrical Engineering, Math or
- MBA with one of the above undergraduate degrees.

Experience/Interest

- 0-5 years' technical programming language experience
- Strong interest in Computing
- Good academic/job performance record.

Please send resume and college transcripts to:

P.L. Palfreyman
Professional Recruitment
The Shell Companies
P.O. Box 2463
Houston, Texas 77001.



The Shell Companies
Shell Oil Co., Shell Chemical Co.,
Shell Development Co.,
Shell Pipe Line Corp.

People working with energy
An equal opportunity employer
M/F

DEC 10

The Midwest corporate headquarters of a multi-billion dollar financial institution is awaiting the arrival of a DEC System KL-10. To fully utilize the vast capabilities of this PDP 10 equipment, several highly analytically experienced systems analyst/programmers are needed to develop and work within this time sharing environment. As these positions are responsible to the Controller Department, typical projects would relate directly to annual statements, work force analysis, corporate planning and budget analysis and general financial applications.

Qualified candidates should possess demonstrated success with time sharing applications of a highly technical nature. Strong conceptual and analytical skills are also required, as each individual will handle projects from conception and design through final test stages. The ability to program in Fortran coupled with good interpersonal skills will qualify you for this position. Previous time sharing experience with exposure to DEC equipment and knowledge of interactive plotting devices is also preferred.

For immediate consideration, please submit resume in confidence, including salary history and requirements, to:

CW Box 1492, 797 Washington St., Newton, MA. 02160

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Electrical Engineers

Since 1969, we've been providing Confidential and Industry-knowledgeable placement across a wide spectrum of the Electronics market. Personal contact by former industry personnel professionals, with close ties throughout the industry, puts us in the position to find the right position for you. If you have been thinking of investigating new opportunities, we urge you to contact us in confidence for individual discussions of particular opportunities in your career field, or to submit a confidential resume with salary information for review. Client companies assume all fees. For those who find it inconvenient to call during working hours, our office will be open until 7:30 P.M.

Data Communication Specialist -- BS/BSEE and some experience in the design of advanced data communications, including high speed modems, multiplexers, intelligent network processors, synchronous data link control (SDLC). **Salary to \$30,000**

Process Control Engineers -- Degree in Engineering with background in Computer Sciences. 3-5 years of experience in the Application of Process Control Computers within the Petrochemical, Chemical, Pulp and Paper or Textile Industries. **Salary to \$25,000**

Test Equipment Design Engineers -- BSEE with Digital Design experience in developing prototype digital test equipment within a Systems Environment. **Salary to \$25,000**

Digital Logic & Circuit Design Engineers -- BSEE and some experience in Logic & Circuit Design, including a familiarity with DDT, TTL, CMOS, etc. **Salary to \$20,000**

Computer Architects -- BS/MSEE and 3-5 years of experience in the definition and development of Minicomputer Systems. Will be a principal participant in developing a new family of computer systems. **Salary to \$35,000**

Sr. Power Supply Design Engineers -- BSEE and 3-5 years of Design and Development of regulated and non-regulated power supplies. The application of this work will be to build an in-house capability within a systems organization. **Salary to \$30,000**

OEM Evaluation Engineer -- BSEE and 3-5 years of experience within a design and development organization. Will evaluate major OEM peripherals such as disks, tapes, printers, etc. **Salary to \$28,000**

Microprocessor Design Engineers -- BS/MSEE with detailed hardware and software background. Position entails logic design simulation and prototyping. **Salary to \$25,000**

Contact: Robert Norton

nk Norton, Kleven and Co., Inc.

INDUSTRIAL RELATIONS MANAGEMENT CONSULTANTS

Three Fletcher Avenue, Lexington, Massachusetts 02173

Telephone (617) 861-1020

Member Massachusetts Professional Placement Consultants
Representing Equal Opportunity Employers M/F

MANAGER TECHNICAL SERVICES

A challenging career opportunity exists for an individual to manage the technical services unit of an established information systems dept. This position is located at our corp. data center and would include company paid relocation to our So. Calif. location.

Experience required

Data Base Analysts 3 to 5 years with IMS/VS, Systems Software Sysgen and maintenance. Degree in science or math preferred. Excellent company benefits. Please send resume and salary history to director of personnel.

THE BEKINS COMPANY

777 Flower St.

Glendale, CA 91201

An Equal Opportunity Employer

More Than 75 Outstanding CPE Specialists Now Work
at FEDSIM. Join a Team of Experts!

The Federal Computer Performance Evaluation and Simulation Center (FEDSIM) is seeking both entry-level and experienced CPE analysts. FEDSIM provides consultant services to other Federal agencies in such areas as:

- Evaluating the performance of hardware configurations, operating systems, application programs, data base management systems, and communications systems. Applicants for these positions should have detailed experience in system programming, with such systems as MVS, EXEC-8 and GCDS and must have an understanding of both operating system internals and computer technology.
- Assessing the operational efficiency, management practices, and organizational effectiveness of data processing installations. Applicants for these positions should have experience in EDP management, EDP auditing, or EDP management consulting.
- Performing capacity planning studies, which include workload requirements analysis, configuration sizing and communications network design and evaluation, and providing ADP procurement assistance in such areas as benchmark design, specifications development, proposal evaluation and life-cycle planning. Applicants for these positions should have experience with hardware and software evaluation and with computer and/or communications system modeling techniques.
- Assessing the design and predicting the performance of special purpose computer systems, and analyzing the overall performance of complex systems that contain computers as integral subsystems. Applicants for these positions must be knowledgeable in Operations Research techniques, computer operating systems, and discrete-event simulation languages.

Salaries range from \$15,090 to \$30,750 with excellent opportunity for management responsibility. Advanced degree desired. Send resume of qualifications and salary history to:

Headquarters, U.S. Air Force

Oet S, 11dd ABG/OPCS

Washington, DC 2033d

Offices located in Alexandria, VA.

AN EQUAL OPPORTUNITY EMPLOYER

**Sr. Programming
Analyst to
Manage Remote
Computing Site**

MIT's Information Processing Services (IPS) has a position available for a Senior Programming Analyst to manage the East Campus Computing Facility (ECCF). Responsibilities include operational management of a PRIME 300, an RJE station, and a terminal room; evaluation and planning of ECCF needs; liaison between ECCF users and IPS; provision of user services with emphasis on statistics modeling, simulation, and econometrics; and supervision of a small support staff. Candidate must have a Bachelor's degree or equivalent combination of education and experience, preferably in computer science or a related field, and at least 5 years experience in computer programming or applications, including consulting experience and extensive use of large-scale computer systems. Demonstration of excellence in written and oral communication and interpersonal skills is required. Managerial interests and ability also required. Please submit resume with salary history to: MIT Personnel Office, 400 Main St., Cambridge, MA 02139. Attention: Job No. A77-91. An equal opportunity/affirmative action employer.

SYSTEMS & PROGRAMMING

MANAGER

National Corporation seeks an experienced Systems and Programming Manager for San Diego Based Division. Must have 3-5 years programming with COBOL, GCOS, OCS 2000 and MOD 1MSR. Experience with IBM, Burroughs, or Honeywell equipment in on-line environment, and data base management systems. Additional requirements include 2 years + analyst and systems management. Involving wholesale related applications (order entry, inventory, billing, etc.), on-line entry and inquiry, supervision of one or more programmers, and overall systems development responsibility. Salary commensurate with experience.

Send complete resume indicating previous work history, reasons for job changes, wages history and present requirements to: Computer World, 1434 Westwood Blvd., Ste. 9, Los Angeles, CA 90024.

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM II, Assembler and COBOL. Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:



W.M. Jones

**Harper-Grace
Hospitals**

Human Resources Department

3990 John R.

Detroit, MI 48201

(313) 494-8082

An Equal Opportunity Employer M/F

Computer Systems Specialists

Lockheed announces challenging career opportunities for qualified computer specialists in areas of hardware evaluation, planning, performance and systems software.

Hardware Systems Specialists

Qualified individuals will assume high level positions having direct interface with senior company management. Candidates should have a B.S. degree, at least five years in data processing experience, and knowledge of hardware/software systems. Individuals will perform evaluations, direct planning efforts, and manage the performance of current and future computing equipment for the company. Experience with IBM equipment, minicomputers, peripheral hardware, distributed systems, and data communications is desirable. For further information, call Dick South collect at (213) 847-6121.

Software Systems Specialists

You will be a member of a team maintaining the MVS operating system for two IBM 370-168's which support more than two hundred on-line terminals under IMS/VS, TSO, RJE and interactive graphics. The organization is moving rapidly this year into distributed processing with terminals attached to minicomputers in turn attached to the host 370. IBM 3850 Mass Storage and 3350's are already installed. Candidate should have at least five years experience in sysgens, installing PTF's, problem diagnosis, and assembly language coding. Most recent experience should be with MVS and prior experience with MVT. Degree in Computer Science is preferred. For further information, call Duane Bickel collect at (213) 847-6121.

These positions command excellent salaries and fringe benefits including savings, medical and dental plans.

Please write or send resumes to Bill McVeda, Lockheed Employment Office, P.O. Box 551, Burbank, CA 91520.

LOCKHEED
Lockheed-California Company
Burbank, California
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

ALL AT ONCE IT'S HARRIS!

The Computer Systems Division of Harris Corporation is perhaps the fastest growing division within our Fortune 500 company. New Divisional Headquarters are in the process of being built in the highly desirable Fort Lauderdale location where we are now situated. Most of the positions listed below will be situated in Florida, where the cost of living and the climate, as well as recreational activities are highly desirable.

SENIOR SOFTWARE ENGINEER

Due to the rapid introduction and sale of our S-100, S-200 Computer System, which incorporates the VULCAN, multi-purpose virtual operating system, our Quality Assurance group has established this new growth position. The individual we seek must have a BS or MS degree in Computer Science or math and a minimum of 5 years' solid experience in operating systems coupled with some in-depth exposure to compilers. Language capabilities should include a minimum of Assembly, FORTRAN and COBOL. In addition, communications skills, both verbal and written, will be necessary. Functional responsibilities include: establishment of Quality Assurance tests with appropriate documentation and advance planning for continuous software testing. In accomplishing these tasks, vertical and lateral communication with key management personnel will be expected. Software oriented individuals with familiarity with CPU's and Operating Systems from CDC, H-P, DEC, UNIVAC, and/or IBM will help in determining applicant's success.

FIELD MARKETING ANALYSTS

The individuals we seek will have broad exposure for pre and post analyst field support. We prefer experienced systems personnel having backgrounds with Honeywell, UNIVAC, Control Data, IBM, or RCA mainframe exposure. Experience in FORTRAN and COBOL with a solid grasp of operating systems will be helpful in aiding our customer revenue base. This position is the result of a solid product line and competitive expansion in the data processing community. Individuals seeking a company with a future in the data processing community should consider HARRIS. We prefer degreed individuals with 3+ years' experience in the field. Several positions are available throughout the United States, including Florida.

SENIOR ANALYSTS

Several positions are available in addition to field marketing which includes the following areas: software development, including the development of systems software, the development of high level compilers and implementation of software product plans and marketing strategies. MIS - includes programming responsibilities which involve implementation of a comprehensive marketing forecast system and system design. Also, will assist with the development of the front-end order entry system.

SENIOR FIELD SERVICE ENGINEERS

Several positions are now available throughout the United States and parts of Canada for experienced individuals having a minimum 2-5 years' in large to medium scale computer systems. Hardware and software knowledge, as well as installation, troubleshooting, maintenance and repair on peripheral hardware necessary. The most successful candidate will come from CDC, UNIVAC, Honeywell, IBM, DEC or H-P.

SENIOR DESIGN ENGINEERS

Two positions exist at our Fort Lauderdale location in the Computer Systems Engineering Department. The first position involves peripheral systems and will be responsible for the development of magnetic tapes and disc storage systems, including the specification and design of system controllers, evaluation and selection of existing OEM products and advanced product planning. Additional responsibilities include project scheduling, budgeting and supervision of technicians.

The second position involves computer terminals and the development of computer terminal systems as they would relate to CRT's and teleprinters, including terminal systems and subsystem logic design. Also, advance product planning, project scheduling and budgeting, as well as supervision of development technicians.

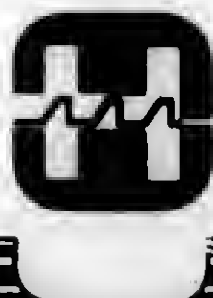
Both of the above positions require a Bachelor's degree in electrical engineering with 3-6 years' experience for peripheral systems and 2-5 years' experience in the case of computer terminals.

LOGIC DESIGN ENGINEERS

Individuals experienced in the design and development of digital computers will be most welcome in our engineering development area. We prefer degreed individuals having a minimum of 2-5 years' experience in the development of CPU circuit design.

Send your resume and salary history in strictest confidence to: Mr. Robert M. Coyner, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309 or call direct on our toll free watts line 800-327-4989.

An Equal Opportunity Employer Male and Female



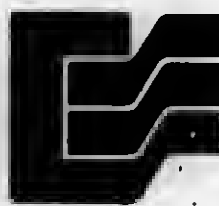
HARRIS
COMPUTER SYSTEMS
A DIVISION OF HARRIS CORPORATION

Earn an all expense paid trip to the Middle East. Go to work there.

If you're a Senior Computer Systems Analyst, E-Systems can offer you more than just a job, but an exciting career beginning with an initial assignment in the Middle East.

Specifically, we have openings in Saudi Arabia, Egypt and Oman for persons with five to ten years experience in computer based systems using large mainframe computers and mini computers, and a BS/MS degree in Computer Science or EE. Obviously, these positions aren't for everybody. But if you'd like to travel, see the world and make good money at the same time, send us your resume today.

E-Systems is the answer.



E-SYSTEMS

Garland Division

An equal opportunity M/F employer

Send your resume to:

Employment Manager
E-Systems, Inc.
P.O. Box 226118
Dallas, Texas 75222

SYSTEMS PROGRAMMER

Washington University in Saint Louis is searching for a qualified candidate to assume the position of Systems Programmer for a DEC-20 installation in the School of Engineering.

Responsibilities will include: 1) maintaining a highly reliable and attractive DEC-20 installation through careful systems analysis, tuning and testing, with complete documentation; and 2) through liaison with the University Computing Facilities Systems Programmers, develop and expand on a continuing basis a two computer network for both high throughput and highly interactive computing.

Desired qualifications include substantial experience in DEC-10 and/or DEC-20 system software, and suitable educational background in Computer Science or related areas. Candidates should submit a resume, with references, by April 1, 1978, to:

Director, Box 1110
Computing Facilities
Washington University
St. Louis, MO 63130
An EOE/AA

INSURANCE SYSTEMS

Jack Edwards Associates specialize exclusively in insurance data processing. We deal with a select number of highly professional companies who are looking for the best people available. Your career is reviewed and opportunities discussed on a one to one basis.

We are now looking for a Sr. Programmer (\$24,000), a Project Manager (\$30,000), and a Technical marketing representative (\$35,000). If you are in the insurance field we'd like to hear from you.

Jack Edwards Associates
Suite 600
2650 Lakeside Drive
Vienna, Virginia 22180
(703) 891-0688
Insurance Personnel

DATA PROCESSING

SYSTEMS DESIGN/SUPPORT

Brodart, an industry leader in information services for the library marketplace, is expanding its systems design and programming capabilities in line with the increasing demand for its "products".

SYSTEMS ANALYST

Operating in a project team environment, analysts participate in the full range of systems design and analysis activities for a variety of applications areas: Inventory Control, Order Entry, Marketing, Accounting. Project assignments will provide exposure to large CPU as well as on-line mini-computer environments. One to three years of systems design experience including completion of one major project, a working knowledge of design techniques (file structures, access techniques, etc.) and programming requirements, and a familiarity with on-line mini-computer applications will be useful in satisfying position objectives.

PROGRAMMER

In support of project team design efforts this individual will modify existing programs or create new programs to satisfy systems requirements. Position activities include design of program logic, selection of subroutines, coding of program instructions, preparation of test data and analysis of program test performance, end program documentation. This assignment will provide significant exposures to mini-computer applications. At least one year of applications programming experience in a mini-computer environment and a familiarity with BASIC PLUS are highly desirable. (POP programming experience most desirable.)

These positions offer competitive compensation plans including a comprehensive fringe benefits program. Assistance is provided to facilitate your relocation to our headquarters operation in Williamsport.

Interested candidates are requested to submit a full resume and salary history for consideration. Qualified candidates will be contacted by March 27, 1978.

Thomas E. Wozniak
Manager, Personnel Administration



**THE
LIBRARY
COMPANY**

BRODART, Inc.
1609 Memorial Avenue
Williamsport, PA 17701

An Affirmative Action
Equal Opportunity Employer (M/F/V/H)

position announcements

position announcements

position announcements

position announcements

position announcements

PROJECT DIRECTOR

This top level position, will be responsible for development and implementation of a major automated claims processing system. The project is being financed by a consortium of seven corporations. The Project Director will have a development staff of 40 to 60 EDP professionals and must work with other professional disciplines.

The successful candidate will have 5-10 years experience in EDP general management and will have directed several large and complex projects to completion. The Project Director will possess superior communications skills and have the ability to interact with the highest levels of management. His broad experience will have crossed the lines of data processing, finance, product development and claims operations. Familiarity with government claims systems would be advantageous. A degree is required.

The exceptional compensation package is commensurate with the magnitude of the project.

Send resume and salary history in confidence to P.O. Box 5580, Department RH, Dallas, Texas 75222.

**EXECUTIVE DIRECTOR
COOPERATIVE COMPUTER CENTER**

Located in west suburban Chicago, the Cooperative Computer Center serves the administrative data processing needs of three Board of Governors Institutions: Chicago State University, Governors State University, and Northeastern Illinois University. Resources include a staff of 60, production software developed by SCT Corp. and an ITEL AS/4 computer supporting several RJE stations in an OS/VS1 environment.

Reporting to a council of the three university presidents, chaired by the governing board's Executive Director, the Executive Director is responsible for optimizing the performance of present resources, developing long-range AOP plans, preparing operating budgets, recruiting staff, allocating resources, project management, and ensuring that the universities receive timely and accurate management information.

Minimum academic qualification is a bachelor's degree; an advanced degree in Computer Science or a related field is preferred. In addition, candidates should possess significant technical and administrative experience related to the management of an administrative computer center. Such experience should include a successful record of planning, budgeting, policy development, coordination and technical leadership for cost-effective university information systems. Candidates must be able to establish effective working relationships both with senior executives and technical personnel, and be sensitive to the varying information needs and political considerations within a university cooperative.

Starting annual salary will be \$33,000 to \$37,000, depending upon experience.

Resume references and salary history must be received by March 31, 1978 and should be addressed to: Dr. Donald E. Walters, Chairman, CCC Director Search Committee, Board of Governors of State Colleges and Universities, 544 Iles Park Place, Springfield, Ill. 62718. An Equal Opportunity/Affirmative Action Employer.

**DATA PROCESSING POSITIONS
SAUDI ARABIA**

A rapidly growing systems management company has immediate openings in Riyadh, Saudi Arabia.

PROJECT MANAGERS

Challenging positions involve development and operation of innovative TP systems for government agencies. Will manage international staff of DP and micrographics professionals with interaction at the highest levels of government. Must have at least 10 years solid DP experience and at least 5 years in significant management positions. Experience with large scale IBM TP systems required.

OPERATIONS MANAGERS

Challenging positions involve operation of large-scale IBM Teleprocessing system, multi-shift data conversion efforts, and micrographics production. Must have at least six years solid Data Processing experience and at least two years in significant management systems.

SYSTEMS PROGRAMMERS

Positions involve implementation and maintenance of an innovative IBM 370 TP system with CRT and Microfiche terminals. At least two years in-depth experience maintaining IBM OS TP systems required, preferably CICS with 3270 terminals. Must be able to maintain system single-handedly.

SENIOR SYSTEMS ANALYSTS

Minimum of five years experience in analysis and design of business TP applications. Must be knowledgeable in COBOL and IBM OS TP systems, preferably CICS and 3270 terminals. Should be capable of leading large projects.

PROGRAMMER ANALYSTS

Minimum five years experience in applications design and programming in a TP environment on IBM 370 OS systems. Must be fluent in COBOL and assembler and possess knowledge of IBM's CICS and 3270 terminals.

COMPUTER OPERATORS

Minimum two years experience as Senior Operator of IBM OS teleprocessing system.

OPERATIONS INSTRUCTORS

Will be responsible for operations training of Arabian personnel. Must be completely familiar with IBM computer operations and possess instructor skills.

KEYPUNCH INSTRUCTORS

Will train Arabian personnel in keypunch and verification skills. Must have significant practical experience, possess instructor skills, and speak Arabic.

Salaries commensurate with experience. Excellent benefits. Six weeks paid vacation annually with round-trip air fares to place of residence. Free furnished housing and free education for children. Send resume and salary history to:

SYSOREX INTERNATIONAL, INC.

10590 North Tantau Avenue
Cupertino, CA 95014
Attn: J. Singleton

**COMPUTER SCIENCE PROFESSIONALS
MEET THE CHALLENGE WITH GULF**

Build a meaningful career in southwest Houston at Gulf Oil's newest and most advanced computer complex. Gulf Science & Technology, one of the operating companies of Gulf Oil, offers an excellent benefit package and competitive starting salaries for...

APPLICATIONS PROGRAMMERS

These positions offer the qualified data processing professionals challenging work assignments in a state of the art computer complex. These positions also offer outstanding potential for career growth and advancement for the person who is willing to meet the challenge.

Prerequisites include a degree in Computer Science or related field, 2-5 years experience in commercial applications programming using COBOL and/or ALC in a 370/OS-VS or MVS environment. Good working knowledge of IBM JCL and experience with IMS, TSO, and VSAM a definite advantage.

Salaries will be commensurate with education and experience. Qualified applicants are invited to submit their resumes including salary history to:

Mr. J.P. Haney

**GULF SCIENCE
& TECHNOLOGY CO.**

Drawer F-71
P.O. Box 36506
Houston, TX 77036

An Equal Opportunity Employer M/F

PROGRAMMERS

Openings presently for our banking data services. Positions require a minimum of 3 years programming experience. Must have experience in Assembler language and DOS in banking industry. CICS, DOS/VS, and COBOL experience desirable. We offer a challenging opportunity for technical growth, excellent benefits, and pay commensurate with performance. Send resume or call for interview appointment.

CONNOR LECTION
(213) 642-2337

Service Bureau Company
A Div. of Control Data

**CONTROL DATA
CORPORATION**
8616 La Tijera

Los Angeles, CA 90045
An Affirmative Action Employer M/F

**COMPUTER
SALES**

We are looking for sales professionals to sell our mini-computer systems to end-users. For the right individuals, these are truly unique and unusual opportunities for career and financial growth. To be considered, applicants must have prior sales/marketing experience in the mini-computer and/or small computer business systems marketplace. Compensation will include base salary plus incentives, and a liberal employee benefit package. Send detailed resume including current earnings to our Employment Manager.

LOCKHEED

ELECTRONICS COMPANY
U.S. Highway 22
Plainfield, N.J.
An Equal Opportunity
Employer M/F

**POSITIONS
NATIONWIDE
CALL TOLL FREE
800-426-0342**

SYS PROGS To 35K
DOS/VS, IMS OS-MVS, H600-OS
& CDC.
PROG ANALYSTS To 24K
Burroughs exp. in mfging, sales &
finan.
COBOL PROG To 22K
2-3 yrs. exp. in any application
PROJ LEADERS To 25K
Prod./Control, Inventory &
mfging.
PROCESS CONTROL
TECH. MGR. To 43K
MSEE & 8 yrs experience
OB DESIGNER To 28K
IBM 370/OS enviro. INS back-
ground preferable.

BILL ISGRIG
PARKER PAGE ASSOC.

P.O. Box 12308
Seattle, WA 98111
Offices in Wash., D.C.,
Chicago, Atlanta, Portland, Or.

**MIS
DIRECTOR**

Major medical center seeks an experienced, results-oriented Director to assume responsibility for the Management Information Services Division.

Candidates should have extensive senior-level experience in a large data processing operation, strong management and communications skills, and the ability to develop and implement a comprehensive hospital information system. Previous experience in a health care environment preferred.

Submit detailed resume, including salary history and availability in strictest confidence to:

Edward A. Berger
Recruitment Director

JACKSON MEMORIAL HOSPITAL

1611 N.W. 12th Avenue
Miami, Florida 33136

An Equal Opportunity Employer

**OPPORTUNITIES FOR COMPUTER PROFESSIONALS
IN BUSINESS COMPUTER APPLICATIONS:****ANALYST
PROGRAMMERS**

We have openings for experienced individuals who have a proven track record in large applications systems using advanced IBM 370 hardware and software technology. If you desire to help us ready for the 1980's, if you produce quality systems on time,

within budget, within specifications, you may like the challenges.

SENIOR ANALYST PROGRAMMER

Northeast Utilities needs you if you can help form our medium and long range EDP plans with emphasis on systems solutions to utility business problems. You should have extensive experience in large scale (IBM-MVS-TP) integrated business systems. We also expect you to be current on data base, distributed processing, word processing, text processing and retrieval techniques. Obviously, all your work should be based on rigorous cost benefit analysis methods.

Please apply in writing with educational, employment and salary history to:

Mrs. Linde Heidenis

NORTHEAST UTILITIES

P.O. Box 270, Hartford, Conn. 06101

The Connecticut Light and Power Co.
The Hartford Electric Light Co.
Western Massachusetts Electric Co.
Holyoke Water Power Co.
Northeast Utilities Service Co.
Northeast Nuclear Energy Co.

an affirmative action, equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

Data Processing

COMPUTER PROFESSIONALS**CHICAGO AREA****SENIOR PROGRAMMER ANALYST**

We currently have several openings for a Senior Programmer Analyst with at least two-five years actual Assembler Language programming experience under DOS or OOS/VS. A working knowledge of COBOL would be beneficial as well as experience with LIFE/70 or other insurance consolidated systems such as CFO or LIFE/COMM. Your responsibilities will include the installation of LIFE/70 and the modifications and enhancements necessary to accomplish this.

SENIOR SYSTEMS ANALYST

Several openings currently exist for a Senior Systems Analyst with at least 3-5 years experience, preferably in the insurance industry, including manual and computer systems design and implementation. LIFE/70 or other consolidated insurance systems experience is very desirable. Programming experience desirable but not mandatory. Your responsibilities will include development of computerized systems as well as the conversion to LIFE/70.

We are a fast growing Life Insurance Company specializing in pension and association group business. In March we are upgrading our hardware to a 370/148 operating under OOS/VS. We offer top salaries and comprehensive benefit package, including dental insurance and an incentive savings program; advancement opportunities from within and a location convenient to all public transportation.

Send resume in confidence to:

CW Box 1471
797 Washington St.
Newton, MA 02160
Equal Opportunity Employer M/F

**SYSTEMS ANALYSTS****NEW YORK, BOSTON,****CHICAGO, DALLAS, WASHINGTON, D.C.**

COMTEN, a leading manufacturer of Communication Systems and Performance Evaluation systems, offers career opportunities to experienced professionals in the following disciplines:

PERFORMANCE EVALUATION

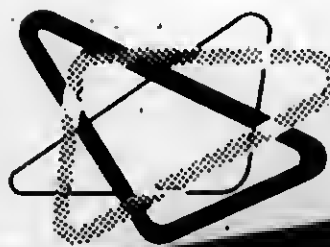
Pre/post sales support . . . installation and implementation planning of all COMTEN hardware measurement equipment . . . analysis of large scale (IBM 370/145 equivalent or above) machine environments.

TELECOMMUNICATIONS

Pre/post sales support . . . design and development of client telecommunications networks . . . installation and maintenance of COMTEN communication software.

Qualified candidates should possess knowledge of large scale systems (MVT, SVS, MVS), inter-communicative ability, 2-3 years programming experience in BAL, JCL and OS utilities. Hardware diagnostic ability desirable but not essential. Excellent salary and fringe benefits. Send your resume and salary history in strictest confidence to:

Jane Christenson
1950 West County Road B-2
St. Paul, MN 55113

**COMTEN**

We Are An Equal Opportunity Employer M/F

NLT**Computer Services Corporation**

AN AFFILIATE OF NLT CORPORATION

Needs a Few More Good People!

Our rapidly expanding business is creating opportunities for professionals who wish to grow with us.

We have a position available in DEBUQUE, IOWA which requires heavy experience in manufacturing applications, project management or equivalent responsibilities. The position will require daily user interface, and qualifications need to include a programming background with COBOL or BAL.

As a leading computer service company, our environment is one of on-line RJE, IBM 168-VS. We provide a wide variety of application services to several special industry groups - serving our customer utilizing remote batch, on-line, and mini computers.

The right person can expect excellent benefits and solid salary plus commissions coupled with outstanding promotion possibilities.

If you are looking for a "fast track" on which to apply your skills - and you are sharp, aggressive, and addicted to challenge - send your resume and salary history to:

Mike Head
Director of Personnel
NLT Computer Services Corp.
National Life Center
Nashville, TN 37250

Programmer Analyst

International manufacturer in new facility, on Chicago's northwest side, seeks analyst with degree or commensurate experience for order entry/marketing or manufacturing applications.

This position requires a solid COBOL background, analytical ability and strong USER orientation. Data base manipulations experience is highly desirable.

We offer an in-house orientation program with an excellent salary and benefit package commensurate with ability. Please forward resume, in confidence, to or call:

SKIL POWER TOOLS

Patrick Murphy
286-7330
4801 W. Peterson Ave.
Chicago, IL 60646
Equal Opportunity Employer

**SYSTEMS COORDINATOR
UNIVERSITY STUDENT
RECORD SYSTEMS**

Responsible for managing team of Computer Systems Analysts/Programmers to design, develop, program and implement student information systems in major state university, 23,000 students. Acts as project leader in new and existing applications, provides Computer Center interface with user department personnel. Must possess excellent communications skills, technical background in systems analysis and programming, familiarity with university systems environment and senior supervisory experience. Prefer M.S. in appropriate field, COBOL and IBM-JCL knowledge, familiarity with student records and registration, on-line systems orientation. Salary high teens.

**SYSTEMS PROGRAMMING MGR
CENTRAL FLORIDA
REGIONAL DATA CENTER**

Requires strong background in IBM OS/MVT and MVS operating systems software to manage systems programming team and provide technical support in 270/165-II Regional Data Center environment servicing two large state universities. Currently MVT/HASP, CICS, TSO moving to MVS/NJE/JES 2. Center is node in State University data center network. Heavy technical training and experience plus proven record of supervisory and management responsibility in similar Center required. B.S. or M.S. in Computer Science, Engineering or Science, and background in major university computer environment preferred.

APPLICATION DEADLINE BOTH POSITIONS MARCH 31, 1978
Affirmative Action Equal Opportunity Employer

Resume to:
Director,
Central Florida
Regional Data Center
UNIVERSITY OF
SOUTH FLORIDA
Tampa, FL 33620

**D.P. SALES ENG.
\$18,000 + COMM.
Houston Area Res.**

Exp selling small D.P. systems or acctg machines. Southern U.S. Attain \$25K-\$30K 1st yr. 3 yrs new acct sales. Total hardw/softw'r systems for ins., banking, retail & public utility ind.



ROSS personnel agency
20 Rte 110, Melville
LI, NY 11746
(516) 549-5656

PERTEC CAREERS

- **FINANCIAL SYSTEMS MANAGER**
(Data Based)
- **FIELD SUPPORT MANAGER**
- **MARKETING COMMUNICATIONS MANAGER**
- **PRODUCT LINE MANAGER**
- **ENGINEERING MANAGER**
(Applications Software Software Engineer, Sustaining Engineer, Albuquerque)
- **SYSTEMS ANALYST**
(Personnel & Manufacturing)

PERTEC is a dynamic peripheral and micro-computer firm located in the Los Angeles area with excellent benefits which include a dental plan, 12 personal leave days and a paid facility shut-down between Christmas and New Year.

Expansion and growth create the environment for your career here at PERTEC.

Send resume to Personnel Department.

PERTEC MICROSYSTEMS

a division of Partec Computer Corporation

21111 Erwin, Woodland Hills, Ca 91367

An Equal Opportunity Employer M/F

**COMPUTER SALES
MAKE THE KILL
IN 5 MINUTES
INCREDIBLE BUT TRUE
DO YOUR OWN DEALS!**

The fast growing BILLION DOLLAR used computer industry is the place!

Quick sales . . . some as quick as 5 minutes.

Doing the Deal Yourself . . . and getting the financial and personal satisfaction that comes from a "deal".

Your sales arena has no geographic bounds . . . and no product line bounds . . . whether you have sold: mainframes, peripherals, minis, PC, terminals or have sold for: Computer manufacturers . . . or distributors!

FIND OUT HOW TO PARTICIPATE IN THIS EXCITING AND REWARDING PROFESSIONAL SALES OPPORTUNITY.

Call the President (617) 261-1100

AMERICAN USED COMPUTER CORPORATION

712 Beacon St., Boston, MA 02215

position announcements

position announcements

position announcements

position announcements

position announcements

Is Your Job Holding You Back?



ASC is a leading D.P. consulting firm which can offer you the opportunity of your lifetime. We are in need of talented and dedicated technicians and will provide the following for them:

- Excellent Salaries Per Diem Allowance
- Paid Vacations and Holidays
- Company-Paid Major Medical Insurance
- Life Insurance for you and your family
- Welcome back bonus for previous employees

Call our TOLL FREE number Monday Thru Saturday and ask about our numerous D.P. job openings.

1-800-543-7583

ALLEN SERVICES CORP

DAYTON AIRPORT OFFICE

212 West National Road

Dayton, Ohio 45377

In Ohio call (collect)

(513) 890-1200

An Equal Opportunity Employer M/F

SR. DATA BASE ANALYST

Immediate opening for an experienced Sr. data base analyst to provide technical support in the design and use of data bases required background must include two years experience of IMS/VS data base design and back-up/recovery exposure to IMS/VS data dictionary would be an asset.

Excellent Benefits
Glendale Location

Please submit resumes complete w/salary history to:

BEKINS

777 Flower Street
Glendale, CA 91201

Attn: Director of Personnel
An Equal Opportunity Employer

SALES

A Rare Opportunity In SALES...

If you have the credentials of a professional marketing person - a real talent for making things happen - a determination and persistence to close business - the ability to deal with top level businessmen - tangible successes in sales and/or sales management to support your confident manner - and you have a marketing job for which is unequaled in our business.

Continuing demand for our product has outpaced our ability to cover the marketplace. We are seeking additional sales professionals to fill marketing territories immediately available in the Chicago, Houston, Detroit, Boston, Philadelphia, San Francisco, Los Angeles, Atlanta and New York/New Jersey areas. If you have the desire to move into sales management, our growth is going to create management openings. Our sales and sales management candidates must have a college degree, a minimum of three years of computer sales experience and sincere interest to be a part of an energetic and exciting company.

If you are this highly qualified sales professional interested in real personal growth opportunities through hard work, send your resume in confidence to:

Mike Starr
OR CALL TOLL FREE
800-336-0170

Tesdata
SYSTEMS CORPORATION

7921 Jones Branch Drive
McLean, Virginia 22101

An Equal Opportunity Employer M/F

PROGRAMMER ANALYST

Maine based co. w/small progressive EDP dept. seeks min. 2 yrs. exp. COBOL + min. 6 mos. analysis. RPG-II a plus. Hardware IBM 370 DOS/VS. Good growth opportunity. \$21-\$28,000 (Fee Paid).

ROBERT HALF PERSONNEL AGENCIES

140 Federal St.
Boston, Mass. 02210
(617) 423-6440

EDP SUNBELT OPPORTUNITIES \$18,000 to \$30,000+

IMS professionals!! Your expertise and talents are in great demand throughout the Southeast & Southwest. Currently we have on file numerous career opportunities from Programmer/Analysts to Technical Support to Sr EDP Mgmt. All offer competitive starting salaries and excellent employee benefits. Client cos pay all fees including interview and relocation expenses. No contracts to sign. For specific information on these positions contact J. Schwab, (704) 375-0600 or send resume in confidence to:

FOX-MORRIS PERSONNEL CONSULTANTS

1742 Southern National Center
Charlotte, N.C. 28202
Specialists in EDP Placement

computer hardware



and software candidates RELAX

SUPERIOR RESOURCES
16400 Ventura Blvd.
Encino (L.A.), CA 91436
(213) 986-4400

COMPUTER CAREERS, INC.
Specialists-Data Processing
4720 Montgomery Lane
Suite #503
Bethesda, MD 20814
(301) 654-9225

BRENTWOOD PERSONNEL ASSOC.
Computer Division
1280 Route 46
Parsippany, N.J. 07054
(201) 335-8700

D. BROWN & ASSOC.
Dorothy Spletet
DP Specialist
610 S.W. Alder, Suite 711
Portland, OR 97205
(503) 224-6860

members of
National Personnel Associates
Specializing in DP

INTERNATIONAL SALES

IPS Computer Marketing Corp. is a major international dealer in used IBM computer equipment. We are looking for a marketing representative for international sales, working out of our offices in Fort Lee, New Jersey (suburb of New York City). At least five years sales experience required, with minimum of two years experience in international market. Previous sales experience should be in data-processing-related area. Prefer someone now living in New York City area. High earning potential through commissions. Some international travel required. Please send resume (no telephone calls) to G.H. Hellborn, President.

IPS

Computer Marketing Corp.
2460 Lemaire Avenue
Fort Lee, New Jersey 07024

Compiler and Software Design

Project leadership to coordinate the work of program areas and provide technical leadership and guidance. Perform system design, structure and design of compilers, code generator, linker, loader, source level debugger. Ensure on time delivery of software. Enforce documentation procedures.

Experience in compiler design and optimization. Knowledge of structured programming techniques and structured languages. Computer Science degree or equivalent with minimum four years appropriate experience. Understanding of peripheral drivers and control software. Knowledge of microcomputers desirable.

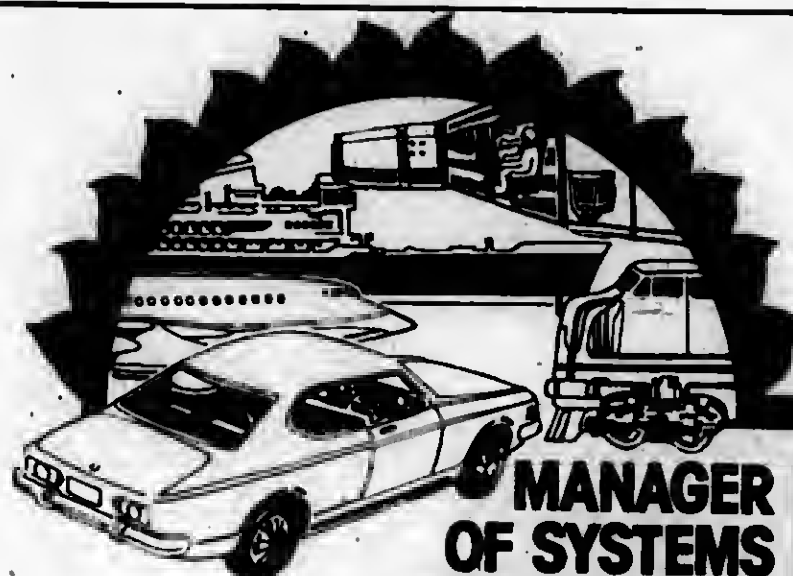
Tektronix, Inc. develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Mary Walhood, TEKTRONIX, INC., P.O. Box 500, C11, Beaverton, Oregon 97077.

An Equal Opportunity Employer M/F/H

Tektronix
COMMITTED TO EXCELLENCE



MANAGER OF SYSTEMS DEVELOPMENT - TECHNICAL SUPPORT

As a leader in the field of electronic testing equipment, we rely heavily upon data processing operations to support our status and on-going expansion. Our recent development from DOS/VS/POWER IBM 125 environment to a data base end VS/9 environment has created a challenging career opportunity for a Manager of Systems Development-Technical Support.

The responsibilities for this position are directing system programming, standards, production control, data base management, telecommunications, and the technical evaluation of production systems.

You should have a degree in Computer Science or equivalent, a minimum of 4-5 years experience in a VS/9 or OS environment and a minimum of 3 years management experience. Heavy user liaison experience is a plus. Excellent compensation package includes a salary in the mid \$20s and comprehensive benefits. Send resume complete with salary history and expectations, in confidence, to:

EMPLOYEE RELATIONS DEPARTMENT

Sun ELECTRIC CORPORATION

3011 E. Route 176
Crystal Lake, Illinois 60014

An Equal Opportunity Employer m/f

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

USE THE ATTACHED
ORDER FORM AND
THIS ENVELOPE TO

a new subscription
new address
new title
new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



**797 Washington Street
Newton MA 02160**

position announcements

position announcements

position announcements

position announcements

position announcements

\$45,000 to \$12,000

**DIRECTOR, MIS
SYSTEMS MANAGER
PROGRAM MANAGER
SOFTWARE MANAGER
OPERATIONS MANAGER
PROJECT MANAGERS
SYSTEMS ANALYSTS
PROGRAM/ANALYSTS
PROGRAMMERS**

NO FEES TO PAY OR CONTRACTS TO SIGN. The above positions are located throughout INDIANA and the USA. Salaries are commensurate with expertise, disciplines and ability to relocate. For prompt consideration in confidence call or write GENE SANDERSON, O'SHEA SYSTEMS, 107 N. Penn., Suite 801, Indpls., Ind. 46204. Phone (317) 632-1381.

Computer Specialist

Advanced Data Communication and Techniques

Salary, \$24,000

This is an opportunity to take a central position within this NYC based major multinational company's EDP operations. In this key spot, you will fulfill a maintenance function to assure the operating status of communications hardware and software, and develop, adept and disseminate a wide variety of software packages and techniques to programming and operating staff.

To match these requirements, we seek an individual with 2 to 3 years experience in systems, programming and operations, and 1 to 2 years in techniques and communications. Highly creative talents and the ability to communicate well with other computer staff, many of whom will be at distant locations, is essential. Knowledge of Honeywell large systems is desirable, but by no means mandatory.

If you would like to learn more about this opening, send resume with salary history to:

CW Box 1482
797 Washington St.
Newton, MA 02160

SENIOR SCIENTIFIC PROGRAMMER ANALYST

Arch Mineral Corporation is seeking a Senior Scientific Programmer Analyst for its corporate office in St. Louis, MO.

Requirements include a BS or MS degree in physical science or engineering, 3 years minimum experience with broad computer exposure, time sharing and mini-computers. Experience in Fortran, Basic and data base techniques. Mining experience a definite plus.

Duties will be to assist engineering and mining personnel in defining their needs and translating them into computer systems. Salary dependent upon qualifications. Excellent comprehensive benefits package. Send resume, including salary history to:

Robert Specking
Arch Mineral Corp
500 North Broadway, Suite 1800
St. Louis, MO 63102

ASSISTANT DIRECTOR CORPORATE SYSTEMS

A Midwest Fortune 1000 Corporation is seeking to fill this position in its corporate headquarters. The position reports to the Director of Corporate Systems.

The individual will direct the activities of the entire corporate development staff and will be responsible for a budget of \$300K. College degree would offer an advantage, equivalent experience accepted. Candidate should be acquainted with information requirements for the product distribution process in a manufacturing environment.

Candidate should presently be earning \$18 to \$25,000. All replies held in strict confidence. Our employees are aware of this search.

Send resume and compensation history to:

CW Box 1481
797 Washington St.
Newton, MA 02160

An Equal Opportunity Employer

FOREIGN ASSIGNMENTS

Middle East, West Africa,
North Sea, Southeast Asia,
South America

- Data Processing Manager
- Systems Programmers
- Lead Systems Analyst

Our position as a worldwide leader in engineering and construction services for the energy industry has brought about extensive expansion of our overseas operations. New and on-going projects in such areas as structural fabrication, installation and hook-up, marine pipelaying, LNG facility construction, pipe rolling and dredging have created several growth-oriented opportunities for the following professionals:

All positions offer excellent salaries, overseas premiums, benefits package, single or family status (dependent on job) and travel (dependent on job).

If your background encompasses one of the positions listed please submit resume in confidence, including salary requirements to our Personnel Department, Oceanic Contractors, Inc., P.O. Box 61961, New Orleans, Louisiana 70161. An Equal Opportunity Employer M/F



Oceanic Contractors, Inc.
A wholly-owned subsidiary of
J. Ray McBurnett & Co., Inc.

PROGRAMMER ANALYST

\$12,997-\$18,364

Exciting opportunity now exists in our Silver Spring, Maryland based administrative offices for an experienced programmer analyst to assist in the design, implementation and maintenance of on line administrative and financial systems. This is a merit system position offering excellent fringe benefits, annual salary reviews and a starting salary to \$15,400, depending upon experience. Requires bachelor's degree in computer science or related field with experience in programming and systems analysis. Experience with HP 3000 or similar equipment is desirable as is exposure to RPG II and COBOL. Send resume by March 17 attention: Programmer Analyst Recruitment, Employee Relations and Development Office, MNCPPC, 8787 Georgia Ave., Silver Spring, MD 20907. An equal opportunity employer; M/F.

**The Pros of
working and living
in Houston**



- Dynamic Business Community
- Attractive Cost of Living
- Warm Climate

Our client is currently scheduling expense paid interview for qualified applicants during the next several months.

If you are degree and have expertise in each of the following:

- Programmers/Systems Analysts/Project Leaders
- Business or Scientific Applications
- COBOL, PL-I, or FORTRAN
- 370/OS

Send us your resume, or call us collect (station-to-station) at (713) 621-9811 and we will appraise your chances.

Scientific Placement, Inc.
EMPLOYMENT SERVICE 2700 SOUTH
POST OAK ROAD Dept. 52
HOUSTON, TEX 77056 713-621-9811

WHAT IS THE STATE-OF-THE-ART? OTHERS TALK ABOUT IT WE'VE GOT IT!

Many organizations talk about it, but we at the Systems Research and Development Organization of Federated Department Stores are actively and presently involved in it.

We are using top down design, structured programming, structured design techniques, Warnier diagrams, and structured walk throughs...

We are totally dedicated to IMS and are presently using 1.1.4 and are in the process of developing a sophisticated teleprocessing network in the United States to support over 20 operating divisions from New York to California.

WHERE DO YOU FIT IN? PROGRAMMER ANALYSTS

We are presently looking for several intermediate Programmer/Analysts and are fully prepared to train in the latest State-of-the-Art techniques. If you have solid analytical skills through two or more years work experience in OS, COBOL, and will dedicate yourself toward personal development and excellence, we will provide you the opportunity, training, and climate to truly become a current professional in management information systems.

SR. DATA BASE ANALYSTS

These professional opportunities require practical experience with the issues involved in IMS data base design.

If your background includes experience with physical and logical data base design, and knowledge of IMS utilities and how performance tools are utilized, we would like to discuss your being involved in our exciting Data Base Administration group that is currently involved in a very large scale development activity.

Your opportunity is now! As one of our software professionals, you will enjoy our technically challenging and highly professional work environment. We offer excellent compensation and benefits, including paid relocation.

For immediate and confidential consideration, rush your resume to:

Mr. Frank McKain
Systems Research & Development, Room C-313

Federated Department Stores

222 W. 7th St. Cincinnati, Ohio 45202

ALL REPLIES HELD IN STRICT CONFIDENCE

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMERS/ SYSTEMS ANALYSTS

Continued growth at LORAL ELECTRONIC SYSTEMS has created challenging state-of-the-art micro-processing opportunities for Programmers and Systems Analysts at all levels. Experience with mini-computer systems in real-time applications is required with experience in electronic warfare highly desirable. Individuals selected will participate in the development of new software from concept definition to systems integration.

Paid relocation to our Engineering facility located in the ideal suburban area of Westchester County, New York. Starting salary commensurate with background and experience plus a full array of company benefits. For prompt consideration call:

(914) 968-2500, Ext. 385, 386

or send resume and salary history to: Richard C. Reitter, Professional Staffing Department.



988 Central Park Ave., Yonkers, N.Y. 10704
An Equal Opportunity Employer M/F/H

SYSTEMS PROGRAMMER

Progressive organization seeks an individual to join a group of professionals dedicated to quality results. The ideal candidate should possess proven experience in DOS VS and CICS VS systems programming. Besides offering continued growth we also offer a salary commensurate with experience and ability. Send resume with salary history in confidence to:

CW Box 1478
797 Washington St.
Newton, MA 02160

PROGRAMMER/ANALYST STATISTICAL

University of Wisconsin-Madison, Academic Computing Center. \$13,000-\$17,000 annual, excellent fringe benefits.

Duties: Development/conversion/maintenance/user consulting for statistical software (SPSS, BMDP, MINITAB, Box-Jenkins, TSP, etc.) on UNIVAC 1110. Qualifications: Minimum Bachelors degree, extensive FORTRAN experience, some statistics and statistical software experience, good communications skills. Submit detailed resume to: David E. Musolf, 1210 W. Dayton St., Madison, WI 53706 by March 1, 1978. An Equal Opportunity Employer.

TELECOMMUNICATIONS SYSTEMS PROGRAMMER

RCA Corporate Staff Organization has immediate opening for Systems Programmer in our Cherry Hill, New Jersey Computer Complex. This opening is due to our expanding Corporate Data Communication Network, currently a five node network serving three hosts.

Responsibilities include installation, maintenance and troubleshooting of new communication systems, as well as design and implementation of enhancements to the system.

Successful candidate should have a minimum of two years experience with communications systems and be competent in programming assembly language, preferably COBOL or BAL. Additional experience with NCP and TP ACCESS METHODS will be given special consideration.

RCA offers an excellent fringe benefits program.

Forward resume to: J.F. Sheehan, RCA Cherry Hill Offices 201-2, Cherry Hill, N.J. 08034.

We are an equal opportunity employer F/M.

RCA

PROGRAMMER ANALYST

We are seeking a Programmer Analyst with 2-5 years of COBOL programming experience. If your programming exposure has been in an IBM 370 DOS/VS environment, we have a special opportunity awaiting you. Our Corporate Management Information Systems Department can provide uncommon career stability and professional challenge in an ideal environment which can advance your career.

Your background should include manufacturing and business systems, especially inventory tracking systems. A computer science degree would be helpful, but not mandatory. Initial responsibilities primarily will involve programming with progressively increasing analysis exposure in the future.

As the nation's largest commercial printer, we can provide a dynamic and innovative atmosphere in which to grow. We are a Fortune 500 NYSE listed company which offers excellent compensation and fine benefits to the successful candidate. Please forward your resume, including current earnings, in confidence to:

Ed Leed
Corporate Recruiter
R.R. DONNELLEY
& SONS CO.
2223 S. King Dr.
Chicago, IL 60616

An Equal Opportunity Employer

EDP CONSULTANTS

Regional midwestern CPA firm seeks EDP consultants for growing practice. Minimum of 3 years EDP experience required. Accounting degree desirable. Exceptional opportunity. Limited travel. Send resume in confidence to:

CW Box 1483
797 Washington St.
Newton, MA 02160

DP PROFESSIONALS

for a booming NW economy

DP Consult To \$35K
Prof Mgr To \$22K
Software To \$23K
Prog/Anal To \$20K
Mini Base Sales & Comm

All fees paid by employer
Send resume in conf. to:

COMPUTER PERSONNEL

(206) 453-0444
1 Lk Bellevue Dr.
Bellevue, WA 98005

ACADEMIC POSITION

Program Director for expanding Information Systems Curriculum. Experience in teaching and industry. Ph.D. preferred. Respond with resume by April 1 to:

Dr. James Stam
Academic Vice President
Maryville College
13550 Conway Rd.
St. Louis, MO 63141
EO/AA Employer

Director of Data Processing

Hands-on administration DEC 20 installation and development of on-line management systems. Requirements: bachelor's degree, management background, capabilities in COBOL and FORTRAN, good communications skills. Salary commensurate with experience. Contact: Director of Administration.

Long Island University
Brooklyn Center
1 University Plaza
New York, N.Y. 11201

Overseas Adventure To \$40K USA

IRAN

SYSTEMS ENGINEERS/
SOFTWARE PROGRAMMERS
UNIVAC 1100 & EXEC VIII

DMS 1100 Data Base Exp
Rare opportunity for 1108 Senior programmer or Systems programmer to live & work in Iran, land of growth & adventure. 18-24 mon. assignment with many outstanding benefits. Send resume to Mr. Tink Nathan, President.

CYBERMETRICS CORP.
P.O. Box 578
McLean, VA 22101
(703) 356-1887
Other positions avail.
USA & Iran

Data Processing Manager

UP TO A CHALLENGE?

Then move on down to sunny Florida where we'll provide you with the indepth management responsibilities to match your unique combination of technical and leadership abilities. Line management experience in a high pressure production setting that demonstrates a proven track record in human resources development coupled with a thorough understanding of IBM 360 & 370 series hardware mandatory. Background in COM and on-line systems, data base management, telecommunications and mini computers preferred, while a reputation for producing results is a must.

Excellent earnings, benefits (including relocation assistance) and strong potential for advancement with a rapidly growing corporation. Send resume and salary history to:

REAL ESTATE DATA, INC.
2398 NW 119 St.
Miami, Florida 33167



An Equal Opportunity Employer M/F

MEDICAL INFORMATION SYSTEMS

The nation's leading automated Medical Information Systems Company has the following openings:

REAL-TIME APPLICATIONS PROGRAMMERS

Programmers are required for work on real-time medical information system. The system handles the total information flow throughout the hospital including such features as automatic scheduling, order and results entry, and charge collection. Duties include program specification, program and file design, coding, and checkout. Assembly language and two to five years programming experience required.

BUSINESS OFFICE SYSTEM ANALYST

Work with hospital administration and staff of our client hospitals, relating their requirements to our comprehensive medical information system and business office system. Research, analysis, design and specification of new systems, problem solving. Requires recent experience with computer accounting systems, hospital financial systems experience preferred. Patient billing/accounts receivable experience required.

LEAD APPLICATIONS PROGRAMMER

Work with our Business Office Systems to develop and maintain our comprehensive financial systems. Supervisory experience required. Medical billing systems experience desired. You will be responsible for hospital-related financial systems which operate nationwide.

PROGRAMMER/ANALYST

You will be responsible for design, coding and testing on complex financial systems. Three to five years COBOL experience required.

PROGRAMMER

Work with our Integrated financial systems. One or more years experience in a COBOL environment. Our operating environment is IBM 370s. We offer competitive salaries and excellent benefits. Send your resume, including salary history to:

TECHNICON MEDICAL INFORMATION SYSTEMS CORP.

3255-1 Scott Boulevard
Santa Clara, CA 95051
ATTN: Elisabeth Fjorstad

INSTALL A 3033

Mallonics Information Center is installing IBM 3033's in June & July, 1978. We are a full service data center currently running two 168's and a 158. We are located in the pleasant San Fernando Valley away from traffic and congestion, just 30 miles from Los Angeles and 30 minutes from the Pacific Ocean.

Challenging career openings currently exist for the following:

• SYSTEMS PROGRAMMERS

Experience should encompass one or more of: MVT/MVS Internals, JES 2, IMS/VS, CICS/VS, TSO, VTAM/SNA, UTILITIES, ALC, and performance evaluation.

• SYSTEMS ENGINEERS

Strong knowledge of JCL and MVT or MVS concepts. Programming skills in at least one of the following languages: PL/I, FORTRAN, APL or COBOL; assembler language skills; strong debugging skills and demonstrated ability to work with Data Center customers. TSO experience a plus.

• PROGRAMMER ANALYSTS

Experience should include design, development, implementation and maintenance of information systems utilizing multiple IBM 168's operating under MVS with IMS, RJE and TSO facilities. Should have 3-5 years of COBOL programming, preferably within IBM OS, VS, or MVS environments.

For immediate consideration, please send resume complete with salary history in confidence to:



Bob Bonney

LITTON MELLONICS
INFORMATION CENTER

6701 Veriel Avenue
Canoga Park, CA 91304

Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER

Join Southern Bankshares... a progressive and growing company in central Virginia.

Opportunity for Programmer with a solid experienced background in Neat/3 and NCR Century computers. Banking and CIF experience given preference.

We offer competitive salaries and an excellent package of fringe benefits. Send resume in confidence to:

C.L. Baughman

SOUTHERN BANKSHARES, INC.

P.O. Box 26363 Richmond, VA 23260
An Equal Opportunity Employer

Systems & Data Processing Career Opportunities

Expansion has created openings for ambitious professionals to work with state of the art business systems. These challenging and rewarding positions offer excellent growth potential in a scenic Lehigh Valley office setting located 1-1/2 hours from either New York or Philadelphia.

The environment includes multiple IBM 370, DOS/VS systems using CICS, IDMS and COBOL with Datapoint and IBM 3790 minicomputers.

SR. ANALYSTS

Should have an in-depth knowledge of financial control, payroll, manufacturing, distribution and cost systems.

SR. PROGRAMMERS

Should have experience in on-line systems, data-base, mini-computers and structured programming techniques.

SYSTEMS PROGRAMMER

Should be familiar with CICS support.

PROGRAMMER ANALYSTS

Experience with distribution and financial application systems including order entry and invoicing, and experience with on-line and data base systems.

Share in the excitement of an innovative company that offers an excellent salary and benefit package.

For immediate consideration call (201) 859-7474 collect or send resume with salary history to:

**EMPLOYMENT MANAGER
Ingersoll-Rand Co.**

942 Memorial Parkway, Phillipsburg, N.J. 08865

An equal opportunity employer M/F

PROGRAMMER/ANALYST F/M

Growing Independent Oil Company in Southern California looking for Programmer Analyst to work second shift.

- Minimum three years experience
- SYS/3, Model 15
- Languages - RPG II and Fortran
- Strong C/P background

Company offers Salary commensurate with experience and excellent benefit program, fully paid.

If you are interested in a challenging position and feel that you qualify, please send resume INCLUDING salary history to: CW Box 1489, 797 Washington St., Newton, MA 02160.

Equal Opportunity Employer

WANT TO LIVE IN HOUSTON?

Dignified, personal representation for data processing personnel with hundreds of fee-paid client companies. Call or send your resume to:

The DPCenter

for

Data Processing Careers

4615 SW Freeway, Suite 960 E
Houston, Tx 77027 (713) 960-9102

Personnel Consultants



A STEP ABOVE THE ORDINARY...

D) CHALLENGE ...

the excitement of constant change and state of the art assignments ... the variety without changing jobs constantly.

C) COMPENSATION ...

aci pays full value for competency & performance - base salary, incentive, O.T., M/M, Hosp., Vacations, Holidays, Relocation, Education.

B) POTENTIAL ...

the ability to allow individual employees to realize and achieve growth and advancement.

A) QUALITY ...

the concern & attempt to produce the BEST application systems and software.

PROGRAMMERS • ANALYSTS • TECHNICAL WRITERS

The alternative to boredom and stagnation ... Consultants use all major hardware, software, and language products (IBM, HONEYWELL, BURROUGHS, NCR, MICROS, MINIS - OS, DOS, CICS, IMS, TOTAL, DBOMP, IDMS, TASK-

MASTER, IDS, ETC. - COBOL, ASSEMBLER, PL/1).

If you know one, several, or all, we'd like to talk to you about our multitude of application and software development projects currently in progress.



**CALL COLLECT
513-278-4861**

SERVING: CHICAGO
CINCINNATI
CLEVELAND

automation consultants, inc.

1700 Needmore Road, Dayton, Ohio 45414

COLUMBUS
DETROIT
OKLAHOMA

PITTSBURGH
TOLEDO
TEXAS

EOE M/F

EDP PROFESSIONALS

Local & Nationwide Opportunities Company Fee Paid Only
Sr. Prog/Anal \$23K
Oil & Gas Co. offers professional environment with good upper level management visibility. 370 COBOL.
Sys Software \$30K
SYSGENS and Maintenance on 370 VM CMS OS/VS1 MVS or IMS
Prog/Analyst \$17.9K
Training position for Project Management. Banking or Insurance experience. 370 COBOL or ALC/CICS.
Scient. Program \$18K
Program Mathematical, Engineering, Operations Research or Real Time Command & Control Systems.

DUNHILL

Employment Agency of Ft. Worth, Inc.
901 Ridgela Bank Bldg.
Ft. Worth, TX 76116
A National DP Search Firm

PROGRAMMING DATA PROCESSING OPPORTUNITIES

WESTCHESTER

A large Westchester-based headquarters has unusual growth opportunities for the following qualified individuals:

SR. SOFTWARE PROGRAMMER

With 4 to 8 years experience in solving hardware and software problems. 2 years in maintenance of OS/VS1 operating systems. Assembler language required. Degree preferred. Data base & teleprocessing involved.

CHIEF PROGRAMMER/ANALYST

5 to 8 years in systems design and programming for business applications, personnel, payroll and financial systems. COBOL required. Top-down design and structured programming techniques desirable. Accounting background and college degree required. Data base environment helpful. Will function as project leader.

PROG/ANALYST

3 to 4 years experience in DP with 1 year systems analysis. COBOL required.

PROG/ANALYST

2 to 3 years experience with some analysis. COBOL required.

Salaries are commensurate with experience. Good benefits structure. Send resume, indicating position of interest, with salary history and requirements to:

CW Box 1488
797 Washington St.
Newton, MA 02160
An EOE, M/F

DATA PROCESSING & INSURANCE PROFESSIONALS GROW WITH ISA ATLANTA/CEDA RAPIDS

ISA is a rapidly growing professional firm in a dynamic and vital industry - Insurance oriented D.P. Software and Services. Professional people are the reason for our success and the foundation for our continued growth. And our growth is calling for additional insurance and data processing professionals at almost all levels.

PROGRAMMERS/ANALYSTS/ SALESMAN/MANAGERS/ACTUARIES

ISA needs your energy, talent, and ideas. We offer, in turn, exceptional career growth potential in a warm and exciting organization. Either in our suburban Atlanta headquarters or our Cedar Rapids operation, you will be offered professional challenge, state of the arts industry exposure, and the rewards deserved by successful professionals.

THE INDUSTRY - THE COMPANY - THE LOCATIONS

At ISA we believe we have it all. To explore the many opportunities for you within the firm, send your resume in confidence to: FORREST EDWARDS, Director of Recruiting.

6855 Jimmy Carter Blvd.
Norcross, GA 30071



INSURANCE SYSTEMS OF AMERICA INC.

PROGRAMMERS

At BURNS and ROE, personal achievement and significant participation in corporate growth go hand in hand. Development of career and continuation of educational pursuits are encouraged. Financial rewards and recognition are coupled with a comprehensive, company paid benefits program provided by BURNS and ROE for our employees and their families.

We are located in Bergen County, within easy reach of the excitement and cultural facilities of New York City, yet situated in one of the most desirable residential areas on the east coast.

We currently have openings for highly motivated professionals to work on challenging assignments.

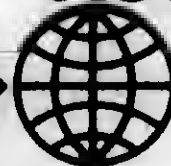
These positions require knowledge of OS JCL and one or more of the following languages: MARK IV, COBOL, PL-1, Fortran. Degree desirable.

Initial assignments will be in the areas of project control, finance and technical support. Our computer environment includes: IBM OS/VS, VSAM, CMS and RJE.

Please submit detailed resume, including salary history and requirement in confidence to: Mr. Robert Borsdorf, Dept. 213CW, 650 Kinderkamack Road, Oradell, N.J. 07649.

An Equal Opportunity Employer M/F

Burns and Roe



position announcements

position announcements

position announcements

position announcements

position announcements

SAN FRANCISCO OPPORTUNITY FOR PROGRAMMER ANALYSTS LARGE SCALE DUAL PROCESSOR SYSTEMS B 6817 - BURROUGHS LARGE SCALE DUAL MINI COMPUTERS

(2) DEC PDP 11/70

PLUS A TERMINAL NETWORK CONSISTING OF L.S. ADM 2's & 3's, ASR 28's, TC 3500, TC 3800, IBM 34, ASR 33's, TC 500, DATA 100's

We are seeking two individuals to make significant contributions to the continuing development of our on-line transportation oriented applications which encompass operations throughout the U.S. and Canada.

B6817 position requires a minimum of 2 years programming using COBOL and some system design experience.

PDP-11 position requires a minimum of 2 years programming using BASIC + and a working knowledge of RSTS-E.

Starting salary from \$16K to \$20K depending upon experience. Outstanding fringe benefit program includes fully paid medical insurance. Relocation allowance for those who qualify.

Send Resume to:

Personnel Officer
**WESTERN PACIFIC
RAILROAD COMPANY**

526 Mission St.
San Francisco, CA 94105
An Equal Opportunity Employer M/F



SOUTHERN CALIFORNIA DATA PROCESSING OPPORTUNITIES

Our client, one of the nation's largest restaurant chains, currently has openings in the following areas:

SYSTEMS PROGRAMMERS:

Qualified candidates will have two to three years' experience as systems programmers with DEC-10 operating systems (TOPS). Will have responsibility for operating systems design and maintenance as well as vendor and user interface. Supervisory potential. Salary \$20K-24K.

NETWORK DATA COMMUNICATIONS SPECIALIST:

This position is responsible for maintaining a stable and efficient data communications network. Must maintain network software, monitor network performance, and handle vendor interface. Candidate must have two to three years experience in the following areas: hardware/software evaluations, data communications, trouble-shooting operating system bugs, and hardware vendor interface. DEC-10 experience is a big plus. Salary \$18K-22K.

DATA BASE PROGRAMMER/ANALYST:

A staff position responsible for assisting the Data Base Administrator and dealing with the integrity, security and performance of all data bases. Will also provide support in the analysis, design and implementation of data bases. Qualified candidates will be highly motivated individuals with three years commercial data processing experience. COBOL language ability and good communications skills. Salary \$16K-20K.

Client will pay complete relocation expenses. Excellent fringe benefits.

We are consultants to management. If you wish to join a rapidly growing, professional organization, please send resume and salary history in confidence to Consultant, CW Box 1486, 797 Washington St., Newton, MA 02160.

PROGRAMMER

Do you want to gain experience in a PL/I shop using structured programming? Hyster Company, a major manufacturer of material handling equipment, has an immediate need for programmers with knowledge of 360/370 OS, JCL, and utilities. Knowledge of PL/I desired but will train experienced COBOL programmers. Prefer degree in Computer Science, Business or Math. Knowledge of manufacturing systems helpful.

Hyster Company offers a complete benefit program, including an investment plan.

Send resume and salary requirements to:

M.E. Johnson
Employment Administrator

HYSTER CO.

P.O. Box 847

Danville, Illinois 61832

An Equal Opportunity Employer M/F



Project Leader 370/os

\$22,000-\$26,000

Exeter Associates
Executive Recruiters

Bruce A. Montville
P.O. Box 923
Computer Park
Hampton, N.H. 03842
(603) 926-6712

DATA PROCESSING MANAGER

Well established wholesale lumber firm in Southwestern Louisiana. 2/3 years experience as Programmer/Analyst in On-Line System (preferably Burroughs). Interested candidates should submit resume including references, salary, history and experience to:

Personnel Coordinator
P.O. Box 1803
Lake Charles, LA 70602
Equal Opportunity Employer

DATA BASE MANAGER

Responsible for data base design, data security, system recovery & backup procedure, DB optimization & system software. 4 years experience COBOL and responsibility for design & maintenance of DB & DB software. Burroughs B6805 & DMS 11 on site. Salary \$26,325 Final filing date 3-20-78 at 5 p.m. Contact the Sierra College Personnel Department, 5000 Rocklin Rd., Rocklin, CA 95677 or phone (916) 624-3333 Ext. 302. An equal opportunity employer.

Pacific Northwest

Project Leader

Leading manufacturer is expanding and requires a key person for system development. We are seeking previous implementation experience with MRP, BDMP, on-line order entry, inventory control and production scheduling. TP and data base experience desirable. Salary commensurate with background. Excellent benefits.

Systems Programmer

Expanding Puget Sound Company is seeking a strong individual to take on major responsibilities in design and development of on-line system of approximately 200 CRT terminals. Environment is DOS/VS, CICS, BTAM preferred. OS/VM desirable. Excellent working conditions and benefits. Salary 20-22K.

Sales Engineers

Several top companies offering outstanding Pacific N.W. positions for individuals with experience in direct sales of minicomputers to end users. Compensation-base salary plus commission vary by company but would total 25-40K first year.

Call in confidence or send resume including salary history and position desired to: Al Friedman, Data Processing Division, Executive Resources, Inc., 310 108th Ave. N.E., Bellevue, WA 98004 (206) 455-8300.

COMPUTER LEASING SALESMAN

IPS Computer Marketing Corp. is a major dealer and lessor of used IBM computer equipment. We are looking for an experienced leasing salesman for our office in Fort Lee, New Jersey. Will have responsibility for leases in present portfolio, lease brokerage, and leasing of new IBM processors. At least five years successful sales experience required, with minimum of two years in leasing field. Prefer someone now living in New York City area. High earnings potential through commissions. Please send resume (no telephone calls) to G.H. Heilborn, President.



Computer Marketing Corp.
2490 Lamoline Avenue
Fort Lee, New Jersey 07024

CORPORATE DATA PROCESSING STRATEGIST

A major corporation located in southeastern Wisconsin requires a professional planner to act as key liaison between the Computer and user departments. The prime responsibility will be the identification of potential computer applications and their translation into viable short and long term development plans. This position reports directly to the head of the Computer Department and obviously affords high visibility at the top management level.

The successful candidate must be college degree, possess significant experience in computer planning (as a user, vendor's representative, or consultant) and exhibit communicative finesse.

If you match this description and are looking for an opportunity to challenge your intellectual capacity and creative analytical skills, send your resume, including salary history, in confidence to:

CW Box 1486
797 Washington St., Newton, MA 02160
An Equal Opportunity Employer M/F

DECSYSTEM-10/20 PDP-11

SYSTEMS PROGRAMMERS

We are a small software company located in the Boston area. We are looking for experienced systems wizards to work on development of advanced software including compilers and data base management systems. Our plans call for development on both the DECsystem-10/20, as well as the new VAX-11.

If you've had experience with TOPS-10/20, PDP-11 operating systems, or compiler design on these machines, then we'd like to talk to you. An ability to communicate and work with others in a small group is necessary. In return we offer top salary and fringe benefits, responsibility for design and/or implementation, and a great working environment. Please send resume in confidence to:

CW Box 1486
797 Washington Street
Newton, MA 02160
An Equal Opportunity Employer

MANAGER-SYSTEMS & PROGRAMMING

Leading transportation industry has an outstanding opportunity for a technically competent manager in a progressive IBM 370 VS/IMS operation. Responsibilities include supervision of vision of 20-25 systems analysts and programmers.

Candidate selected will be degree with 3-5 years applicable experience. Please send resume and salary history to:

THE BEKINS COMPANY
777 Flower St., Glendale, CA 91201
Attn: Director of Personnel
An Equal Opportunity Employer

SENIOR SYSTEMS PROGRAMMERS

DECsystems-10 Timesharing

The Division of Computer Research and Technology has career Civil Service positions for senior level systems programmers for the DECsystem-10 timesharing system. Salary ranging from \$18,258 to \$21,883 per annum (GS-11 to GS-12), depending upon educational level and experience.

Duties will consist of maintaining and modifying the monitor and supporting software systems, developing and implementing communications software, as well as advising and instructing the scientific user community in the use of this system. Experience in the DECsystem-10 timesharing system as well as experience in one of the following areas: SAIL, FORTRAN or PL/I, communications, graphics or utility development. A degree in Computer Science, Mathematics, or Physical Science is desirable.

Candidates should call (301) 496-6951 or forward Standard Form 171 to: Miss Stalla Nobillo, National Institutes of Health, Public Health Service, 9000 Rockville Pike, Building 12A, Room 3019, Bethesda, MD 20014. An Equal Opportunity Employer.

NATIONAL INSTITUTES OF HEALTH

position announcements

position announcements

position announcements

position announcements

position announcements

programmer analyst / systems development

Our company is...

Trevenol Laboratories, Inc., a leader in the medical products field, located in north suburban Deerfield. We have achieved an outstanding growth record in sales and earnings, and provided outstanding opportunities for our employees.

You should have...

At least 2 years experience in COBOL, Mark IV, or PL-1, under DS/VS or MVS. IMS DB/DC would be a definite plus.

Your responsibilities will...

Include projects of short or intermediate size from initial user contact to implementation.

We can offer you...

- 1) Opportunities in: manufacturing, marketing, distribution finance or quality control/research and development systems.
- 2) Extensive user contact in all phases of projects.
- 3) Additional training and experience in IMS DB/DC.
- 4) A very modern attractive office building.
- 5) Highly competitive salary and fringe benefit program to include stock purchase and profit sharing.

Send resume in confidence to:

Sam Hines

**TRAVENOL
LABORATORIES, INC.**

One Baxter Parkway
Deerfield, Ill. 60015

Minorities and women are definitely
encouraged to apply

An Equal Opportunity/Affirmative
Action Employer

FIELD ENGINEERS

DATA GENERAL MINICOMPUTERS & PERIPHERAL EXPERIENCE

Computer Systems Support Corporation needs experienced, aggressive Field Engineers for the New York City area.
Excellent opportunity for career oriented individuals now available in our newest office.

Send resume to

Lloyd E. Root Jr.

Computer Systems Support Corporation

9112 Gaither Road
Gaithersburg, MD 20760

DATA PROCESSING CONSULTANTS

Our East Coast Office is seeking highly qualified consultants to join our rapidly expanding consulting staff.

Qualified candidates should have demonstrated successful experience in the design, programming and implementation of diversified applications. Retail industry a plus, minimum 5 years experience required. Familiarity with hardware/software of major vendors. An undergraduate degree is required. We offer a most attractive growth opportunity and compensation package for high caliber candidates.

Send resume in strict confidence to:

Marsden Johnson Systems, Inc.
39 Main St.
Ashland, MA 01721

BURROUGHS LARGE SYSTEMS

Progressive Hospital on Florida's West Coast is installing 66800 DMS 11 Data-Comm System. Positions immediately available include:

SENIOR SYSTEMS ANALYST - Hospital Medical Systems exp. desired. \$18,600 to \$23,500.
LEAD PROGRAMMER/ANALYST - Hospital Financial Systems exp. desired. \$16,000 to \$19,500.
LEAD COMPUTER OPERATOR - Direct 66700-67700 or 66800 exp. required. \$13,150 to \$15,400.
Send resume and salary requirements in first letter to: Director, EDP, Memorial Hospital, 1901 Arlington St., Sarasota, FL 33579.

PROGRAMMER ANALYSTS

The Williams Companies is a secure, growth-oriented, \$2 billion company engaged in the fertilizer, energy and metals industries. Subsidiaries: Agrico Chemical Co., Williams Pipe Line Co., Williams Exploration Co., Williams Energy Co., and Edgcomb Metals are headquartered with the parent company in the \$200 million business/retail complex of Williams Center, in the heart of downtown Tulsa, "America's Most Beautiful City."

We have an immediate need for programmer analysts for design and maintenance of general data processing applications. Familiarity with IBM 360/370 programming and Cobol under O.S. environment is required; IMS and RSO experience would be helpful. BS or BA degree, or its experience equivalent, and a minimum of two year's programming experience are required.

Please call (918) 588-2091 (collect) or send your resume and salary history in complete confidence to:

David R. Moore

THE WILLIAMS COMPANIES

Department 834
One Williams Center
P.O. Box 2400
Tulsa, Oklahoma 74101
An Equal Opportunity Employer M/F

PITTSBURGH EDP CAREERS

We are EDP recruiting specialists concentrating on positions in the Pittsburgh and Tri-State area. The following is just a cross-section of the opportunities that are available.

Sys Progs(5) To \$26K
IBM hdwe, sftwe, OS internals
T/P Specialist To \$20K
IBM 370/OS, Cobol
Prog/Anal(7) To \$21K
Cobol, Mfg, Bus & Banking
Programmers To \$19K
Cobol, IBM & Honeywell.
Send resume including salary history in confidence to Berry Lopez, c/o:

CAMERON OF PGH., INC.
428 Forbes Ave., Suite 412
Pittsburgh, PA 15219
(412) 391-7409

RPG II PROGRAMMER ANALYST

Small mfg. co., located in Central N.Y. State has terrific oppty. for an all around prog./analyst to take over several projects. Some financial applications + mfg. system. Move into DP mgmt. Deg. \$16,000 (Fee Paid). Contact P. Siegel.

**ROBERT HALF
PERSONNEL AGENCIES**

1310 Liberty Bank Building
Buffalo, N.Y. 14202
716-842-0801

PROGRAMMER

Southern Company Services, Inc., has an immediate opening for a Programmer in Birmingham, Alabama. The company serves as the power plant engineering, planning, and design organization for the Southern electric system which is comprised of Alabama, Georgia, Gulf, and Mississippi power companies and Southern Company Services.

Applicants should have one year of experience as an applications programmer in Basic Assembler language. A degree in math or computer science is desirable. Please send resume and salary requirements, in confidence, to:

Personnel Department
Southern Company Services, Inc.
P.O. Box 2625
Birmingham, AL 35202
Equal Opportunity Employer M/F

DEC PROGRAMMERS

PDP-11/70 experience with BASIC. Prefer exposure to BOMP, Order Entry, and Cost Accounting. 1+ years \$13-15,000.
BASIC + 2 and RSTS-E. Degree in math or IE required. Knowledge of TOTAL and material systems helpful. 1+ years, \$13-16,000.

PROG/ANALYST

Experience with COBOL in an on line environment. Exposure to CICS, BAL, and VSAM helpful. Growth oriented d.p. center developing on line applications for a manufacturing firm.

Keith North, CPA, CDP

**ROBERT HALF
PERSONNEL AGENCIES, INC.**

2026 Reinier Bank Tower
Seattle, WA 98101
(206) 524-9000

CHIEF AUDITOR

Our client in North Carolina is seeking an experienced data processing auditor. This candidate should have financial AWA OP auditing experience. Ideally, he should be exposed to bank operations, OP systems knowledge and one of the following languages: COBOL, Assembler or RPG. This is a newly formed division and this individual will function as chief auditor, supervising others, yet will also operate in a hands-on environment. Salary range, mid-20's.

Please respond quickly in that our client wants to make a decision by the end of March.

M. Sullivan
Data Processing Division
Creative Personnel Services
512 Charlottatown Mall
Charlotte, N.C. 28204
(704) 372-9383
Toll Free within N.C. only
(800) 432-8380

Sales

Computer Graphics Products Sales Reps

Openings in Dallas, Boston, Kansas City & Phoenix

You can enjoy the benefits of an exciting and rewarding career, selling CalComp computer graphics products. CalComp is a world leader in the design and manufacture of computer peripheral equipment.

We are seeking individuals possessing 4 years experience in the sale of data processing equipment. A college degree in a technical discipline would be desirable. Familiarity with plotters and interactive graphics terminals and their applications in resolving engineering problems would be desirable. Experience selling minicomputer based systems would be a plus.

These opportunities offer attractive compensation in the form of base salary plus extensive commission along with excellent fringe benefits package including a dental plan. Please send your resume and specific earnings history to:

For Boston:

Jahn Kean
470 Totten Pond Rd.
Waltham, Mass. 02154

For Dallas & Kansas City:

Larry Crow
13610 Midway Rd., Suite 240
Dallas, Texas 75240

For Phoenix:

Don Modle
1270 No. Kroemer Blvd.
Anaheim, California 92806

CALCOMP

CALIFORNIA COMPUTER PRODUCTS, INC.
An equal opportunity employer M/F

SNOWBOUND? JOB BOUND?

The **SUN** is shining in Miami for qualified Data Processing Professionals.

Recent corporate expansion has created the need for additional personnel.

For the experienced, imaginative professional who enjoys the challenge of a rapid growth environment we offer the following:

- clean air
- fabulous year round climate
- relocation expenses
- educational expenses
- promotional opportunities
- unique bonus program
- excellent salary opportunities

Each response will be evaluated for exposure to the industry and career potential — not specific hardware/software experience! Please send resume and salary history to:

REDI
2398 NW 119 St.
Miami, FL 33167

An Equal Opportunity Employer M/F

PROGRAMMER ANALYST

Fortune 500 Company, Headquartered in St. Louis, Missouri needs a programmer analyst for a variety of applications such as marketing and production control in a manufacturing environment.

Applicant must have B.S. Degree or equivalent with 2-5 years programming and analysis experience in COBOL including IBM 370/135, UNIVAC 9480, UNIVAC 1100 series or similar size equipment.

Excellent compensation, relocation and benefits programs, including dental benefits.

Forward resume with salary history and requirements as soon as possible to:

E.J. NELSON

7777 Bonhomme Ave., Suite 1210
St. Louis (Clayton), MO 63105

position announcements	position announcements	buy sell swap	buy sell swap	buy sell swap
SYSTEMS PROGRAMMING DATA COMMUNICATIONS The University of Delaware is seeking qualified candidates for a senior position in its DATA COMMUNICATIONS/SYSTEMS SOFTWARE group. The person chosen will have responsibility for modification and development of innovative software on our large scale B7700 and OEC-10 computers. Candidates should be self-motivated and have a bachelor's/master's degree in computer science and/or engineering with 3-4 years effective experience in successful projects involving operating systems, language processors, or data communications programming on large scale computers. This position represents an exciting opportunity to grow in a multi-host network consisting of HP2000, OEC 11/70, B7700, OEC-10, and CYBER173 computers in a modern University Computing Center. Send resume and salary requirements to: Robert W. Rahe, Mgr. Data Communications/Sys. Software Computing Center University of Delaware Newark, DE 19711 An Equal Opportunity/ Affirmative Action Employer	DATA PROCESSING PROFESSIONALS IMS DB/DC We seek systems and applications professionals to develop and install large integrated systems. Experience in one or more of the following is desirable: • IMS Systems Programming • IMS Application Programming • Teleprocessing • COBOL • Supervisory responsibilities These are growth positions in a professional environment. Excellent salary and benefits package. Send resume and salary requirements to: BLUE CROSS & BLUE SHIELD OF RHODE ISLAND 444 Westminster Mall Providence, RI 02901 Equal Opportunity Affirmative Action Employer M/F	3803-1/3420-7 AVAILABLE FOR SALE OR LEASE IPS can supply 3420-7 systems of any size from inventory. Controllers with or without switching features. Attractive sale or lease terms available. CALL EO JOSEPH for an immediate quote. IPS COMPUTER MARKETING 2460 Lemoine Ave. Fort Lee, N.J. (201) 947-4200	FOR SALE IBM 360/67 1.8m Memory (.5 IBM, 1.0 EM&M) 1-Multiplex Channel (IBM 2870 with 2 subchannels) 2-Selector Channels (one IBM 2860-2) Available-Sept. 15, 1978-Firm Will consider offers for entire system or individual components Direct Inquiries to: Director, Computer Services Amos Eaton Bldg., Room 206 Rensselaer Polytechnic Institute Troy, N.Y. 12181, or Call 518-270-6635	
		WE BUY AND SELL AND INSTALL NEW AND USED COMPUTER ROOM FLOORING Raised Floor Installation, Inc. 19 Seaboard St. Clifton, N.J. 07013 Telex (201) 778-2444 in New Jersey (212) 594-4030 in New York (415) 546-9466 in Calif.	COMPUTER PRICE GUIDE "The Blue Book of Used Computers" Quarterly publication contains current price information about used IBM computers and peripherals. Includes newsletter about current price trends and availabilities. \$5 per issue - \$18 annual subscription Computer Merchants Inc. 75 South Greeley Avenue, Chappaqua, New York 10514 Member Computer Dealers Association (914) 238-9631	LIQUID COOLED MAIN FRAME USERS We have a cooling unit for liquid cooled CPU's that operates up to 50% cheaper than other available units. Saves installation time and money. Does not take up space in computer room. Comes complete with 100% back-up system. CONTROLLED ENVIRONMENT CORP. 640 Reynolds Kansas City, KS 66101 (913) 342-3599 Over ten years experience in computer room environments. Ask about a heat recovery system for your EDP site. Could save you a small fortune in utilities.
MUMPS SYSTEMS PROG/ANALYST DataPhase Systems, Inc., a rapidly-growing leader in interactive database applications, has several challenging positions on its software staff involving advanced data organization and communications concepts. Responsibilities include system development and implementation, field support, and interfacing with vendors and customers. Limited travel. The desirable candidate will have two years active programming experience, including use of MUMPS or MIIS, and will be familiar with mini-computer systems. Good communication skills required. We offer an excellent salary and benefits program, with exciting opportunities for personal and professional growth. Please call or write in confidence to: Mr. Lloyd F. Botway Manager, Systems and Development, DataPhase Systems, Inc., 4528 Belleview, Kansas City, MO 64111, (816) 931-7927, EOE/MF.	FLORIDA and SOUTHEAST Sr. Scientific Mini Assembler FORTRAN POP11/other Data Base Implementors Mini-Compiler Internals Data Base Applications 370 OS IMS TOTAL/OL 1 Bking. Prog./Anal. BAL & COBOL 370 DOS & OS Applications Spec. Degreed, 4-4 Yrs Exp. \$18K IN ADDITION, we have urgent need for hands-on experienced SE's with hardware, software and firmware know-how for our superior FLORIDA clients. All fees and expenses paid so call or send resume with current salary to: FRANK LEONARD Personnel 1211 No. Westshore Blvd. Suite 100 Tampa, FL 33607 (813) 872-1853	BUY-SELL TRADE For Computer Cell Action Write CAC 404/458-4425 P.O. Box 80572 Atlanta, Ga. 30366		
EDP Applications Programmer State of Arizona Two immediate openings. One requires background in development/programming of Civil Highway Engineering programs utilizing high level programming languages. Plotting experience is desirable. Hardware/Software is IBM 370 OS/VS + FORTRAN, PL-1. The other opening requires background in development/programming of financial information programs utilizing data base management techniques and high level programming languages. Hardware/Software is IBM 370/IMS, OS/VS and PL-1, COBOL. The starting salary for both positions is \$13,335. Send resume immediately to R. Gonzales, Employment Section, State Personnel Division State of Arizona, 1831 W. Jefferson, Phoenix, Arizona 85007.	POSITIONS WANTED GENERAL SYSTEMS DIVISION Workaholic IBM/GSD systems engineer needs challenges with another vendor, a Big 8 consulting group, a large user, or even someplace else in GSD. Specializes in C/P and model 150. Extensive S/32 experience; currently concentrating on first S/34 installations. '78 Symposium attendee. Under 30, unmarried, MBA. CW Box 1480 797 Washington St. Newton, MA 02160	FOR IMMEDIATE SALE IBM 1401 System C-4 Processor 1402-01 Card Read Punch 1403-02 Printer 1311-04 Disk Drive 1311-02 Disk Drive System has been under continuous IBM maintenance. For further information contact: Kerry Beverly Sterling Computer Systems, Inc. Houston, Texas (713) 623-6770	BROKER IN DEC COMPUTER SYSTEMS AND COMPONENTS C.D. SMITH 730 N. Post Oak Road #301 Houston, Texas 77024 (713) 686-9405	ISI INDEPENDENT WE BUY-SELL-INSTALL & REPAIR AT REASONABLE PRICES HONEYWELL USED SERIES 200 EQUIPMENT COMPUTER SYSTEMS PARTS - PERIPHERALS Now in stock 2040-64K M7-32K M9 120-1250 - TAPE DRIVES READERS, PRINTERS, PUNCHES 3200-131K Avail. 6/78 CALL NOW Wilson Graber (513) 874-8100 INTEGRITY SYSTEMS, INC 4812 Interstate Drive Cincinnati, Ohio 45246
DP MANAGER Davenport, Iowa industrial firm needs experienced individual to manage on-line OEC 11/34 installation. Systems programming and supervisory experience required. Industrial experience and business or accounting education preferred. Attractive salary. Send resume and salary requirements to: CW Box 1479 797 Washington St. Newton, MA 02160	BUY SELL SWAP	FOR SALE DATAPoint 1134 Almost New Best Offer Also Available: Printer Accounting Software Contact: BRISTOL INFORMATION SYSTEMS, INC. 84 North Main St. Fall River, MA 02720 (617) 679-1051	FOR LEASE-FROM LESSEE 370/168-U36 avail. June 1978 3855, 4525, 4580, 2150, 2151, 6111, 3066-II, 3067, 2860-3, 2870-1, 2880-2(2) Will lease for 2, 3, or 4 years Contact: Mr. Frederick D. Lehmann MARTIN MARIETTA DATA SYSTEMS P.O. Box 5837, MP-263 Orlando, Florida 32865 (305) 855-1050, Ext. 7410	
The EDP Specialist TRIMBEC INC. (Agency) Specializing in career placement of EOP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing Field. Send resume, salary history and geographic preference to the attention of Adele Durheim, Data Processing Division. All inquiries will receive immediate response. 7143 Henry Clay Blvd. Liverpool, N.Y. 13088 (315) 451-4220 WE KNOW THE PEOPLE YOU NEED TO KNOW	FOR SALE IBM SYSTEM/32 155 CPM PRINTER 9.3 MB DISK 16.K MEMORY AVAILABLE 8/78 CONTACT: CW BOX 1487 797 Washington St. Newton, MA 02160	FOR SALE COMPLETE MCS MINI SYSTEM NOVA 3 CPU 65 KB TAPE DISC TERMINAL, PRINTER CW Box 1491 797 Washington St. Newton, MA. 02160	WANTED ALL 360/370 SYSTEMS AND SYSTEM/3 AND PERIPHERALS WE BUY • SELL • LEASE • TRADE transdata P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647	

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

DEC

FOR SALE

MG 10 (256K)
PDP 11/34 (64K, 256K)

NEW TERMINALS
AT DISCOUNT

DEC (LA38,180LS120)
LSI TELETYPE
DIABLO OMRON
DIVA/AMPEX (160 MB) DISK SYS

WESTERN DATA SYSTEMS
P.O. Box 7000, 82
Redondo Beach, CA 90277
(213) 377-1414

FOR SALE

IBM 3348 Data Modules
Immediate
IBM 3420-3 Tape Drives
May 1st
IBM 3277's
30-60 days

CONTACT

Head Associates, Inc.
P.O. Box 444
Hopedale, MA 01747
(617) 473-0400

FOR SALE

NCR Century
100 32K Memory
2 - 655 Spindles
450 LPM printer
30-955 disk packs
300 CPM card reader
Under NCR Service Agreement
June 1, 1978 Delivery
Incl. Gen. Accounting Systems
\$19,500

VALCO, INC.

BOX 550

Rocky Ford, CO 81067
Contact: Allen Joseph
(303) 254-7464

DEC COMPATIBLE
PERIPHERALS

THIS MONTH

\$3,550

128KB MOS

FOR

UNIBUS 11

ALSO

PRINTERS

TAPE

CRT

DISK

BEST BUYS-ANYWHERE

ALPHA BYTE

1111 W. 10th St.

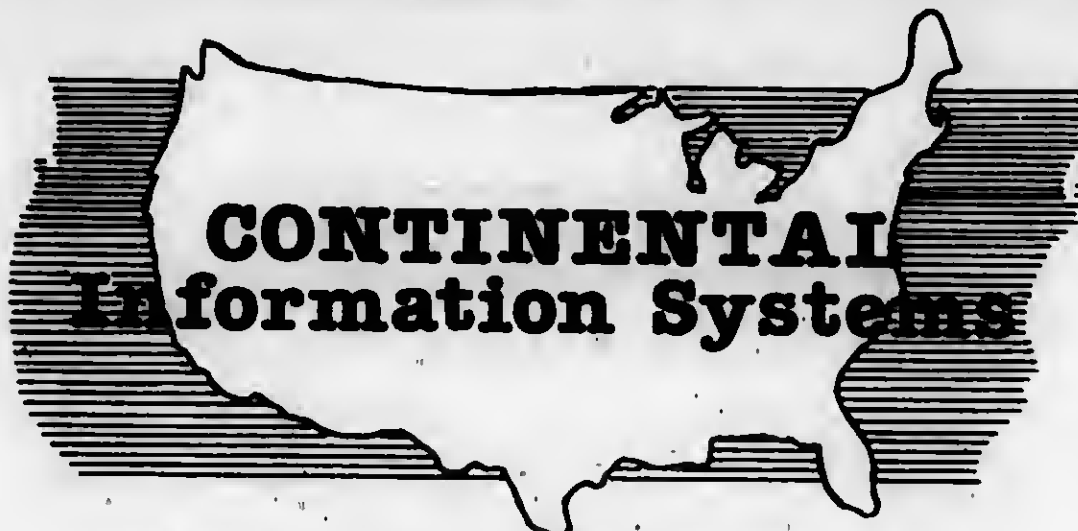
Dallas, TX 75207

FOR SALE

IBM System 3 Model 10 Consist-
ing of: Available 5/15/78, 5410 A
15 Processing unit 24K Bytes;
5424 A 01 Multi Function Card
Unit; 5444 A 01 Disk Storage
Drive 2.45 Million Bytes; 5445
003 Disk Storage Mdl 3 40.96
Million Bytes; 5203 003 300
Lines per minute printer with 132
print positions; Call (901)
388-2983, David Haynes or Write
P.O. Box 8381, Memphis, Tenn.
38108.

FOR SALE
BY OWNER

Complete DEC 11/20 System
56K bytes core
Four RK03 disc drives
On DEC Maintenance
Available Immediately
Contact: Paul Eggerman
(617) 566-6800



BUY, SELL, LEASE, SUBLEASE, AND TRADE NEW AND PRE-OWNED IBM EQUIPMENT AVAILABLE

Mar 78 165-11

168 memory, pre-owned
168 1436 buffer expansion
2860-2
2870-1
2880-2

Apr 78 135

145
155-11
158 pre-owned
165-11
158 AP, ITC qualified
168
158-3 upgrade
2880-2
3271's, 72's, & 77's

May 78 135

158, pre-owned
168, pre-owned
3360-5 (4)
2 MB 158 INTEL
2860-2

Jun 78 158, pre-owned

2880-2
158

We will also take your currently installed IBM equipment in trade
on a new system.

Peripherals and I/O

All 360/370 Disk, Tape
Printers, Readers, and T/P

Gene Chappell
Wanted:

3330's, 3340's & 3420's

Call Us!



CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900

CIS is very interested in
buying pre-owned
IBM 370 systems.
If you are thinking
about selling, let us
make you an offer.

ECLIPSE C300

- SURPLUS -

20 mag. dual disks, mag tape
300 LPM printer, 8 line communications
4 CRT'S. Full software. 1 1/2 yrs. old
BUY OR LEASE FROM OWNER

PHIL THOMAS

(305) 272-8753

Thomas Business Systems, Inc.

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340's

IBM UNIT RECORD
EQUIPMENT

026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557,

029-059-129

Call us for all your needs, we buy
rent and sell all types of IBM unit
record equipment. Over 12 years
of serving commercial and govern-
ment requirements. Contact ACS
for proposal.

ACS
Houston TX 77081
(713) 666-2122
TWX 910-881 1526
EQUIPMENT CORP.

MEANS

System/3 Leasing
For A Lot Less

Save up to 60% on your installed or on-order
System/3 or other computer system with our
new purchase and leaseback program—ELEX/3.

The Equipment Lease Exchange Inc.
P.O. Box 14
MEDFORD, NEW JERSEY 08055
609/654-1100

BUY - SELL - TRADE

DATA MODULES
DISK PACKS
DISK CARTRIDGE

Attn: Gerie Moura

USED COMPUTERS,
INC.

7 Woodside Ave.
Berwyn, PA 19312
(215) 647-1881



dearborn taketh your surplus IBM

equipment and make it disappear

or leaseth it back to you

Call Tom Millunchick:

(312) 827-9200

or any dearborn office



dearborn
computer company

dealer - IBM computers
systems software
leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788

FOR SALE BY OWNER

PDP 11/70 DA
AVAILABLE
IMMEDIATELY

PDP 11/70 64K

1 FP 11-C Floating Point
1 RWP04-AA Disk Drive
1 TNU1G-EA Tape Drive & Control
1 LP11-VA Printer & Control
6 DL11-E Modems
2 LA36 DEC Terminals
1 AR11-KT Analog Sub-system

(All Under Continuous DEC Maintenance)

PRINCIPALS ONLY

For Full Particulars

Respond to

CW Box 1446

797 Washington St.

Newton, Mass. 02160

3033

(11/78, 2/79 Lease Only)

For Immediate Lease or Sale

138's, 148's

3203-4's



BARRETT
CAPITAL
& LEASING
CORPORATION

14 Redwood Road
White Plains, N.Y. 10605
(914) 761-0070

The Logical Choice

BUYING SELLING
LEASING

360/30-40-50-65s

CPU - Peripherals

AND SYSTEM/3

3340 A02, 8023303-1, 11 5410-A14
3830-2 3333-1 11 3871
3420-4, 6, 8 3420, 3, 9 4100
3330-1, 11 3410's 6378
3420-3, 5, 7 3403's 5424-A1
3603-1, 2 3420's 5203-2
2501's 5560
2401's 5444-2

DATA AUTOMATION CO., INC.
4858 CASH ROAD
DALLAS, TEXAS 75247



AC 214 637-6570

BUY • SELL • LEASE

026 - \$ 850 085 - \$ 750
029 - 1850 088 - 2500
059 - 1375 129 - 3350
082 - 800 514 - 800
083 - 1800 548 - 1500
084 - 2500 552 - 900
557 - 2800

MOHAWK-6401-6403 NCR-736

Want to buy IBM 029's, 129's, 3741's, 3742's

COMPLETE LINE BURNERS, SHREDDERS,
DECOLLATORS AND BINDERS.
ECONOMICAL LEASE PURCHASE PLANS

DP SERVICE INC.
STAN PELC or NATALIE REYES

CALL... 312-774-2556
5505 N. MENARD AVENUE, CHICAGO, ILLINOIS 60630

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
DEC HARDWARE PDP11-PDP8 Processors Peripherals Memories VT52's LA36's LS120's LA180's <i>Also available</i> Other printers and discs available with controllers for most minicomputers. NDS NATIONAL DATA SALES CORP. 516/944-7444	 BUY-SELL-LEASE-TRADE 3031/3032/3033 (Lease Only) <i>John Mills</i> (313) 642-8000 3420 3803 3333 3830 3330 3340 <i>Darryl Hastings</i> (313) 642-8000 360 30/40/50/65 <i>Gary Smith</i> (313) 642-8000 370/165 370/168 <i>Bob Van Hellemont</i> (313) 642-8000 370/158 <i>Ron Baker</i> (313) 642-8000 370/155 <i>Gary Smith</i> (313) 642-8000 370 148/145/138/135 <i>Pam Hoban</i> (313) 642-8000 370/115/125 <i>Bob Southwell</i> (313) 642-8000 1403 2821 2501 1442 1443 If you rent any of these and are returning them to IBM call me. I'll show you how to make money using your rental credits. We buy and sell all of these units. <i>Kathy Housey</i> (313) 642-8000 3270 CRT's Printers/Controllers 1130 <i>Call Jim Carleton</i> (313) 642-8000 System/3 Model 15 <i>Jerry Roberts</i> (313) 642-8000 3742 3741 5496 <i>Jerry Sharon</i> (313) 642-8000 360/20 083-029-059-026 <i>Call Maria Bednarz</i> (313) 642-8000			

IN CANADA
IBM 360 370
Don DuPuis
 Windsor, Ont.
 (519) 258-8910

Ron Ridding
 Toronto, Ont.
 (416) 883-3704

Jacques Dagenels
 Montreal, Que.
 (514) 374-5920
 CMI Company

IMMEDIATE DELIVERY
NEW
PDP 11 T 03
16K
RK05F/J
LA 36
CONTACT:
A. FARRELL
MAV SYSTEMS, INC.
 132-29 33rd AVE.
 FLUSHING, NY 11354
 (212) 463-1749

FOR SALE

Two (2) Electronic Retina Com-
 puter Reader (ERCR) w/associ-
 ated CPU's, tape drives, line print-
 ers, and misc. peripherals.

Also eight (8) Bar Code Reader/
 Sorter (BCRS) systems, Models
 1A and 1B, w/associated CPU's,
 tape drives and misc. peripherals.

Manufacturer
 Recognition Equipment, Inc.

For further details contact:
 E. Hutchinson

AMERICAN EXPRESS
COMPANY

Phoenix, Ariz.
 (602) 248-3082

CMI
CORPORATION

The IBM Specialists

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000

Member
 Computer Deale-
 Association

efm computer
 leasing, Inc.



3000 marcus avenue
 lake success, ny 11040
 (516) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40	360/65
360/50	370/135
	370/145

FOR SALE
IBM Printer 600LPM

1403 Model 7 with
 1133 Multinlayer

ATTENTION
1130 USER!

\$12,500

Call Gene Kijanowski
 (312) 758-0900
 Available April 1, 1978

FOR SALE

IBM 5410 System 3 CPU
 8 K Memory, Serial Num-
 ber 17704, Used Hours:
 3370.

Continental Life
 Ins Co
 Call Mr. Bush,
 (602) 957-1040

DEC
HARDWARE
PDP 11 PDP 8

Processors Peripherals
 Memories
 VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
 Seekers and Sellers
 (516) 585-0800

SELLING

PREVIOUSLY OWNED
EQUIPMENT & SYSTEMS
N.C.R. & BURROUGHS

N.C.R. 31, 32 & 151 & 152 Teller Units
 735/735 & 745 Mag. Tape Enc. & Line Printers
 N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
 BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S
 Also B-700 Thru B-4700 Systems w/wo Peripherals
 WE ARE AUTHORIZED N.C.R. DEALERS OF
 210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS
BUYING OR SELLING-CALL US FIRST.

KEY-EXIMPORT CORP.

256 LIVINGSTON ST (P.O. BOX 129) NORTHVALE, N.J. 07647
 TELE. N.J. (201) 767-3444 N.Y.C. (212) 736-7736
 TELEX 135149 CABLE KEYEXIMP NORTHVALE NJ

BUYING



Pioneer Computer Marketing
 1165 Empire Central Pl.
 Dallas, Texas 75247
 214/630-6700
 Attn: Barney Sutton

AVAILABLE FOR SALE

3330-1	3420-5	(w/3350)
3333-1	3420-6	(w/6425)
3330-11	3333-11	(w/8150)

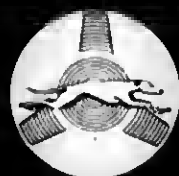
**When you plan to buy or
 sell your computer
 equipment...**

For complete information
 call the Greyhound Representative in your area.

WANT TO BUY

370/158 370/155 370/145

U.S.	Home Office	T. A. Takash	602-248-6037
	New York	Dick Ventola	914-949-1515
	Chicago	Pete Ahern	312-298-3910
	Dallas	M. W. "Bill" Tucker	214-233-1818
	San Francisco	Henry Paulson	415-283-8980
INTERNATIONAL	Canada	Don Meunder	416-366-1513
	U.K./Europe	Joe Gold	022-61-27-54
	Mexico	Andres Contreras	905-543-8850
	Austro-Asia	John Hallmark	214-233-1818
	Euresia	Don Haworth	214-233-1818
NON IBM	Dallas	John Hallmark	214-233-1818



GO GREYHOUND

Greyhound Computer Corporation

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WANTED TO BUY
IBM 370/155
 with or without DAT
Contact: Harry Blair
(713) 524-8249

FOR IMMEDIATE SALE

New Data General
 6053 CRT Terminals
 LIST \$2,290
 SALE \$1,700
 New Nova 3D, 64KB
 20% Off List
CONTACT: Bob Bac!
BINARY DATA
SYSTEMS, INC.
 88 Sunnyside Blvd.
 Plainview, N.Y. 11803
 (516) 922-1585
 (212) 895-0130

For Sale Or Lease
System 3/15
Complete Systems

Any configuration from B 19 to D 24
 30 to 90 days delivery depending
 upon your requirements.
 Also complete inventory tapes — disks.
 Printers — CPU Upgrades
Call Avery Reynolds 214-630-6700
TWX 910-861-4936



Pioneer Computer Marketing
 1165 Empire Central
 Dallas, Texas 75247

Member of Computer Dealers Association

FOR SALE
NCR
CENTURY 100
(32K)

450/900 LPM Printer
 (6/8 Line option)
 Dual Spindle-Ceramic Heads
 300 CPM Reader
Contact: D. MOORE
 4005, W. 65th St., No. 120
 Minneapolis, MN 55435
 (612) 927-4391

INVENTORY REDUCTION
MUST SELL NEW
EQUIPMENT
AT OR BELOW OUR
DISCOUNTED COST

Data General CS40 Systems
 (with printers and CRTs)
 Wangco Model 712 Tape Drives
 Ball Computer Model 3120
 Tape Controller for Data
 General Nova CPU
 EDS Model 300 Multiplexers
 for Data General Nova CPU
 Tally Model 2200, 200 lpm
 printer with interface for
 Data General Nova CPU
 Data General Nova 3/12
 W/16k memory & I/O CTL.
ACT NOW—SUPPLY LIMITED

CONTACT:



Agency Records Control, Inc.,
 Technical Systems, Ext. 223
 (713) 693-6122
 P. O. Box 1009
 Bryan, TX 77801

FOR SALE
PDP 11/34
(2) RK05J'S
RSTS/E
96K bytes

IMMEDIATE DELIVERY

\$24,500

CALL M.E. CONGDON

EDUCOMP QUODATA
(203) 728-6777

DEC EQUIPMENT

BUY & SELL
AVAILABLE
NEW & USED:
 RP03, RP11
 RPR02, RPR11
 RK05, RK11
 RK06, RK611
 LP11, VT52
 LA180, LA36
WILL TRADE
EXCELLENT PRICES

ALPHABYTE
 714 994 6746

RANDOLPH NEEDS:
3340-A2 DISKS
3420-3, 4 & 8
MODEL TAPE DRIVES
CALL: MIKE SEEKINGS
TOLL FREE
800-243-5308

RANDOLPH COMPUTER COMPANY
 Division of Firstbank Financial Corporation
 A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
 537 State Street, Greenwich, CT 06830 • (203) 681-4288

148

New Equipment Leases • Purchase/Leasebacks
CALL: CHUCK STABILE
(201) 947-4200
IPS COMPUTER MARKETING
 2460 Lemoine Avenue
 Fort Lee, N.J. 07024

NATIONAL COMPUTER RENTAL
415 MADISON AVENUE
NEW YORK, NEW YORK 10017
(212) 532-1500



MEMBER OF TIGER LEASING GROUP

SHORT AND LONG TERM
LEASES WITH ATTRACTIVE RATES

360 / 30, 40, 50, 65

370 / 125, 135, 145, 155
138, 148, 158, 168

3031 3032, 3033 DISK TAPES

WE ALSO BUY - SELL

MEMBER OF COMPUTER LESSOR ASSOC.



WANTED
029-129

We Buy
 Rental Credit Machines.
 Continue to Rent at A
 Discount From IBM Prices.
 Call Bob Stackhouse

Data Rentals/Sales

(213) 559-3822

FOR SALE
OR LEASE
IBM 2314-A1 1x4

Available

April 24, 1978

Call Collect or Write
Berlent Industries,
Inc.

1975 Hempstead Turnpike
 East Meadow, N.Y. 11554

516-794-9722

FOR SALE OR LEASE
370/168

AVAILABLE JUNE '78

(MODEL 1, 3 or A)

Bob VanHelleMont

CMi CORPORATION — (313) 642-8000

We are
buying,
selling,
& leasing!

Buying: 3830, 3420, 3330, 3333
 Selling: 360/65, 360/40
 Leasing: 360/65, 370/135

Please contact:

Linda Vaughn / (415) 955-0220

Tommy Talbot / (415) 955-0238

ITTEL
CORPORATION
 Data Products Group

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

If it's IBM equipment you're BUYING • SELLING • LEASING • TRADING

call... **the Matchmakers** **1-800-654-9179** **TOLLFREE!**

CSI COMPUTER SALES INTERNATIONAL, INC. 

AVAILABLE
FOR SALE OR LEASE
 IBM 3705-1 Model A1
 with following features:
 1642-4650-8002
 4701-4714-1302
 1541
 WESTERN MARKETING
 AND FINANCIAL
 (415) 526-9221
 (312) 397-3311
 Fred Hegeman Jack Air

Short or Long Term

Leasing From

RANDOLPH

370/138

370/148

370/135

370/145

... and all other IBM systems ...
 from S/3's and 115's ... to 168's
 and all 303X CPU's or full systems.
 Up to 8-year leases available.

CALL THE 370 HOTLINE

800-243-5307



Randolph Computer Company
 537 Steamboat Rd., Greenwich, CT 06830
 (203) 661-4200

FOR SALE

- One Data Products line printer/Model 2315/50 col.
- One Model 3673 Memorex disk controller
- Two True Data 400 cpm card readers
- One GRI-99 Model 30 mini-computer with 10MB CDC disk storage.

Telefile
 COMPUTER PRODUCTS, INC.

17131 Daimler St.
 Irvine, CA 92714
 (714) 557-6660

Ask for Joe Letbetter

Buy or Sell
Disk Packs
Data Modules

Trade Ins Available

Call Lorraine

(312) 421-2900
 Systems Supply Corp.
 833 W. Jackson Blvd.
 Chicago, IL 60607

FOR SALE

IBM SYSTEM/34

Delivery expected middle July.
 Installation and software services
 available if needed.



CALL
ED BROWN

(213) 735-1631

2314-A1

- 8 or 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

COMDISCO
 312-698-3000

Wanted To Buy

3672-Memorex storage control unit

3673-Memorex disc controller

3670-Memorex disc module

3675-Memorex disc module

Contact:

Harry Blair 713-524-1401

digital

Factory Refurbished Equipment

All quality tested and warranted
 by the people who made them.

- Complete systems
- Processors
- Peripherals
- Accessories
- Complete Documentation

Digital Equipment Corporation
 Traditional Products
 125 Northeastern Boulevard
 Nashua, New Hampshire 03060

☐ Please send your complete product listing.

☐ Please call, I'm specifically interested in: _____

Name _____

Address _____

City _____

State _____

ZIP _____

Phone _____

CW3138

DEC
PROCESSORS
PERIPHERALS & MODULES
 BUY - SELL - LEASE - RENT

\$1,000,000

NEW & USED DEC INVENTORY

- DEC CPU'S
- DEC DISKS & CONTROLLERS
- DEC TAPES
- DEC TERMINALS
- DEC PERIPHERALS
- MISC. BOARDS & MEMORY

Hundreds of Misc. Modules & Cables Available
 Call for other components in stock

SAVE 33%

NEW 11T34 CONFIGURATION

\$23,333.33

For fast delivery and substantial savings
CALL the DATALEASE Digital HOTLINE

800-854-0359

DATALEASE

700 No. Valley St., Ste. A, Anaheim, California 92801
 (714) 533-3920 **Telex 692439**

THREE AND FOUR YEAR WALK-AWAY LEASES

1. ATTACHED PROCESSOR FOR 3158

2. 3158 - 3 MEG WITH APU FEATURE

SPRING AVAILABILITY

3. 3158 - 3 MEG MOD 3

SUMMER AVAILABILITY



THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle — (312) 944-1401
 600 North McClurg Court-Suite 4202A
 Chicago, Illinois 60611

Paul Nortman — (516) 752-1000
 1 Huntington Quadrangle-Suite 4S13
 Huntington Station, New York 11746

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

Buy Sell Lease

IBM Equipment

Please Call or Write

Kennsco

7232 BOONE AVE. NO. / MINNEAPOLIS, MN 55428
PHONE: 612/533-5800

BUY SELL LEASE SUBLEASE

370/168, 165, 155 call TED MOLINARI	370/158 call JEFF KLEIN
370/148, 145 call CHUCK STABILE	370/138, 135 125, 115 call RICK THEILE
INTERNATIONAL call ED CHAMPAGNE	360/65, 50, 40 & 1/0 call DAVE TAIT

ED JOSEPH

IPB Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024
"THE SOURCE" since 1963

BUY-SELL-SWAP

PDP 11'S & NOVA'S

Systems and Peripherals at very attractive prices

New and Used

ICS

Computer Equipment Sales

408-735 7360 PAUL PEREZ 408 735 7361

dataserv

buy • sell • lease • trade

370

115/125 135
Steve Lacny
800-328-2406

370

138 THROUGH 158
Dove Miller
616-637-8481

370

Peripherals
800-328-2406
Tom Anderson

360

CPUs and Peripherals
Neal Johnson
800-328-2406

Sys/3

CPUs and Peripherals
800-328-2406
SYS 32'S

For Sale or Lease
Any 115/125 configuration
Sending 115/125
Back to IBM

Call us! We'll show you how to make money using your rental credits.

For Sale or Lease
138-145-155
CPUs — Peripherals — Memory
370/145-H

7855
8810
8982
8983
3215 Console
3047 Power Units

Avail. Now **WTB**
3203-02 3272, 3271
3340-B2 3277, 3420
3410/3411 3803, 3830
3505/3525

STOP! Before you send any of the above machines back to IBM call us. We'll show you how to make money.

For Sale or Lease
360/30-40-50-65s
CPU — Peripherals — Memory

We'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory

SYSTEM/3
5410-5415
SYSTEM/32
SYSTEM/34
ALL MODELS
Deliver Positions

Call Toll Free 800-328-2406 or 612-544-0335

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
P.O. Box 9488, Minneapolis MN 55440

For Sale or Lease
370/168
with attached processor
July, 1978

Call
R. Van Hellemont
(313) 642-8000
CMI Corporation

BUY - SELL - LEASE - BROKERAGE -

For the
National, Foreign, and Wholesale Trade
Buy, sell, lease, sub-lease, or be your agent in placement of your pre-owned IBM 360/370/System 3, or other units

COMPUTER INTERNATIONAL LTD
BEACH COMPUTER CORP
CWC's Leasing Division
COMPUTER WHOLESALE CORP
(504) 581 7741

Suite 507/508 First National Bank of Commerce Bldg.
New Orleans, LA 70112
Member Computer Dealers Assoc.

AVAILABLE
One 370/158 AP
With associated model upgrades
MAY 1978
3830, 2150, 2151, 6111
Available April 21, 1978
(ITC Qualified)
WESTERN MARKETING AND FINANCIAL
(415) 526-9221
(312) 397-3311
Fred Hegeman - Jack Air

SALE OR LEASE

- 3410/3411 Tapes & Control
- 3271/002 Controller (with 4 CRT's)
- 3033 8 Meg System
- Fall '78 Delivery (I.O.A. sole owner)

WANTED
3420-6 with Dual Density

IOA DATA CORP

MINICOMPUTERS & SYSTEMS

Don't waste company time or money. Check with us before you buy or sell.

New DEC Equipment
Immediate Delivery
RK11-RK05 Disk Systems - \$8500
PDP 11/04s and 11/34s - 20% off list
DZ 11
DEC Station 78

New DG Equipment
Immediate Delivery
DG 10 Mbyte Disk Systems from \$7500
DASHERS - 15% to 25% off list
Nova 3/12 or 3D - 20% off list
Immediate delivery for MOS!
Inventory Clearance
call us for free brochure

MINICOMPUTER EXCHANGE
(408) 733-4400
TWX 910-339-9272

FOR SALE

360/67
370/158K
370/168KJ
CPU, MEMORY, CHANNELS

CW Box 1490
797 Washington St.
Newton, MA. 02160

URGENTLY NEEDED! ANY QUANTITY!

DEC and DATA GENERAL
computer equipment
CASH AVAILABLE

CALL TODAY!

(313) 994-3200

NEWMAN COMPUTER EXCHANGE
One North Main Street, Apartment 1W11

FOR SALE OR LEASE

2 IBM 360/30's 128K
64K IBM - 64K Data Recall
2 IBM 360/30's 32K
All Available Immediately
With Choice of Features
Call Collect or Write
BERLENT INDUSTRIES, INC.
1975 Hempstead Turnpike
East Meadow, New York 11554
516-794-9722

APL CONSULTING * EDUCATION * SOFTWARE

For all your in-house needs.

(416) 868-6013

Numetrix Limited
3 Church St., Suite 600
Toronto, Ontario M5E 1M2

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Bldg., Jackson, MS, 39201, for the following data processing equipment and services:

Request for Proposal No. 343 due 2:00 p.m., April 4, 1978, for the acquisition of an upgrade and additional disk drive for an existing Four-Phase IV/70 system.

Request for Proposal No. 344 due 2:00 p.m., April 4, 1978, for the acquisition of an interactive graphics video display terminal.

Request for Proposal No. 345 due 2:00 p.m., April 4, 1978, for the acquisition of an interactive plotter/digitizer.

Request for Proposal No. 346 due 2:00 p.m., April 4, 1978, for the acquisition of modems or acoustical couplers with speeds ranging from 110 baud to 56K baud for terminal communications with various computer systems used by the state of Mississippi.

Request for Proposal No. 347 due 2:00 p.m., April 4, 1978, for the acquisition of the IBM software package Online Library Circulation System, IUP number 5796-APA, or equivalent; and VS-BASIC, program product number 5748-XX1, or equivalent.

Request for Proposal No. 348 due 2:00 p.m., April 4, 1978, for the acquisition of a job accounting and utilization software package to operate under MVS.

Request for Proposal No. 349 due 2:00 p.m., April 4, 1978, for the replacement of existing IBM 3830, 3333, and 3330 disk drives with faster and greater capacity devices.

software for sale

software for sale

software for sale

time & services

time & services

CONVERTING?



Try the experts. OASD Corporation encourages test evaluations of all of our language translators.

RPG/RPG II to COBOL (DOS or OS) will accept all types of RPG and produce ANSI COBOL. Most translations are 100% error free. Our modular COBOL simplifies maintainability.

SYSTEM/3 COBOL to OS COBOL makes this tedious, redundant conversion completely automatic. We're 97% clean, which frees a lot of man hours for more important tasks.

DOS COBOL to OS COBOL is basically a difference of syntax, but may mean a lot of wasted man hours.

GE MAP to OS COBOL will allow immediate upgrade of your GE 400 series to full ANSI COBOL.

360/20 BAL to 360/370 OS ALC is an extremely solid product eliminating a monotonous programming job.

OASD TRANSLATORS SAVE TIME AND MONEY.

Many service options are available: lease, conversion only, conversion and clean compile; full conversion responsibility including testing and JCL.

For a prompt solution to your conversion problems, write or call today.

DASD CORPORATION

National Marketing
1480 Renaissance Drive—Suite 315
Park Ridge, Illinois 60068
312/299-5005



Honeywell 600/6000/66 Users!

NEED A DIRECT APPROACH TO DATABASE MANAGEMENT?

WITH FEATURES LIKE —

- MULTIPLE/VARIABLE-LENGTH RETRIEVAL KEYS
- MULTI-USER/CONCURRENT ACCESS AND UPDATE
- PROCEDURAL APPROACH TO DATABASE DESIGN
- HIGH LEVEL LANGUAGE INTERFACE
- EASY TO INSTALL AND USE

Let us tell you more about BancOhio's **DIRECT** Database Package!

Contact:
Jim Withgott
BancOhio Corporation
770 West Broad Street
Columbus, Ohio 43222
614/463-8316



TSO USERS...



—Create and modify test data
—Automatically document JCL

Video Programming tools (VIP) extends and enhances your use of TSO to these particular areas of need.

Test data is easily generated and modified by even a novice user through an interactive command processor running in foreground. It is also a simple task for maintenance programmers to select records from live files and modify fields to recreate conditions suspect in program failure. Incidentally, VIP understands the need to input HEX, binary and packed data.

More comprehensive test conditions are easily produced and overall program test time significantly reduced (especially compared to the trial and error of batch testing or the awkwardness of working with foreign languages or processors).

JCL documentation is automatically done and always current with VIP's flowchart generator. Each step appears on an 8 1/2" X 11" paper for easy inclusion in documentation manuals.

For samples documentation and more information, write or call

DASD CORPORATION

National Marketing
1480 Renaissance Drive—Suite 315
Park Ridge, Illinois 60068
312/299-5005



RPG TO COBOL

Oetaware's software translator converts RPG and RPG II programs to the industry standard ANSI COBOL (OOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCOOPER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCOOPER (7070) to COBOL
- COBOL to COBOL
- AUTOCOOPER/SPS to COBOL

For more information on our translators, write or call today.

Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

IF YOU ARE CONSIDERING
A FUTURE WITH

MVS

AND THE BENEFITS OF
INTERACTIVE TIME
SHARING UNDER

ISO

YOU CAN HAVE IT NOW,
WITH

TONE 3

THE LOW OVERHEAD—
HIGH PERFORMANCE
TIME SHARING SYSTEM
FOR

VSI

DESIGNED TO CONFORM
TO THE STANDARDS OF

IBM

WRITE OR CALL FOR DETAILS

TONE

11588 Trask Avenue
Garden Grove, Ca 92643
(714) 636-8501

TIME AVAILABLE
370/135
DOS/VS

Up to 8 hours 2nd shift -
some first shift available.

Attractive Rates

192K, 2-3420,
5-3330, 2-1403 N1
Commonwealth Avenue
Across from Armory

Contact:

Jo-Ann Fanti
(617) 738-6410

WE ARE
**BROKERS OF
COMPUTER
TIME**

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

370/158 mod 3
Datacenter

3.5 meg MVS

Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Kerlevsky
(212) 564-3030

Datamor

132 West 31 St.
New York, N.Y. 10001

I.B.M. 360-40

All Shifts 128K, 4-2401
MOD-2, 9-2314, 1403-N1,
2540, 1401 Compatibility.

From \$35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036

Contact:

Al Pelmo (212) 997-1413
Charles Leigey (212) 997-1411

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI,
Oete Craft, Oata General, CDC,
OEC, EMM, Fabri Tek, Honey-
well, GAI, HP, Intardata, Lock-
head, Plessey, NCR, SMI, Univac,
Microdata, Verian, XOS.

Any Manufacturer's Memory

THREE DELTA CORP

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

COMPUTER
TIME

RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 15511
360/30

- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect

Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

REMOTE
JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide Incoming Watslines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, MASP, INTERCOMM, MOSCOT
- Complete data security including off-site storage

For information
call John MacDougall
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

DEC 11/70

RSTS/E

TIMESHARING

\$4.00 HOUR

Servicing Md. & Va.
All Programming Langs.
Software Packages for
Payroll, Accts. Recv.
and Payable, Inventory,
etc. Data Base Services

OCEANIC ENTERPRISES
INC.

201 N. Charles St.
Baltimore, MD 21201
(301) 685-3122

KEYPUNCH SERVICES

- FREE pickup/delivery in Greater Boston area
- QUICK turnaround
- INEXPENSIVE
- CONFIDENTIAL
- VOLUME discounts
- NO monthly minimums
- ACCURACY assured

DATA/SYSTEMS

(617) 244-3454

TIME
FOR SALEComputer Time
Brokers &
Specialists

- On-site or remote processing
- Serving the Tri-State Area

BRODKE COMPUTER CORP.
250 W 57 ST., NEW YORK, NY 10019
212/586-0923

Need
Computer
Time?

Time is available now on a
370/145, 1-MEG 3340 Disks,
3420 Tapes, Reader, 1403N1
Printer, Punch, DOS/VS &
Power/VS. RJE capability.
1401 compatibility. Payroll
package. Programming sup-
port available. Unit Record
equipment. Convenient New
Jersey Location.

Contact: Bill Vincent

201-654-3230

for more details

TURNKEY
SYSTEMS

**FREE
BUSINESS SOFTWARE**
GL, A/P, A/R,
Payroll

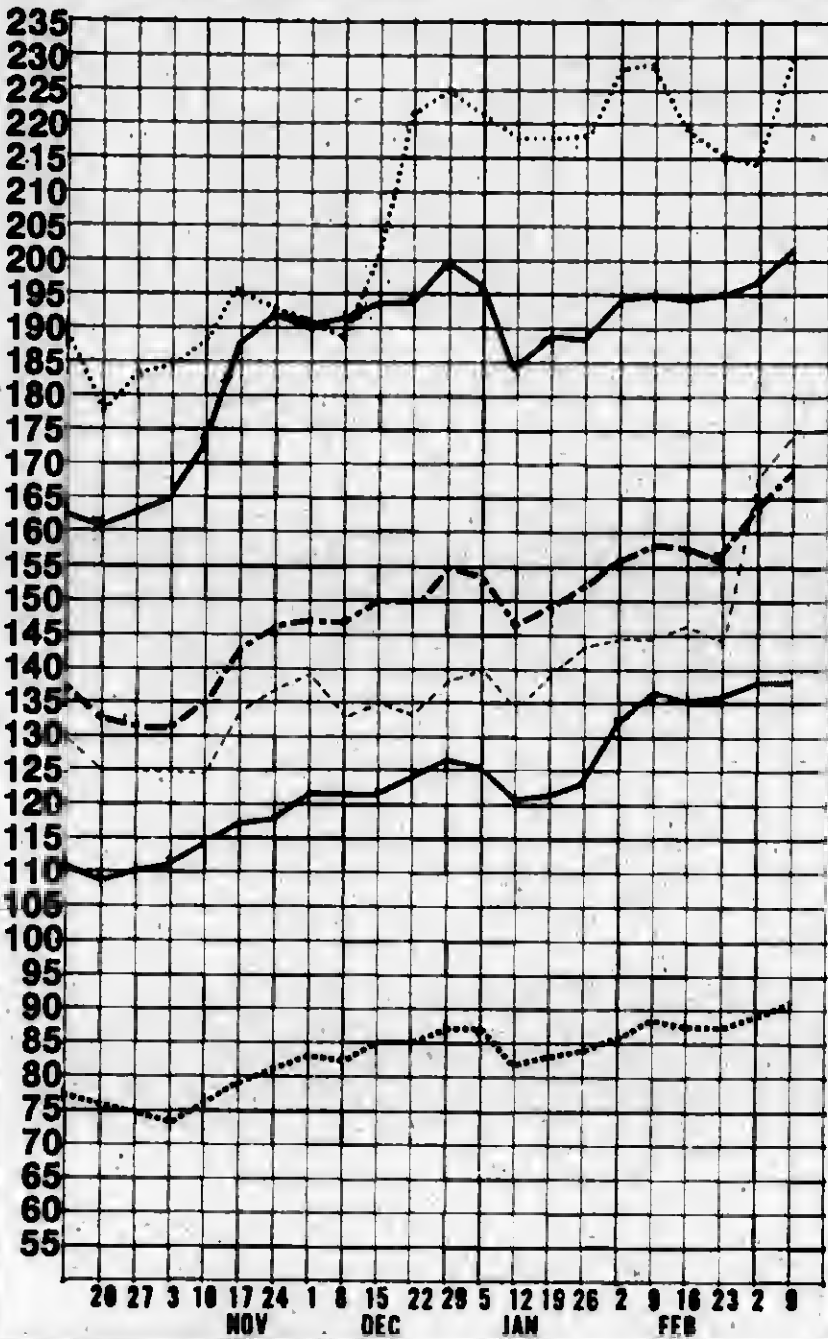
With Purchase of TI
990/10 Model 8

PERCOR

(512) 476-3495
803 W. 24th St.
Austin, TX 78705

COMPUTERWORLD Computer Stocks Trading Indexes

— Computer Systems — Software & EDP Services
 - - - - - Peripherals & Subsystems - - - - - Leasing Companies
 — Supplies & Accessories — CW Composite Index



Earnings Reports

HONEYWELL			
Year Ended Dec. 31			
	1977	1976	
Shr End	(000)	(000)	
Revenue	\$6.90	\$6.50	
Tax Cred	2,011,093	2,405,295	
Earnings	10,813	7,784	
3 Mo Shr	145,124	113,053	
Revenue	2.32	2.07	
Tax Cred	831,851	738,077	
Earnings	2,095	3,174	
	48,648	43,165	

a-includes \$12 million gain from sale of part of interest in Honeywell Bull.

COMPUTER PRODUCTS			
Year Ended Dec. 31			
	1977	1976	
Shr End	\$53	\$31	
Revenue	8,000,000	6,153,000	
Earnings	895,000	508,824	

a-Adjusted for November 1977 20% stock dividend.

ELECTRONIC ASSOCIATES			
Year Ended Dec. 30			
	1977	1976	
Shr End	\$0.02		
Revenue	26,431,000	\$23,876,000	
Disc Op		\$544,000	
Tax Cred	34,000	190,000	
Earnings	48,000	(3,980,000)	
3 Mo Shr	.39		
Revenue	0,573,000	5,771,000	
Earnings	1,028,000	(2,848,000)	

e-Represents elimination of excess prior loss provisions.

MEDICAL COMPUTER SYSTEMS			
Year Ended Dec. 31			
	1977	1976	
Shr End	\$43	\$41	
Revenue	10,429,907	8,252,244	
Earnings	1,170,777	1,123,079	
3 Mo Shr	.11	.11	
Revenue	2,705,143	2,453,647	
Earnings	308,787	303,103	

NATIONAL DATA COMMUNICATIONS			
Year Ended Oct. 31			
	1977	1976	
Shr End		\$27	
Revenue	\$3,281,101	3,327,275	
Tax Cred		200,000	
Earnings	(358,854)	481,622	

Computerworld Sales Offices

Vice-President/Marketing
 Roy Einreihof
 Advertising Administrator
 Terry Williams
 COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800
 Telex: USA-92-2529

Boston
 Robert Ziegel
 Northern Regional Manager
 Mike Burman
 Frank Collins
 Account Managers
 COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800

New York
 Donald E. Fagan
 Eastern Regional Manager
 Frank Gallo
 Account Manager
 COMPUTERWORLD
 2125 Center Avenue
 Fort Lee, N.J. 07024
 Phone: (201) 461-2575

San Francisco
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Donna Dezelan
 Account Coordinator
 COMPUTERWORLD
 353 Sacramento Street
 Suite 600
 San Francisco, Calif. 94111
 Phone: (415) 421-7330

Los Angeles
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Judy Milford
 Account Coordinator
 COMPUTERWORLD
 1434 Westwood Boulevard
 Los Angeles, Calif. 90024
 Phone: (213) 475-8486

Japan
 Mr. Shigema Takahashi
 General Manager
 DEMPA/COMPUTERWORLD
 1-11-15 Higashi Gotanda
 Shinagawa-ku, Tokyo 141
 Japan
 Phone: (03) 445-6101
 Telex: J2424461

United Kingdom
 Tony Vickers
 IDG PUBLISHING LTD.
 140-146 Camden Street
 London NW1 9PF
 England
 Phone: (01) 267-1201
 Telex: UK-264737

West Germany
 Hans-Jürgen Ballnath
 COMPUTERWORLD GmbH
 8000 Munich 40
 Tristansstrasse 11
 West Germany
 Phone: (089) 36-40-36
 Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 8, 1978

All statistics compiled,
 computed and formatted
 by
 TRADE QUOTES, INC.
 Cambridge, Mass. 02139

E R C N	PRICE					E R C N	PRICE					E R C N	PRICE							
	1977-78 RANGE	CLOSE MAR 8 1978	WEEK NET CHNGE	WEEK PCT CHNGE			1977-78 RANGE	CLOSE MAR 8 1978	WEEK NET CHNGE	WEEK PCT CHNGE			1977-78 RANGE	CLOSE MAR 8 1978	WEEK NET CHNGE	WEEK PCT CHNGE				
COMPUTER SYSTEMS																				
A ANDAML CORP	22-55	46 3/4	- 1/R	-0.2		C ADVANCED COMP TECH	0- 2	1 1/2	0	0.0		O DATA ACCESS SYSTEMS	4- 5	4 3/4	+ 3/4	+18.7				
N BURROUGHS CORP	55-91	61 3/4	+1 3/4	+2.9		C ANACOMP INC	7-12	12 1/8	+3	+32.8		O DATA 100	6-11	10 1/2	+ 3/8	+3.7				
O COMPUTER AUTOMATION	18-30	24	+1	+4.3		A APPLIED DATA RES.	5-12	9 3/8	0	0.0		A DATA PRODUCTS CORP.	9-19	15 1/4	+ 1/4	+1.0				
N CONTROL DATA CORP	20-29	24 1/8	- 1/4	-1.0		N AUTOMATIC DATA PROC	23-30	24 1/2	+ 1/2	+2.0		O DATA TECHNOLOGY	3- 4	4 1/8	+ 1/8	+3.1				
C CRAY RESEARCH INC	15-31	25 3/4	0	0.0		C COLMAN AMERICAN COS	1- 2	1 1/4	0	0.0		O DATUM INC	1- 3	2 1/2	- 1/4	-9.0				
N DATA GENERAL CORP	35-54	42 3/4	0	0.8		C COMPTON-SLVY NETWORK	9-15	9 1/2	0	0.0		O DECISION DATA COMPUT	2- 3	1 3/4	- 1/8	-6.6				
N DATAPoint CORP	18-41	38 3/8	+ 1/2	+1.3		O COMP ELECTION SYSTEMS	6-10	9	0	0.0		O DELTA DATA SYSTEMS	1- 1	3/8	0	0.0				
N DIGITAL EQUIPMENT	37-53	40 1/2	+ 3/4	+1.8		C COMPUTER HORIZONS	1- 2	2 1/4	0	0.0		A DOCUMENTATION INC	6-12	10 5/8	- 3/8	-3.4				
N ELECTRONIC ASSOC.	2- 4	4 1/8	+ 1/2	+13.7		C COMPUTER NETWORK	6-11	8 1/4	- 1/8	-1.4		C DATARAM CORP	2-24	18	- 1/4	-1.3				
A ELECTRONIC ENGINEER.	R-16	12 7/8	- 1/2	-3.7		N COMPUTER SCIENCES	7-10	8 3/4	- 1/8	-1.4		N ELECTRONIC M & N	4- 5	4 1/4	- 1/8	-2.8				
O FOUR-PHASE SYSTEMS	13-23	21 5/4	+ 1/4	+1.1		C COMPUTER TASK GROUP	1- 2	1 3/4	+ 3/8	+27.2		D FABRI-TER	1- 2	1 1/8	0	0.0				
N FOXBORO	28-54	29 1/4	- 3/4	-2.5		C COMPUTER USAGE	1- 3	1 3/4	0	0.0		O GENERAL COMPUTER SYS	0- 2	1 3/8	- 1/8	-8.3				
O GENERAL AUTOMATION	6- 9	7 3/4	+ 1/8	+1.6		C COMSHARE	5- 9	8	- 1/4	-3.0		N HAZELTINE CORP	8-12	12	+1 1/4	+11.4				
O GRI COMPUTER CORP	1- 1	1 1/8	+ 1/8	+12.5		O DATA DIMENSIONS INC	3- 5	5 1/8	+ 1/8	+2.5		N HARRIS CORP.	28-47	44 5/8	+1 1/4	+2.8				
N HENLETT-PACRARD CO	83-87	64 3/8	+ 3/8	+0.5		O DATAR	1- 2	1 1/4	0	0.0		O INFODR INC	4- 8	8	+ 5/8	+4.9				
N HONEYWELL INC	43-55	44 1/4	+ 1/4	+0.5		N ELECTRONIC DATA SYS.	14-20	18 3/8	+ 1/2	+2.7		O INFORMATION INTL INC	8-14	8	+ 1/2	+6.6				
O IBM	241-286	246 1/8	- 5/8	-2.1		C INSYTE CORP	2- 3	1 3/8	0	0.0		O INTEL CORP	38-57	40 1/2	+1	+2.5				
O MANAGEMENT ASSIST	5-11	10 3/8	- 1/8	-1.1		C IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0		A LUNEL ELECTRONICS	3- 4	4	- 3/4	-15.7				
O MICRODATA CORP	7-18	12 7/8	+ 5/8	+5.1		C KEANE ASSOCIATES	3- 4	3 1/2	+ 1/8	+3.7		O MSI DATA CORP	A-15	13 1/2	+ 5/8	+4.8				
O MINI-COMPUTER SYST	5-12	6 1/2	- 1/4	-3.7		C KEYDATA CORP	1- 3	1 3/8	+ 1/4	+22.2		O MEMOREX	23-34	28 1/2	+1 1/4	+4.5				
C MODULAR COMPUTER SYS	5-10	10	+1 1/4	+14.2		A LEGGILION	7-17	12 5/8	-1 1/8	-8.1		N MONARK DATA SCI	5- 8	8	+ 1/2	+6.6				
N NCR	32-47	40 7/8	+ 5/8	+1.5		A MANAGEMENT DATA	1- 2	1 1/8	0	0.0		C PERMIL CORP	2- 6	5 3/8	+ 3/8	+1.5				
O PRIME COMPUTER INC	12-27	25 1/4	- 1/4	-0.9		A NATIONAL CSS INC	10-18	15 1/2	-1 1/8	-6.7		N PERTEC CORP	7-11	9 1/8	- 1/8	-1.3				
N PERMIL-ELMER	17-22	18 1/4	+ 3/8	+2.0		C NATIONAL DATA CORP	4- 8	8	+ 5/8	+8.4		A POLITEC INSTRUMENT	2- 2	2	0	0.0				
N RAYTHEON CO	16-35	34	+2 7/8	+9.2		A CN LINE SYSTEMS INC	16-24	22 5/8	0	0.0		C PRECISION INST.	2- 2	2	0	0.0				
N SPERRY RAND	30-42	34 5/8	+1 1/2	+4.5		N PLANNING RESEARCH	3- 6	4 1/2	+ 3/8	+9.0		O QUANTOR CORP	3- 5	3 3/8	0	0.0				
O SYCOR INC	8-21	20 1/8	- 1/4	-1.2		C PROGRAMMING & SYS	1- 1	3 1/4	+ 1/8	+20.0		O RECOGNITION EQUIP	6-10	7 5/8	+ 1/2	+7.0				
A SYSTEMS ENG. LABS	5-14	13 1/2	+1 1/2	+12.5		C PAPIOTA INC	2- 4	3 1/4	0	0.0		C SCAN DATA	1- 2	1 3/8	+ 1/8	+10.0				
A WANG LABS.	10-14	12 7/8	+ 3/8	+3.0		O REYNOLDS & REYNOLD	17-21	18	0	0.0		O STORAGE TECHNOLOGY	10-26	25	+ 1/2	+2.0				
LEASING COMPANIES																				
O ALANTHUS CORP	3- 6	5 3/4	0	0.0		O SCIENTIFIC COMPUTERS	1- 4	3 1/4	+ 3/8	+13.0		O T BAR INC	7-16	15 3/4	+1	+6.7				
O BOOTHNE COURIER CORP	8-16	16	+ 1/8	+0.7		O TMSHARE INC	14-23	19 3/8	- 3/4	-3.7		A TEC INC	6-10	6 3/8	+ 1/8	+2.0				
C CONDISCO INC	9-16	9 1/4	- 1/4	-2.4		A URS SYSTEMS	4- 6	5 7/8	+ 3/8	+6.8		N TEKTRONIX INC	29-40	33 1/2	- 1/8	-0.3				
A COMMERCE GROUP CORP	1- 3	1 3/8	+ 5/8	+83.3		N WYLY CORP	1- 3	2 7/8	- 1/4	-8.0		N TELEX	2- 4	3 1/2	+ 1/4	+7.6				
A COMPUTER INVESTS GRP	1- 2	5/8	0	0.0		SOFTWARE & EDP SERVICES										O YESOATA SYSTEMS CP	13-20	13 3/4	- 1/4	-1.7
N OATRONIC RENTAL	0- 2	1 1/4	0	0.0		C ADDRESSOGRAPH-MULT	10-18	17 5/8	+1 1/8	+6.8		C WILTEK INC	1- 1	5/8	+ 1/8	+25.0				
A DCL INC	1- 4	3 1/4	+ 1/4	+4.0		C ADVANCED MEMORY SYS	7- 9	8 5/8	+ 1/2	+6.1		SUPPLIES & ACCESSORIES								
N OFP INC	6-10	7 7/8	- 1/4	-3.0		N AMPEX CORP	8-13	12 1/4	+ 1/4	+2.0		A AMERICAN BUS PRODS	6- 8	7 3/8	+ 1/4	+3.5				
N ITEL	15-22	18 3/4	+ 1/8	+0.7		C ANDERSON JACOBSON	3- 6	5 1/8	+ 1/4	+5.1		O BALTIMORE BUS FORMS	1- 4	2 1/4	0	0.0				
N LEASCO CORP	19-28	24 1/4	+2 1/4	+8.4		O APPLIED OIG DATA SYS	10-20	13 1/4	- 1/4	-1.8		A BARRY WRIGHT	10-19	17	+ 3/8	+2.2				
O LEASPCORP	1- 2	1 3/8	+ 1/8	+10.0		O BEEHIVE INT'L	5-12	5 3/4	+ 1/4	+4.5		O CYBERNETICS INC	1- 1	7/8	0	0.0				
A PIONEER 7ER CORP	5-11	5 5/8	- 1/R	-2.1		A BOLT-BEPANEK & NEW	6- 9	5 5/8	- 1/4	-4.2		C DUPLEX PRODUCTS INC	14-20	19 3/8	+ 1/4	+1.3				
N U.S. LEASING	10-14	12 3/4	- 3/8	-2.8		N BUNKER-RAND	8-13	11 3/4	- 1/8	-1.0		N ENNIS BUS. FORMS	6-11	10 1/4	0	0.0				
PERIPHERALS & SUBSYSTEMS																				
N ADDRESSOGRAPH-MULT	10-18	17 5/8	+1 1/8	+6.8		A CALCOMP	3- 5	3 7/8	- 1/2	-11.4		O GRAPHIC CONTROLS	13-39	39	- 1/8	-0.2				
C ADVANCED MEMORY SYS	7- 9	8 5/8	+ 1/2	+6.1		C CAMPROGE MEMORIES	1- 4	2 5/8	0	0.0		C MOORE CORP LTO	24-37	29 1/4	+ 1/4	+0.8				
N AMPEX CORP	8-13	12 1/4	+ 1/4	+2.0		N CENTRONICS DATA COMP	16-30	18 1/4	- 7/8	-4.5		N NASHUA CORP	16-28	22 3/4	+ 1/8	+0.5				
C ANDERSON JACOBSON	3- 6	5 1/8	+ 1/4	+5.1		C COGNITRONICS	1- 1	7/8	0	0.0		O STANUARD REGISTER	18-25	21 1/2	0	0.0				
N APPLIED OIG DATA SYS	10-20	13 1/4	- 1/4	-1.8		C COMPUTER COMMUN.	5- 8	8 1/8	+1 5/8	+25.0		C TAP PRODUCTS CO	8-19	7 3/4	0	0.0				
O BEEHIVE INT'L	5-12	5 3/4	+ 1/4	+4.5		O COMPUTER CONSOLES	4- 7	4	0	0.0		N UAPCO	18-22	21	- 1/8	-0.5				
A BOLT-BEPANEK & NEW	6- 9	5 5/8	- 1/4	-4.2		A COMPUTER EQUIPMENT	2- 4	3 7/8	0	0.0		A WASHAM MAGNETICS	10-15	10	- 1/4	-2.4				
N BUNKER-RAND	8-13	11 3/4	- 1/8	-1.0		O COMPUTER TRANSCIVER	1- 1	1 1/2	+ 1/8	+9.0		N WALLACE BUS FORMS	17-21	19	+ 3/8	+2.0				
A CALCOMP	3- 5	3 7/8	- 1/2	-11.4		C COMTEM	9-14	13 1/2	+1 3/8	+11.3										
C CAMPROGE MEMORIES	1- 4	2 5/8	0	0.0		N CONRAC CORP	19-28	19 1/4	- 1/2	-2.5										
N CENTRONICS DATA COMP	16-30	18 1/4	- 7/8	-4.5																
C COGNITRONICS	1- 1	7/8	0	0.0																
C COMPUTER COMMUN.	5- 8	8 1/8	+1 5/8	+25.0																
O COMPUTER CONSOLES	4- 7	4	0	0.0																
A COMPUTER EQUIPMENT	2- 4	3 7/8	0	0.0																
O COMPUTER TRANSCIVER	1- 1	1 1/2	+ 1/8	+9.0																
C COMTEM	9-14	13 1/2	+1 3/8	+11.3																
N CONRAC CORP	19-28	19 1/4	- 1/2	-2.5																
EXCEN: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH L=NATIONAL; N=MINNESOTA; O=OVER-THE-COUNTER O-T-C PRICES ARE 810 PRICES AS OF 3 P.M. OR LAST 810 (1) TO NEAREST DOLLAR																				

We're really proud of our add-on memory for your PDP*-11/70. Here's why.

First, we'll ship it when you need it. No waiting. We invented semiconductor memory, manufacture our own components and deliver more bits of memory every year than any other company.

No one has more experience in MOS memory technology than our design team. They've designed our in-1670 for PDP-11/70 to deliver optimum reliability, with the features you need. Error Correction Coding and Error Logging, for example, mean that single bit errors are corrected automatically, and logged to simplify preventive maintenance.

We designed our in-1670 for easy expansion, too. It gives you up to two megabytes in a single frame. As your needs grow, you can expand easily by adding memory cards in convenient 128K byte increments.

We're proud of our worldwide service organization, too. It's the support you'd expect from the independent

that delivers more memory systems than anyone.

Finally, there are economic advantages. Choosing Intel can give you clear-cut cost savings. And the added peace of mind you get when you go with a leader. That's true of all our memory systems, for PDP-11 and LSI-11 computers, and 370 computers, too.

Why wait? Pick up the phone and call your local Intel sales office. Or, for more information, call us at 408/734-8102 or use the coupon below.

intel® delivers.

Intel Memory Systems

1302 N. Mathilda Avenue, Sunnyvale, CA 94086

CW/3/13/78

Send me more information on memory for my

PDP-11/_____, LSI-11_____ Other_____

Call Me _____/_____

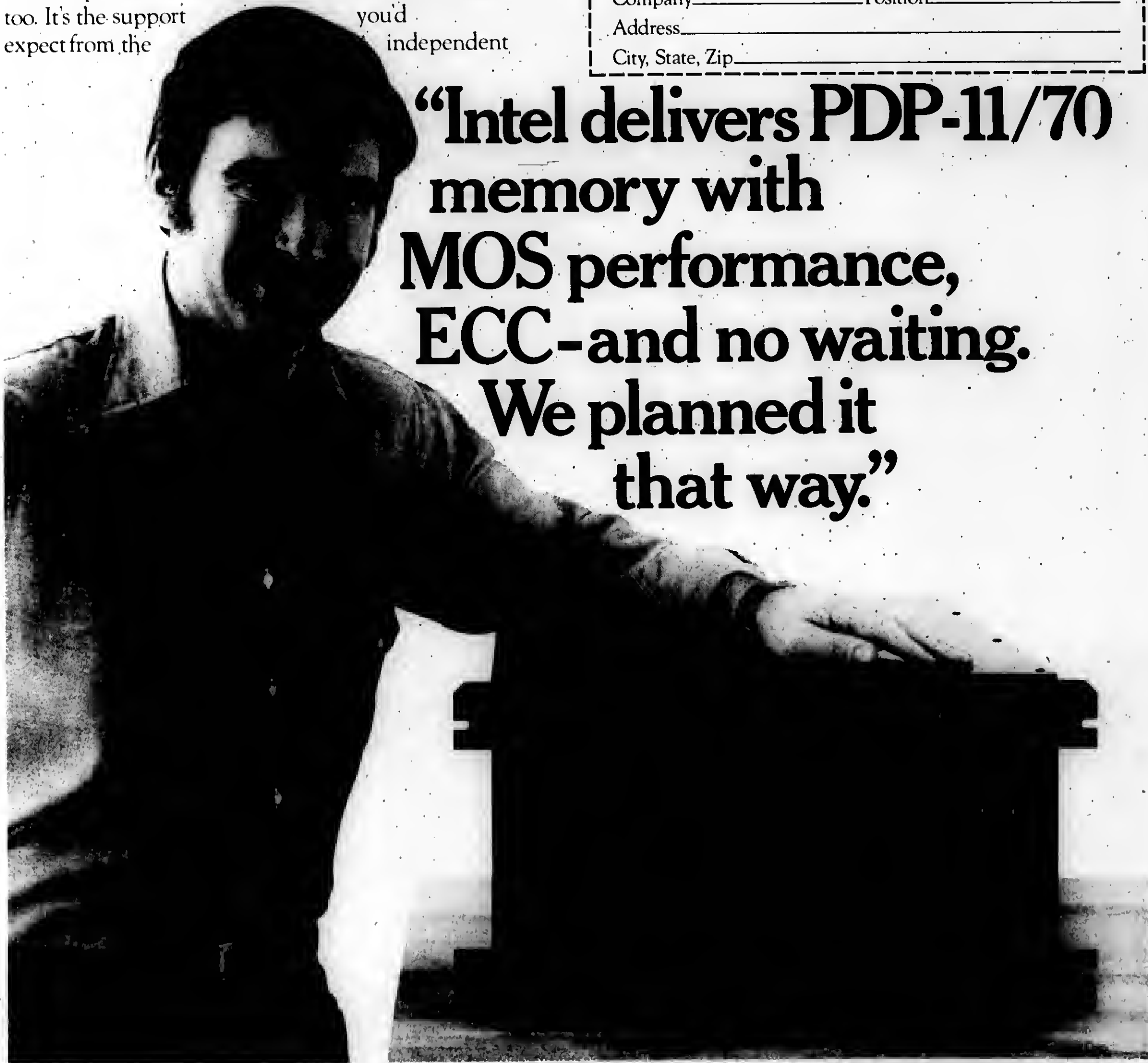
Name_____

Company_____ Position_____

Address_____

City, State, Zip_____

**“Intel delivers PDP-11/70
memory with
MOS performance,
ECC-and no waiting.
We planned it
that way.”**



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

12

March 20, 1978

75¢ a copy; \$18/year



Paul R. DeRensis



Daniel T. Brooks

CW Photos by E. Holmes

Malpractice Menacing Analysts, CLA Warned

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — If doctors, accountants, lawyers and engineers are vulnerable to malpractice suits, can systems analysts and programmers be far behind?

As "professionals," systems analysts may find themselves open to charges of professional negligence from those who have suffered harm from a faulty system design, Daniel T. Brooks, an attorney with the New York firm of Cadwalader, Wickersham & Taft, told a recent meeting here of the Computer

Law Association (CLA).

Even if the job of systems analyst is not yet mature enough to be regarded as a profession subject to public licensing and ethical codes, a systems analyst may find himself liable for systems design if the court views him as it would a manufacturer. Manufacturers are liable for defects in the design of products, and the legal rules governing this area are strict, Brooks said.

The attorney noted that in Michigan and Massachusetts, where a number of computer manufacturers are headquartered, a systems analyst may be open to attack "if he made an innocent misrepresentation" to a user about a system's capabilities.

Programmer Like Tradesman

Because programmers can be defined more clearly as technicians or skilled tradesmen, they are further away from becoming professionals and from encountering malpractice charges. Their tasks are more analogous to those of the airplane pilot, the machinist, the electrician and the plumber, Brooks stated.

Programmers are more likely to be held to the "reasonable man standard" than are systems analysts. The analyst's responsibility for the system design and the judgment he puts into it tend to require that he be held "to the minimum level of competence projected by the profession," Brooks suggested.

In addition to raising the question of malpractice by systems analysts and programmers, the increasing use of computer/communications technology will affect the negligence risks that established professions such as law, medicine and engineering already assume, according to Paul R. DeRensis, a lawyer with the Boston firm of Powers & Hall.

(Continued on Page 10)

Ruling Due on O'Hare System Air Controllers Demand Backup

By Marguerite Zientara

CW Staff

CHICAGO — A federal judge here is considering demands by a group of air traffic controllers for a computer backup system and new software testing procedures at O'Hare International Airport.

"The possibility of two airplanes hitting or of having a mid-air collision increases in the first few minutes after the computer fails, when the controller could become disoriented and lose track of his airplanes," according to Richard Scholz, spokesman for the 63 controllers who have made the demands.

The demands were made in a lawsuit filed in 1975 against the Federal Aviation Administration (FAA), the Civil Service Commission and the Department of Labor, Scholz said. The trial took place in January.

Radarscope Display

The Automated Radar Terminal System (Arts III) at O'Hare generates a display that is superimposed on the radarscope, indicating an airplane's airline name and number, ground speed and altitude.

"When the computer fails, we lose that information and the controller must then make the transition to a mental three-dimensional picture to control the airplanes," Scholz said.

Although the computer system, run on two specially built Univac 8303 systems, is 99.9% reliable, Scholz said, it failed on 46 days in 1977, and during the first two weeks of 1978, the computer failed on six days.

According to Scholz, "it fails too many times for short durations." He explained that if it failed 10 times for two minutes each time, it would be much more serious than if it failed once for two days, since it is the transition period from working with the

computer to working without it that is dangerous.

Neil Callahan, public information officer for the Great Lakes Region of the FAA, denied that the adjustment period is dangerous. "The radar targets do not disappear. It's just the data block — the information that's associated with the targets — that disappears," he said.

"O'Hare Airport was the busiest air-

port in the world for 15 years and it never had a data block. There was no such thing. Now there is a data block, but when the data block disappears it doesn't change the situation any at all," Callahan contended.

According to Warren Webber, data systems officer at the O'Hare Control Tower, "The equipment has been very reliable. It's been in for going on seven

(Continued on Page 6)

Distribution System Helps Midwest Bear Coal Strike

By Ann Dooley

CW Staff

CANTON, Ohio — Although the United Mine Workers strike has reduced coal supplies here drastically, most users have experienced only minor energy cutbacks, thanks in part to a process control system that helps distribute area utilities' energy resources. American Electric Power Co. (AEP) has not been paralyzed by fuel shortages primarily because the company has been able to get nonunion coal and to distribute power from utilities outside the affected areas.

In fact, the coal strike hasn't called for any extraordinary measures at AEP at all; it's business as usual, an AEP spokesman said of the computer system which has been overseeing power distribution since 1963.

American Electric is one of the largest utilities in the country, providing power to seven states from 15 generating stations and 45 generating units along a 765,000 kV transmission line, the largest in the U.S.

The AEP process control system uses an IBM 1800 computer to receive signals from power generators for monitoring the reliability of the high-

voltage network. It reads what various plants are generating and then distributes the supply among the participating utility companies depending on power usage criteria, the company spokesman explained.

Power voltage information from area substations is sent over telephone lines

(Continued on Page 6)

Grad Admits Using System To Get Phi Beta Kappa Key

By Marguerite Zientara

CW Staff

FLUSHING, N.Y. — A former student at Queens College here has admitted awarding himself unearned Phi Beta Kappa status in 1975 by tampering with the school's computerized grade records system, according to Gene Robbins, assistant to the president of the college. In addition, there exists "hard, irrefutable evidence" that grades were changed for 12 to 15 other students, and it is believed that the same person made the changes.

The grade changes, which were alleg-

edly made between 1974 and 1977, were not discovered until January of this year during a routine manual audit by faculty members, Robbins said.

Every semester, computer printouts of grades are sent to every faculty member to be checked against their own grade books. "The problem is that you're talking about a big population here and you can never guarantee that 100% of our 1,200- to 1,500-member faculty is going to go through all the grades. It could just be that the grades they checked [in the past] were cor-

(Continued on Page 8)



EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Assistant Editor	Frank Vaughan
Washington Bureau/Chief	Edith Holmes
Staff Writers	Catherine Arnst Jeffrey Beeler Timothy J. Scannell Brad Schultz Marguerite Zientara
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Barbara T. VanScoyoc Susan Gerrard Joe Hunn
Photography Editor	Ann Dooley
Editorial Assistant	Denise Petski
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger Frampton
Munich	Hans-Jurgen Ballnath
Asia	Hidetsuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone

SALES

Vice President/Marketing	Roy Einreinhofer
Advertising Administrator	Terry Williams
Display Advertising	Mary Anne Furlong
Classified Advertising	Donna Whalen
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen
CIRCULATION Vice-President/Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti
Customer Service Rep Assistant	Peggy Kelly Eleanor Smith
PRODUCTION Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm
Typesetting Supervisor	Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 Munchen 40, Truderingstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-0101. Telex: J242461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy. U.S. — \$18 a year, Canada and PUAS — \$28 a year, Europe and Middle East — \$50 a year, all other foreign — \$65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed — write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

For Leaking Customer's Data

Burroughs Loses \$3 Million Suit

By Tim Scannell
CW Staff

GENEVA, Ill. — The Quad County Distributing Co., a wholesale beer distributor here, was awarded \$1 in actual damages and \$3 million in punitive damages after a jury found Burroughs Corp. guilty of divulging confidential information.

Burroughs intends to appeal the verdict, however, because the amount awarded to Quad "had no relationship between the actual damages and the punitive aspect" of the alleged disclosure, according to Edmond K. Lech, a Burroughs spokesman.

The information divulged was confidential "dock prices" — or the amount Quad pays a brewery for its beer, Wendell Clancy, an attorney for the beer firm, stated. "There are only two or three people in the world who knew what the price was," Clancy said.

Burroughs disclosed privileged reports containing prices and figures from Quad's records in the process of demonstrating similar software to a competitive beer distributor, Clancy stated.

Discovery of Leak

The disclosure was discovered by a Quad vice-president "who was having a conversational lunch with a competitor," Clancy explained. The competitor jokingly mentioned that he was aware of Quad's dock prices and "he gave [the vice-president] three of them, one of which was the confidential one," the attorney said. Coincidence was ruled out because the competitor quoted the price "to the last decimal point," he noted.

Evidently, Burroughs "kept some of

our information at its district office for debugging as it was going through the formulation of these programs," Clancy said. The information was apparently loaded onto a disk that was used to demonstrate the programs to Quad's competitor.

Burroughs will fight the court's decision "all the way," Leach said. "Our opinion is that it will not stand up" because "both the law and the facts will support our position."

"Number one, we don't think we gave away the confidential information; two, if we did give it away, they [Quad] were not damaged; and three, even if they were damaged, they were damaged to the extent of a dollar — not \$3 million," Leach said.

Software Suit

In the same action, Quad originated a software lawsuit against Burroughs stating "that Burroughs had failed to provide it [Quad] with software that was functional," Clancy said.

The court ordered Burroughs to pay \$18,718 to compensate Quad for the "additional programming required . . . and additional wages and salaries paid to . . . employees hired as a result of breaching the oral contract" entered into by the defendant, according to the court transcript.

Quad had to recruit the services of an outside software firm to reconstruct its programs because the Burroughs written contract covered it "against assuming any responsibility or risk whatsoever," Clancy stated. "We had to completely throw it [software] out and start all over again" with a new supplier who gave Quad a whole system from scratch, he said.

Burroughs contends that the alleged oral contract was entered into by a Burroughs employee subsequent to signing a written agreement with Quad to supply hardware. "Ordinarily, my argument would be that the salesman [dealing with Quad] didn't have the power to enter into such an agreement," Leach stated.

Although Burroughs is also appealing this aspect of the suit, it has dismissed it as "a minor part of the case" and "insignificant next to the \$3 million," Leach said. Burroughs intends to concentrate on reversing the court's decision regarding the amount for punitive damage because "it looks to us like a type of windfall for the plaintiff [Quad] to which it's not entitled," according to Leach.

"When a jury decides something, you never know precisely what they're deciding on," Leach remarked. "Sometimes they come up with a figure nobody can find any basis for" because there is no way of knowing just "what goes on inside of a jury room," he noted.

In Quad's opinion, the jury awarded it \$3 million not only to punish Burroughs but to deter the entire industry from doing that sort of thing, Clancy remarked.

"It was very easy . . . to get [the jurors] to identify with the fact that there's an awful lot of data and information in the hands of the computer industry which is germane to them" and which should remain confidential, Clancy said. "They didn't think that anybody should be allowed to go around and disclose [this information] without at least asking for consent," he added.

On the Inside This Week

NEWS

Issue of Bias Tinges McAdams Testimony	4
Witness Says McAdams 'Affected' Testimony	5
FBI Switch Plans Never Had Clearance	6
NBS Offers Programs for Testing Minimal Basic	8
Malpractice Seen Threat to Systems Designers	10
Ruling Coming on Fairness of Burroughs Award	11
Computer Expo Opening in Anaheim Tomorrow	12
NCC '78 to Stress Applications, Not Theory	13
Records Transfer Net Helps Migrant Studies	14
Bank 'Secure' Even From System's Developers	15
Employee Written Highway Peckage Aids States	16
No Limits in Sight for Minuturization: Keyes	17
Micro-Based Unit May Aid Arrhythmia Victims	18
Prepare for Nuclear Accidents, Users Advised	19
DP Control Project Gets Print Into Brelle Fester	20

EDITORIAL

New Track for IBM?	22
The Human Connection: Brief Your Boss Briefly	23
The Taylor Report: Prompting Works	23
One Universal DBMS Standard Not Probable	25
Detapro Liberating DP From Sturgis' Curse	26
Must DP Shops Squash DPers' Individuality?	28
In System Design, Only Three Goals Exist	30

SOFTWARE & SERVICES

Service Stores Source Code for Users	33
Test System Adopted to Univac, Burroughs Sites	34
Date Base Use Adds Life to Classic Complaints	36
HP Creating System Language, Compcon Told	38
Canadians Using Net to Study Structures	39

COMMUNICATIONS

Users of AT&T Services Seen Facing Price Hikes	41
Users Pleased With Multiplexer Performance	42
Virtual Data Link Gives Remote User Control	45
Tester Works as Monitor, Analyzer, Simulator	48

SYSTEMS & PERIPHERALS

Micr Units Take on 10 Million Item/Day	49
System Helps College Solve Record Problems	49

MINIWORLD

User Gets Bigger, Buys Smaller System	59
Warehouser Stows Away Inventory Problem	60
Small System Fills 'Insetable Demand' for Data	61
System Helps Firm Keep Up With Competitors	62
Business System Cures Hospital's Dete Blues	64
Firm Peves Way for Improved Throughput	66

MICROCOMPUTING

Second Faire Sees Busy Buying, Selling	67
From Rey Guns to Micro Mice: A Look at Faire	68
Infinite MPU Available Five Ways	70

COMPUTER INDUSTRY

Procurement System, Library Service Brewing	71
Exhibit Space Open for Personnel DP at NCC	71
FCC Will Deregulate Terminal Gear: Wiley	74
Taiwan's Hardware Demand Remaining High	75
Two U.S. Firms Get \$7.5 Million Qantas Order	76
Sponsors Detell Jerusalem Conference Program	77
Medicel Imaging Merges to Top \$1 Billion by '82	79

"ADR's LOOK[®]

**spots
problems
in time
to take
action."**

— Kenneth J. Panzarella, Vice President
Information Services Division, Carte Blanche



**"ROSCOE[®] gives Carte Blanche
a competitive edge in attracting
blue chip clients and programmers."**

"Our division is now an independent profit center, serving outside clients, in addition to meeting the internal needs of Carte Blanche. In our business, lost time quickly means lost revenue. To prevent that, our operations group uses LOOK throughout the day to see what is in the computer, what resources are being used, and what jobs are waiting to be processed. LOOK lets us see where the inefficiencies are and take corrective action," Mr. Kenneth Panzarella commented.

"We really don't know how much it would cost us if we didn't have LOOK, because it shows us things that are just starting to happen. With LOOK, we can stop and change before serious time losses occur. We are sure that LOOK has paid for itself many times over."

"We needed a programming system which would allow us to work efficiently at remote client locations," Mr. Panzarella continued. "We looked at ROSCOE — as well as competing systems. After comparing cost, productivity gains, and CPU overhead requirements, we chose ROSCOE."

"ROSCOE's on-line programming capabilities allow our programmers to work at peak efficiency regardless of location. Our programmers are happier and they have a higher degree of professionalism. It keeps costs down and makes us more competitive. ROSCOE has increased our ability to do a better job for both our service bureau customers and Carte Blanche. We're positive we made the right choice."

Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians. For more information on what ADR software can do for you, call or write:

 **APPLIED DATA RESEARCH** THE ON-LINE SOFTWARE BUILDERS™
Route 206 Center, Princeton, N.J. 08540, Phone: 609-924-9100

ADR software products: in use at over 8000 installations worldwide. U.S. offices in Atlanta (404) 252-9130, Boston (617) 245-9540, Chicago (312) 694-2244, Cleveland (216) 826-0190, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (609) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 281-2011. International offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.



Most Important U.S. Witness

Issue of Bias Tinges McAdams' IBM Testimony

By Catherine Arnst
CW Staff

NEW YORK — After a record-breaking 74 days of testimony, Dr. Alan K. McAdams, the government's chief economic advisor for the U.S. vs. IBM antitrust trial, left the stand last week. As the person with the mission of interpreting and evaluating the past two years of evidence — or 60,000 pages of transcript — McAdams was the government's most important witness.

A professor of economics at Cornell University, McAdams is the government's main expert witness for this case. His direct testimony took 30 days and filled 4,200 pages of transcript, while the IBM legal team used 35 days and 4,400 transcript pages cross-examining him. The other nine days were taken up by redirect and recross-examination.

The main theme of that cross-examination was the witness's purported bias, and IBM lead attorney David Boies did not have to work very hard to prove it. McAdams was basically an advocate for the government's point of view, Boies argued; at least two other witnesses in the trial have called him a "zealot."

Boies observed that, although there is nothing wrong with advocacy in attor-

neys, higher standards should be demanded from an expert witness: "With McAdams, all you were getting was a partisan argument."

McAdams' role, in part, was to sum up the government's case; indeed,

Analysis

some observers claimed his testimony resembled a closing argument. He is probably the man most qualified to play such a role because he has worked with the government trial staff in some capacity since October 1972.

McAdams first became involved with this litigation as a staff member of the President's Council of Economic Advisors when he was asked to analyze the government's case and then, in the pretrial discovery stage, to determine its merits. By September 1975, he was working full-time for the Department of Justice as a consultant for the case and was designated an expert witness.

The purpose of an expert witness is to give an independent analysis of the issues and evidence. But not only did McAdams study the evidence the government presented, he also helped choose which evidence was presented. He became, in effect, a de facto mem-

ber of the trial staff, and some observers said he was the de facto leader.

Raymond Carlson is the Justice Department attorney in charge of the government's direct case, but McAdams appeared to be the strategist. "It became — I don't want to sound all that positive — it became evident to me, though... that there was some kind of a, well, power vacuum and McAdams postured himself to fill that power vacuum... there's no strength of leadership that comes from Carlson."

"You do, however, get that sense when you begin talking with and about and to McAdams," Larry Welke, president of International Computer Products, Inc. and a government witness, has said (see related story on Page 5).

McAdams helped draft the government's pretrial brief, its statement of triable issues, "the economic analysis of the market for general-purpose electronic digital computer systems" and the amended complaint.

He or a member of his staff was present at the pretrial interviews, depositions and court testimony of virtually all the government witnesses. A trademark of the government's examination of witnesses was the sight of McAdams handing notes to the attorneys with questions they should ask.

Government attorney Lewis Bernstein defended McAdams' immersion in the case on the grounds that only by devoting such time and attention could he do a thorough analysis of the industry. The drawback, however, is that he became part of an effort against IBM and his testimony was meant to further that effort.

Consequently, the strength of McAdams' analysis and conclusions, and there were many, was diluted.

Strong Analysis

In his cross-examination of McAdams, however, Boies could not do much substantive damage to the validity of the facts on which McAdams based his analysis. The main thrust of the defense was to emphasize that McAdams drew many of his conclusions from the testimony of government witnesses who were obviously biased against IBM, such as Memorex employees involved in that firm's antitrust suit against IBM, now in progress on the West Coast.

But McAdams' testimony, like the government's case, depended more on internal IBM documents than trial witnesses, and Boies could do little to soften their impact.

The documents — more than 4,000 of them — were for the most part written by top IBM executives and contain descriptions of the actions and strategies the government claims are anticompetitive. They are generally considered to be the strongest evidence in the government's case, and McAdams quoted from them at length.

Where Boies may have scored points, however, was in his efforts to show that McAdams relied on evidence that supported his conclusions and to some extent ignored that which contradicted those conclusions.

IBM in part based its mistrial motion [CW, Jan. 9] on McAdams' method of "selective reinforcement." Throughout the trial, corporate executives defined

in several different ways the general-purpose computer systems market and testified in ways that differed from McAdams' definition of that market — a key issue in the case.

Although McAdams relied heavily on these witnesses for information pertaining to IBM actions in the general-purpose computer systems market, he considered their definitions of that market irrelevant to his analysis, he said.

With other testimony, McAdams would be unable to recall readings that disagreed with his conclusions, although he showed an amazing memory on direct examination. For example, he testified under direct examination that the design change in the IBM Model 3420 tape drive, which offered a digital interface, offered users no advantages over the analog interface used with the Model 2420.

However, testimony in the Telex vs. IBM trial contradicted that assessment, with witnesses stating that a digital interface offers a clearer signal and greater reliability than an analog interface. Although McAdams testified that he or a member of his staff had reviewed all the "substantive" portions of the Telex record, he could not recall reviewing that particular portion.

Dispute Over Theories

Another weakness in McAdams' analysis, and what some observers see as a weakness in the government's case, is the fact that there are many prominent economists who would disagree with McAdams' theories and methods of analysis. Economics has been called "the dismal science"; it is also a disputed science.

One such dispute exists over McAdams' method of using cash flow as a measure of a firm's profitability. Statements issued by the Accounting Principles Board warn that "misleading implications" can result from the use of cash flow statistics "which are not placed in proper perspective to net income figures and to a complete analysis of source and application of funds."

Other economists also dispute the use of cash flow as an indicator. McAdams, however, maintained that it is an appropriate method for his purposes.

McAdams also disagreed with a Harvard Law Review article on predatory pricing by Professors Donald F. Turner and Philip Areeda. He charged that some of the conclusions were misleading and the analysis was poor.

However, both authors are noted lawyers and economists, and Turner will probably offer just as many reasons in defense of his article when he testifies in this case for IBM.

The lack of agreement among economists regarding McAdams' testimony is analogous to the lack of agreement about the government's charges. Most analysts agree that IBM dominates the computer industry and that it is a large and successful company.

Whether that dominance and success should be considered monopolization is a question which leads to heated disputes — particularly this very long and extensive one in New York. And there are a long string of experts yet to come who will take the stand to keep that dispute alive.



Mass storage for your DG CPU, under \$7000.*

And that includes the controller.

Our Reflex® Winchester type disc drive will give you up to 63 megabytes of unformatted data storage. With immediate delivery.

Controllers are available from MiniComputer Technology and Xylogics. If you already have an SMD interface, we're compatible.

We'll show you how to put together the whole package for less than \$7000. Right now. Contact one of our local sales offices or the Director of Peripheral Sales, Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.

*Quantity ten price for disc drive and controller.

Sales Offices:

Atlanta: 404/252-9700
Boston: 617/862-1862
Chicago: 312/671-5212
Dallas: 214/387-3073
Los Angeles: 714/533-8035
New York: 516/328-8622
Philadelphia: 215/628-8699
San Francisco: 415/573-7461
Seattle: 206/455-0152
Tampa: 813/872-1557
Washington, DC: 703/620-3995

Microdata

OEM PERIPHERALS. A SIGNIFICANT DIFFERENCE.

Witness Says McAdams 'Affected' Testimony

By Catherine Arnst
CW Staff

NEW YORK — A government witness has charged that his testimony was "affected" by conversations with Dr. Alan McAdams, the government's chief economic advisor on the U.S. vs. IBM antitrust case.

The witness — Larry Welke, president of International Computer Products, Inc. of Indianapolis — was on the stand for eight days in April and May 1976. He made the accusation in a September 1976 interview with IBM attorneys from Cravath, Swaine & Moore.

The interview was given without the government's knowledge and Welke's remarks were not made under oath. In the interview, Welke claimed that during discussions with the government before his testimony, McAdams "unnecessarily probed and prodded" him to the point where "I got the feeling of being, well, harassed."

IBM attorney David Boies used the Welke interview during his recent cross-examination of McAdams in an attempt to impeach McAdams' conclusions concerning IBM's alleged anti-competitive actions — conclusions that McAdams claims to have based in large part on the testimony of government witnesses.

Long-Time Advisor

The interview with Welke was sought after a *Computerworld* article [CW, June 21, 1976] quoted Welke as stating that "McAdams is running the strategy for at least the unbundling part of the trial." In his cross-examination of McAdams, Boies attempted to show bias on McAdams' part because of his involvement with the government trial staff.

McAdams has maintained that his deep involvement with the government's case did not influence his objectivity, and that his conclusions concerning IBM were based on a fair appraisal of the record. IBM's strategy during its cross-examination of McAdams was to show that he actually shaped that trial record and only considered the portions that meshed with his preconceived conclusions.

'Designed Attack'

Welke, although a government witness, agreed with that appraisal in the post-testimony interview he gave IBM attorneys. Although Steven Woghin conducted Welke's direct examination in court, in early discussions "[McAdams] was designing the attack and the approach of everything that they were trying to get from me," Welke said in that interview.

Welke claimed that one of McAdams' tactics was to ask a question repeatedly if the answer was not satisfactory "There's a certain amount of that that is normal, that's just examining all aspects of the situation, but there is a point where you get past that and where by credibility, I felt, was being questioned, and that gets to the point of being harassment," he said.

After being asked one question 14 times, Welke decided McAdams "was looking for something, and it wasn't a question of my trying to teach him or share any knowledge with him. He very definitely had his mind made up."

When confronted with the Welke interview in court, McAdams said, "I do not believe [Welke's] perception is ac-

curate" and contended some of the words Welke quoted McAdams as saying were inaccurate. McAdams recalled that Welke resisted answering several questions "because he didn't understand the context" and "he seemed to think [the questions] were driving at something they weren't driving at."

Welke was considered by several observers to be a very poor witness for the government because he contradicted his deposition and direct examination testimony while on cross-examination. Judge David N. Edelstein questioned Welke at the time about conversations he had had with members of both legal teams, possibly in an attempt to learn if any pressure had been applied. He also asked both sides

to read Welke's testimony carefully "and then we will decide what steps to take next."

There was some discussion of perjury charges, sources said, although nothing was ever charged in court. Government attorney Lewis Bernstein asserted that McAdams did not base any of his conclusion on Welke's testimony, however.

After reviewing the IBM interview with Welke, Edelstein suggested the existence of "a pattern of one who is trying to play on both sides of the court and yet not getting in the center."

Bernstein objected to the use of the interview except in a very limited sense and asked Edelstein to issue an order prohibiting IBM from publicly releasing the contents without applica-

tion to the court "because it is conclusive and in unsworn form."

"The government would have no objection if IBM would call Mr. Welke and have Mr. Welke make those statements and then permit Mr. Welke to be cross-examined on those statements, and then have Dr. McAdams give his testimony with respect to it. That, I believe, is the fair and just way to do this since reputations are at stake, and the question of veracity is at stake," Bernstein said.

Edelstein denied the government's request for an order to seal the interview, but said he would not admit it into evidence unless IBM called Welke back.

Attorneys for IBM are "undecided" about whether to recall Welke to the stand.

2400 DP MANAGERS WORLDWIDE CAN'T BE WRONG!

More than 2400 CA-SORT users continue to report savings of up to 50% on Disk Work Space . . . up to 50% savings on I/O activity . . . up to 25% on CPU time . . . and dramatically improved programmer efficiency.



Significant enhancements make CA-SORT, Release 5.0 for 1978 the most advanced sort software system available in the world today!

Now CA-SORT Release 5.0 improves performance of the world's Number One sort software system.

- I/O accesses slashed further by an extension in the command chaining logic!
- Full support of 3350 disks is now available.
- Under DOS, support for multiple input devices (tape and disk) is provided.
- The sort has been more finely tuned for VS through the use of monitor systems and string extension techniques.

INSTALLATION STILL TAKES 10 MINUTES --SAVINGS BEGIN WITH THE FIRST LONG SORT RUN!

There are no lengthy "surveys" to be taken . . . no artificial benchmarks . . . no simulated environments . . . just install and start improving your throughput

CA-SORT is the only sort software system for OS, OS/VS, DOS, and DOS/VS that actual users have placed on The Datapro Honor Roll for three consecutive years.

CA-SORT RELEASE 5.0 IS AVAILABLE NOW . . . SEND (OR CALL) FOR YOUR FREE, NO OBLIGATION, INFORMATION KIT!!

MAIL THE COUPON OR CALL TOLL-FREE TODAY 800-221-4767

U.S. OFFICES:

New York, Georgia, Illinois, California, Ohio, Michigan, Virginia, Texas, Connecticut, Missouri

WORLD WIDE OFFICES:

Australia, Austria, Argentina, Benelux, Brazil, Caribbean, Chile, Columbia, France, Germany, Holland, Indonesia, Israel, Italy, Japan, Mexico, Philippines, Scandinavia, South Africa, Spain, Southeast Asia, Switzerland, United Kingdom, Venezuela

YES! Please rush my CA-SORT Release 5.0 Information Kit along with details of the FREE 15-day trial.

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone No. () _____
Computer Model _____ System _____

655 MADISON AVE. NEW YORK, NY 10021

COMPUTER ASSOCIATES

CW 3/20/78

FBI Message-Switch Plans Never Had GSA Clearance

CW Washington Bureau

WASHINGTON, D.C. — The General Services Administration (GSA) said it never gave the Federal Bureau of Investigation permission to solicit vendor proposals for a telecommunications system that would permit the switching of criminal justice information between state and local law enforcement agencies.

The only authority bestowed on the FBI by GSA was for a request for proposal (RFP) for minicomputers to replace the bureau's two IBM 2703 communications controllers, a GSA spokesman said here last week.

That authority was recently suspended following the public protest of Rep. John E. Moss (D-Calif.), who does not want to see the National Crime Information Center (NCIC) endowed with message-switching capabilities until privacy and civil liberty concerns have been resolved [CW, March 13].

In a March 10 letter to Jay Cochran, assistant director of the FBI's Technical Services Division, GSA Commissioner of Automated Data and Telecommunications Service Frank Carr directed the bureau to "return unopened" the vendor proposals it received for the telecommunications processors.

The suspension of authority to acquire the minicomputers does not extend to requests made by the FBI last October to procure 40 cluster terminal sets and 60 data terminals, the spokesman stated.

The FBI contended its RFP was proper because it informed prospective vendors that while it wanted to see the message-switching capability included in any proposals as an option, the bureau did not yet have authority to install message switching.

GSA said, however, that it had instructed the FBI to delete all mention of message switching from the RFP.

Judge Considering Demand For O'Hare Backup System

(Continued from Page 1)

years and we've really had little trouble with it. When it goes down, it's usually for a few minutes, up to about half an hour.

"It's the memory sometimes, sometimes a board, sometimes it's programming. There's no particular problem with the equipment. Of course, you know, every time it goes out it's played up quite a bit, just like anything else in aviation. It's much more reliable, in my opinion, than most systems," he said.

Backup System on Order

Webber described a backup system now on order for O'Hare and due to arrive in August. He said that two more Univac systems — formerly known as Input/Output Processors will be installed and that the present two will be "modified to do the same things as the new ones.

"With four, they will all run simultaneously, but there will be fallback and fail-safe considerations," Webber said. "Two could go out and you could re-

configure and recover within six seconds, almost simultaneously," he said.

"Six seconds doesn't mean too much, really. Even when people say in six seconds a plane moves pretty far — that's true, but in six seconds I don't think that would cause any problems. Since the radar turns at one sweep every four seconds, one and a half sweeps would be missed at most," Webber said.

"I'm very satisfied," he continued. "I think it's going to be just what we need, that is if it works the way the contract says it's supposed to work."

Scholz agreed the enhancement package will give greater reliability, but, he said, "it will not guarantee a fail-safe situation and our suit said we think we should have a fail-safe situation at this airport because of the number of people who are flying in and out of here." O'Hare Airport is considered the busiest airport in the world with a volume of 2,400 airplanes per day and 850,000 airplanes per year.

Scholz said the issue boils down to one of money. "The cost to research, develop, build and put in a complete new computer — one that would not do anything except sit there and wait for the other one to fail — would be tremendous compared with the cost of what [the FAA is] doing," he said.

"If 400 people were killed in a collision, the public would want to know why and if it was because of a computer failure, I don't think anyone would argue with us that maybe we do need a backup. But because nobody's been killed, [the FAA] wants to save money," Scholz contended.

Software Tests

The second DP-related demand of the suit was for more effective testing procedures for computer software. The FAA mandates that the software program be updated nationwide twice a year, Scholz explained. When the program is updated, it is tested on various computer systems around the country, but according to Scholz, there is no facility to test it at the peak traffic conditions O'Hare experiences.

"When it comes here, the computer is run during the midnight shift to see if it loops properly and goes through the program, but they're testing it at 10% of normal traffic conditions," Scholz explained. If it tests properly for a 10-day period, it is then put on the computer, and "usually — almost every time — it has a rash of failures for the first month until they get the bugs worked out of it, because it was not properly tested," he contended.

"They test it to the best of their ability, but they need a new testing program so we don't have these rash of failures," he said.

Scholz expects a decision within six months. "We're optimistic," he said. "We think we proved our case beyond any shadow of a doubt. The FAA does not argue with our facts and figures."

The suit also seeks a 32-hour work week for O'Hare air traffic controllers, a halt to the present understaffing of journeyman controllers at O'Hare and an update of the training program and procedures that require journeyman controllers to spend so much time training people.

Distribution System Buoying Midwest

(Continued from Page 1)
to three Hewlett-Packard Co. 2116B minicomputers, where the information

is collected and relayed by microwave to the IBM 1800 at the computer center here.



Mass storage for your Interdata CPU, under \$7000.*

And that includes the controller.

Our Reflex® Winchester type disc drive will give you up to 63 megabytes of unformatted data storage. With immediate delivery.

Controllers are available from MiniComputer Technology. If you already have an SMD interface, we're compatible.

We'll show you how to put together the whole package for less than \$7000. Right now. Contact one of our local sales offices or the Director of Peripheral Sales, Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.

*Quantity ten price for disc drive and controller.

Sales Offices:

Atlanta: 404/252-9700
Boston: 617/862-1862
Chicago: 312/671-5212
Dallas: 214/387-3073
Los Angeles: 714/533-8035
New York: 516/328-8622
Philadelphia: 215/628-8699
San Francisco: 415/573-7461
Seattle: 206/455-0152
Tampa: 813/872-1557
Washington, DC: 703/620-3995

Microdata

OEM PERIPHERALS. A SIGNIFICANT DIFFERENCE.

Announcing OPTIMIZER III: Help at last for your most valuable system resource.

From Capex, a dramatic new approach to COBOL programming

Programmers need all the help they can get. Each day, the demand for more programs, better programs, grows.

Now at last, there's an answer. It's an exciting new program product we call OPTIMIZER III. If you use COBOL and any of the IBM OS, VS1, SVS or MVS operating systems, OPTIMIZER III can help you produce more reliable, more efficient systems... on time... at lower cost.

Works With Your Programmers

By providing key information in easy-to-use form, the new OPTIMIZER III works with each COBOL programmer to help produce better programs faster and easier. You get more programming capacity, more system capacity, better program quality.

OPTIMIZER III goes to work for you in three critical areas:

1. Expands Programming Capacity

OPTIMIZER III takes the guesswork out of programming. It shows the programmer exactly what the program did or didn't do, what was tested and what wasn't, and where opportunities exist for improving performance. It speeds program debugging by virtually eliminating the need for cryptic hexadecimal dumps. It helps you design, develop and maintain more efficient, more reliable programs

with less programmer time and effort. You get the capacity you need to develop more programs.

2. Improves Program Reliability

OPTIMIZER III shows the programmer *exactly* what the program does. It helps you find hidden logic problems and ensures adequate testing before the program goes into production. If a production program does fail, OPTIMIZER III provides the information needed to quickly diagnose and correct the problem. Result: fewer program failures, fewer missed schedules.

3. Stretches System Performance

Programs compiled with OPTIMIZER III are smaller and faster, thanks to proven automatic object code optimization. Turn-around time is improved. Programs are developed using fewer compiles, fewer test shots. Printing time is reduced. Less time is lost to program failures and reruns. Overall system capacity is expanded and performance is improved.

Results Available Immediately

With OPTIMIZER III, you get more programming capacity, more system capacity, better program quality. And you get them *immediately*. Without changing systems. Without costly retraining. Without increasing costs.

You can have new OPTIMIZER III working for you literally in a matter of minutes. To find out how, write or call now: (602) 264-7241.

CAPEX CORPORATION
Atlanta (404) 261-3553
• Boston (617) 329-6170 •
Chicago (312) 596-6550
• Dallas (214) 238-7191 •
Los Angeles (213) 923-9216
• New York (201) 262-8888
• Other offices worldwide.

Capex Corporation
2613 N. 3rd St., Phoenix, AZ 85004

Gentlemen:

Please send me more information
on OPTIMIZER III.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

Model _____

System ☐ MFT ☐ MVT ☐ VSI
☐ SVS ☐ MVS

BZ



Announcing OPTIMIZER III Help at last for your valuable system reso

From Capex, a dramatic new approach to COBOL programming

Programmers need all the help they can get. Each day, the demand for more programs, better programs, grows.

Now at last, there's an answer. It's an exciting new program product we call OPTIMIZER III. If you use COBOL and any of the IBM OS, VS1, SVS or MVS operating systems, OPTIMIZER III can help you produce more reliable, more efficient systems... on time... at lower cost.

Works With Your Programmers

By providing key information in easy-to-use form, the new OPTIMIZER III works with each COBOL programmer to help produce better programs faster and easier. You get more programming capacity, more system capacity, better program quality.

OPTIMIZER III goes to work for you in three critical areas:

1. Expands Programming Capacity

OPTIMIZER III takes the guesswork out of programming. It shows the programmer exactly what the program did or didn't do, what was tested and what wasn't, and where opportunities exist for improving performance. It speeds program debugging by virtually eliminating the need for cryptic hexadecimal dumps. It helps you design, develop and maintain more efficient, more reliable programs

with less programmer capacity you need to de

2. Improv

OPTIMIZER III shows what the programmer logic problems before the production. If a production MIZER III pro to quickly dia Result: fewer missed sched

3. Stre

Programs are smaller and automatic ob around time i developed us shots. Printing is lost to prog all system cap mance is impr

Result

With OPTIMI ming capacity, r program quality. Without changing ing. Without incre

You can have n you literally in a matter write or call now: (602) 2

CAPEX CORPORATION
Atlanta (404) 261-3553
• Boston (617) 329-6170 •
Chicago (312) 596-6550
• Dallas (214) 238-7191 •
Los Angeles (213) 923-9216
• New York (201) 262-8888
• Other offices worldwide.



capex
CORPORATION

NBS Asks \$13 Million To Fund Standards Work

WASHINGTON, D.C. — Assistant Commerce Secretary for Science and Technology Dr. Jordan J. Baruch has asked Congress for "a major increase in resources" — \$13.4 million and 33 positions — to enable the National Bureau of Standards (NBS) to do its duty in developing federal computer and communications standards.

Nearly \$11.7 million of the funds earmarked for standards work would go to outside contractors, Baruch told the House Appropriations Subcommittee on State, Justice, Commerce, the Judiciary and Related Agencies here recently. He predicted the overall standards effort could save the federal government \$440 million annually.

Appearing before the subcommittee, Baruch buttressed requests for more people and funds made by the acting director of the NBS Institute for Computer Science and Technology, Zane Thornton, before the Senate last month [CW, Feb. 27].

Baruch referenced the law that gave NBS standards-making authority in the federal information processing field, Public Law 89-306, better known as The Brooks Act. The law "envisioned substantial savings to the federal system if such standards could be put into place, and the potential for these savings is stronger now than ever before," he said.

"To implement the act in the spirit in-

tended, a substantial effort at NBS must be undertaken and it simply cannot be done without the resources. There is no question that this is a sound investment that should not be delayed any longer," the assistant secretary of Commerce stated.

Baruch also promised hearings on the I/O channel interface standard under consideration for final approval by NBS will be held on the proposed standard this spring.

NBS Offers Free Programs For Testing Minimal Basic

By Don Leavitt
CW Staff

WASHINGTON, D.C. — Test programs and documentation for Minimal Basic are being distributed by the National Bureau of Standards (NBS) with hopes they will be reviewed and commented upon by government officials, vendors and software developers.

The tests are available free to almost anyone who has two magnetic tapes to spare, but NBS would like to have the comments by the end of July, a bureau spokesman said.

A standard for Minimal Basic, a subset of the Basic language developed at Dartmouth College, has been adopted

(Continued from Page 1)
rect," he explained.

The central figure in the situation, whose name the college refused to release, was Queens College student during the 1974-75 academic year, when he worked part-time in the school's registrar computer area, Robbins said. After graduation, he became a full-time Civil Service employee, still working in the DP area for the school. "The employee of the college resigned on the spot when confronted with the situation," Robbins said, and

"he has acknowledged he tampered with his own grades."

According to Robbins, grades were changed for a number of students in the fall semester of 1976 and the spring semester of 1977, when the alleged perpetrator was a Civil Service employee. "There is no evidence that he did anybody's grades but his own while he was a student," Robbins said.

No Word on Method

Sy Fischthal, Queens College DP manager, was reluctant to discuss the manner in which the grades were changed. "It jeopardizes [the employee's] situation and also jeopardizes the system to a certain extent, although we have put further checks on the system. For the coming semester, it'll be a totally new system," Fischthal said. "At this point I don't feel it proper to go into it."

The grade records system runs on an IBM 360/40. After the manual discovery of the grade changes, the computer was used to test several files against each other in a quest for possible additional misrepresentations.

According to Robbins, the central figure will be withdrawn from Phi Beta Kappa and could possibly have his degree revoked. "We cannot take away his degree because he tampered with his grades if in fact the grades were good enough to warrant his getting a degree in the first place," Robbins said.

Possible Penalties

In the case of the other students involved, a campus investigating team will determine whether each student should go before the Disciplinary Committee and/or the Committee on Scholastic Standards. The scholastic standards committee will determine guilt or innocence relative to the grade situation only.

The Disciplinary Committee could levy such penalties as rescinding a student's degree, reinstating the student's original grades, requiring the student to take a makeup exam for every contested grade, suspending the student or terminating the student's affiliation with the college.

The findings of the college's investigation to date have been sent to the New York City Bureau of Criminal Investigation by the university's legal office. The bureau is investigating the case jointly with the Rackets Bureau of the Queens County District Attorney's Office.

New York City Commissioner of Investigation Stanley Lupkin, who is heading the probe, explained, "If, hypothetically — and I don't want to give anybody the impression that these are the facts — someone with access to a computer terminal or for that matter on a manual basis were to solicit money or agree to accept money in return for changing grades, that would constitute a crime."

"If in fact there is someone responsible for this particular activity, even if money didn't change hands, it is arguable that that person was acting in a manner that would constitute official misconduct, which itself is a penal prohibition," Lupkin said.

It would be impossible to predict when a decision might be reached, he added. According to Robbins, the information so far indicates that "no compensation of any kind changed hands."



Mass storage for your DEC CPU, under \$8000.*

And that includes the controller.

Our Reflex Winchester type disc drive will give you up to 63 megabytes of unformatted data storage. With immediate delivery.

Controllers are available from Xylogics and Xebec. If you already have an SMD interface, we're compatible.

We'll show you how to put together the whole package for less than \$8000. Right now. Contact one of our local sales offices or the Director of Peripheral Sales, Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.

*Quantity ten price for disc drive and controller.

Sales Offices:

Atlanta: 404/252-9700
Boston: 617/862-1862
Chicago: 312/671-5212
Dallas: 214/387-3073
Los Angeles: 714/533-8035
New York: 516/328-8622
Philadelphia: 215/628-8699
San Francisco: 415/573-7461
Seattle: 206/455-0152
Tampa: 813/872-1557
Washington, DC: 703/620-3995

Microdata

OEM PERIPHERALS. A SIGNIFICANT DIFFERENCE.

BDS HAS A DATAPRODUCTS LINE PRINTER FOR YOU.

DATA GENERAL

NOVA
ECLIPSE

BURROUGHS

B 80/800

B 1700-B 7700

TD 700/800 TERMINAL SERIES

DEC

PDP 8

LSI-11

PDP-11

DEC 20

HP

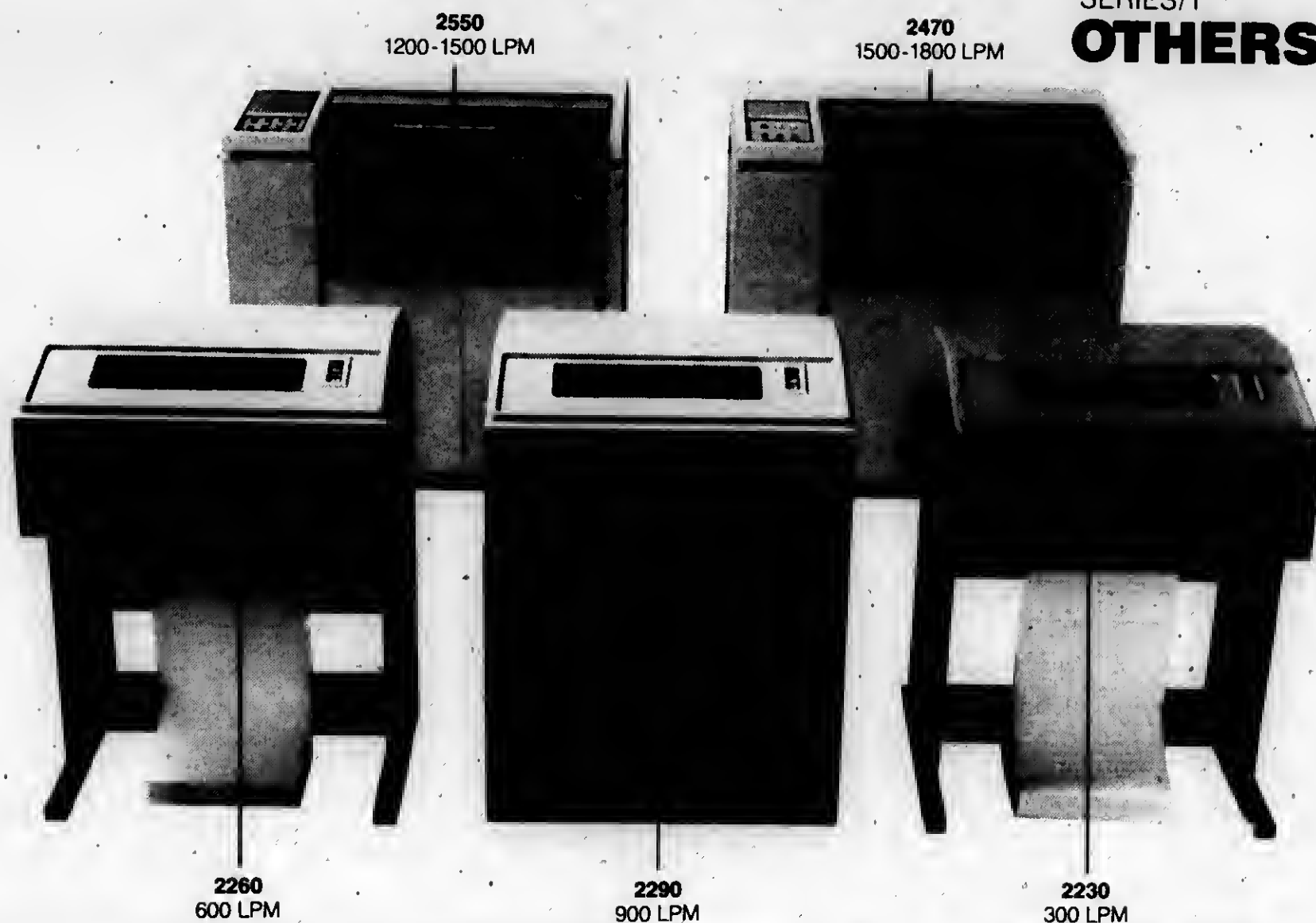
2000/21MX/1000 SERIES

3000 SERIES

IBM

SERIES/1

OTHERS



BDS, the largest Data-products distributor, has the cost effective answers to your printer requirements. We've got Dataproducts printers with speed ranges from 300-1800 LPM which are 100% compatible with all above listed computers. These printers offer true plug compatibility.

There are absolutely no conversion problems. We supply the printer, controller and cable. You simply plug the controller in and you're ready to print.

When you buy a Data-products printer from BDS you buy more than just a printer. You get economy, efficiency, promptness and reliability.

Economy—BDS prices offer an attractive price/performance alternative to the limited and expensive main-frame offering.

Efficiency—Our full compatibility enables you to **really** plug in and go. We offer the complete speed range so you may match the right printer to your print load.

Promptness—BDS delivers in 30-45 days.

Reliability—As the largest supplier of Dataproducts printers to the end-user and system house, we have delivered hundreds of printers to hundreds of satisfied users. More than 50,000 Dataproducts printers are in daily use throughout the world.

If your printer requirement is not listed above, contact us, we can probably fill your need.

MORE FOR LESS? I LIKE IT!

The computer system I use _____
My line printer requirements are _____

Name _____

Title _____

Company _____

Street _____

City _____

Telephone () _____

State/Zip _____

Ext _____



BDS Computer Corporation
1149 Chestnut St
Menlo Park, CA 94025
(415) 326-2115

**BDS Computer Corporation, 1149 Chestnut Street
Menlo Park, CA 94025, (415) 326-2115**

Boston 617-232-1744
Dallas 214-748-5207
Denver 303-825-3058
Des Moines 515-243-8646

Ft. Lauderdale 305-564-1744
Kansas City 913-371-8128
Los Angeles 213-613-0768
Nashua 603-880-4040

Newport Beach 714-759-1553
Oklahoma City 405-236-2931
Orlando 305-422-5678
Phoenix 602-258-9092

Portland 503-281-8462
Salt Lake City 801-355-7086
San Diego 714-231-1156
Seattle 206-282-6839

Programmers Not So Menaced

Malpractice Seen Threat to Systems Designers

(Continued from Page 1)

Used chiefly by professionals to collect information, the computer today helps the lawyer with his legal research, the engineer with complex equations and simulations and the doctor with patient monitoring and diagnosis, DeRensis said. These professionals may run into liability troubles if they fail to use computer technology or if they rely on it too much, he warned.

A court would look at a number of factors in deciding whether a professional was liable for failing to use a computer — even when DP isn't used routinely for that application by his profession. Hardware and software availability for the application, the reliability of the system, its cost/benefit ratio and the extent to which it minimizes or reduces risks would be considered, DeRensis stated.

The Boston attorney said he does not believe the failure to use a system will automatically constitute malpractice should something go wrong. But, he added, as soon as computers become established for a particular application or in a specific profession, malpractice suits will plague those professionals who do not employ them.

At the same time, professionals must not depend on their computer systems too much. A professional is liable for malpractice if he relies on an erroneous output that is known or "should have been known" to contain a defect, DeRensis said.

DeRensis cited as an example a monitoring system in a Missouri hospital's intensive care unit. The system had a habit of registering the vital signs of one patient on the terminal monitoring another patient. Had a doctor relied on the system in an emergency situation, he would have courted a malpractice suit, the attorney said.

If the physician had no notice of the problem and used the system strictly as an aid, he would be liable only for his own errors in judgment. Unless the accepted practice of the hospital called for independent verification of the computer output and the doctor failed to obtain that assurance, he would have no liability for the computer malfunction.

The physician would have a duty to observe any system that is automatically activated, however. DeRensis told the CLA audience that an automatic blood transfusion system, for example, would dictate the use of parallel verification procedures in case an unknown system defect could cause the patient harm.

The professional who relies neither too much nor too little on a computer may find the system will reduce his malpractice exposure. Computers can perform some tasks better than humans, DeRensis reminded the association.

The supplier-manufacturer also will become a more vulnerable target for suit by injured clients, DeRensis said, because some of the loss suffered by professionals through malpractice suits can be shifted to the supplier-manufacturer.

Suppliers of equipment, software programs, data bases and services are all exposed to liability from a wide range of sources, including fraud,

breaches of contract and harm done to the customers of a user — for instance, the patients of a doctor and the clients of an engineer.

Attorney and CLA Program Chairman Roy N. Freed, also with Powers & Hall, cautioned software firms against their insistence on calling programs "products" in an effort to endow them with substance. By maintaining that they sell products, these firms open themselves to product liability — not to mention taxes, he said.

Suppliers and users of computer systems alike should consciously limit their exposure to liability, Freed said. He urged the consideration of liability insurance, customer waivers of poten-

tial liability claims through contracts, efforts to reduce the risk of harm to others and lobbying for legislation to limit liability claims.

There are practical limitations to nearly all of these remedies, he acknowledged. Some types of insurance — particularly for creators of software programs and against fraud claims — aren't available at any price.

Insurance for service bureau errors and omissions is available, but only at inordinate prices, Freed said, and many customers won't agree to limiting liability through contracts.

Lobbying is expensive and consensus on the form and content of the legislation to be proposed is difficult, given

the range of supplier and customer interests, he added.

Freed suggested that suppliers adopt pricing structures that provide for "self-insurance" in the event of a liability suit.

From the lawyer's viewpoint, computer system records can affect the legal liabilities of suppliers and users of DP and should be used in court cases, according to Martha M. Jenkins, an attorney with her own firm in Chicago.

Jenkins said lawyers must be aware of the new parties and liabilities that have come along with increased computer use. In general, she believes computers will enhance the trial lawyer's job by managing litigation.

Comdisco is First in the Second Market

Comdisco is the largest dealer of used IBM equipment in the world. Over 1,000 processors have already been remarketed by Comdisco, with an original IBM sales price of more than 1¼ billion dollars.

More important than our volume, though, is our commitment to our customers. We buy, sell, lease, sublease and completely arrange lease financing. We are their one single source for almost any IBM equipment upgrade.

When you're in the second market — buying, selling or leasing IBM equipment — the best deals are made by Comdisco.

Make us your first choice.

Ruling Due on Fairness of Burroughs Award

By Brad Schultz
CW Staff

BOSTON — A hearing into whether Burroughs Corp. fairly won a bid for the hardware needed to implement the Prosecutor's Management Information System (Promis) for the Massachusetts Supreme Judicial Court (SJC) has been concluded and the Hearing Officer will soon give her recommendation on the matter to the Massachusetts Committee on Criminal Justice (CCJ) Proposal Review Board.

Last December, runner-up Honeywell-Information Systems, Inc. protested the SJC's handling of the bidding competition, prompting the hearing and causing CCJ general counsel John L. Tobin to charge the SJC Executive Office with failing to "engage in

open and free competition in accordance with applicable minimum federal standards" [CW, March 6].

Tobin thereby stalled Massachusetts' attempt to gain the first statewide implementation of Promis, a software package developed by the Institute for Law and Social Research (Inslaw) in Washington, D.C. To date, the system has run as a county court operation.

Promis is aimed at facilitating the prosecution of a high volume of cases, allowing more attention to be given "to those cases that deserve it," identifying defendants with multiple cases pending and providing "management reports helpful to those responsible for planning and evaluating court activities."

Tobin's committee is administering a

Law Enforcement Assistance Administration (LEAA) grant enabling the court to acquire Promis. LEAA subsidized the creation of Promis and is making the system available to all public prosecution and court agencies — together with support, user group membership and Inslaw materials — at no charge.

Two Issues

The hearing addressed two issues: whether an SJC DP team fairly evaluated the bids and whether Burroughs' winning \$815,000 bid was truly responsive to last year's request for proposal (RFP). Last November, the SJC evaluation team rejected HIS' \$1.2 million proposal along with those of seven other vendors.

In the hearing, Tobin attempted to prove the SJC's DP center altered its system specifications in the "clarification" stage of the procurement process so HIS was misinformed about the requirements. HIS has claimed Burroughs' original bid was not responsive to the RFP, but was modified to be responsive only after the clarification.

In a "statement of facts" presented to Hearing Officer Barbara Clurman, both Tobin and Bigelow expressed their agreement with the following rendition of the procurement process:

- Bids were opened last August at a public meeting attended by all nine vendors responding to the RFP. A three-person evaluation team — including the SJC DP center director, Robert K. Mitchell — was established in September.

- Feeling it did not have sufficient information with which to make a selection, the team immediately asked SJC Executive Secretary John A. Fiske to request a clarification of response from all vendors. Fiske sent this request 10 days later, receiving answers from all but one vendor within about three weeks.

- The team heard oral presentations from six vendors in October and early November. After making site visits to the four vendors not excluded from consideration following these presentations, it narrowed the field to Burroughs and HIS.

- Soon afterwards, the team gave the nod to Burroughs because the firm "was responsive to the RFP as clarified . . . Burroughs was a responsible bidder, and . . . the Burroughs proposal was approximately \$400,000 cheaper than the [HIS] . . . proposal of October . . . and \$200,000 cheaper than [the HIS proposal] of November."

- In December, HIS branch manager John D. Borgman sent a formal letter of protest to Fiske, asserting that Fiske's office had held no public opening of the responses to the request for clarification; that Burroughs' response, based on its B1800 series hardware, did not "meet the mandatory specifications and requirements of the RFP in several respects"; and that the evaluation team improperly allowed modifications of some bids.

Decision Soon

Witnesses were examined and cross-examined during the two-day hearing, as Tobin and an HIS attorney took the offensive, while Bigelow represented the SJC and William McCormack of the Boston law firm of Bingham, Dan and Gould represented Burroughs.

Burroughs did not have representation on the first day of the hearing, but secured assistance from McCormack on the second day in response to the HIS use of counsel, a Burroughs spokesman indicated.

Clurman is expected to recommend to the CCJ Proposal Review Board on March 24 whether a reopening of the bidding is warranted.

A Burroughs spokesman has warned that, because other vendors learned the exact nature of the Burroughs proposal at the time the award was announced, these vendors could exploit this knowledge — representing two years of effort — should the bidding be reopened.

Twelve reasons why:

IBM Processors available

360/30's 40's 50's 65's Available now. Sale, Lease Trade	145 Wanted to purchase or sub-lease now. Limited machines available.	155 Available now with DAT. Sale or short term lease interim to your 3032.	158 Wanted to purchase. Sublease machines available.	165 4 megabyte system with DAT, just a shade slower than a 168. Sale or lease.	168 Machines available 4th quarter. Sale or Lease.
---	---	---	---	---	---

IBM Peripherals available

3420 6250 BPI Models 4&6 available immediately.	3420 1600 BPI Will purchase or trade for models 4&6 (6250).	3830-2 Wanted to purchase.	3330/33 Models 1&11 available now for sale or lease.	3340/44 Wanted to purchase or trade.	3350 Limited quantities for sale or lease.
---	---	--------------------------------------	--	--	--

IBM 3031, 3032, 3033 Operating Leases available.

Atlanta 404/258-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107

COMDISCO®

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

New York 201/568-9666
San Francisco 415/944-1111
Paris, France 374-1130

Your first choice in the second market.

Computer Expo Opens in Anaheim Tomorrow

ANAHEIM, Calif. — The Southern California Computer Expo '78 will open here tomorrow for a three-day show at the Disneyland Hotel.

The show, the first stop of The Conference Co.'s nine-city Computer Caravan tour will feature a display of DP equipment from the nation's leading computer companies.

Exhibits will include computer systems, minicomputers, data entry systems,

tape and disk drives, terminals, other peripheral equipment, software and services.

User Exchange

The Southern California Computer Expo has also scheduled three days of seminars and workshops for regional businessmen to provide them with a platform for an exchange of information on computer techniques and problems.

Based upon a growing interest in computer operation by chief executives across the nation, this year's seminar and workshop program will devote a full day to educating high-level business management on how to better use computers for corporate growth.

Other topics to be covered in depth include distributed processing and small business systems.

The complete three-day conference program, including workshops, exhibits, exhibitor seminars and the workshop notebook, costs \$135.

Single days cost \$55 each and entitle the participant to free entry to the exhibit area.

The exhibit floor is open to all users with a business card, according to conference coordinators.

Additional information is available from Kathy Quinn at

The Conference Co., 60 Austin St., Newton, Mass. 02160.

Calendar

March 28-30, San Francisco — Northwest Computer Expo '78, sponsored by The Conference Co. Contact: Kathy Quinn, Computer Expo '78, 60 Austin St., Newton, Mass. 02160.

April 11-13, Houston — Southwestern Computer Expo '78, sponsored by The Conference Co. Contact: Kathy Quinn, Computer Expo '78, 60 Austin St., Newton, Mass. 02160.

April 12, Omaha, Neb. — Sixth Annual Vendor's Exhibition of Computer & Business Communications Equipment and Supplies, sponsored by the Ak-Sar-Ben Chapter of the Data Processing Management Association (DPMA). Contact: DPMA, 505 Busse Hwy., Park Ridge, Ill. 60068.

April 18-20, Atlanta — Southeastern Computer Expo '78, sponsored by The Conference Co. Contact: Kathy Quinn, Computer Expo '78, 60 Austin St., Newton, Mass. 02160.

April 19-21, Newport Beach, Calif. — Distributed Data Processing, sponsored by the Institute for Science and Public Affairs. Contact: The Institute for Science and Public Affairs, Continuing Education Division, P.O. Box 31, Benjamin Franklin Station, Washington, D.C. 20044. Also being held at Boston, April 24-26, and Washington, D.C., April 25-27.

April 24-26, Anaheim, Calif. — 28th Annual Electronic Components Conference, sponsored by Electronic Industries Association and the Institute of Electrical and Electronics Engineers. Contact: John P. Sheridan, 1978 Electronic Components Conference, c/o Sprague Electric Co., 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

April 24-26, New York — Microprocessors — The Application Explosion, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Turning a profit in turnkey systems:

If your business is selling turnkey computer systems, using the right computer can be the key to making more sales—profitably.

You need a computer that's easy to use—and adaptable to many uses so you can get more customers. And you want a computer that's priced to sell, at a margin that's profitable.

You want a computer that can really protect your proprietary software—keep it safe, and saleable, sale after sale. And you need a better way of supporting your software than having to visit sites.

You need a computer with proven reliability, so there'll be fewer service problems. And you want a fast, dependable service network when there are.

Needs and wants met here

For all this, the one computer you want is the one we make:

The BTI 4000 Interactive Timesharing System.

It's a ready-to-go system with 10 megabytes of storage, magnetic tape drive, and 8 ports—just add terminals. And it's easily expandable—add disk storage to 400 megabytes, increase user capacity to 32 ports, add peripherals like industry-compatible magnetic tape and a line printer.

The BTI 4000 is designed, manufactured and supported by Basic Timesharing Inc. We're the manufacturer with timeshare experience. Which has helped us produce a computer uniquely right for multi-user applications.

A dedicated performer

The BTI 4000 has been proven in all kinds of applica-

tions—general accounting, dealer inventory control, entertainment ticketing, text publishing, school administration, and more.

What's more, the BTI 4000 is proving its reliability at locations in 39 states, in 5 provinces of Canada, and in Europe, too.

Things you'll like

The BTI 4000 uses BASIC-X, an unusually powerful extension of BASIC. With the features you need to get your software up—quickly, efficiently. So you

Your customers will enjoy faster response, because the BTI 4000 implements many of your application program operations in firmware.

The system also offers continuous availability, because software backups, updates, and other housekeeping activities can be performed locally, remotely or programmatically, with users on the system.

And the BTI 4000 is so easy to manage, your customer won't have to add a specially-trained employee just to run it.

Service—good and fast

In the packaged systems business, service can have a real impact on your success.

That's why service is such an important part of our business.

The BTI 4000 is designed for over-the-phone, on-line diagnosis of actual and potential problems. 24 hours a day, 7 days a week, we're ready to help. If a BTI 4000 ever needs on-site service, we have a network of field specialists to provide just that.

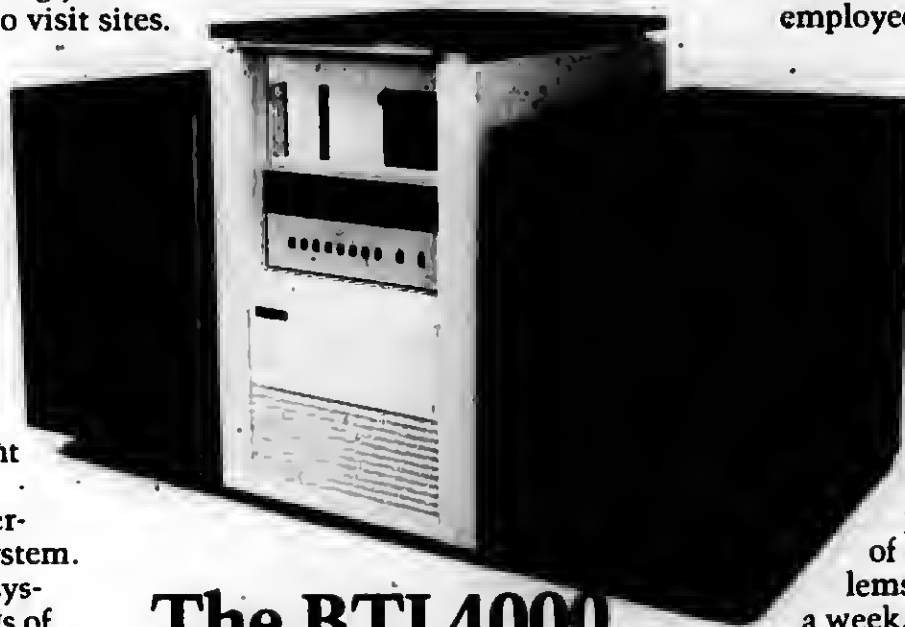
Priced to please

A single BTI 4000 costs \$35,950. There are attractive quantity discounts—like \$28,760 each for a quantity of 10.

For that price you get all the features and support benefits mentioned above, not a scaled-down version.

You can get complete information at your BTI regional office, listed below.

The BTI 4000. It could be your key to turning more profit in your turnkey installations.



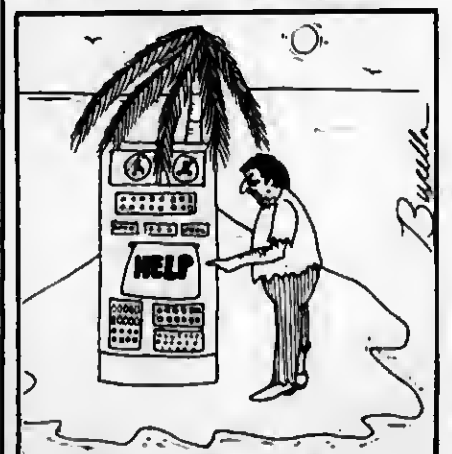
The BTI 4000 Means Business.

can start selling sooner.

Especially important to you, the BTI 4000 protects your proprietary software. So you can count on selling it again, and again. Without losing control of it. And with the convenience of dialup access, so you can support it without the cost of site visits.

Things your customers will like

The BTI 4000 is a true timesharing system. It allows doing any mix of tasks, all at the same time, from any number of locations.



'You Call That a Solution?'

With 100 Sessions Planned

NCC '78 to Stress Applications, Not Theory

MONTVALE, N.J. — The approximately 100 technical sessions of the 1978 National Computer Conference scheduled for June 5-8 in Anaheim, Calif., will stress practical applications rather than theoretical concepts of computer use, with special attention to the requirements of the end user.

According to Dr. Leonard Y. Liu, program co-chairman and director of systems architecture and standards for IBM in Poughkeepsie, N.Y., the sessions will cover the latest developments in 25 key topic areas relating to computer methodology, applications, systems and societal concerns.

Liu and program co-chairman Dr. Sakti P. Ghosh, a senior research staff member in the Computer Science Department of the IBM Research Laboratory in San Jose, Calif., plan for the conference to cover 10 applications areas. These will include such topics as special-purpose terminals, artificial intelligence, electronic funds transfer systems, simulation and personal computing.

The use of computers in helping to alleviate energy problems will be covered in six to eight sessions covering the use of decision support systems in planning for transportation; the application of large-scale models to predict future patterns in supply and demand for energy products; the use of microprocessor technology and microcomputers in conserving energy; and applications of computers in resource exploration. Four related sessions will center on image processing from remote sensing.

Methodology Area

According to Liu, the computer methodology track will cover performance measurement and evaluation, programming methodology, automatic programming and analyses of software techniques and tools.

In addition, a number of sessions will provide a detailed look at DP management and administration at the installation level.

The computer systems sector will cover data networks, distributed systems and programming and operating systems, with special attention given to computer architecture, the impact of recent developments on hardware technology and data base management systems.

Computer architecture will receive in-depth analysis, beginning with a review by leading industry experts of the evolution of minis, micros and mainframes. Other sessions will focus on standardization, the impact of the user on present-day architecture, development of large-scale computer architecture and a look at special-purpose machines developed for the military.

The "Impact of Recent Developments" will cover what's ahead in computer storage technology, peripheral devices and power supplies; very large system integration; advances in data communications; and business planning for the marketing of technology.

DBMS Coverage

Coverage of data base management systems will begin with an analysis of the decision to implement large-scale data base systems, followed by consideration of a number of factors includ-

ing design, installation and personnel training.

The NCC '78 conference program will also explore the impact of computers on "People and Society" through 15 sessions covering communications regulatory policy, legislation and its impact and computer careers and education. Included will be a review of both existing legislation and proposals on the drawing boards, with emphasis on the projected impact on manufacturers, end users and society as a whole.

Specific topics include protection of proprietary interests in software, privacy, personnel issues, computer communications and computer crime.



Dr. Leonard Y. Liu



Dr. Sakti P. Ghosh

Buying a communications monitor?

Check out our competition.

	TASK/MASTER	
On-line CRT format creation	✓	
Automatic editing of incoming messages	✓	
Built-in interfaces for DL/I, TOTAL, IDMS, ADABAS, DATACOM/DB, S/2000, etc.	✓	
Store-and-forward message switching	✓	
Message queuing and queue protection	✓	
Automatic restart for files, queues and programs	✓	
Support for all commercially-available terminals	✓	
Multi-processor support for distributed processing	✓	
Integrated support for VTAM (SDLC)	✓	
Operating system independence (DOS, DOS/VS, OS, VSI, SVS, MVS)	✓	
Built-in statistics and tuning aids	✓	
Integrated diagnostic aids	✓	
True terminal independence — not "mapping"	✓	
Multi-tasking of DBMS requests	✓	
Native-language applications (COBOL, FORTRAN, PL/I and Assembler)	✓	
No pre-compiling of applications	✓	
Support for all IBM file access methods (including VSAM)	✓	
Easy-to-use documentation	✓	
Automatic source-generation to customer specifications	✓	
Modular pricing (from \$475 per month)	✓	
On-site installation and education	✓	
Worldwide support (over 300 users)	✓	

TASK/MASTER offers more features than any other communications monitor. Features that will save you time, save you money, and insure the success of your on-line system.

If you're not looking at TASK/MASTER you should be. For more information, clip the coupon or call.



turnkey systems inc.
111 east avenue
norwalk, connecticut 06851
(203) 853-2884/telex 964351

839 mitten road
burlingame, california 94010
(415) 697-1833



tsi international, ltd.
19 bedford row
london WC1R 4EB, england
01-405-7304/telex 23302

additional
representation
worldwide

- ☐ Send more information.
☐ Have a TASK/MASTER representative call.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

Records Transfer Net Helps Migrant Students

By Marguerite Zientara
CW Staff

LITTLE ROCK, Ark. — The constant mobility of migrant workers' children has been the major stumbling block in their education. The children, arriving at a school without records, are often placed in the wrong grades and cannot do the work assigned.

In order to keep track of each migrant student's educational and health histories and to

make these records available to schools throughout the country, the computerized Migrant Student Record Transfer System (MSRTS) was established here eight years ago.

There are an estimated 500,000 migrant students in the U.S., who enroll in different school systems three to 15 times a year. By 1970 it was obvious to a group of state directors of migrant records

transfer systems that something had to be done.

"We knew we had a problem in that we couldn't get the records to the school at the same time the child was there," MSRTS Director Joe Miller explained.

The MSRTS, which runs on an IBM 370/158 with 2M bytes of memory operated by the General Services Administration (GSA), contains "a wealth of information" in

both academic and health areas, according to Miller. Specifically, the system contains test information, special interest information, special programs information, information on inoculations, academic screenings and any critical health problems that may exist.

The system, accessed by 160 terminals across the nation, originally contracted services through the University of Ar-

kansas Medical Center starting in 1970. It leased an IBM 370/135 from 1973 until September of last year, when the GSA IBM 370/158 took over.

The system is in the process of being upgraded and soon an IBM 3705 controller will be used in place of the System/7 controller, Miller said. At present the computer is accessed by Teletype Corp. ASR 33 and ASR 35 terminals that are, according to Miller, "the cheapest mode of communications possible." A pilot is being run, however, and the terminals will be upgraded soon.

According to the Family Educational Rights Privacy Act, the MSRTS can release personal information only to the school in which a child is enrolled, Miller said. The system does, however, provide statistical data to states and the U.S. Office of Education.

Last year the program cost \$3.23 per child for the year, regardless of the number of moves made or of the amount of information put into the computer, Miller said.

Game Lets Duffers Play Elite Courses

By Tim Scannell
CW Staff

NEW YORK — Teeing off at such notable golf courses as Pebble Beach, Firestone or Oahu is not an opportunity usually available to the occasional "duffer." The average player, restricted by a limited budget or lack of time, often pursues his sport at the local fairway or a nearby putting green.

However, by using a computer-simulated golf game manufactured here by Golf-O-Tron, Inc., a person can not only "play" at these prestigious courses, but also at Winged Foot, Pinehurst 2, Thunderbird and the Dunes as well.

Golf-O-Tron simulates play on a real golf course by means of hundreds of microcomputer-controlled slides that are projected onto a 10- by 10-foot nylon screen. A golfer, when playing one of the seven available courses, positions

(Continued on Page 16)

INTRODUCING THE DECISION DATA SERIAL PRINTER AND PRINTER TERMINAL THEY'RE VERY UNLONELY.

So many people feel lonely when they come later, when there's nobody around to talk to.

If you know that lonely feeling, meet the Decision Data 3240 Printer Terminal and 6540 Serial Printer. They come complete with a 70-city Field Engineering Force, ready to move at the drop of a dot. And they come complete with as much microprocessor and LSI technology as possible, to make service calls as infrequent and as brief as possible.

The microprocessor also makes these printers bi-directionally smart, with horizontal and vertical tabbing for high-speed stepping and skipping. Print rate for the 96-character set of 9 x 7 dot matrix characters is 120 cps, and the effective rate is even faster.

These are, moreover, exceptionally versatile units. The 3240 is an excellent time-sharing terminal or system console or console/output printer for a mini or small business system. The 6540 is an excellent

and supports a wide range of applications and can print double spaced, with or without headings, shipping labels, and tags.

And they'll keep on being versatile as your system grows: we've already built in many of the variations you're likely to want next.

Look into the lonely 3240 and 6540, backed by Decision Data service, coast-to-coast. Their prices are about as low as any you can find. And they can be rented or purchased. For more information, call us, at 215-674-3300. Or write:

Decision Data Computer Corp.
100 Witmer Road
Horsham, PA
19044



DECISION DATA
COMPUTER CORPORATION
makes computing cost less

**Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3**

**BEST PRICE
FAST DELIVERY
800-323-2288**
CALL TOLL FREE
IN ILL. CALL 312-279-1960
Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

Thanks to Software Package

Bank 'Secure' Even From System's Developers

Special to CW

More and more companies are establishing comprehensive programs to protect their data centers and information from theft, alteration, disclosure and misuse. Some have developed in-house security systems and suddenly find that more than half their DP staff know how it worked, thus diluting the effective protection.

That's one reason a California bank decided to purchase a commercially available system that is transparent and confidential throughout the organization. The bank also found it could catch security violations even by people who had developed the product.

The bank had installed a system called Secure, developed by Boole & Babbage, to protect its data. Earlier this year, the bank also contracted Edward Syrett, manager of technical products for Tesseract Corp., to develop an accounts payable system. Syrett had worked with the Secure developers for more than a year and was fully familiar with the system.

One Friday evening, Syrett returned to the bank to get in some extra debugging time, but found that one of the utility programs for the on-line system wasn't working and needed to be re-linked. However, the people who normally maintain the on-line system had already left.

Syrett was faced with two alternatives; either change around all of the JCL to use a different library or relink the utility, even though it wasn't his job, to get the debugging work done.

Deciding to relink, he tried to make the link in both TSO foreground and background, but kept receiving back a message that the job had failed with a 913 Abend code.

"I was new to TSO at the time," Syrett commented, "so when it failed the first time I figured that was just something else that didn't work. So I went to the reliable methods I was familiar with and submitted a background job and it also 913 abended."

"That's when it dawned on me that the utility was protected and that I had just perpetrated a security violation," Syrett added. "Most programmers or TSO users wouldn't have even known it was a security violation because the system is so transparent to the user."

He explained that if you look at the abend code in the IBM manual it will tell you that the operator didn't respond with the right code. However, Secure operates by assembling the password from information present in the job control or logon procedure and has taken the operator interface out of the picture by checking against itself passwords known only by the security officer.

"I realized I wasn't going to get any testing done, so I simply went home for the weekend," Syrett said. "In a sense it cost me some productive time from the bank's standpoint, it was worth it to them to lose time to protect their information."

Syrett noted that had the data not been protected, it would be possible for an individual to go in, make some changes and simply forget to tell the people responsible for maintaining the system which changes had been carried out.

"What I was trying to do was per-

fectly innocent and benign," he stated, "but there's no way the operating system could know that. Without any protection there would have been no record of my changes, and the next time someone used that module it might not work and the maintenance people would have had to spend hours digging into the program to locate the problem."

Simple to Solve

Syrett explained that if someone were to simply replace an entire module the problem would be simple to solve because operations could go back to their latest backup tape and reinstall the library.

"A couple of years ago, when I was with Stanford Linear Accelerator, it occurred to me that the most effective sabotage to an organization would be very subtle program changes," Syrett said. "If someone were to go in and make some changes in the Fortran sub-routine library such as the one of the special function routines like sine or cosine, the calculations would be almost the same value but would be off 1% or 2%. That would mean that the scientific calculations would be processed but all of the numbers would be subtly wrong."

"Imagine how you could sabotage defense work or a project sensitive to a firm's ability to do business," Syrett

speculated. "It would probably take years before anyone found out what was going on because the last thing you would suspect is that a canned, reliable routine would be providing wrong numbers."

Regarding his own run-in with Secure, Syrett said the following Monday morning the security officer approached him. She explained that she had been studying the Secure auditing report, which records all accesses and attempted accesses, and wanted to know why he had been attempting to access that particular data.

"My explanation must have been logical because I stayed on the project," he concluded.

Want a faster, cleaner, user-oriented financial application system? ACCOUNTING IV...right off the shelf and right on the money.

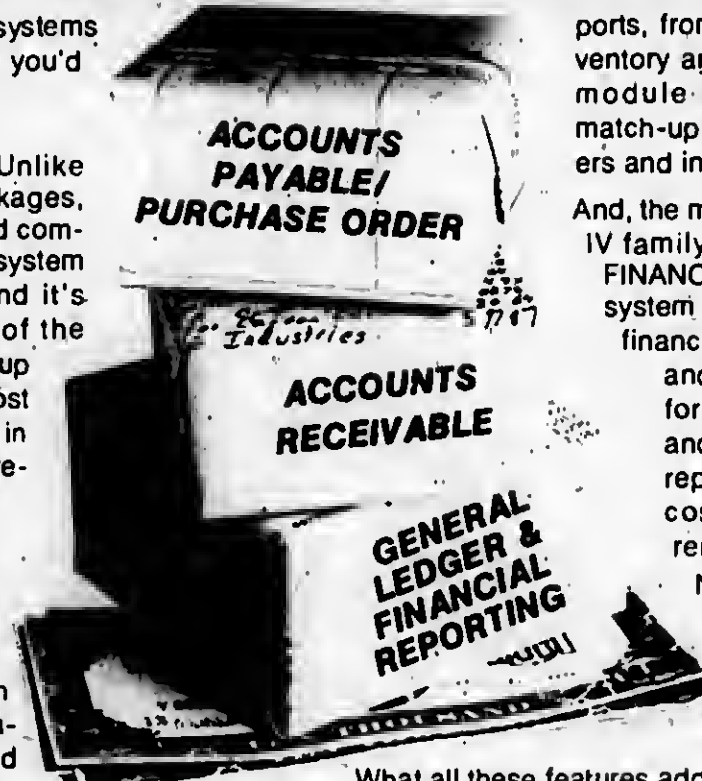
A lot of off-the-shelf accounting systems can make you wish that's where you'd left them... on the shelf.

But not ACCOUNTING IV... Unlike other financial application packages, ACCOUNTING IV is as flexible and comprehensive as a custom-built system costing five times as much. And it's easy-to-use — requires none of the special programming that ties up valuable DP time and makes most packaged systems unduly slow in getting information back to the requesting party.

There are four members of the ACCOUNTING IV family — each providing smooth integration with existing programs, each written totally in ANS Cobol, and each boasting a wealth of unique features that makes it easy to install and easy to adapt to the user's needs.

ACCOUNTS RECEIVABLE, for example. A fully integrated module providing tight monetary controls, a wide range of billing options, and complete automation of every receivables function. Over 25 management reports available to suit the user's requirements. Everything from detail aged A/R to sales analysis by product.

Or ACCOUNTS PAYABLE. An extremely flexible system offering more than 50 statistical and informational re-



ports, from check reconciliation to inventory analysis. The Purchase Order module performs the three way match-up of purchase orders, receivers and invoices.

And, the mainstay of the ACCOUNTING IV family... GENERAL LEDGER & FINANCIAL REPORTING. A powerful system with a broad data base for financial and statistical collection and reporting. Offers capabilities for profit-planning, budgeting and forecasting, responsibility reporting, transaction analysis, cost allocation, multiple-currency accounting, and more.

New enhancements include on-line data entry and inquiry as well as interfaces to TOTAL, IDMS, DL/1 and IMS data bases.

What all these features add up to is an entirely new level of control over business operations. A strong claim? Yes, but one that over 250 companies have already seen us make good on.

So contact Informatics today and let us show you how in as little as four weeks you can be up and running with an accounting system that's right off the shelf and right on the money.

ACCOUNTING IV is sold and supported by Informatics Inc., the world's largest independent software vendor.

informatics inc  **Software Products**

World's Leading Independent Supplier of Software Products

Member SIA  Software Industry Association

Informatics Inc., Software Products
21050 Vanowen St., Canoga Park, Calif. 91304 (213) 887-9121

Please send literature on:

- ☐ General Ledger & Financial Reporting.
☐ Standard Product Cost.
☐ Accounts Payable. ☐ Accounts Receivable.
☐ I would like to attend a free ACCOUNTING IV seminar.
Please send dates and tell me when the next seminar will be in my city.

Name

Position

Dept. Computer

Firm

Address Tel.

City State/Province Zip

Employee-Written Package Aids Highways

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — An employee in the Program Management Division of the Federal Highway Administration has written what he calls a "rather crude" program that enables his department to distribute valuable information to the state highway departments throughout the country.

The Program Management Information System's developer, who prefers not to be

named, said the program was written "because the variations in the way states do things in this field are so great, and so unstable, there was no nice way of keeping this stuff current and answering questions, or giving specific examples on a national scale."

The program provides information selectable by key word, by major topic of information and by state. The major topics included in the program are:

- Laws of each state.

- Agency organizations of each state.
- Funding sources.
- The highway systems for which a state is responsible.
- "Need studies" indicating how much a highway system has deteriorated.
- What fiscal studies a state performs.
- How a highway program is developed.
- The procedures used for scheduling a highway project.

- Any unusual procedures in automation and computer use.

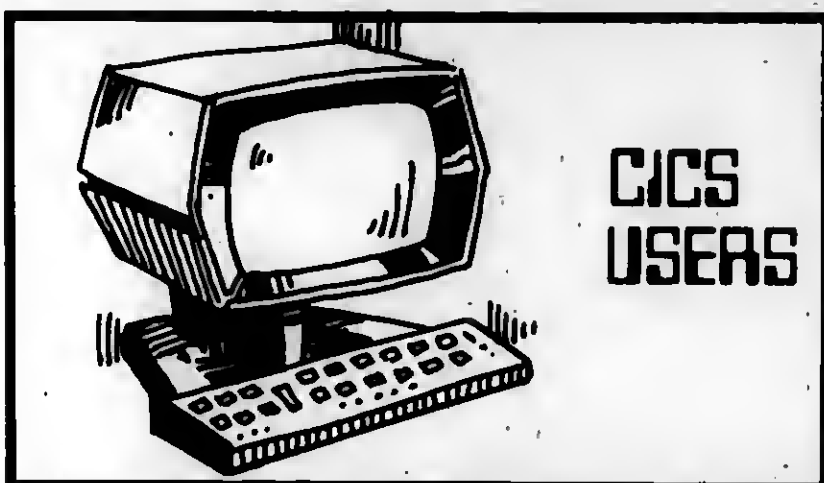
Requests for information might be made by a foreign country, trade association or a state, the developer said. The information would be especially helpful to any state highway agency manager seeking resource data applicable to his state's particular needs, he added.

The system, based on an IBM 360/65, produces a machine printout of the information sought and automatically prints out the name or number of a reference document or appropriate bibliography for

further elaboration on a topic, according to the spokesman.

The system, started about two years ago, is just one program in the Department of Transportation's main computer system.

The program was originally developed as an attempt to visualize the progression from the passage of the laws that initiate highway projects through the actual projects themselves, the spokesman explained. This would include information on what studies the states do, how often they do them and whether they are required by law.



DASD's new utility map generator (MAPGEN) will increase your BMS coding productivity by at least 75%.

MAPGEN is not a new language. It is a system where the completion of a simple specification form will greatly improve accuracy by eliminating unnecessary data, add flexibility and greatly simplify maintenance. All DFHMSD, DFHMDI and DFHMDF macro source statements are program generated.

A hard copy image of each screen is automatically printed at the time the map is defined.

'Map build' features aid in the use of extended features under CICS/VS.

Call or write today

DASD CORPORATION
National Marketing
1480 Renaissance Drive — Suite 315
Park Ridge, Illinois 60068
312/299-5005



Duffers Play Elite Courses

(Continued from Page 14)

himself on a platform covered by artificial turf and drives a real ball at the screen.

The microprocessor measures the elapsed time between the ball leaving the tee and its impact on the screen's surface. As soon as the ball strikes the screen, another ball — this one made of light — appears at the point of impact and moves in an arc simulating the rest of the actual ball's flight.

Numbers indicating how far the shot has traveled and the yardage left to go are displayed in the upper right- and left-hand corners of the screen following each stroke. As each distance is registered, a different picture is flashed on the screen, depicting the view as it would appear if one were standing where the ball had landed.

The ball's distance and trajectory are calculated to within one yard of the actual distance of the course represented on the screen, a Golf-O-Tron spokesman said.

Because of its realism, the game has been endorsed by the Professional Golfer's Association (PGA), although it is still "somewhat dubious about the yardage indications when using some of the higher number irons," Ken Davis, Golf-O-Tron president, said. "The repeatability of the yardage is there, however, and that's what it claims is very important."

Every 18-hole course is represented by 160 slides showing every possible angle on the fairway. The screen is sectioned into a grid containing 580 sensitive "spots" that register a position in the microcomputer if hit by a ball, Davis said.

Each unit has, in fact, more than 100 Texas Instrument, Inc. or National Semiconductor Corp. chips that are programmed for tracking distance and trajectory figures.

At \$18,500 plus, the game "is not an inexpensive item," John Hallgart, production vice-president noted. "We're working on price breakdowns now and hope to get the unit's price down," he said.

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call and per-call field service at rates much less than the competition.

NEED FAST TURNAROUND? CALL OR WRITE:

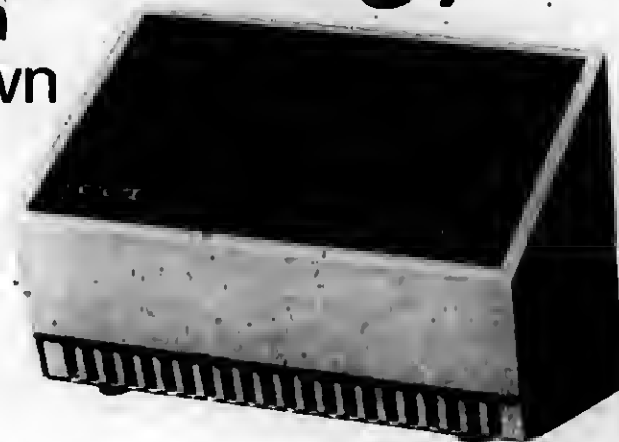
COMPUTER SYSTEMS SUPPORT CORPORATION

9112 Gaither Road
Gaithersburg, Maryland 20760

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

Today's Out Front Technology from Crown



Crown Communications introduces an intelligent data communications storage unit designed for today's needs — CCI 5000. Compatible with Teletype Dataspeed 40 and 43.

Imagine — a data communications storage and forwarding unit with all the benefits of microprocessor technology packaged no larger than most of today's modems and data sets and at a hard to believe low price.

Crown Communications, Inc.
2750 Northaven
Suite 111, Dallas, Texas 75229
214-243-6941

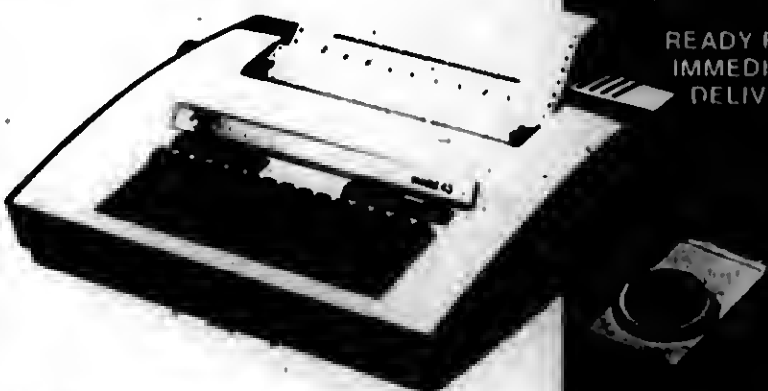
you can be well connected for only \$1285 or \$38 per month.

The all new 43 Teleprinter, with Acoustic Coupler, is ready for immediate delivery. This quiet desktop impact printing terminal features full ASCII character set, buffered 10 or 30 cps operation. It prints up to 132 characters per line on regular paper. Modular, solid-state construction and self-test ability means easy maintenance. And, the 43 Teleprinter, is supported with nationwide service.

Time Sharing Data Entry Communications

43 Teleprinter with Acoustic Coupler

READY FOR IMMEDIATE DELIVERY



At Management Response, we are your Terminal Connection. We also have DEC LA-36, LS-120, LA-180, VT-52, Regent 100, and more. **READY FOR IMMEDIATE DELIVERY.**

Order now, right from our stock, CALL TOLL FREE: (800) 323-2135



COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

☐ Please enter my subscription
(details on back)

☐ I'm already a subscriber,
but I'd like you to
change my:

- ☐ address
- ☐ title
- ☐ industry
- ☐ other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

Europe and Middle East – \$50 All Other Foreign – \$65

Expiration
Date: _____

City	State		Zip Code

Computerworld

interested in receiving information on



THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

- 80 Librarian/Educator/Student
-
- 90 Other:

Detach here, fold, and place in post-paid envelope attached through binding.

Atomic Dimensions Possible

No Limits in Sight for Miniaturization: Keyes

By Frank Vaughan
CW Staff

SAN FRANCISCO — Progress in fabricating miniaturized components and in the art of lithography may well continue until the techniques "can cope with dimensions approaching atomic diameters," and there are no limits in sight, according to Robert W. Keyes of IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y.

"Advances in electron and ion sources, particle optics, radiation-sensitive resists, etching processes and masking materials are the ingredients that will make further miniaturization possible," he said at a recent conference here.

The crystalline imperfections that lead to the production of defective devices has limited the size of substrates. As these defects decrease, the size of future substrates will increase, he pointed out.

Better Circuit Designs

"A final trend that has contributed to the advance of integrated electronics is improvement in circuit design, so that fewer chips are needed to perform a given function," Keyes said. The chip area needed to implement a function has decreased even when the improvements in lithography are discounted, he noted.

"Advances in the technology of fabricating ever-smaller components on

larger and larger substances can be expected far into the future," he said. "The basic questions to be investigated then are: 'What will the characteristics of ultraminiature devices be?' and 'What problems will be encountered in the utilization of chips containing thousands of high-performance circuits or millions of bits?'" he continued.

"The answer to the first question lies in the physics of electronic devices. The nonlinearity that enables 'on' and 'off' states to be clearly distinguished requires that applied voltages be large enough to dominate the random thermal motion of electrons. Applied voltages must also overcome the variability in thresholds and characteristics

caused by lack of perfect manufacturing control of devices. The point is that voltages cannot be decreased infinitely as miniaturization advances; voltages of a substantial fraction of a volt will be required," he explained.

Another consequence of the application of voltage is the production of heat. While early circuits could easily be cooled by a flow of air, new cooling technologies involving, for example, the direct transfer of heat from solids to liquids, are emerging, he pointed out.

"The heat dissipation problem will become less severe when levels of integration reach the point at which systems contain only one or a few chips. The density of heat flow can then be reduced by conduction through a large solid heat sink and transferred to a fluid at low density," he suggested.

An additional limit is found in the problems of wiring semiconductor chips that contain large numbers of logic circuits, he said, noting that the sheer complexity of wiring design problems may prevent the optimum utilization of very large chips.

Report Alerts Users to 'Uncle Sam' Ploy

By Brad Schultz
CW Staff

WINTER PARK, Fla. — Computer vendors often use purported federal government commitments as an excuse to avoid handing out better deals to users, according to a recent report by International Computer Negotiations, Inc.

The report said vendor sales personnel tell users: "Look, we would really like to do that for you, but our [General Services Administration (GSA)] contracts ... say we can't give — even a favored customer like your firm — a better deal than we give [the government]. So our hands are tied ... we wouldn't want to break a contractual commitment to ... our biggest customer."

Many users fall prey to this play because they don't understand what the vendor's GSA commitments really are; have a patriotic reticence about asking the vendor to break an agreement with Uncle Sam; are ignorant about how vendors can actually get around GSA commitments; and assume that asking for benefits beyond what the government got is unfair in some way, according to CNReport Volume 1, Issue 8.

Most vendors' commercial marketing people "do not even know what specific concessions their company has made" to the government, the report said, explaining that government contracting "is traditionally the responsibility

of a separate vendor division, such as the 'federal systems division.'"

CNReport suggested four ways to counter these ploys: understand the vendor's position, be well apprised of the facts and use them shrewdly, listen carefully and shoot high in the negotiations.

To understand the vendor's position, the user should ask the vendor to supply a copy of the actual terms and conditions granted GSA, the report said.

As to obtaining and using the facts, the report recommended asking the sales representative if he is saying the firm cannot give a better deal than the one it gave the government or if it is offering the same deal.

If the vendor declines to make the same concessions the user can concentrate on why this is so; or if the vendor agrees to grant the same deal, the user will be well ahead, the report noted.

The report suggested making the transaction unique as a countermeasure to vendor insistence that a provision in its GSA contract forbids granting a better deal than the government received in a similar transaction. One way to do this is to type into the agreement a statement that the acquisition is experimental or the first of its type installed in a particular area, the report said.

Among other methods for evading the GSA ploy, the report recommended finding some "soft consider-

ation" to compensate the vendor for a benefit the vendor claims cannot be provided free and asking the vendor to supply specified services or support with a guarantee that the work will be done within a certain time frame or at a maximum price.

Adapso Sets N.Y. Tax Meet

NEW YORK — A meeting will be held to discuss the recently announced New York State Tax Commission computer sales tax decisions on Wednesday, March 29, at 1:30 p.m. at the New York Hilton Hotel. The meeting, open to the public, is being sponsored by the Association of Data Processing Service Organizations (Adapso).

On Feb. 6, the New York State Department of Taxation and Finance, Taxpayer Services Division, issued a five-page technical service bulletin entitled "Computers," which sets forth the sales taxation decisions of the State Tax Commission on sales of computer programs, programming services, equipment and other DP services.

The bulletin defines taxable and non-taxable hardware, software and serv-

ices and describes the procedure for obtaining a tax refund or credit.

It does not address the question of data conversion services (key-punching, tape updating, etc.), which will be the subject of the next release. The Department of Taxation and Finance invites comments from all interested persons regarding whether they believe such services should be subject to New York State or local sales taxes. Comments should be sent by April 1 to Commissioner Thomas Lynch, Department of Taxation and Finance, Building 9, State Campus, Albany, N.Y. 12227.

"Computers" is available from Frank Person Jr., Taxpayer Services Division, Department of Taxation and Finance, at the same address.

Listen to what a dealer has to say about TTS...

'Total tech gets my tough jobs done'

When you need a tough, reliable, fast, and efficient way to handle all your computer and data processing hardware, call the one company that can handle the toughest Total Technical Services.

RON BRECKNER, President
Data Sales Co., Inc.
Minneapolis, Mn.

TOTAL TECHNICAL SERVICES
13405 YORK ROAD, NORTH ROYALTON, OHIO 44133
(216) 237-8363

- 360/370 System Install/Deinstall
- 360/370 Features
- Field Engineer Training

HIRE A SUPER-SLEUTH

FORTRAN debugging with TRACER
for NOVA/ECLIPSE and PDP-11 Users

If your program debugging efforts often seem like long-winded detective novels, odds are you're lacking the proper tools.

TRACER is a fully symbolic, FORTRAN debugging package that shows you exactly what happens as your program executes. So you can spot logic flaws at a glance. Examine variable values as they change. Determine if proper arguments are being passed to subroutines. And ferret out the culprit lines in your source code.

The cost? Minimal, if you figure in the time to be saved in software development and the increase in programmer productivity.

So, hire a super-sleuth. Call or write us today for a free TRACER User's Manual. Case closed!!

TRACER from IPTC
2462 Embarcadero Way, Palo Alto, CA 94303
(415) 321-6284

Micro-Based Unit May Aid Arrhythmia Victims

MADISON, Wis. — The use of a microcomputer within a heart monitoring device the size of a paperback-dictionary may soon make possible instantaneous indications of arrhythmia for certain heart patients.

Work on the miniature system is being done at the University of Wisconsin-Madison's Biomedical Engineering Center by a team of two professors, two graduate students and a hospital programmer.

Prof. Willis J. Tompkins visualizes the monitor as running

for up to a month at a time, measuring and recording an electrocardiogram (ECG) 200 times a second while the wearer goes about his daily business.

If and when it detected a peculiarity in the heart's electrical output, the monitor would first beep a warning to tell the patient there was something wrong and then display a message on a liquid crystal panel.

Finally, it would store in memory up to 16 seconds of the abnormal ECG along with its computer diagnosis of what was wrong.

The wearer could then go to a telephone, dial a regional heart center, couple the device to the phone and transmit the saved ECG for detailed analysis.

RAM and ROM Soon

In its present form, the device uses an RCA CDP 1802 microcomputer with 4K bytes of expandable memory, chosen because it uses almost no electrical current. The unit now uses random-access memory (RAM), but will eventually include both RAM and read-only memory (ROM), according to Tompkins.

Wires taped to the patient's chest carry the continuous heart signal to a section of the monitor that converts it to di-

gital pulses. The pulses are stored in the memory and analyzed by the computer for heartbeat irregularities.

There are circuits to sound the beeper, power the liquid crystal display and convert the information for transmission by telephone lines. The information is transmitted via an inductive coupler at the rate of 300 bit/sec and in a working system would go to regional centers to be analyzed and forwarded to the patient's doctor, according to Tompkins.

The unit's memory records only about a quarter-minute's worth of data, and as long as the heart is behaving normally it simply records on top of the old information. Only when the heart misbehaves does the memory freeze-frame a per-

manent record for later transmission.

While there are machines today which patients can wear to record heart activity, they use power-hungry tape recorders that limit battery life to about 24 hours, according to Tompkins. Without the "intelligence" of a computer to detect irregular heartbeats, tape machines must record the whole 24 hours, after which time a technician must search the entire tape for arrhythmias.

Parts cost for the unit is presently around \$500, not including assembly labor costs, according to Tompkins. However, he said that ultimately this would probably be offered as a service, rather than retailed.

Upgrade to IBM 6250 BPI tape drives now!

SAVE IBM RENT — ELIMINATE DOWN-TIME caused by field conversion

We will purchase your IBM 800 1600 BPI drives now & install 3420 1 3420 6 drives immediately from inventory

Call Nick DiBari
312-698-3000
or your nearest Comdisco office

COMDISCO

COMPUTER TERMINALS Save Up To 40%

On purchase or lease of the following
Hazeltype, Infoton Decwriter LA36 LS180,
LS120, Diablo 1620 1, Texas Instrument 745, 743.

Example:

Texas Instruments 745: \$1,825

**CALL FOR A QUOTE
201-469-9344**

Terminal Sales & Development Inc
867 Sebring Ave., Bound Brook, N.J. 08805

ACM Now Seeking Nominations For Annual Grace Hopper Award

NEW YORK — The Association for Computing Machinery (ACM) here is seeking nominations for its Grace Murray Hopper Award, given each year to an outstanding young computer professional for a single recent major technical or service contribution to the computer community.

In order to qualify, candidates must have been 30 years of age or younger at the time the qualifying contribution was made, according to Richard G. Canning, chairman of the Hopper Award Committee.

The award will be presented at the opening session of ACM's annual conference next Dec. 4 in Washington, D.C. The award is in the

amount of \$1,000, donated by the Univac Division of Sperry Rand, and is accompanied by a certificate.

While the award is open to any professional in the computing community, emphasis for the 1978 award will be placed on contributions in the fields of business data processing and personal computing.

The nomination process is open to anyone, including those who may feel they themselves deserve the award, according to Canning, who publishes the "EDP Analyzer" newsletter.

In addition to showing the name, address and phone number of the nominee, each

nomination should include a statement, from 200 to 500 words long, on why the candidate deserves the award.

A description of the contribution as well as comments on its value should be part of the statement, Canning noted.

The date of birth of the candidate and the date on which the qualifying work was completed as well as the name, address and phone number of the nominator should also be submitted, the chairman said, adding that all nominations should be in his hands by June 30.

Nominations should be sent to Canning at 925 Anza Ave., Vista, Calif. 92083.

Edutronics Course Helps Non-DP'ers

KANSAS CITY, Mo. — The Edutronics Group has released a multimedia in-house course entitled "Using the Computer as a Management Tool." The course was designed to show users the possibilities of DP and practical approaches to working with DP personnel.

The course consists of 12 modules and includes audiovisual presentations, case studies, a course book, leader's guides, conference leadership manuals and training charts.

Attention is focused on methods of identifying the difference between data and information, which a spokesman said Edutronics considers the key factor in understanding DP terminology.

Additional information on the other courses is available from the group's headquarters at 3435 Broadway, Kansas City, Mo. 64111 or other offices in Chicago, Boston, Dallas, Los Angeles, San Francisco, Washington, D.C. and New York.

**Now you can give
your customers
a piece of our
mind.**

Dealerships for the A.O. Smith/Mesa Two mini computer are now available for qualified EDP consulting or service bureau firms. Mesa Two is an excellent "turnkey" system with broad appeal. A Mesa Two will provide you with:

- short sell/install cycle
- proven dealer education program
- attractive profit margin
- marketing support in your own area

Find out more about how you can become an authorized Mesa Two dealer by filling out the coupon and mailing it—today. Or call Jack Gallagher (414) 447-4472. We'll work with you all the way.

A.O. Smith
DATA SYSTEMS DIVISION



Dealer inquiries are especially invited from: Minneapolis, St. Louis, Denver, Seattle, Dallas, Houston, Atlanta, New York, New England, Oklahoma City, Nashville, Los Angeles, San Francisco.

Yes! I am interested in receiving more information about a Mesa Two dealership.

Name _____ Title _____ Firm _____

Address _____ City _____ State _____ Zip _____

Mail to: A.O. Smith • Data Systems Division • Box 584 • Milwaukee, WI 53201

Insidious Threat Involved

Prepare for Nuclear Accidents, Users Advised

By Jeffrey Beeler
CW Staff

N. BERGEN, N.J. — Only good fortune spared users from possible disaster following the recent crash of a nuclear-powered Soviet spy satellite in northern Canada.

If the malfunctioning Cosmos 954 had fallen near a large city instead of in a frozen wilderness, the resulting radiation could have severely disrupted DP operations miles from the crash site.

No such disruption occurred, of course, but the incident does dramatize the growing need for users to protect their systems from peacetime nuclear accidents, according to Bohdan Szuprowicz of 21st Century Research here.

In recent years, the threat of such accidents has steadily increased, and unless users institute adequate safeguards, their installations could someday fall victim to an atomic power plant malfunction, radioactive waste spill or some other equally unforeseen nuclear calamity, Szuprowicz warned.

Users also face a growing threat from less random nuclear disasters like terrorism and sabotage, he added.

Nuclear Power Plants

Before 1987, as many as 780 nuclear power plants will be in operation, under construction, on order or in planning stages in 55 countries. As these facilities send and receive nuclear fuels like plutonium across international borders and through unstable developing nations, the material could easily fall into the hands of terrorist or other insurgent groups bent on blackmailing or otherwise subverting established authorities, Szuprowicz predicted.

By the early 1990s, the traffic in fissionable materials will be equivalent to at least 6,000 nuclear bombs.

If a nuclear explosion from a terrorist or foreign attack did occur someday, the first and most devastating threat to computers (and everything else for that matter) would result of course from the initial blast effects — heat and firestorm, radiation and radioactive fallout. Fortunately, for users, the damage from these effects, though catastrophic, would probably be limited

to a relatively small area, except during an extremely large blast or an all-out nuclear attack.

Insidious "Pulse"

A more insidious and wide-ranging threat would come later from a less familiar phenomenon called electromagnetic pulse (EMP), a form of destructive energy emitted during a nuclear explosion. After the immediate effects of an atomic blast had begun to subside, EMP could cause communications "blackouts" by disrupting the ionosphere, which reflects high-frequency transmissions back to earth, Szuprowicz warned.

The effects of this blackout could last hours and extend as far as 600 miles from the blast site, he added.

Users can protect their systems from the hazards of EMP in several ways, according to a spokesman from Norden Corp., a manufacturer of militarized computers. One precaution is to shield critical components and systems modules like power supplies in protective housings that could withstand the intense emissions from a nuclear explosion, the spokesman said.

Automatic Power Down

Another technique involves installing emissions detectors that would automatically cut power to computer systems when the intensity of nuclear emissions surpassed a set limit and then restore power when the level again fell below the danger point, he added.

These or other anti-EMP devices are a standard part of many military computers. But they are also "extremely complicated and expensive," the Norden spokesman noted, and thus might prove economically impractical for many nonmilitary users to implement.

As an additional safeguard against EMP, Szuprowicz suggested that users decrease their reliance on nuclearly vulnerable high-technology hardware. But he conceded that "such an approach would require that reversal of present trends in national policy and is thought unlikely to gain acceptance."

Of course, some DP sites, because of their strategic importance, will remain almost impossible to defend against

nuclear emergencies, no matter how carefully their users try to protect them, he added. Some of these particularly susceptible sites include electronics manufacturing plants, component assembly factories, oil refineries and petrochemical installations, electronic power generating stations, communications centers, air terminals, railroad marshalling yards, ports, dams and canals.

Another likely victim of a nuclear accident or attack would be the electronics industry, which depends heavily on coordinated inputs of a vast range of advanced technologies. In fact, almost every industry that relies heavily on computers and other electronic gear is more likely to feel the effects of a nuclear catastrophe than its less technologically advanced counterparts, Szuprowicz said.

Perhaps the most dynamic franchise opportunity since fast food burgers.

A National ComputerLand Retail Franchise

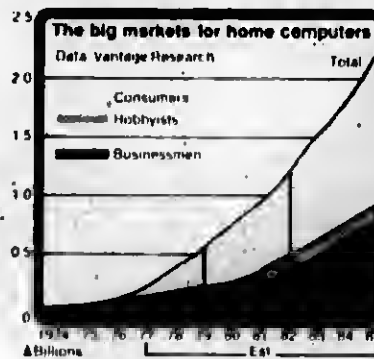
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 35 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Mail to E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW
San Leandro, CA 94577 (415) 895-9363

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

Call for Papers

1978 BIENNIAL DISPLAY RESEARCH CONFERENCE

Cherry Hill, N.J., Oct. 24-26, 1978.

Previously unpublished papers on significant results in the field of electronic display materials, processes, devices, circuits and applications are requested. Areas of interest include light emitters, direct view, addressing technology, projection and display characterization. Specific topics include phosphors, fiber and electron optics, cathodoluminescence, photochromics, concepts and new phenomena.

Send 20 copies of both a 35-word abstract and a one- or two-page draft summary by June 1 to Lawrence Oodman, RCA Laboratories, Princeton, N.J. 08540. Telephone is (609) 452-2700, ext. 2087. A few post-deadline papers on important new projects will be considered if 100-word abstracts and one- or two-page summaries are received by Sept. 18.

AMATEUR COMPUTING 78, Shareton National Meter Hotel, Arlington, Va. July 22-23, 1978.

Topics will include personal computing; amateur radio and microcomputers; home educational uses of computers; speech, music and graphics; standards for hardware, software and interfacing to the real world; and subjects of interest to beginners.

If interested in presenting a paper, participating in a panel discussion, displaying an amateur computer system or sponsoring a tutorial, submit a letter of intent along with a one-page abstract or outline by April 15 to John Walt Miller, program chairman, 8921 Pacific Lane, Annandale, Va. 22003. Telephone is (703) 256-5702.

SECOND INTERNATIONAL CONFERENCE ON COMPUTER SOFTWARE AND APPLICATIONS, Chicago, Ill., Nov. 13-18, 1978.

The conference will bring together computer practitioners, users and researchers to share their ideas, experiences and requirements for applications software, management techniques and software development support, including automated techniques. Potential topics include software development methodology; reliability and maintainability; software tools; social, legal and regulatory issues; computerized decision-making systems; and application-oriented languages.

Send a 1,000- to 5,000-word paper by June 1 to Prof. C.V. Ramamoorthy, Dept. of Electrical Engineering & Computer Science, University of California, Berkeley, Calif. 94720.

THE SECOND ANNUAL SYMPOSIUM ON COMPUTER APPLICATIONS IN MEDICAL CARE, Washington, D.C. Nov. 5-8, 1978.

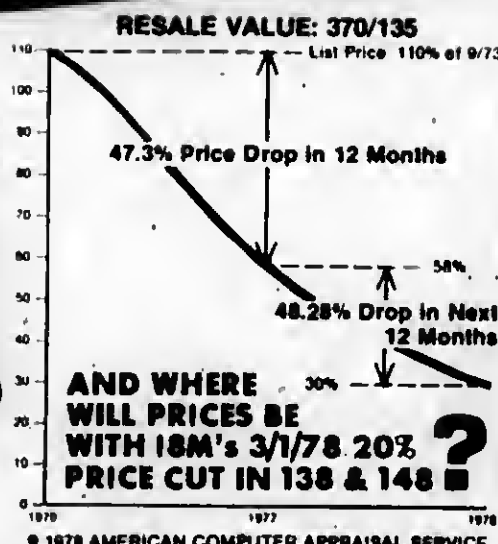
The conference hopes to inform physicians and health care professionals about current and potential applications of computer technology to patient care and to identify areas of future research and development. Suggested topics include nuclear medicine, medical imaging, multiphasic testing, history-taking by computer, medical systems architecture and privacy and security of patient information.

Send three copies of an abstract outlining a 20-minute presentation by April 24 to F. Helmuth Orthner, Ph.D., Department of Clinical Engineering, School of Medicine and Health Sciences, 2300 K St. N.W., George Washington University, Washington, D.C. 20037.

PREVENT YOUR NEXT IBM 370 \$100,000 MISTAKE!!!

IBM 115-125-138
148-155-165
135-145
158-168

**CPU's • MEMORY • DISKS
I/O • TERMINALS
TAPES • SYSTEMS**



The Market in IBM 370 Equipment can swing in just a few days, resulting in fluctuations of over \$100,000. Therefore, the Economics of Buying, Selling, and Leasing IBM 370's require a highly specialized skill. We've been helping IBM users stretch their DP budgets for over 10 years.

SEND FOR OUR FREE 370/360 PRICE CHARTS

AMERICAN USED COMPUTER • 617-261-1100

P.O. BOX 68, KENMORE STATION, BOSTON, MASSACHUSETTS 02215

DP Control Project Gets Print Into Braille Faster

By Marguerite Zientara
CW Staff

SYRACUSE, N.Y. — The computer can now help the blind to read and may soon help some people with lesser visual problems to see, thanks to work done by Syracuse University's John Biegel, professor of industrial engineering and operations research.

Biegel, while guiding students in design projects, has developed a system for translating information into braille for the blind and is experimenting with a computerized contact lens-grinding system.

"The problem in braille is one of physical size," Biegel noted. "Each braille character takes up six times the space of an English letter. Typing manually with a standard braille typ-

ing machine, it takes two hands to type a single character. It is a very slow process, it takes up a lot of space and it's very slow to read," he said.

In Biegel's system, a Teletype Corp. ASR 33 allows input to a Digital Equipment Corp. PDP-8 minicomputer with an editor in the memory. The English text is edited as it's being input and the computer outputs a paper tape coded for use with a PDP-14, a machine controller. The controller is connected to a manual braille writer that has been modified so the keys are operated with solenoids.

Writing Time Cut

The computerized system reduces the braille writing time by a factor of three or four, Biegel estimated. Although he

believes other similar systems exist, he thinks his may be unique in its use of the editor as an in-between process.

"If you make an error in braille, usually you have to start a page over," Biegel said. "You can't erase. With the editor, however, all the corrections are made before the typing begins."

Biegel's work so far has been in Grade 1 braille — a one-for-one translation from the English text. Grade 2 braille, which has a lot of contractions and cuts down the total amount of writing to 50% to 60%, is now occupying one of Biegel's students' time.

"For this project we have to put together a dictionary. When a word is input into the computer, it will have to check with the dictionary to see if it can be contracted," he said.

"The problem is that there isn't much being done in braille," Biegel explained. "If you can even get a braille text, chances are it will be six to eight years old."

"Blind people generally do not have the funds necessary to realize this sort of project," Biegel noted. He said he hasn't received any funds to support his work, which took about a year to complete, but that they may be available through charitable organizations.

With variations on his system, Biegel thinks, the same thing could be done less expensively.

Lens Grinding Project

A second project on which Biegel has been gradually working for the last four years is that of computer-controlled contact lens grinding. "The reason a lot of people don't wear contact lenses is that with the present manner of making them, they will fit only near-sighted and far-sighted people," Biegel said.

"People with astigmatism, for example, cannot wear them. The computerized process would enable such people to wear contacts," he said.

Biegel uses the same principle of computer control in this process, except that the computer is an MMD 1 microcomputer from E&L Instruments of Derby, Conn. The micro controls a lathe.

To measure the eye, one takes a negative of the eye using a focal plane arrangement. The distance between a pair of concentric rings will give the distance of the eye below the focal plane at that point, according to Biegel.

That information is read into the computer, which then translates it into input for the lathe to grind the exact contour of the eye on the inside of the lens. In order to make lenses for people with astigmatism, for example, the inside of the lens must fit the contour of the eye.

At the present time, Biegel has not been able to produce any lenses which are optically correct. "The problem is getting a very fine surface finish that doesn't require additional polishing. When you polish the lens, you polish off the contours you put in it," he said.

Biegel is hopeful for the success of the process: "It's just a matter of time."

OPM

Leasing Services, Inc.

Invites you to its

Annual Computer Leasing Workshops For Computer Users

April 3, 1978 — Los Angeles
April 5, 1978 — San Francisco

"An Understanding of
Today's Computer Leasing Complexities
plus a
Look At Tomorrow's Opportunities."

Hosted By:

Mordecai Weissman President
Myron S. Goodman Exec. V.P.

Future workshops to be held in....
Chicago — April 12 Houston — April 13 New York — April 19

R.S.V.P. Ms. Ofelia Loret de Mola 1-800-221-2674
1-212-747-0220

OPM Leasing Services, Inc.
71 Broadway
New York, N.Y. 10006

INTERNAL REVENUE

problems got you down? If your taxes aren't finished why not let your computer do it for you. Volume VIII has just been released! It contains a SUPER 1040 Tax program that fills out Schedule A and handles inputs from supplemental schedules B, C, D and F. It has all the new tax revisions in it and is complete and ready to run. In addition there are a number of other programs included on: interests, mortgages, installments and more. Volume VIII is only \$19.95 plus \$1.50 for UPS delivery. Hard to believe?? Our Volume VI which contains our Mini-Ledger is only \$49.95 and Volume VII which contains our powerful Word Processor and other programs is only \$39.95. Bankcards and COD orders call 800-327-8543. For information only call 305-361-1153. Mail orders please remit to:

SCIENTIFIC RESEARCH
220-W Knollwood
Key Biscayne, FL 33149

Urges Unified Approach

Eger Warns Privacy Laws Blocking Data Flow

By Ronald A. Frank
CW Staff

LAS VEGAS — Laws being enacted in various countries to ensure the privacy of data are blocking the free flow of information throughout the world, according to John M. Eger, attorney and consultant.

Unless some unified approach is taken to the transborder data problem, each country will enact its own set of restrictions. Taken together, these laws will form an "information curtain," rigidly blocking the transnational flow of information throughout the world, Eger said at the recent Interface 78 conference here.

Nineteen countries now have data protection laws on the books or in the making, he noted; others have laws in force or under consideration to protect sovereignty, sensitive data and privacy.

The net effect that many countries see from the free exchange of information is electronic colonization or electronic imperialism. This viewpoint is prevalent in the Third World countries, which see information endangering traditional national roles, Eger indicated.

The industrial nations see these laws as a form of protectionism to prevent U.S. dominance, he said.

Canadian Control

Agreeing that the trend is toward control, Frank Main, a member of the Canadian Parliament and secretary to the minister of state for science and technology, said the Canadian government probably will have to regulate some aspects of transborder data flow because "there are too many forces at play to allow ourselves the luxury of zero regulation."

While Main could not predict exactly

what laws will be proposed, he said they would be designed to protect the interests of Canadians while at the same time being compatible with the interests of other nations.

By 1985, Canadian users will be importing \$1.5 billion worth of data processing services each year; as much as 80% of this total will be the result of parent-to-subsidiary transactions across the U.S.-Canadian border, Main predicted.

One of the key questions being studied in Canada, according to Main, is whether it is necessary to require laws that make it mandatory for the records of Canadian companies to be kept in Canada. An alternative might be a se-

ries of international data extradition treaties.

If Canada establishes a need to require domestic storage of corporate data, then there is a question of whether it would be possible to resist pressures for similar action with respect to personal data, Main said.

European Controls

Louis Pouzin, director of communications projects at Iria, the French research institute, said European controls against an influx of U.S. data will be implemented by the national postal, telephone and telegraph (PTT) authorities, implementing high international tariffs. These tariffs will inhibit the ex-

pansion of U.S. networks into Europe and encourage the installation of DP centers in Europe.

The PTTs understand DP and communications cannot be sold separately and are therefore considering ways to set up national DP service bureaus. These may well be expanded into national networks, Pouzin believes.

American firms will be in a better position to expand their international networks if they create national subsidiaries jointly with European firms, he said.

Tariff barriers will prove to be more effective to prevent data exchange than laws which seek to control it, he said.

USER DOCUMENTATION...

You know you need it. But do you know what it is?

Announcing a one-day workshop on the business impact of user documentation in three practical segments:

☐ **Documentation Needs Analysis**...user support during marketing, installation, conversion, training and system use varies depending on your system, your corporate objectives and your user's environment. We'll show you how to reconcile these variables.

☐ **Documentation Planning**...based on thorough needs analysis, a formal plan involves cataloging and outlining information units, identifying sources, assigning responsibilities and budgeting. We'll work through a sample plan together.

☐ **Executing the Plan**...good documentation is organized by user function; clearly presented; written in friendly, concise language; illustrated with meaningful graphics; and attractively packaged in durable, maintainable media. We'll show you how that's done.

supported by exemplary handout material. So, you'll leave the workshop with a headful of ideas and a packet of useful tools to help you put your documentation back to work — educating, informing and selling your users.

Who's Behind The Workshop? Unlike academic workshops, this one is based on business experience, not theory.

The workshop is designed and presented by Progressive Communications, Inc. (PCI), a national leader in documentation consulting. Because we specialize in user documentation, we're confident your organization — and your users — will benefit from our experience. Our clients include such systems giants as Citibank, Hewlett-Packard, IT&T, and Western Union Teleprocessing, plus many software and applications companies throughout the U.S.

Our services include user reference/training packages, corporate documentation standards, system marketing programs and software documentation. Our management and staff has packed over 50 years of collective documentation consulting experience into a one-day program that converts the business problems of user documentation into bottom-line benefits. Lorry Gress, president of PCI, will personally conduct the workshops, sharing our experience with your firm.

Who Should Attend?

Your documentation is the hardcopy representative of your systems. Shouldn't you do all you can to make it perform at least as well as your systems? Of course. If you represent one of these areas, this workshop will show you how:

- ☐ Design/development
- ☐ Installation/training/service
- ☐ Documentation/publications
- ☐ Marketing/sales

What Does It Cost?

Individual enrollment fee **\$185**
Multiple enrollments from same firm **\$160 each**

Amount includes workshop fee, lunch and refreshments. All applications must be accompanied by a check for the full amount and postmarked by March 30. You'll receive a written confirmation/receipt prior to the workshop.

Enroll Early, Space Is Limited

Because space is limited, applications will be processed on a first-come, first-served basis. Fill out the application blank now and mail it with a check to the address below. And if you can't attend, send someone else. It's the first step in converting your documentation problems into benefits — for you and your users.

Where and When Can I Attend?

We're bringing our experience to you in these cities:

Atlanta, Georgia World Congress Center, April 18
Baltimore/Washington, D.C., Northwest Sheraton Inn, April 20
Philadelphia, Philadelphia Marriott, April 24
New York, Marriott Essex House, April 26
Boston, Boston Park Plaza, April 28

Also watch for our May workshops in Dallas, Houston, Los Angeles and San Francisco, and our June workshops in Denver, Chicago and Minneapolis.



**PROGRESSIVE
COMMUNICATIONS
INCORPORATED**

The Alamo/310
128 South Tejon Street
Colorado Springs, Colorado 80903
303/471-9874

My firm needs your workshop. Please reserve _____ seats in the

_____ workshop to be held on April _____
(city)

My check is enclosed for \$_____.

Registrants (name and title)

Company name and address



Editorial

New Tack for IBM?

The possibility of IBM entering the retail electronics marketplace — and more particularly the computer store arena [CW, March 13] — raises some interesting points.

The early days of computer stores — just a few years ago — saw these enterprises spring up largely to serve the computer hobbyist, much like early radio stores catered to the amateur radio fan.

However, the computer store market has been changing quickly.

Portia Isaacson, founder of the Micro Store and one of the most ardent advocates of personal computing, noted recently that the store that caters to small business and industrial applications has the

greatest potential for growth [CW, Feb. 27].

It is apparently this tack that IBM will pursue with its expanded concept of demonstration centers for its line of small business computers systems, presently limited to the 5100 series, but sure to grow.

More and more computer stores promise to become "small systems house(s) in disguise as retail outlet(s)" — to quote Isaacson once again. And it appears the giant of the medium and large computer market is poised to react quickly to this growing phenomenon. With \$4 billion in cash and marketable securities in the vaults, IBM could certainly be a formidable competitor.



The Lengthening Shadow

What Users Are Betting On

The recent Interface 78 show in Las Vegas reminded industry veterans of the old Fall Joint Computer Conference held in the same city.

Most vendors introduced something new and there was talk of an even larger show next year. Some sessions were held in rooms that handled about 200 persons, and attendees spilled into the halls.

The upbeat mood of the conference was evidence of the increased importance being attached to communications by the average company.

Archie McGill of AT&T predicted that in the 1980s, corporate telecommunications will be restructured along applications lines integrating the various disciplines such as voice and data that are now separate within different management staffs. Few disagreed.

Many users at the show said they were on the threshold of configuring networks with expanded facilities and more sophisticated equipment. The constantly changing technology and service offerings in the communications area made it mandatory for them to keep abreast of latest developments by attending shows like Interface, these users said.

There were those who had predicted that Las Vegas would not be the best place to hold a show. But attendees trying to fight their way into overcrowded sessions had a hard time believing that fellow managers were in the hotel casinos instead of at technical sessions.

Distributed DP, telecommunications and other related disciplines are merging more rapidly than anyone realizes and users are eager to learn about the alternatives.

Data Past

Five Years Ago March 21, 1973

WHITE PLAINS, N.Y. — IBM unveiled the long-expected 370/115 as an entry-level machine — to the virtual memory 370 series — for users of IBM System/3s and smaller 360 models.

WASHINGTON, D.C. — The General Accounting Office (GAO) said in a report that Congress should not appropriate further funds for the FBI's Computerized Criminal History system until "the FBI and Law Enforcement Assistance Administration implement a program for improving the reporting of arrests and dispositions by law enforcement agencies, courts and correctional institutions."

Eight Years Ago March 25, 1970

NEW YORK — RCA Corp. announced the first full commercial lease/purchase program for computer systems. Under the plan, a user who signed a special six-year contract would receive a 15% reduction from the normal lease rates and own the computer at the end of six years.

LOS ANGELES — The economic situation had grown so serious here that programmers "walked the streets," according to statements from employment agencies. DP managers reported trying to hold on to their best programmers in hopes that things would improve, but many had their doubts.

Letters to the Editor

How About Others' Rights?

John M. Eger's comments regarding the national interests of the U.S. are equally applicable to the national interests of other countries such as Canada ["Transnational Data Flow: The Need for Action," CW, Feb. 13].

With all the adverse publicity over the past few years, does any reader of Computerworld believe in the accuracy of information in criminal record files or credit agency files? Politicians in the U.S. have demonstrated they are quite willing to subpoena and disclose information from private corporations and government agencies. Is there any attempt to verify the accuracy of information about citizens of other countries?

There are many publicized cases in Canada in which the U.S. State Department has tried to "influence" (or force) Canadian politicians into adopting aspects of U.S. foreign policy that were contrary to Canadian interests — for instance, trade with China. The efforts made have been more successful if they had easy access to personal, credit and "sensitive" information on Canadians.

Computers are used extensively for processing seismic exploratory data in the oil industry. In Calgary, the location of the head offices of most oil companies operating in Canada, per capita spending on DP is one of the highest in the world. The subsidiaries of two U.S.-controlled oil companies had justified the installation of expanded computer centers for seismic processing. On orders from the "U.S. head offices," the plans were abandoned and seismic processing was performed in the U.S.

The data transmission costs alone were more than the costs of the planned increased computer facilities for Calgary.

ties for Calgary.

Recently one of these companies announced a major new Canadian discovery. How long has it had the data in Houston?

For at least these companies, more is known in the U.S. about potential Canadian oil and gas reservoirs than is known in Canada. This situation only aids the socialists that demand that Canada nationalize the "foreign"-controlled oil industry.

Canadians are just as concerned as Americans about rights, privacy, profits and jobs. We do not share Eger's views that these should be exported to the U.S. Canadians are not interested in supporting any policies that would "cripple our economy" and that would cause a "severe recession with massive unemployment."

I hope most of your readers do not share Eger's opinions.

Kenneth D. Jones

Calgary, Alberta

Constructive Criticism

I wish to thank you for all the positive action "Late Software Delivery Hurts B80 User" [CW, Feb. 27] has generated. I first heard of the article directly from Burroughs Corp. and it seems to have hit a "sore" spot, which I hope will benefit other B80 users in distress.

I have also received several calls from other B80 users in various states and they are equally disappointed in Burroughs' software schedule. Certainly, Burroughs should view this as "constructive criticism" from the many loyal B80 users like myself.

Thanks again for a job well done.
Hector Villarreal
Comptroller

M.W. Fruit Co.
Pharr, Texas.

(Other letters on Page 24.)

And Hold the Jargon When You Brief Your Boss, Do It Briefly

By Jack Stone
Special to CW

Certainly one of the most frustrating aspects of the typical DP manager's job is handling "bad press." I am, of course, referring to the difficulties the manager has in overcoming what seems to be unending communications problems between DP and the rest of the organization — the internal "public" relations as it were.

In the March 6 column, I talked about excessive use of jargon by DPs as a most successful tool for losing friends and alienating people. This week, I'd like to discuss my approach to a particular but very significant problem that DP managers and analysts have in relating to the top (non-DP) executive.

The situation came to mind some months back when I received a call from an analyst friend of mine. He said he was in the process of making an executive presentation regarding a system study and asked if I might review the briefing materials.

The purpose of the presentation was to deliver the results of the study of an existing system and to recommend improvements. His documentation was nothing short of brilliant. All of the data flows were diagrammed in excruciating detail. The procedures and processes were carefully narrated — page after page.

There was but a single, alas tragic, flaw to it all. Except for the statement of objective, it was, in my

judgment, completely incomprehensible to an executive. With respect to meeting the primary objective of the presentation — namely, getting a go-ahead to implement system changes — the documentation was a disaster.

Presenting Study Results

Let me relate here what I told him, my personal approach to packaging study results for executive decision-making. As you read, you may object to my insistence on stringent length restrictions, claiming they are too arbitrary and superficial. But my experience in training and dealing with top executives tells me that when it comes to managing the DP function, an executive's interest wanes at roughly the fourth power of the time he has to spend on the subject. In other words, brevity is the keynote!

• First, the structure of the first section — "Summary." We begin with a problem statement, — three sentences at most. The current system is not meeting processing requirements in some ways or other, for some reasons or other. Don't use numbers here, just general terms expressed in proper English.

Then write a "statement of objective(s)" for the study that resulted in this document — the extent of the plan and the main deficiencies. Three sentences here.

Next should come a capsule of the "study results," a non-numeric general rendition of the findings — an-

other three sentences.

Finally, the "payoff." This is one sentence long and states what is expected of the new system, in terms of simple numbers, as related to vital business issues.

If you are concerned that you are sticking your neck out too far on the

The Human Connection

payoff matter, then add a "caveat" clause. For example, "Assuming that no new major systems development projects are started in the next three months, it is expected with this system that base profitability to the corporation should be increased by X% during the fiscal year beginning in July."

• The second section, "Introduction," is an expansion of the material contained in the first section, but is structured to provide a somewhat different perspective for the reader. For example, the subsections could be labeled "background," "scope," "recommendations," and "projected benefits." The additional detail would allow for some quantitative information, but no charts, or graphs.

And above all, don't put in a detailed discussion of how system improvements would be implemented. Keep it all on the func-

tional capabilities level. Limit the writing to three single-spaced typewritten pages.

• The third section, "Current System," has two parts: "system description" and "major deficiencies." The description consists of exactly two pages, one for narrative data flow and one for an illustrative diagram of the flow.

Do not use the conventional flow-chart symbols in the diagram. Instead, use figures representative of the physical boxes familiar to the executive. And don't connect the boxes with straight lines; get someone on the staff with an artistic bent to draw some interesting arrows or lightning bolts. It really makes a difference with this audience.

The "major deficiencies" part should describe the key inadequacies of the current system. Limit this to one page.

• The fourth section, "Future System," has "system description" and "major advantages" subsections that parallel the previous section. The "advantages" narrative should be a point-by-point answer to the deficiencies of the current system.

Finally, package all the technical detail in an awesome black binder, bring it to the meeting, point to it once or twice during the session, but never, never show it to the executive — he'll develop a glassy-eyed stare.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

In Federal 'Upgrade' Project

Prompting Works With Sifted Data Bases

Acronyms are often misleading — but the acronym Upgrade, for User-Prompted Graphic Data Evaluation, is not only accurate, it actually understates the real importance of the technical methodology being used by the President's Council On Environmental Quality (CEQ).

The problem CEQ was trying to attack when it started the Upgrade project some four years ago was that while there was a lot of data around in different data bases — such as those in the Geological Survey, National Institutes of Health and the Environmental Protection Agency — the contents of each of the data bases were structured differently, and more important, had different meanings because of the different collection and validation methods used.

Yet, the data from one base was often needed to make comparisons with data from the bases of other disciplines — for instance, studying the effect of clean air on the incidence of illnesses.

The approach taken was to set up a screened data base, containing data from the various bases that was compatible insofar as it was usable for various statistical examinations. The yield of compatible data may be considered shockingly low — it was around 5% — but I don't think this is surprising at the current state of the art.

Prompted Input

The input methods of Upgrade were a major source of concern and special treatment. It was appreciated that users would be primarily concerned with tracing and solving special problems, such as the causes for the high incidence of cancer in New Jersey. They would not have prior knowledge of computers or of Upgrade.

So in effect, they had to be trained on the job. The method selected for providing this training was to let the user prompt the action, working from menus of available actions, with "help" functions available to explain the various facilities and how to call them in.

Upgrade even confirms the user's instructions before acting on them.

Output is also under user control, again using menu selection techniques. Various graphics are emphasized on the menus to help users focus on the relationships be-

ing displayed.

One of the best features is the multiple processing capability. There are some regression and other facilities built in, but the system also performs interfacing work that can make facilities on other computers or other computer networks (such as Telenet) available.

Currently, there are no interfaces to Arpanet, which seems curious in the light of the obvious advantage and availability of such an interface, but the system design — which is the interesting thing from the professional point of view — allows for them.

Operational Results

The Upgrade system has already shown itself to be semitransportable. New Jersey is using a terminal system to trace the cancer situation, concentrating on the industrial use of various chemicals. In New Jersey there were 14,000 cancer deaths in 1976 — and a new law. The Cancer Registry Law in combination with the 1977 Toxic Substance Control Act are producing astonishing data about substances state officials had previously considered innocuous.

The data is being plugged in and used in conjunction with the CEQ data bank and Upgrade facilities. While nothing has been definitely confirmed, the state people are

very excited about progress.

Cost may well be one of the items that is most exciting. For the evening discount cost of \$8.80 on CEQ's IBM 370/168, using a 500K region, I took a look at various basic data for the counties of Massachusetts. I did a few analyses, came up with some surprising figures and documented a possible line of investigation with graphs and statistical work. This took about an hour, starting from scratch (and Upgrade). That is certainly going to be worthwhile.

System Development

Development of the system for the CEQ has been in the hands of Sigma Data Computing Corp. of Rockville, Md., and the system is being written so as to be transportable both to other hardware and to other application areas. The costs have not been excessive and everything seems to have been done with state-of-the-art hardware and software. I think this approach of a screened data base, with user-centered input and output and interfacing processing capabilities is the most effective use of money for any data base system I have seen.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

The
Taylor
Report
By
Alan
Taylor
CDP

What Would Grosch Say About Third Survivor?

One of the most enjoyable features of *Computerworld* used to be the outrageous predictions by Herb Grosch on the future of the computer industry. There were many amusing variations of his analogy comparing IBM and its competitors to Snow White and the Seven Dwarfs. But futurology in those days seems simple by comparison with would-be predictions made today.

One, having some credibility, was recounted recently in a *UK Financial Times* survey of the computer industry: it is simply that by the mid-1980s, only three corporations will survive: IBM, a Japanese combine and one other. The interest is in predicting the one other.

On the basis that by the mid-80s

information processing will be an amalgam of DP and communications, it would be a brave futurologist indeed who will forecast which consortium of mainframe vendors, mini and micro vendors and even communications companies will make the running. Do you think we could put the question to Herb Grosch?

H.P. Thornhill

London, England

Annoyed at Starkman

A response to Barry Starkman ["Any Advice for DP Grad?" *CW*, Feb. 13]:

I am annoyed that you have found that there are no entry-level jobs in

data processing. For the last six years at the University of Wisconsin-Platteville, we have placed 100% of our computer science students who seek programming positions. The answers to your questions, based on our graduates are:

1. Beginners are not more likely to find jobs than experienced programmers.

2. No particular area would be best, but you should plan on relocating.

3. A quality university will usually find its graduates are in demand.

4. While it is interesting to consider how most programmers get their first jobs, perhaps you should review your experiences and abilities.

Letters to the Editor

5. Look hard.

6. The total academic history is usually of most importance.

7. Computer science programs may range in the preparation they provide for DP positions from excellent down to almost worthless.

8. A B.S. in computer science from a university with an established record for producing good entry-level programmers will normally produce the widest employment opportunities. Play it safe.

9. If nothing else works, try writing an article about your problem in *Computerworld*, but don't mention your university.

Dr. Leonard Myers, Chairman
Computer Science Department
University of Wisconsin
Platteville, Wis.

Ignored Honest Firms

It is imperative that I respond to Alan Taylor's column of Feb. 27 ["Readers Document DP-Controlled Rip-Offs"]. Taylor made general, sweeping accusations about the search and placement business. Although he did make some valid comments, he chose to ignore those search and placement firms that maintain the highest standards of integrity and confidentiality. Readers have probably encountered experiences with both types of firms.

At last count, there were approximately 800 "management consultant search and placement" firms in Massachusetts. These firms run the gamut: there are the search divisions of the big eight accounting firms, and then there are individuals operating from corner telephone booths. Yet, it is the individual applicant who selects which consulting firm will present him to the computer world.

Quite honestly, I am amazed at the casual attitude applicants take during this critical decision-making process.

We all realize that the computer industry is currently the most rapidly growing segment of the New England community. The lack of qualified personnel to satisfy growing needs has created an atmosphere ripe for the opportunist.

If an individual were going to seek legal or tax counsel, he would be very demanding of the professional in whom he was placing his confidence. Why then should one be less demanding of the professional who is planning his career pattern?

I sincerely hope Taylor will explore and consider the firms of which I speak.

Joe Vito
President

Multi Processing, Inc.
Lexington, Mass.

Like a Ticking Bomb

The federal court decision reported in the short article "Banks Barred From Providing DP Services" [*CW*, Jan. 30] seems like a ticking bomb about to explode. The legal precedent could generate the subsequent divestiture of financial institutions' DP services as a form of "unfair competition" with independent computer service bureaus.

The subject presents some interesting possibilities.

James S. Moyer
Westminster, Calif.

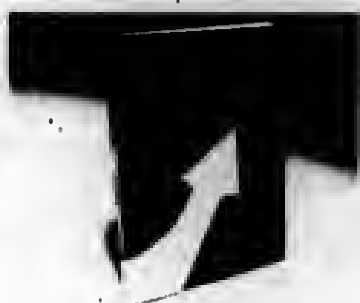
"ANSWERS"

THAT'S ALL WE PUBLISH



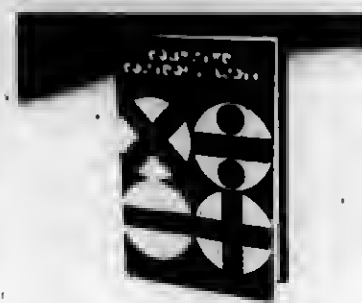
1. DATA BASE SYSTEMS: A PRACTICAL REFERENCE

Ian R. Palmer
From *Datamation* — "a must for all interested in maintaining a state of the art knowledge". Includes data base concepts, functions and facilities of data base systems, approaches to software, installing a data base system, and likely directions. 320 pp.; (\$29.50 prepaid) \$34.50



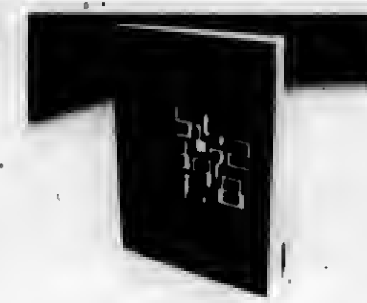
2. A GUIDE TO EDP PERFORMANCE MGMT.

David P. Norton and Kenneth G. Rau
Provides answers about management control, resource utilization, results measurement, and user satisfaction. Includes practical application of measurement methodology and control to your organization. 310 pp.; (\$24.50 prepaid) \$28.50



3. COMPUTER CONTROL & AUDIT

William C. Mair, Donald R. Wood and Keagle W. Davis
Provides tools and techniques for control and audit of computer based systems and their operation, plus advanced topics (on-line systems, data base, and mini-computers). New 1978 edition. 512 pp.; (\$25.50 prepaid) \$29.50



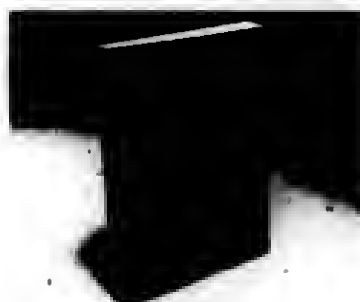
4. DATA BASE MANAGEMENT SYSTEMS

New 1978 Edition
Leo J. Cohen
From *Datamation* — "A standout... I strongly recommend this..."
From *Computerworld* — "the magnum opus of data base"
Answers questions about data base systems, evaluation and selection; contains details on IMS/VS, TOTAL, System 2000, IDMS, DATACOM/DB and ADABAS. 370 pp.; (\$42.00 prepaid) \$48.00



5. THE DATA CENTER DISASTER CONSULTANT

Kenniston W. Lord, Jr.
Defines a total security plan for your installation. Identifies vulnerabilities, how to audit the physical installation and develop a recovery plan. Contains a checklist of more than 500 questions, a sample Disaster Recovery Plan and a sample Security Audit Report. (\$22.50 prepaid) \$25.00



7. DATA DICTIONARY SYSTEMS

Henry C. Lefkowitz
From *Datamation* — "... a masterful job... this book is a must..."
From *EDP ANALYZER* — "... obtain and read Lefkowitz' book..."
The only detailed report on data dictionaries. Answers what they are, what they do, and describes and compares LEXICON, CINCOM DATA DICTIONARY, IBM's DB/DC, DATA MANAGER, DATA CATALOGUE AND UCCTEN. 504 pp.; (\$75.00 prepaid) \$85.00

Send order form with check or P.O. to:
Q.E.D. Information Sciences, Inc., Box 181, Wellesley, MA 02181

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

Circle Book Nos. desired and fill in price

1. DATA BASE SYSTEMS	\$ _____
2. GUIDE TO EDP PERF. MGMT.	\$ _____
3. COMP. CONTROL & AUDIT	\$ _____
4. DATA BASE MGMT. SYSTEMS	\$ _____
5. D.C. DISASTER CONSULTANT	\$ _____
6. INTELLIGENT TERMINALS	\$ _____
7. DATA DICTIONARY SYSTEMS	\$ _____
8. DATA BASE MONO SERIES (All 6)	\$ _____
MONO. SERIES SEPARATELY	
Circle Nos. Desired 1, 2, 3, 4, 5, 6	\$ _____
SUB TOTAL	\$ _____
POSTAGE / HANDLING	\$ 1.50
TOTAL DUE	\$ _____

Send check and save

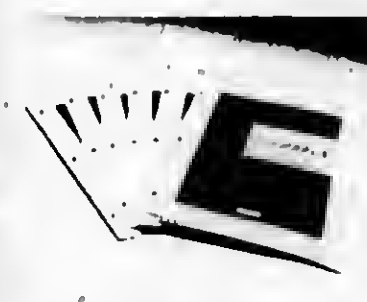
Q.E.D. Information Sciences, Inc.
P.O. Box 181, Wellesley, MA 02181 • (617) 237-5656

CW3



6. INTELLIGENT TERMINALS:

Functions, Specifications and Applications
George B. Bernstein and Arnold S. Kashar
The age of the intelligent terminal is here. This book is an all-encompassing guide to terminals and terminal systems. Covers: functions • components • communications • software • reliability • application • selection • alternatives • the future. 260 pp.; (\$24.50 prepaid) \$28.50



8. THE DATA BASE MONOGRAPH SERIES

Special reports written by industry experts. The series editor is Robert M. Curlice of Arthur D. Little, Inc. The subjects are covered in great detail: #1 — Access Mechanisms & Data Structure • #2 — Planning for Data Base Systems • #3 — Data Base Design Methodology • #4 — Data Base and Computer Systems Security • #5 — An Assessment of Current DB Trends • #6 — The Entity-Relationship Approach to Logical Data Base Design. (\$12.50 prepaid) \$15.00 each Save — (\$55.00 prepaid) All Six \$65.00

Vendors Plan to Support Users

One Universal DBMS Standard Not Probable

By Eugene I. Lowenthal
Special to CW

L.E. Towner's view of data base management system [DBMS] standardization was naive ["Non-Codasyl DBMS a Bad Choice for Users," CW, Feb. 6]. He asserted that, given a Codasyl standard, "the non-Codasyl DBMS vendor will be forced to upgrade his system" and that if the user "thinks the vendor will continue to enhance and maintain what it considers an obsolete version, he had better think again."

These statements were presumptuous, have no basis in experience and totally ignored the realities of business relationships between suppliers and their customers. Consider the number of programs that have been written using current data manipulation languages, the number of data bases that have been created, the number of programmers and end users who have been trained to use the packages that have been around for five or more years.

The cost of conversion to a new DBMS would clearly be enormous. It has been MRI Systems Corp.'s long-standing policy to protect that investment by perpetuating the various languages and by providing "bridges" between system upgrades. The company is engaged in intensive future product planning.

We have also considered several strategies with respect to the potential of standardization. In every case the plan calls for continued long-term support of the languages on which our customers have come to depend.

If MRI were motivated to develop and market a Codasyl-compatible DBMS, this would not be inconsistent with a policy of enhancing and maintaining our current product. Indeed, if it came down to that, it

would not be technically difficult to produce a DBMS that supports both styles of user interface.

Although I cannot speak for other vendors, it appears likely they would have a similar outlook. None of us is interested in incurring the wrath of the installed customer base.

Multiple Standards Likely

The Codasyl Data Base Task Group delivered its report in April 1971. In the seven years that have since passed, the proposal has not achieved the status of a standard — despite the number of Codasyl-oriented commercial packages and

despite the regularly published predictions that adoption of a Codasyl standard is inevitable.

Reader Commentary

Some fault the industry, particularly IBM, for not blessing the concept and actively resisting standardization efforts. Others point to the user's increasing demand for high-level languages and data independence, coupled with the availability of competing data base ap-

proaches that address these needs far better than the proposed Codasyl "navigational" data manipulation language does.

A likely outcome is the evolution of multiple standards, in recognition of different styles of interface that are appropriate for different uses, just as there continues to be a niche for Fortran as well as Cobol.

What is not probable is the widespread adoption of a single, universal standard as envisioned by Towner.

Lowenthal is vice-president of advanced product development of MRI Systems Corp. in Austin, Texas.

The world's best DBMS announces the end of the chain-pointer generation.

**Adabas has broken the chain-pointer barrier.
For the first time in history, an inverted list DBMS is No.1
in both throughput/efficiency and ease of use.**

For years, others have said you could have *either* throughput *or* ease of use. Adabas has always said you can have *both*.

Datapro '77, conducted with *Datamation*, is the latest in a long series of surveys that proves our point. The user community also gave us the highest average rating for all categories. Who could ask for anything more?

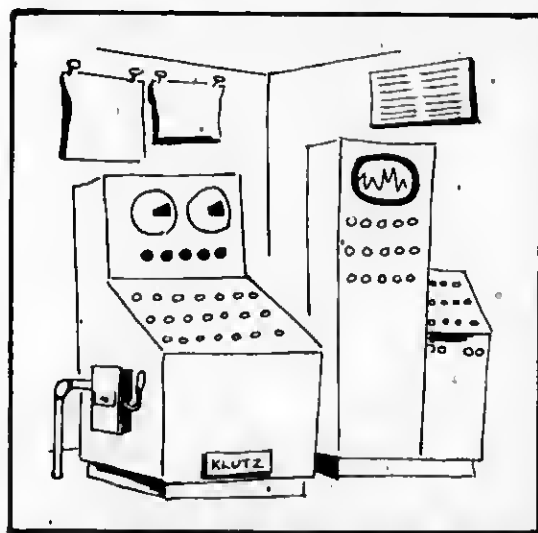
Every day, more people realize that the rigid hierarchical structures of the past are giving way to

the relational approach of tomorrow.

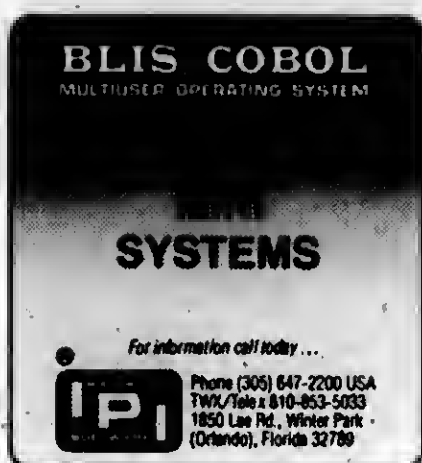
The trend is clear. The future is here. It's Adabas. Combined with Com-pletc, Software ag's teleprocessing system, Adabas is the most powerful DB/DC system available anywhere.

Seeing is believing.

We've just made a lot of claims, and we want to prove them. That's why we'd like to give you a free presentation at your convenience. Simply call us, or return the coupon below.



'I Have a 30M-Byte Random-Access Memory and Now They're Programming Me to Vacuum Rugs.'



software ag
OF NORTH AMERICA, INC.

Reston International Center, 11800 Sunrise Valley Drive
Reston, Virginia 22091. Phone (703) 860-5050

1. ☐ I'd like more information on Adabas.
2. ☐ Please send more information on Com-pletc.
3. ☐ Please call to arrange a free presentation.

Name _____ Company name _____
Street _____ City _____
State _____ Zip _____ Phone _____
Type of computer _____ Operating system _____

Available Worldwide



320

Member SIA Software Industry Association

Datapro Liberating DP From Sturgis' Curse

By Joseph T. Rigo

Special to CW

I love Datapro.

I think its ratings of hardware and software products are just great.

Our company writes user manuals for some of the software vendors whose products are rated in Datapro Research Corp.'s surveys. I love the ratings because they are liberating our business from the curse of Miss Sturgis.

Miss Sturgis was my high school English teacher in Portland, Maine. She was a great person and an extremely effective teacher. She would scream bloody murder, climb onto her desk, make any sort of fool of herself to put an idea across.

My complaint is that she thought English was a natural science. She believed there were laws to be followed, not just conventions.

Miss Sturgis believed people who

Reader Commentary

obeyed the laws would lead long, cultured lives. Those who failed to obey were condemned to spend their days scratching their armpits in public.

She did not preach what she practiced.

To Miss Sturgis, any instructional

technique, within the laws of morality, was valid if it helped to force a concept into a student's head. Writing, however, had to follow all the established rules of formal literature.

She would have no use for a first-class user manual for system software. A good manual contains too many one-sentence paragraphs. It uses technical jargon and employs strange page formats. The writer may appear to know more about computer programming than about Hemingway. The manual does not look like a work of literary art.

For years, however, Miss Sturgis' laws have prevailed in large parts of our industry. Technical writers have been expected to turn out

work that was grammatically perfect. All else was secondary.

The manual had to look good. If it didn't work as a reference aid, the customer could phone a programmer for help.

Now here is Datapro asking computer users to rate the products they buy. Ratings are for overall satisfaction, performance, ease of use, ease of installation, vendor technical support, training and, lo and behold, for quality of documentation.

For the first time, there is an independent tool to evaluate the effectiveness of a writer's work. It is not enough for the manual to be grammatically correct. It must also tell the user how to do a job.

Already Getting Results

The Datapro system is new. It is still being debugged, but it is already influential.

Survey results are beginning to get respect where it counts — in the marketplace. As vendors of documentation, we have found that high Datapro ratings give us a very real competitive edge.

The good thing about the ratings is that they will act to improve documentation across the board. Surely, no one will complain about that.

IBM, for example, typically spends \$60,000 to write a customer programmer's guide and get it ready for the printer. An independent software vendor may spend \$20,000 to document a comparable product.

IBM executives don't like it when Datapro scores their product at 2.5 (out of a possible 4.0) and the independent vendor gets 3.5 for one-third the price. IBM executives don't mind the cost so much, but they are a competitive bunch. We can be sure they will be working to get their scores up, and other vendors will be pushing to keep pace or do better.

At the moment, Datapro is still in the development stage. Many of its ratings are based on a ludicrously small number of responses. Also, I think, non-IBM users tend to be disproportionately compassionate toward their vendors for various reasons.

Still, the system gets better every year. Datapro is clearly doing its best to improve its product.

In the meantime, it is good to know that someone besides Miss Sturgis is keeping score in the documentation field. She never did like my sentence structure.

Rigo is president of Sysdoc, Inc. in New York.



Zero RPM. The Disk that doesn't Spin.

Megastore goes where a disk drive used to go.

More to the point, Megastore keeps going long after a disk drive quits. Without motors, bearings, heads or platters, there's nothing to wear out, burn out or crash. No moving parts.

Megastore is the astonishing new fixed-head disk memory replacement from Ampex that uses reliable cores instead of rotating media. In the long run it saves a lot of money.

Megastore provides increased throughput, increased system availability, increased system uptime and reduced maintenance costs. A vastly better return on investment.

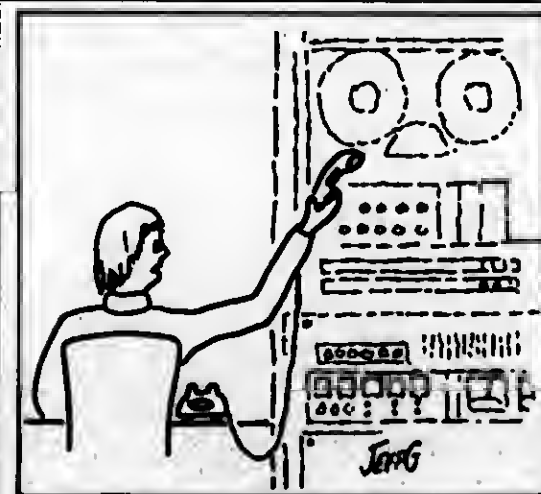
Unplug your disk and plug in Megastore. You'll get a half-million to four million bytes of capacity (in half-megabyte increments) that your existing software can't tell from the disk it was designed for. The only difference you'll see is a major improvement in through-

put, because Megastore has a data access time that's anywhere from 1000 to 3000 times faster than the disk it replaces.

Megastore. Ready now as a software-transparent replacement for Novadisk (Megastore 1223) and DEC's RJS03/RJS04 Disk (Megastore 11). Also available as Megastore 4666 for users who wish to provide their own controller. Other versions on the way. Contact Ampex Memory Products Division, 200 North Nash Street, El Segundo, California 90245. Phone (213) 640-0150. Ask for Megastore. The disk that doesn't spin.

AMPEX

Novadisk is a trademark of Data General Corp.



'It's for You.'

DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals

Thomas Jefferson University Hospital Shapes Applications with DMS/VS



Personnel in the admissions office at Thomas Jefferson University Hospital use an online information system.
IBM's DMS/VS decreases the development cycle and lets users participate in the design.

At Thomas Jefferson University Hospital, Philadelphia, the admissions office reserves and assigns beds, maintains its census of patients and keeps the demographic part of the medical record up-to-date using Display Manage-

ment System/Virtual Storage (DMS/VS).

An IBM program product, DMS/VS converts information from a fill-in-the-blanks form directly into executable programs. It generates and displays user-defined screen formats, processes

terminal transactions, and accesses an existing data base, or one newly defined under DMS/VS. Screen formats can be revised and new ones added quickly and easily, without reprogramming, by making entries on a preprinted form.

"DMS serves both as a powerful programming aid and as a medium for the exchange of ideas and information between the admissions office people and those of us in systems," says Dick Hornick, project manager. "It enables us to allow the user to work directly with us in designing the screens to meet their needs precisely."

"The number of display formats in the system is constantly growing," says Waldren Bailey, director of admissions. "DMS aids in transforming our screen formats and transactions concepts directly into online routines. We have eliminated considerable data redundancy, our records are more accurate and complete, and we are achieving much better scheduling and operational control. Patient data, bed assignments and bed availability information are easily accessible."

Patient Management Support

"Our management plans call for extensive use of data base and data communications in our System/370, and admissions was the logical place to begin — where information on patients is initially collected," says Byron Irwin, associate director. "The medical and patient-oriented approach to the design of our systems demands heavy user participation in the design and a high degree of productivity in its development."

"The university's management services department is called upon to develop systems tailored to our needs and objectives," Irwin notes. "I wanted to monitor and participate in every step and I had that opportunity."

Con Edison Puts 3 Million Subscriber Accounts Online

The Consolidated Edison Company supplies gas and electricity to nearly 3 million retail customers in New York City and Westchester County, where dense population, old buildings, diverse cultures and a population accustomed to frequent moving present a unique challenge to a service-oriented public utility.

Thousands of customers phone or visit the company each day, for a wide variety of transactions, such as making payments, transferring accounts to new addresses, or to ask for help in interpreting bills. To respond promptly to each requirement, a customer service representative must have access to a great deal of information, such as the payment history of the account, the date of the last meter reading, and details of the building and its energy usage.

Now the representative can retrieve, in seconds, all such information about any subscriber from the IBM 3350 Direct Access Storage Facility, by keying account number or address into a display station. All told, the system responds to 80,000 inquiries or transactions during a typical hour, and 115,000 during peak hours.

To obtain the details needed, the in-

terviewer follows simple keyboard procedures. These are interpreted by the Customer Information Control System/Virtual Storage (CICS/VS) in Con Edison's dual System/370 Model 168's.

Says Joseph B. Sansone, vice president for data processing: "The service representative, whether in a district office, dealing directly with the customer across his desk, or in a telephone office, can make decisions and enter transactions immediately through a desktop terminal. The representative sees and immediately corrects any error, old or new. This responsiveness has given a tremendous boost to customer satisfaction and employee morale."

"We use the Multiple Virtual Storage (MVS) operating system to couple loosely two 168's, which share the transaction load. Together they support over 1,900 3277 Display Stations, and readily handle our peak traffic loads. The online system imposes stringent requirements for error recovery and availability, which have been more than met under MVS. And the 3350 has been a cost-effective alternative for storing the details of our 3 million subscriber accounts."



Con Edison service representatives call up details of customer accounts through desktop terminals.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM
DATA PROCESSING DIVISION

Must DP Shops Squash DPer's Individuality?

By Miles Benson

Special to CW

Computing folk are often rugged individualists. They're proud of their profession, proud of their abilities and especially proud of their uniqueness.

That's what made Dow Ward and Dick Reid unusual. They came as a pair. If you hired one, you hired them both. It had been that way since college days.

Until they hit the world of Beancounter, Frankincense and Myrrh. As an old, established stock brokerage house, BFM had a bunch of old,

established rules. And the Ward/-Reid combo just didn't fit with those rules. But that's a little ahead of the story.

I love the word "synergism." Take the time to look it up now, if you don't already know it. It's a cool word to throw around at cocktail parties and computing bull sessions and reports to management.

Dow and Dick were synergism personified. What Dow did least well, Dick handled in spades. And at what Dick wouldn't touch, Dow was expert. Between the two of them, they were quite a crew.

Dick was the salesman of the pair. He could sell a profit analysis program to a nonprofit corporation or a Quadranova Maxicomputer to a

corner grocery. What he knew about people would fill a bubble memory.

Dow, on the other hand, was the bashful programmer extraordinaire. His structured and modular prose possessed poetic beauty. His documentation would have won a Pulitzer. And his programs ran so efficiently they flashed like meteors through central memory.

But sell? Dow couldn't sell RPG to a report generator shop.

Delightful Notion

Together, however, they were wonderful. Dick went out and scouted up customers, and Dow satisfied their technical requirements. "Want a Mark III Frammis

system?" Dick would ask a potential customer. "Here's an improved and generalized Mark III Frammis," Dow would respond after a minimal person-month lapse.

In fact, it was Mark III Frammises and XL Thingamabob applications that had put the two of them through P.Q. Aresti U. Dick majored in Business Ad, Dow was a Computer Scientist, and they had lived and breathed their chosen fields both within and without the classroom.

Working together in college had succeeded so well they decided to keep a good thing going and job hunt as a team. And personnel people in general were delighted with the notion. Hiring two people together was like a two-for-the-price-of-one sale, and Beancounter, Frankincense and Myrrh snapped them up on that basis.

Managerial Dilemma

There is a large gap in large companies, however, between technology as practiced and personnel's picture of how it is practiced. And personnel's delight turned into a managerial dilemma.

BFM had a functionally organized computing shop. If you needed graphics support for an on-line stock price system, you went to the graphics people. If you needed data base management for an accounts receivable application, you went to the DBM people. If you needed sales support, you went to management.

And there, you see, is the problem. Dow Ward could slide comfortably into almost any technology-oriented area. But Dick, for all his business acumen, wouldn't fit into the picture.

He was too new to manage, too technically ignorant to be a technologist, too well-paid to be put anywhere else in the computing organization.

And to complicate matters, personnel had promised that the two of them could be kept together. Short of a total reorganization, there was no reasonable way to do it.

Bad News, Good News

Well, this story has both a good news and a bad news ending.

The bad news was that Dow and Dick just couldn't hack it separately. Dick was laid off first; his role in the shop just never materialized. And introverted Dow wasn't far behind. Without Dick's prodding, he sank into a shell and rarely emerged.

You've probably guessed the good news. Dow, once he left BFM, quickly sought out Dick. And the two of them went back to their old tricks. They formed a two-man company, and lived happily ever after, neglecting the impact of IRS and capital gains.

Which is really the end of my story. Except for one lingering question that really bothers me: Is it possible for a large computing shop to adjust itself to the rugged individualism of its practitioners? Or must it inevitably try to squash their individuality and (whether it succeeds or fails) lose them?

**THINKING ABOUT AN S/34? PDP-11/70? ECLIPSE?
PREFER A VIRTUAL MEMORY SYSTEM?**

**CONSIDER
WANG'S
NEW
2200VS.**

A virtual memory system at an entry level price under \$50,000.

Interactive. Responsive. 2.3 billion bytes of online storage. ANSI '74 COBOL, RPG II, BASIC and ASSEMBLER. IBM 360/370 instructions.

Multiprocessing; multi-programming. Software automatically adapts to sys-

tem size. High, immediate programmer productivity.

The first-time computer that protects your investment.

The replacement computer for the yield you never got.

The remote computer to which you distribute 90% of the application's processing.

Modular. Expandable without system conversion.



If you want to bite into something you can chew, mail this coupon to Wang Laboratories, Inc., Lowell, MA 01851. Or call (617) 851-4111.

I'm hungry. Send me information on Wang's 2200VS.

Name

Title

Company

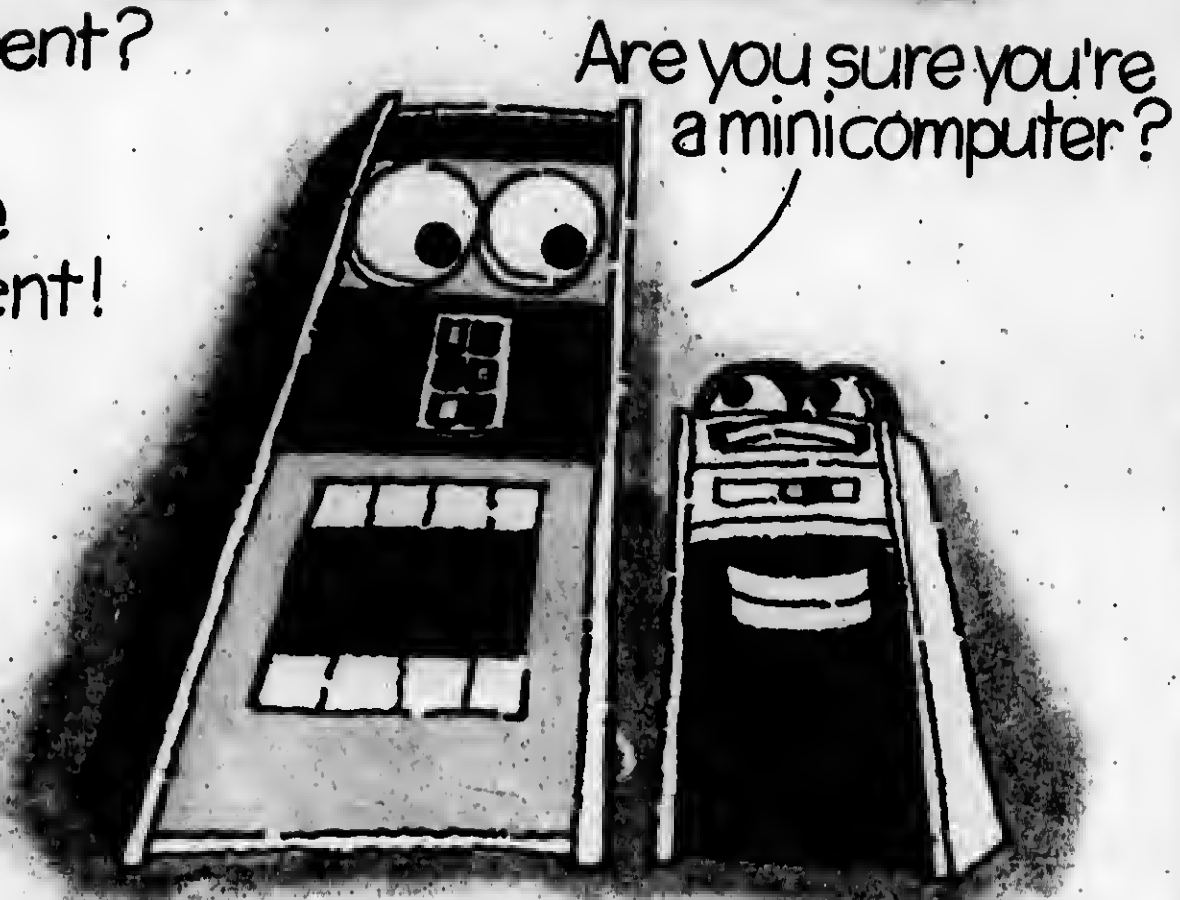
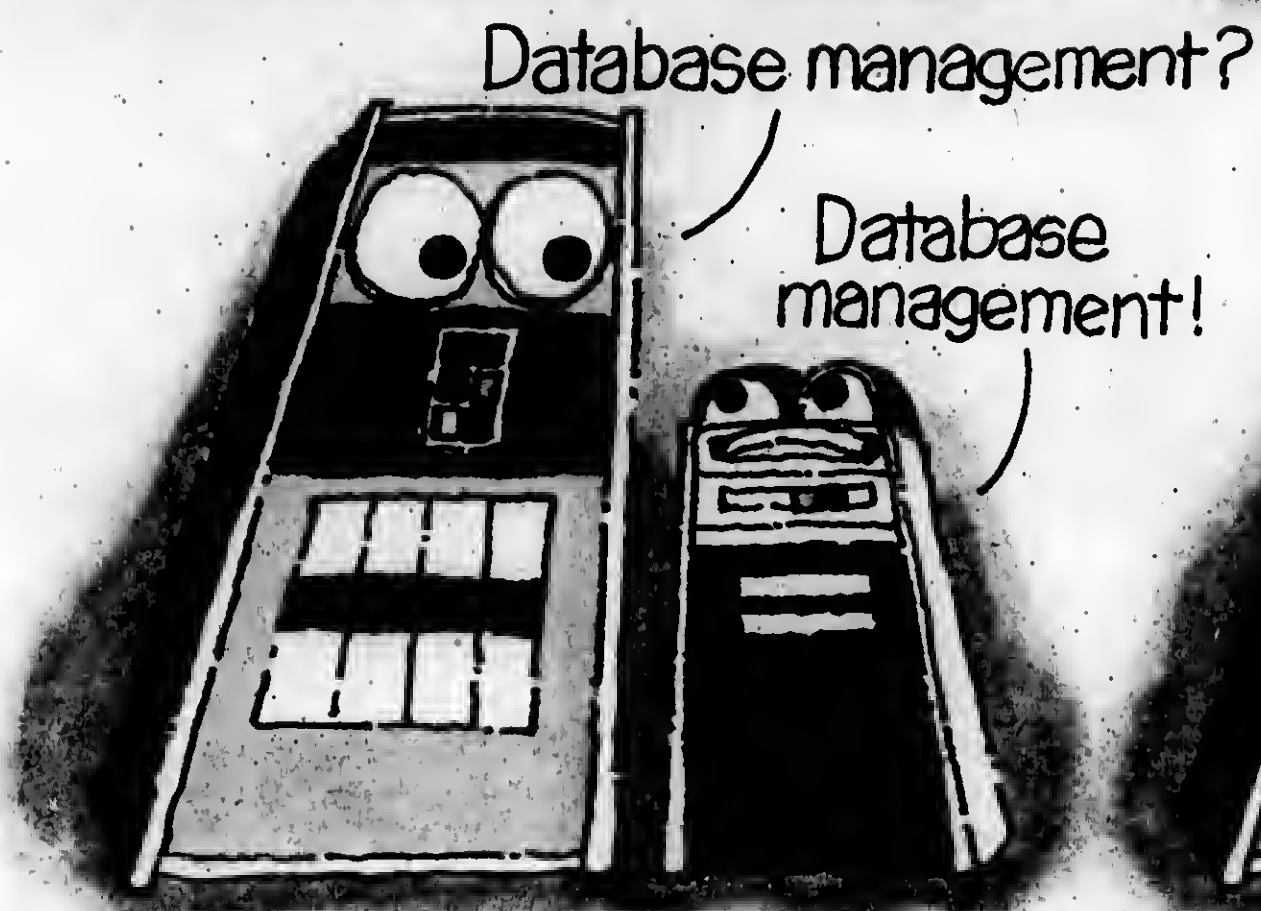
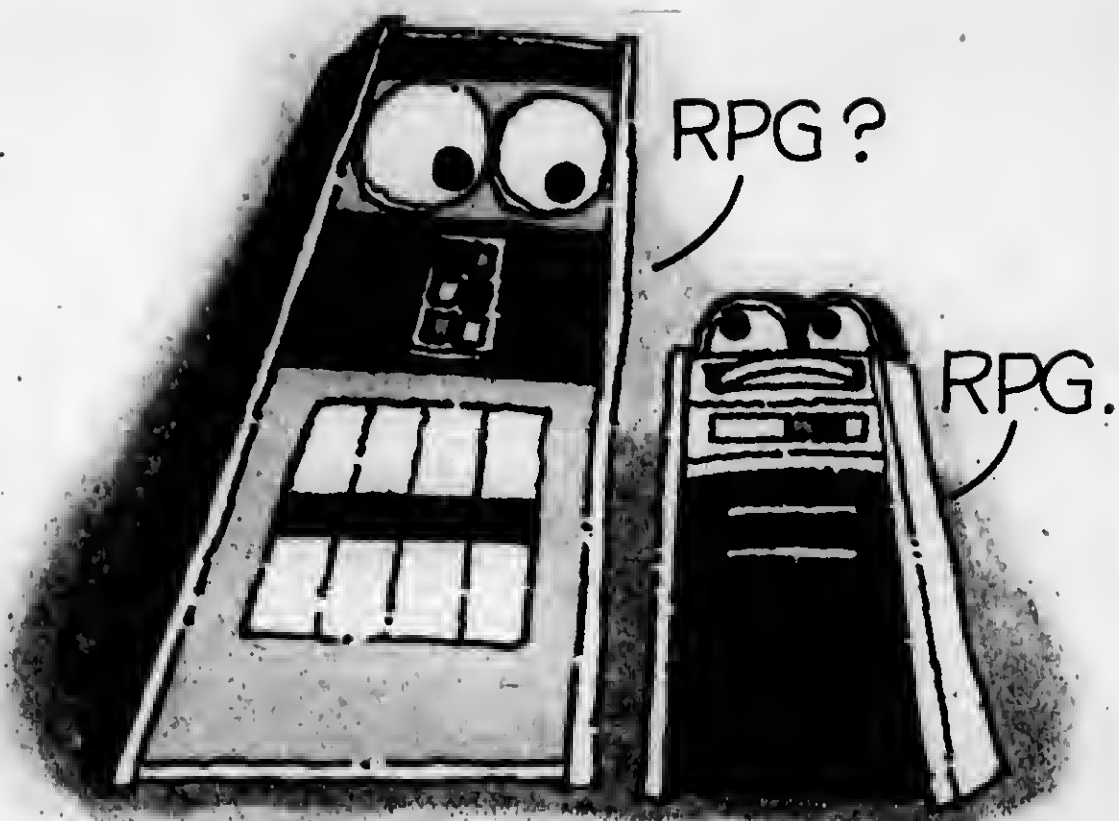
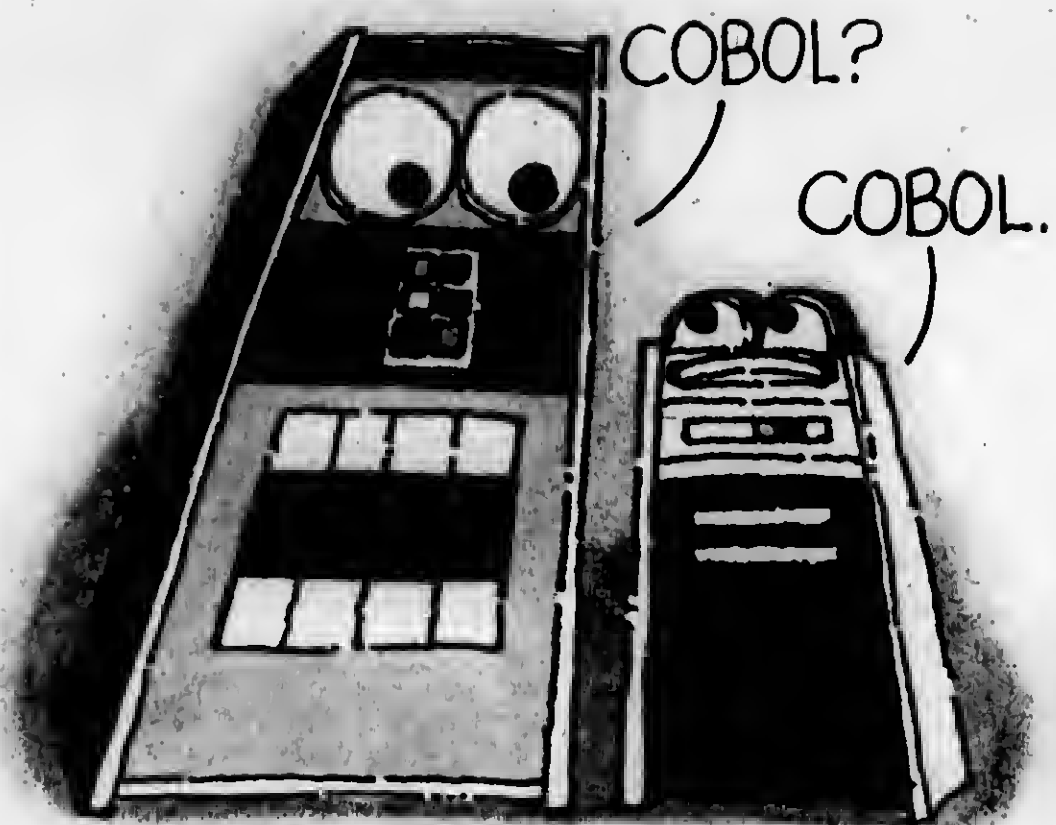
Address

City State

Zip Phone

3208





Our software speaks your language.

Now the largest manufacturer of interactive minicomputers offers the broadest spectrum of commercial software tools: ANSI '74 COBOL, DBMS, SORT, RPG, QUERY, MULTI-KEY ISAM, and more.

That means even better Datasystem functionality in commercial applications. Better because you get:

- great performance in multi-task environments with our new, easy-to-use, interactive, full-function COBOL

- advanced multi-key ISAM data management with our new RMS-11

- fast, versatile report generation with our RPG II

- super fast sorting of data files with our new SORT-11

- advanced data base facilities with our CODASYL-compliant DBMS-11

- quick easy access to data, plus flexible, selective reporting with our new COBOL-compatible DATATRIEVE-11

What's more, we've dropped our prices. And that means even better Datasystem

price performance. For details, contact the nearest Digital office, or Digital Equipment Corporation, Business Products Group, MK-2/H32, Merrimack, N.H. 03054, (603) 884-5432. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital

In System Design, Only Three Goals Exist

By John L. Moseng

Special to CW

Much has been written in *Computerworld* about the benefits of this or that company's new system, yet there are really only three basic system design goals or benefits. They are cost savings, more information and timely data.

Cost savings, often necessary to justify a new application, may result in numer-

ous ways. Perhaps personnel can be reduced or, more likely, additional personnel won't have to be added to

will result from having more information or having it sooner.

Savings in the user depart-

alize, however.

Management may need more information to efficiently carry out its responsibilities. The analyst and user must determine what additional information would be useful.

This additional information may not be easily obtained in a manual system. It might be too time-consuming or too costly to do manually, perhaps almost

impossible.

Whenever additional information is required, additional input data is often needed. The analyst must determine the additional input needed. This input is usually obtained from the form that is used to collect the data.

The cost and difficulty of obtaining the additional data must be weighed against the possible benefits of the additional information. Often, the additional data is readily available and easily collected by modifying the data collection form (source document). In fact, the information may already be on the form.

The cost of capturing the new input must, in turn, be weighed against the usefulness of information generated as the result of the input. Hard-to-capture input increases the cost of the output, reducing its value.

Of course, some additional information can often be obtained from existing data. This is usually done by manipulating the existing data in a new way. The data base approach may make existing data more accessible.

"More information" does not mean only an increase in information quantity, but also an increase in quality. Hopefully, as input data is processed, useful information results.

Timeliness of Data

Reports received too late may not be read, may not allow enough time for evaluating alternatives or may contain data whose value is reduced by time. By converting a manual system to a computerized one, the same report might be available days or even weeks sooner.

If an on-line system is developed, up-to-the-minute information will be available.

An on-line system will make the information more timely; it may even allow for the availability of more information. As information is made available sooner, DP costs increase, yet cost savings may result from decisions based on the timely information. The classic example is inventory control.

A system may be entirely justified on only one of the three basic design goals. But the ideal is having more information, sooner, resulting in a cost savings. Usually, one has to settle for two out of three.

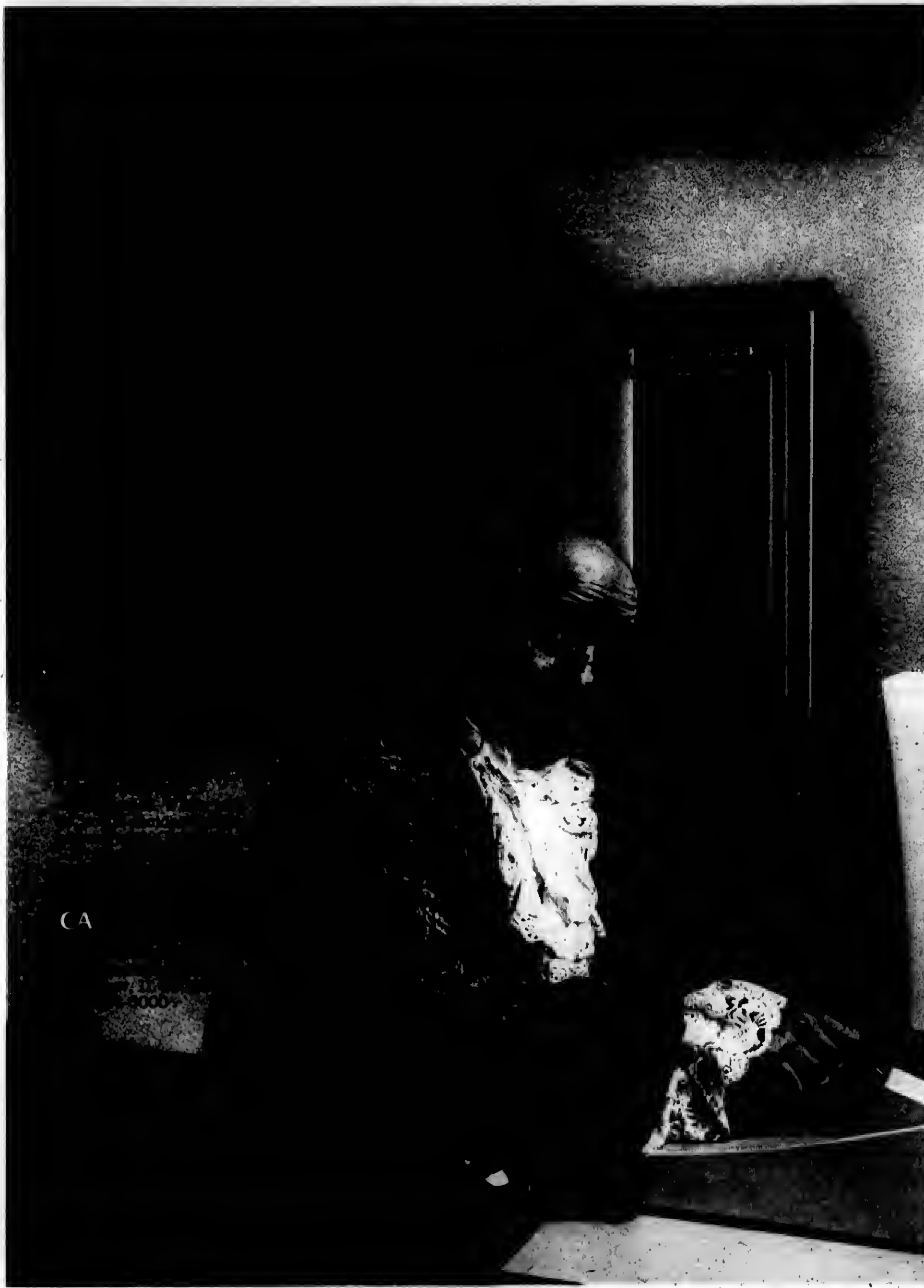
Moseng is chairman of the DP department of District One Technicol Institute in Eau Claire, Wis.

Reader Commentary

handle the increasing workload.

Savings may also result by changing the method of data entry. Hopefully savings

ment must be reduced by the increase in DP costs; in other words, the total cost must be considered. Hoped-for savings may not materi-



Privacy Concerns Important

Free Enterprise at Stake as Industry Grows

By Jim Ryan

Special to CW

In view of the present discussions between government agencies and the computer industry on matters of privacy, antitrust, data communications and interconnect policies, it might be wise to think about the future of the computer industry as a free enterprise.

When computers were first used, they were always in-house. The entire operation took place within a single building and was confined to a particular group of people who used the computer for a special purpose. Their work did not affect the public welfare in any way.

As long as this situation existed, there was complete freedom to operate without regulation by the government.

Because of the need for large amounts of capital, the market was confined to customers able to finance the installations. This restricted free enterprise to the extent that the man on the street could not compete with major corporations.

Initially, there were enough major corporations competing with each other so it wasn't necessary for the government to regulate the industry.

As time passed, however, IBM managed to acquire large segments of the total market and eventually it became a defendant in an antitrust suit. The government began looking closely at the computer industry — and free enterprise was in trouble.

The Industry Changes

While IBM was becoming No. 1, the industry itself was subtly changing from an in-house operation to one that could process remote entry data.

This change didn't effect the free enterprise aspects of the business at first because the lines were all private-line leased facilities and the remote terminals were also leased from the telephone companies. There was a clear interface between the regulated telephone company and the free enterprise computer industry.

This condition didn't last very long because a government ruling was made that allowed the interconnection of customer's facilities to telephone company facilities as long as a protective device was installed. This was more like contrived competition, with "Big Brother" constantly monitoring the new policy, rather than free enterprise.

Remote data entry on a private line continued to have some of the elements of free enterprise until it was found certain kinds of data could be transmitted over the message network.

With this technological advance, the computer industry could use a private line or the message network to transmit data. Since it had these choices, it could be drastically affected by any changes made on telephone network tariffs.

The next technological development was the mini- or microcomputer which could make it economical

for data to be centralized or decentralized for processing. In connection with centralization/decentralization studies, one of the most significant cost factors had to be the communications network, and any action taken by any government agency to change tariffs could seriously affect the cost factors.

It became clear that the effect of government regulations on the telephone industry had a secondary effect on the computer industry.

It was ironic, but the computer industry had more freedom of choice with mini- and microcomputers; at the same time, it was subject to more regulation on the communica-

tions network, a key element of the new systems design. As a result, designers had several choices on the types of computers, but were

Reader Commentary

deeply involved in government-regulated communications networks.

The next technological change was the ability to exchange information between CPUs and to access more than one memory bank. When

this became possible, it raised the whole privacy question. Government agencies quickly concerned themselves with this problem because it could affect the public welfare and lead to possible violations of civil and criminal laws.

This further restricted the computer industry's free enterprise posture. It appeared that the more flexible the industry became, the more it became subject to government regulation.

Could it be that the computer industry has free enterprise only as long as computers are designed on a stand-alone basis?

Ryon is a retired DP user.



SIM-14TM



It'll give your 1401* programs a new lease on life.



• IBM 303X, AMDAHL, CDC, ITTEL users...SIM-14 means no re-programming!

• IBM 360/370 users...SIM-14 means running multiple programs simultaneously!

If your new whizzer has made your 1400 series program old before its time, our simulator can give it instant new life with features like...

...a self-relocating program that's completely interruptible; no hardware restrictions other than decimal arithmetic set; no control storage or

micro codes; full tape and disk support; support for 1400 utilities and sort replacements included...

And more. Enough, in fact, to fill its own manual. To get your copy—and to find out how "cheap" SIM-14 can be—call your nearest Dearborn office.

*Includes 1440 and 1460 programs



dearborn
computer company

dealer-IBM computers
systems software
leasing

1460 renaissance drive/suite 400/park ridge, Illinois 60068 (chicago)/(312) 827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788 • dallas (214) 748-5899
member, CLA; ADAPSO; SIA

Introducing Cullinane's Integrated Data Dictionary:

already proven in more than 60 locations

With more than 60 satisfied users already, IDD has proven to be an easy answer to problems and questions resulting from data change. Because, by actively monitoring the flow of data through your organization, the IDD provides readily available information to answer such questions.

Questions? Suppose your organization wants to alter its most important application system. What programs will the change affect? Which users will be impacted by the change? How much extra work will the change require? How quickly can the change be made?

The answers to these and many other questions are easily and uniquely available with the IDD. Uniquely available because the IDD automatically captures the information to answer questions and requires minimum effort to do so.

As a result, each user department receives a complete and accurate "business

study" of the organization. It's a simple, easy, and economical tool to evaluate data change, standardize data use, monitor data flow and maintain data consistency.

Let us prove to you how easy it is to control your Data Resource. Sign up now for a free introductory seminar. Use the coupon or phone (617) 237-6600.

Cities

Los Angeles, CA
San Francisco, CA
Hartford, CT
Toronto, ONT
Washington, DC
Houston, TX
Atlanta, GA
Philadelphia, PA
New York, NY
Chicago, IL
Boston, MA

Dates

Apr. 11
Apr. 13
Apr. 25
Apr. 27
May 2
May 10
May 16
May 18
June 6
June 8
June 13

**Think twice. You'll use
the dictionary
system users rate #1.**

Name _____

Title _____

Co. _____

Address _____

City _____ State _____

Zip _____

Tel. () _____

My computer is _____



Cullinane Corporation

Wellesley Office Park, 20 William St., Wellesley, Mass. 02181 (617) 237-6600

Service Stores Source Code for Users

By Don Leavitt
CW Staff

SUNNYVALE, Calif. — The financial stability of a prospective vendor no longer has to be a matter of concern for an installation evaluating a software package because a service now offered by Infogard, Inc. makes such concern unnecessary, a spokesman claimed.

Under the service, Infogard holds critical documentation of a software product, including the source code in machine-readable form, in secure storage. This material becomes available to the licensee if vendor support of this package fails.

A contract among the licensee, the vendor and Infogard assures that all interests are protected, the spokesman said. A user who

has no valid license for a particular package cannot gain Infogard's protection, he noted.

Since complete documentation — especially source code — is seldom supplied with licensed software, organizations have been justified in their concern about whether the vendor was likely to stay in business and support the package, Infogard explained. The support was crucial in case program bugs were found or the logic of the software had to be changed.

The Infogard service applies on three levels; the initial activity needed to store the documentation for a given product; care of the material once it is stored; and the activity needed to provide copies of the documentation, and source code, to a user in need.

The initial activity places the documentation in the Infogard system and only the first user seeking the service for a product pays the \$150 setup fee that Infogard charges. Once the material is in place, the company charges each user — including the first one — \$150 to cover maintenance of the environment in which the material is stored.

Finally, when a user has to retrieve the stored data, Infogard charges another \$150. Thus the maximum charged for any one product is \$450, but most users will pay only \$300.

In outlining the fee schedule, however, the Infogard spokesman noted that new versions of products already stored "have to be considered" new products since they have documentation

and source code that differs from what is already in storage. The various \$150 charges apply all over again if users want the updated material protected and available to them, he said.

Infogard can be reached through P.O. Box 2097, Sunnyvale, Calif. 94087.

PDP-11 Gets WP Support

BUENA PARK, Calif. — Word processing (WP) functionally equivalent to Digital Equipment Corp.'s PDP-8-based system — but supporting many users — is available to PDP-11 users with a package from Data Processing Design, Inc. Word-11 is said to support 60 simultaneous users.

Written in Macro-11 as a sharable runtime system, the package's capabilities include editing based on grammatical entities, but it also supports margin control, justification, centering and spelling error detection, according to a spokesman.

Because Word-11 operates as a job under RSTS/E, conventional time-sharing operations can take place on some terminals while others are used for word processing.

Average job size for Word-11 users is 4K words and CPU usage is said to be minimal. Printing can be done on any output device including "daisy wheel" printers, such as those from Qume or Diablo, or line printers.

Minimum hardware required to support Word-11 consists of any valid RSTS/E V6B/C or CTS-500/E Level 2 system running on a PDP-11/34 through 11/70 with 32K words of user memory and a hard-copy printer with upper and lower case fonts.

Word-11 costs \$7,500 including manuals and six months of support.

Data Processing Design, Inc. is at 6980 Aragon Circle, Buena Park, Calif. 90626.

Package Documents RPG Programs

CANOGA PARK, Calif. — Documentation showing the interrelationships of RPG-II source programs, OCL procedures and working sorts reportedly can be generated by IBM System/3 installations utilizing the Pathfinder package from Hawkeye Information Systems.

The utility works for both batch and on-line operations and it supports the "/COPY" facility of RPG's Auto Report, a spokesman said. It can be used with any System/3s, from the Model 8 through Model 15, he added.

Pathfinder provides six basic reports. These include a data dictionary that shows the layout of each file and indicates which programs use the file, which ones use each individual field and how the fields are used.

A system flow chart shows graphically how each program works within the system, the spokesman said.

Three reports focus on OCL — the System/3 user's control language. The OCL-by-File report shows, by disk file name, all programs, procedures and nested procedures within the system. The OCL-by-Program report lists the complete library of programs, shows all files used by each program and the procedures and nested procedures in which

the programs are located.

The OCL-by-Procedure/Nested report cross-references all files, nested procedures and procedures and pinpoints the impact of any change in a given procedure, the spokesman said.

The final Pathfinder output — the \$D Sort listing — aids the

development of new programs by listing all disk sorts already available on the system.

The \$1,800 charged for Pathfinder includes on-site installation and training as well as a year's warranty. Hawkeye Information Systems is at 7852 Glade Ave., Canoga Park, Calif. 91340.

'Strobe' Tracks CICS

CAMBRIDGE, Mass. — Improved operations under IBM's Customer Information Control System (CICS) — through application module optimization and data set restructuring — are possible through use of a version of the Strobe program performance management package now available from Programart.

Strobe/CICS shows where execution time is concentrated and whether that is in the application code or the CICS supervisory modules. Within application programs, CPU time is detailed by location and optionally by source program statement, according to a spokesman.

In this version of Strobe, sampling activity can be started and stopped using simple commands at a terminal, he said, and Strobe profiles of peak activity can be printed while the CICS operations continue.

The support facilities added to Strobe for use with CICS can be used with other on-line systems as well, the spokesman said. This provides an exit through which users can gain module mapping information not available within the normal OS/VS supervisor, he added.

Strobe's ability to report I/O activity as well as execution time is particularly useful for large on-line data base applications, he stated. "File Busy" time for direct access data sets is displayed by unit, volume and cylinder; this can be the basis for restructuring the data base for faster response time, the Programart source noted.

Intended for IBM OS/360 and OS/VS users, Strobe/CICS support adds \$2,000 to the normal Strobe cost of \$10,600. Programart is at 133 Mt. Auburn St., Cambridge, Mass. 02138.



**WHEN YOU'VE GOT IT...
FLAUNT IT!**

JASPER JOB ACCOUNTING SYSTEM

FEATURING:

- WIZARD REPORT GENERATOR
- FREE CICS BILLING CAPABILITY
- RJE ACCOUNTING

DATACHRON CORPORATION 174 FIFTH AVE. NEW YORK, N.Y. 10010 (212) 675-5333

NAME _____ CO. _____ TITLE _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____
TEL. _____ COMPUTER MODEL _____ SYSTEM _____

SOFTWARE & SERVICES

'SPSS/C' Runs on PDP-11

NORTHFIELD, Minn. — An implementation of the Statistical Package for the Social Sciences devised by personnel at Carleton College, SPSS/C was developed to function on small-scale Digital Equipment Corp. PDP-11s, according to a spokesman for the project.

The original SPSS has been described as an integrated system of programs for the analysis of social science data. Intended for IBM 370s and other mainframes, it is said to include well over a dozen statistical procedures that enable the user to perform comprehensive analyses using natural language commands.

SPSS/C Version 2.0 contains "all of the more commonly used SPSS programs," the Carleton spokesman

claimed. It will run on a minimum PDP-11 with 28K words of memory, a disk and a terminal, he added.

The new packaging operates under RSTS, RT and RSX environments; changes to allow its use under DEC's IAS or Western Electric's Unix are under development.

Current license costs, which include one year's maintenance, are \$600 for academic institutions, \$900 for nonprofit, nonacademic organizations and \$3,000 for commercial users. Annual maintenance charges after the first year are \$300, \$450 and \$1,000 respectively.

The SPSS/C project is being managed by the director of computing activities, Carleton College, Northfield, Minn. 55057.

Test Data System Adapted To Univac, Burroughs Sites

VALLEY FORGE, Pa. — Datamacs, the test data generator from Management and Computer Services, Inc. (Macs), has been adapted for Univac 1100 series, RCA Spectra and Burroughs medium-scale CPUs, a spokesman said. The package was previously available only for users of IBM 360s and 370s.

Called Datamacs II, the repackaging eases the creation of test files for programs written in Cobol or any other source language and offers the same program test capabilities as the original Datamacs. It can be used as both a stand-alone or a Cobol-embedded program test tool, the spokesman added.

The file processor option of Data-

macs is a standard feature of Datamacs II, he added, noting that this feature enables users to extract data records from existing files on a conditional basis and to optionally alter portions of that data.

"Might Well Work"

Commenting on the Spectra implementation, the spokesman said it was the result of a contract; the machine involved was an RCA Spectra 70/45, and although the coding "might well work" on the Univac series 70 — as the Spectras were renamed when Univac took them over — Macs had no direct experience by which it could be sure.

Datamacs II operates under the OS/1100 environment with Univac series 1100 equipment and under DOS with the Spectra CPUs. It can be used with Burroughs B4700s and up under MCPs appropriate for the various CPUs.

Datamacs II is available under license for \$12,500 from Macs at 790 Valley Forge Plaza, Valley Forge, Pa. 19482.

'AZ7' Queries Burroughs CPUs

BURLINGTON, Mass. — AZ7, an inquiry system for users of Burroughs Corp. hardware, is available in interactive and batch versions from Azrex, Inc.

The interactive version is suitable for Burroughs B6700 and larger CPUs and for B1700s and B1800s; and the batch version works with medium-size models such as the B3700 and B3800 series, according to Azrex.

The AZ7 system is said to process sequential or index sequential files, to sort on calculated quantities and to process up to three files at once. It can also process multiple sort stages leading to different reports in different sequences from the same pass of the input file and dynamically vary almost any report formatting parameter, including page length and width, the spokesman added.

Free Form English

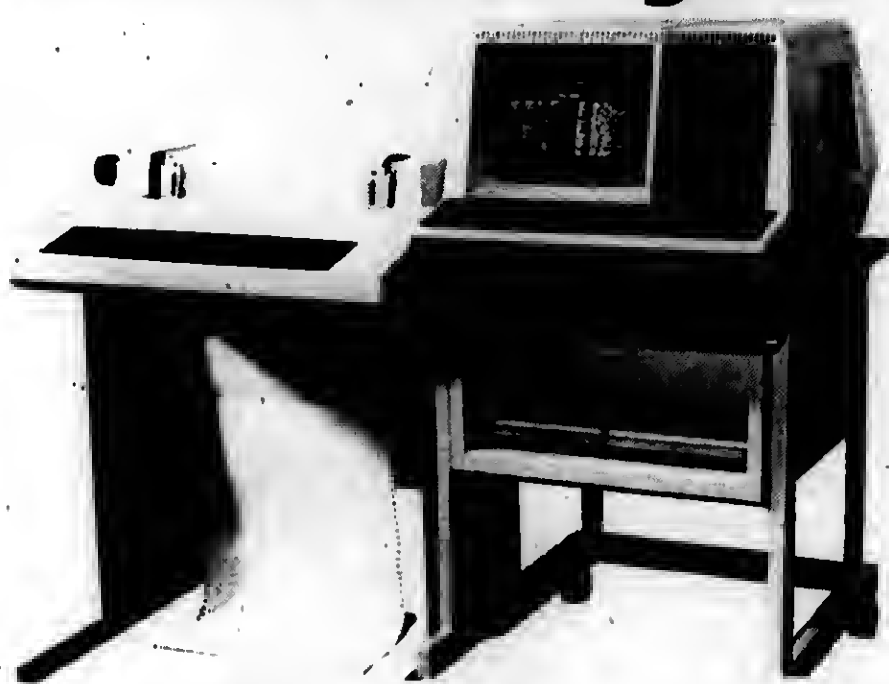
AZ7 is built upon use of "straightforward free-form English" designed so that noncomputer personnel merely tell the computer what information they want and the form in which they want it. AZ7 then produces the information that way, he maintained.

AZ7 operates on dictionary tables, needing only one definition in each file's lifetime and containing both structural information and text used for column titles, error messages and input data prompts.

Professional programmers find AZ7 "more than powerful" for one-time reports; or as a test data generator and extractor; fully capable as the report-writing module in production systems; and even helpful in checking out new systems, the spokesman claimed.

Distributed as a self-installing package, the system is priced from \$10,000 for a basic batch version to \$20,000 for a fully interactive version with all options. On-site support and training seminars are available at extra cost from the firm at 3 Mountain Road, Burlington, Mass. 01803.

Introducing the lowest cost PDP-8 based business system



... in the business.

If you're an end user who finds programming easy, or a small systems house, here's an offer you can't refuse. Quodata Corporation is offering a complete PDP-8 based business system — with the very latest technology — for only \$9,990.

That's \$2,400 less than you'll find anywhere else.

And QDP78 is an outstanding system. It features QBOL, our own business-oriented language. QBOL is compatible with DEC's DIBOL, but it's better. One reason is that it runs under the more flexible OS/8

operating system. FORTRAN IV, BASIC, and SORT/8 are also part of the system.

The QDP78 system is comprised of the latest LSI video display computer, the VT-78, and includes a processor, 32K bytes of MOS memory, a large 24 line by 80 character video terminal with upper and lower case characters, DECwriter II printer, dual diskette drives, and a portable mini-desk.

We have a limited number available, so call now: Richard Prendergast, (203) 728-6777.

quodata
Specialists in DEC Software

196 TRUMBULL STREET • HARTFORD • CONNECTICUT 06103



**The reason Epoch 4 has made it to the top
in the Netherlands is because it deserved to.**

Quality. When you have it, the world finds out fast.

When you're moving into the future as fast as the Netherlands, you use a lot of computer tape. And you quickly find out which ones deliver and which ones don't.

When Graham introduced Epoch 4

several years back, we promised a tougher tape, a fully certified tape, a tape that would guarantee more throughput, and less downtime and overtime.

And we've delivered on those

promises. So much so that we've delivered millions of reels of Epoch 4 all over the world.

Epoch 4 is the patented one. The one that's proven itself through billions of passes.



GRAHAM MAGNETICS *Proven around the world.*

Graham, Texas 78048



Data Base Use Adds Life to Classic Complaints

By Stephen L. Robinson
Special to CW

This week's two minitopics will reflect some of my favorite peeves. First, the always popular "the computer goofed"; second, "management doesn't understand." The advent of data base has extended the life of, and added new meaning to, these often quoted, but misused homilies.

Yesterday I visited one of my local banks to get a cash advance on my Visa card. Since I have a new Visa card and have not yet extended the credit line, I have a \$1,300 line of credit with Visa. Of this total I had about \$820 of expenditures accumulated since the last statement, which was paid in full.

My request for a cash advance of \$200 was rejected "by the computer." I appealed to the bank manager, explaining I knew there was credit available. "Sorry," was all he said, but he did try a special customer service number in New York.

Since it was just after noon, no one answered in New York (lunch time exodus). The bank manager advised me to try the number myself later since the "computer has been goofing lately," and rejecting a lot of cash advances that people swore should have been accepted.

About an hour later, I got through to a very courteous woman in customer service. She checked my account records and rather politely explained that I had just over \$800 in expenditures and \$750 in "holds," which put me far over my limit. Indeed, she asked, it's a wonder I was able to make the last several purchases. The concept of a "hold" interested me: What, I inquired, was the nature of a hold?

Patently, the customer representative explained that when a large purchase is made and the merchant or bank calls in for authorization, a hold is placed on the account for the authorized amount.

"There's your problem," I said. Clearly, you haven't taken off the holds from some of my purchases which have now come in. "Oh no," was the reply, "the computer does that automatically."

"Humor me," I asked. "Retrieve the actual amounts from the hold file and let's see if we can match them up with amounts in the purchase file." Surprise, surprise, every item in the hold file was duplicated in the purchase file.

The customer representative was very apologetic. She didn't know how it could have happened, and she would correct it from her terminal.

I have a pretty good idea how it happened. Since on-line searching and updating is

so expensive, I imagine (but confess, I'm not sure) that Visa only removes "holds" during the massive monthly batch billing run. Such system logic, of course, is quite fallacious. However, for the majority of card holders (except around Christmas time) the sum of

Data Base Corner

"holds" and expenditures will never reach the limit anyway.

Many people falsely rejected for credit do not keep close enough tabs on their accounts to realize they are right and Visa is wrong. That leaves the small minority, including myself, who complain, have the situation corrected and are subjected to the universal explanation that "the computer goofed."

I recently presented a data

base design course to representatives from a number of government agencies. As part of a workshop exercise, we developed file structures for applications from one of the agencies. One of the seminar attendees, from a different agency, observed that the data elements in one of our proposed files matched, almost identically, the elements in one of his files.

Here, I suggested, is a natu-

ral place to demonstrate the effectiveness of the data base philosophy of data organization. We can arrange for the second agency to use the data gathered by the first agency.

"Oh no," was the quick response, "management would not understand."

It is quite true that management probably doesn't understand file designs, but there is one thing that management
(Continued on Page 37)

Don't buy a 32-bit computer.

Buy a 32-bit computer company!

Buy a 32-bit computer from some computer companies, you get a computer and a handshake. Ten days later, you get an invoice. Sometimes you don't even get the handshake.

Buy a 32-bit Interdata computer system from Perkin-Elmer and you get the most advanced 32-bit computer in the world, the hottest 32-bit software in the industry, and an entire company dedicated to one purpose: making you successful. (You also get an invoice.)

There's no substitute for experience.

When you buy an Interdata com-

puter, you buy the company that pioneered 32-bit minicomputers. We've installed plenty of 32-bit minicomputer systems since 1973. And the experience we've gained, experience our competitors simply don't have, can mean the difference between having your system on-line in a few hours. Or waiting for weeks or months.

Systems that solve problems.

And speaking of systems, we build systems for solving problems. Big problems. Small problems. Big systems. Small systems. For science. Industry. Business. Government.

In every system there is one common element. All the pieces can literally be

plugged together and running jobs the day they arrive, which is a real advantage and a timesaver.

Systems with powerhouse software.

The biggest advantage we have, however, is our software. Software, incidentally, written especially for 32-bit machines, not made over 16-bit stuff.

We have gangbusters software. A full-blown transaction oriented operating system. File management. ITC for transaction processing. Communications packages for distributed processing. And high level languages including FORTRAN, COBOL, and BASIC. All designed to make your

'Data Boss/2' Gains Report Writer

N. MIAMI — A report writer facility is the latest extension to Data Boss/2, a data base management system (DBMS) that runs on Digital Equipment Corp. PDP-11s, according to a spokesman for Florida Computer, Inc.

Described as meeting "two-thirds" of the specifications of a Codsyl-style DBMS, Data Boss/2 doesn't support Cobol programs but does work with Basic and Basic Plus. Now, the report writer feature enables users to interactively make queries and set up reports "in a matter of minutes," he said.

The extension formats reports with col-

umns spaced across a page and automatic page numbering. Calculations can be performed on numeric data, he added.

While the new facility provides a number of default options to ease programming, all of them can be overridden to accommodate special forms and formats, the spokesman noted.

Data Boss/2 functions under RSTS/E, which means it is moved in and out of memory as required, the spokesman said. The DBMS, including the report writer, costs \$14,000 and is available from 99 N.W. 183rd St., N. Miami, Fla. 33169.

Data Base Use Gives Complaints New Life

(Continued from Page 36)

does understand — MONEY! I don't mean to sound too mercenary. Management is, of course, judged on other than financial considerations, but there is no question that most managers and executives are judged to some extent on monetary criteria.

DP personnel, especially computer analysts and busi-

ness analysts, must acquire an appreciation for what motivates their management. Only then will they be able to "sell" ideas they know to be valid.

In the case that surfaced during the seminar, we proceeded to cost out the anticipated dollar savings. A conservative estimate was that close to \$100,000 per year could be saved by combining the two input activities.

Intermediary Step

At this point, it is sometimes tempting to run upstairs with the great news that you've discovered a way to save the organization \$100,000. There is, however, an important intermediary step: to reexamine the business procedures that are in any way associated with the data elements now being gathered at both sites.

If this study indicates there are no logical procedural problems to centralizing the data gathering, we can continue with our transition plan.

The next step is to present management with a proposal to change existing business procedures. The proposal should prominently feature a discussion of the anticipated monetary savings.

At this point, you may learn of future organizational plans that might prevent a merging of input efforts (e.g., anticipated changes in one coding scheme, new uses for some of the data, etc.). You may also be presented with apparently illogical arguments such as "I don't trust them to gather the data," "We're not going to reduce our allotted clerks to accommodate them," or "If they have access to our data they'll probably foul it up."

Address Arguments

If such arguments have substance, they should be addressed; e.g., what if we control the input process, suppose the data base administration group controls access to the data, etc. If the arguments are indeed specious, the analyst faces the moral dilemma that has been explored in other recent *Computerworld* columns: to be silent, knowing that money is being wasted, or to go out on a limb, skipping a level (or more) of management in order to be heard.

For those people uncertain which way to go, I would point out the following: if, sometime in the future, management two levels up becomes aware of the potential savings in the change you explored, your manager will likely find a way to convince his manager that he thought of the idea a while back, but you vetoed it. Sitting on good ideas is rarely a good idea.

Copyright 1978 Stephen L. Robinson

programming easier.

But, most important, when you buy a 32-bit system from our Interdata Division, you get service. The old-fashioned kind. The kind where we go out of our way to make sure you're successful.

Good old-fashioned service.

We'll be with you when you configure your system. While it's being built. When it's delivered and installed. While we train your people. And for years thereafter.

If you need customer service, one toll-free call reaches us. Days. Nights. Weekends. We'll be there.

Think about that. And, instead

of just buying a 32-bit computer, buy a 32-bit computer company. Perkin-Elmer.

For more information, write Perkin-

Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free (800) 631-2154.

Here is my business card. Tell me more about computers in ☐ business ☐ scientific ☐ simulation ☐ OEM applications.

PERKIN-ELMER
Data Systems

HP Creating System Language, Compcon Told

By Frank Vaughan
CW Staff

SAN FRANCISCO — Some of the concepts behind Syspal, a programming language for operating system implementation that is under development at Hewlett-Packard Co., were outlined at the IEEE Computer Society International Conference (Compcon 78) here recently.

The language will enable users to create unique operating systems to support different types of operations on different machine configurations, if the user can define the desired operations and the machine constraints to Syspal, according to Dr. Robert A. Fraley.

A member of the technical staff at HP Laboratories in Palo Alto, Calif., Fraley

said the language is not intended to simply adapt an existing operating system to varied hardware configurations. Syspal combines many of the features of Pascal, Modular, Euclid and Concurrent Pascal, he noted.

HP's purpose in developing Syspal, Fraley said, is to "create a language system which contains many tools for system development in addition to the compiler."

"If the language is to be lucid, its concepts must map directly into the target hardware, yet it must be machine-independent," he said.

Four Components

Intended primarily for internal HP use, the major components of Syspal include the Syspal compiler, a library

maintenance program, an interactive runtime system and a language-oriented editor.

The basic program unit is the module, Fraley said. A module contains data definitions, procedures and references to other modules. The compiler is capable of compiling modules as separated units, and the librarian maintains programs, both object and source, in terms of modules, he explained.

Modules may reference one another in two ways, analogous to the two uses of Simula classes: "One technique is to create new instances of the module, either as variables or heap objects. The second technique is to surround one module by another so that all exported variables and procedures of the outer

module are known within the inner module.

"Where Simula only allows a single surrounding module, Syspal allows several. The two surrounding modules may not export the same name. The inner module may, in turn, export some of the names inherited from its surrounding modules," he claimed, noting that the module containment diagram becomes a directed cyclic graph instead of a tree.

Concurrency Model

Syspal uses a model of concurrency which resembles that of Concurrent Pascal. Static structures in the program specify code segments which may be operated in parallel, Fraley stated. Unlike Concurrent Pascal, HP's language permits instances of processes to be created dynamically.

The language has a number of specialized modules for concurrent process handling, he explained. "Two of these — the 'Scheduler' and the 'Resource' — replace the monitor of Concurrent Pascal. The other specialized module is a 'Process.' " Procedures and functions are provided as in Pascal, he noted, and are called by the single keyword "Routine." Unlike Pascal, the normal conventions in the routines are not nested. While nesting is permitted for notational convenience, most routines lie at the outermost level within their containing environment.

The anticipated coding rule for Syspal will be that routines occupy a single page with contained routines included. A routine may be designated "in-line," which allows more efficient implementation of the routine reference, and its semantics are identical to those of a standard routine.

The data structures are in many ways the most important part of Syspal, providing the major advantage over HP's previous Systems Programming Language (SPL). These data structures have been modified to provide "safer, more accurate data descriptions," Fraley noted.

"The syntax of Pascal's control structures has been changed to a 'closed' form. Each structured statement allows a sequence of statements where Pascal allows only a single statement."

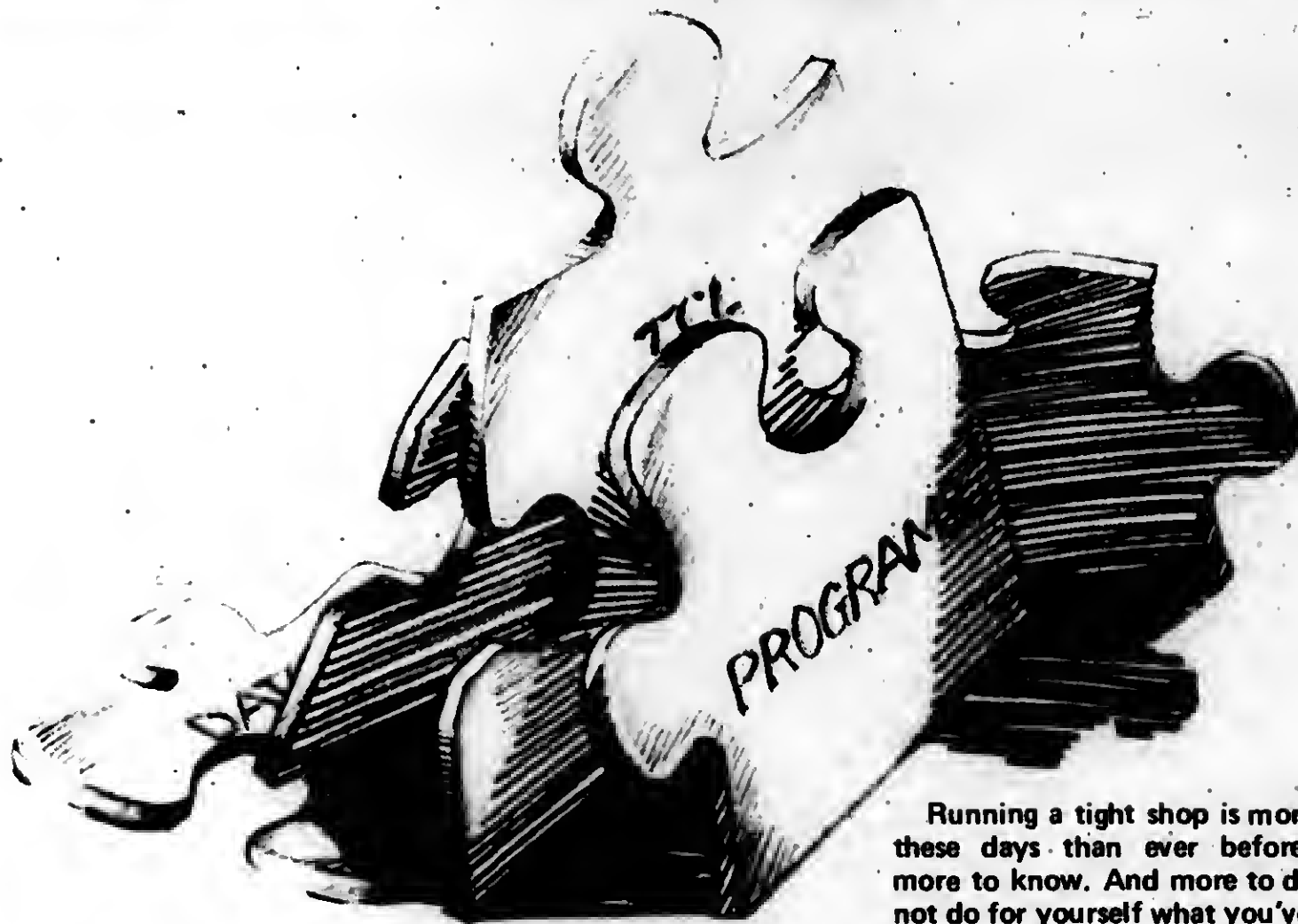
New Vendor Supports 'Scert'

ROCKVILLE, Md. — Developed and marketed for many years by Compress (now a division of Comten, Inc.), the Scert computer system simulation package is now available from Performance Systems, Inc. (PSI).

Scert includes a number of simulation facilities including the modeling of both hardware and software configurations in order to provide cost/performance projections of how any workload will perform. Written in Cobol, Fortran and Assembler, the package runs on IBM 360/370s.

PSI will license the package for an annual fee of \$35,000, but also provide it on shorter terms (a three-month minimum for \$10,500) in addition to on-site consulting support for \$350/day, the spokesman said from 30 Courthouse Sq., Rockville, Md. 20850.

Get It All Together...



Running a tight shop is more difficult these days than ever before. There's more to know. And more to do. So why not do for yourself what you've done for your users?

With JOBDOC, you build a data base of everything you need to know about running your jobs. And then let JOBDOC go to work:

- Controlling Costs
- Monitoring File Relationships
- Generating Complete Job Requirements
- Cross Referencing All Job Related Information
- Providing Operating Statistics
- Giving You A Better Audit Trail Than You Ever Thought Was Possible.

JOBDOC: When you want an easier way to do a tougher job.



Gulf Computer Sciences Inc.
1775 St. James Place
Houston, TX 77027
Tele. 713-627-9320

Canadians Using Net To Study Structures

MISSISSAUGA, Canada — The extensive use of sophisticated computer-based structural analysis programs has helped engineers for Ontario Research Foundation (ORF) here solve such client problems as determining the fatigue life of a power plant pressure vessel or evaluating a girder plate for the construction of a bridge.

Much of the work ORF performs in the structural area involves finite element method capability. Some of the software was developed internally; the remainder are programs from Structural Dynamics Research Corp.

the concrete deck to the strength of the steel girder was the factor of prime interest in terms of local stresses generated at the supports. The local stress distribution in the area of supporting piers established by this study produced reliable design parameters to be used in subsequent designs.

ORF first created a model of the girder design and analyzed it mathematically with Superb, an SDRS finite element program. At the same time, a physical model of one-fifth scale was built and tested with strain gauges to confirm that the mathematical and



Scale model beam is wired for testing at Ontario Research Foundation.

(SDRC) that are available through Cybernet Services of Control Data Canada, Ltd.

ORF was founded in 1928 as a joint venture of the Province of Ontario and the Canadian Manufacturers Association. Today, it provides contract technology services to clients in Canada and the rest of the world in energy, environment, materials and processes and resources.

An example of how the organization uses its expertise in structural analysis involved a client who asked ORF to determine which section of a power plant vessel was most likely to fail and its probable fatigue life.

The client then asked ORF to find the stress migration from the original failure point to determine where the vessel would fail next. Using the SDRS programs, foundation engineers predicted where and how soon it would fail and the stress migration patterns thereafter.

"After the analysis was done, the client told us that an actual vessel showed high stress concentration in the area we predicted," according to Stan Barclay, assistant director of engineering at ORF. "That vessel and other existing vessels were reinforced in the original area of failure and at the point of stress migration."

Bridge Evaluation

Ontario Research combined the SDRS and other structural analysis programs from Cybernet Services with its expertise in engineering and testing to help another client evaluate a plate girder concept used in the construction of bridges.

In this project, the contribution of

physical models behaved the same way.

"If the correlation is good," Barclay said, "then model results can be used in full-scale design. In this case, correlation was within 3.5%, which is well within the acceptable range."

"Once a good finite element model is developed, design variations can be readily checked out at minimum cost without further physical testing."

Current analytical techniques, such as finite element computer programs and experimentation, provide foundation clients with more accurate evaluations of loaded structures than can be achieved through hand calculations using classical formulas, according to Barclay.

"With classical techniques," he pointed out, "the simplification was quite major; you had to assume what would happen. It was a judgment job based on the experience of the experimenter, who would decide by feel where the high stresses were and, as a result, would probably have to use far more instrumentation."

"Even then it would be hit and miss that he was picking up the right areas of high stress," he noted.

"Now you can start a coarse grid or macro model to decide where the high stress areas are. Then you can focus on those high stress areas with micro models and get very precise detail of the area."

"An example we're working on now is railway wheels. It is very important to pinpoint the high stress area because of centrifugal loads within an eighth of an inch. By trial and error methods, that would take an infinite

(Continued on Page 40)

Fujitsu's 50megabyte M2201



Finally!

A reliable, low cost, front loading SMD-interface-compatible disk drive

In the world of SMD-compatible disk drives, the OEM offers a fresh new alternative for disk drive requirements. And the M2201 disk cartridge drive offers high reliability and low off-line storage cost in a technically superior disk drive.

The M2201 features high reliability by virtue of a lower part count and our strong quality control.

In addition, online reliability, where it really counts, is ensured by a 0.3 micron dual filtration system that removes 99.97% of disk environment contaminants.

Moreover, with the M2201's front loading disk cartridge, off-line storage cost is lower than that of top loading storage module media. Yet the SMD-compatible interface of the M2201 connects directly into a storage module drive controller.

A close look at the drive will readily bear out the technical superiority of the M2201:

- A linear motor actuator produces 6-ms track-to-track and 30-ms average access times
- A track following servo system with servo track recorded on cartridge ensures cartridge interchangeability
- A 6,000 POH mean time between failure (MTBF)
- No data staging requirement since all data is on cartridge
- A small and lightweight chassis; drive easily mounts into a standard 19" rack



M225x series fixed type disk drives

Other technically innovative products include the M2251, M2252 and M2253 fixed media storage drives with memory capacities of 12.7/25.4/50.8 megabytes, respectively.

These models feature Winchester technology heads and rotary actuators which offer 10-ms track-to-track and 40-ms average access times. Optionally, these units provide head-per-track unformatted storage capacities of 327.7 or 655.4 kilobytes.

For fresh, innovative solutions to your disk drive problems, contact Fujitsu America, Inc.
2945 Oakmead Village Court, Santa Clara, CA 95051.
Phone: (408) 985-2300, TWX: 910-338-0047, Telex: 357402

FUJITSU LIMITED
Communications and Electronics

ISC Installs 'System 1022'

BRAINTREE, Mass. — System 1022, the data base management system developed by The Software House, is now available through the facilities of the Interactive Sciences Corp. (ISC) communications network, according to a spokesman.

System 1022 reportedly includes features that support both the DP professional and the untrained user. It includes a query language, a report writer and a host language interface, the spokesman noted.

The query language provides an English-like format easily learned by the nontechnical user, he said, adding, however, that retrievals through this facility could include multiple keys and logical operations.

The report writer supports "Fortran-like" output conversions, "Cobol-like" PICTURE editing and a wide range of formatting options. In addition to user-specified page headings and footings, the system allows an unlimited number of control breaks and row and column subtotals, ISC said.

The host language interface enables users to CALL the facilities of System 1022 from Fortran or Cobol programs, the spokesman added.

The ISC remote computing network can be reached from 90 cities across the U.S. and from Canada, Europe and Mexico. The operation is headquartered at 80 Brooks Drive, Braintree, Mass. 02184.

Package Aids Finance Plans

DANBURY, Conn. — Genesis, an interactive financial planning system written in APL, is available on the remote computing facilities of Time Sharing Resources, Inc. (TSR) or as a package from Weiss Associates for in-house IBM 360s or 370s.

The system was designed to handle comprehensive computational data bases with lateral and hierarchical consolidations of data including computation of effective consolidated rates, a spokesman stated.

Genesis supports a series of English language commands and prompting messages to build and then use financial models. Once specified, all computations and consolidations are performed when required, he said.

The commands allow either bottom-up or top-down planning and support

of "what if" capabilities on detail or consolidated data. A built-in report writer facility produces finished output, he added.

Typical applications with Genesis might include strategic, business or operational planning; cash budgeting; variance analysis; capital budgeting; and manpower planning, the spokesman said.

Used on the TSR facilities, Genesis is available for the network's normal service charges. The in-house package costs \$30,000, Weiss Associates noted from 12 Ole Musket Lane, Danbury, Conn. 06810.

Stresses, Strains Studied by User

(Continued from Page 39)

amount of time.

"With the finite element method, you can pick up the approximate high stress areas easily, then search in a small area to find the precise point of high stress."

One of the main benefits of the SDRC programs, Barclay said, is that the software is written in such a way that it is easy for a relatively new computer user to apply sophisticated techniques to problem solving.

Walk-in Service

Another ORF offering is a walk-in service for building finite element models. A client can use a digitizing tablet and a CRT terminal in the foundation offices in this Toronto suburb to build a model for finite element analysis with the SDRC programs.

The client puts the drawing of the structure on the digitizing tablet and moves a cursor over the drawing. Where he wants a point, he presses a button and is given a point or node number and its coordinates.

He can view his model on the CRT terminal in three-dimensional or isometric form to see that he didn't miss or mislocate any points. When he has built his model, he can submit it for analysis by ORF or through his own resources.

"The most time-consuming part of finite element analysis is inputting all the numbers into the computer," Barclay said. "If you automate that, as SDRC has done, then you save an awful lot of time, and this is what we're seeking to accomplish with the walk-in service."

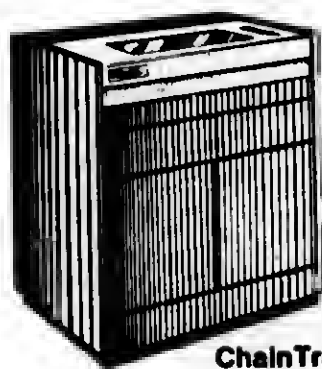
F.D.M. Williams, vice-president of engineering at ORF said the foundation emphasizes the SDRC techniques of integrating finite element analysis and mechanical testing, or computerized systems analysis, "because we want to promote such worthwhile techniques to industry at large so products no longer are produced by the old prototype method where you make 10 and — bit by bit — test them to destruction."

"By using analytical and experimental techniques," he added, "industry can make good use of dwindling resources, especially energy."

"Actually, these techniques have been known for a long time. Cybernet Services gives us the computing horsepower, and SDRC has put these techniques into a usable form. Before that, they were in the domain of the professors, not the users," Williams said.

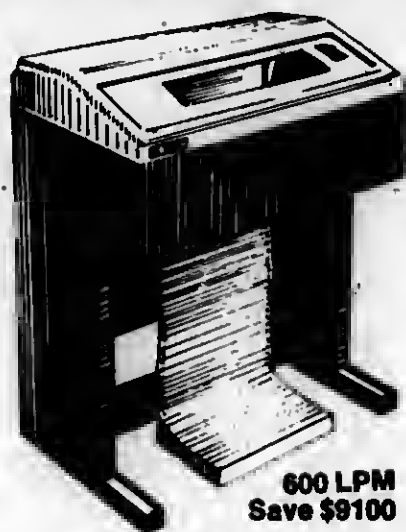


PDP-11 USERS: Save up to \$9100 on your printer costs.



ChainTrain
Save \$8500

Switch to ChainTrain quality for \$8500 less than DEC's 600 LPM drum printer. Our model DAC 6644 is a 600 LPM ChainTrain letter quality printer that replaces the LP 11-YA and comes with PDP-11 interface, installation and maintenance.



600 LPM
Save \$9100

For maximum savings choose Digital Associates' DAC 2260, a 600 LPM plug-to-plug replacement for the LP 11-YA. You can save \$9100 under DEC's 600 LPM printer cost. It also comes with PDP-11 interface, installation and maintenance.



900 LPM
Save \$7500

For faster applications, the DAC 2290 is available. It is a 900 LPM plug-to-plug replacement for the LP 11-CA with savings of \$7500 under DEC's 600 LPM printer. Again, it comes with PDP-11 interface, installation and complete maintenance service.

PDP-11 USERS DISCOUNT COUPON

up to a
\$9100

savings on any DAC LP 11 replacement featured.

Similar savings are available on other printers at The Printer Store, world's largest independent supplier of printer systems.

Pay to the order of:

Name: _____

Company: _____

Address: _____

Phone: _____

☐ I'd like more information on The Printer Store.

Digital Associates Corporation, 1039 E. Main St., Stamford, CT 06902, Call Toll Free 800-243-9054

Users of AT&T Services Seen Facing Price Hikes

By Ronald A. Frank
CW Staff

LAS VEGAS — Users of AT&T services face the prospect that the phone company will continue to raise prices on noncompetitive services, according to consultant Harry Newton.

Speaking at a recent Interface 78 session called "More and More From Bell," Newton told users they will have to pay higher rates for short-haul private lines, direct dial and Wats service. In addition, Bell plans to hike prices for moving and installing equipment.

All this will happen within a framework that attempts to have all services charged on a measured, time basis. In some cases, the rates will be new, such as for incoming busy conditions, Newton said.

In order to cope with this continuing threat of price hikes from the telephone company, users must maintain flexibility in their networks. They can do this by using alternative suppliers such as specialized carriers whenever possible and by combining applications on the same facilities whenever possible, he advised.

As an indication of how Bell regards the data user, Newton pointed out that the 1977 AT&T annual report has a statement of policy that never uses or includes the words "data" or "computer."

There is still little incentive from the Bell System to innovate with new services. Efforts such as Picturephone and Dataphone 50 services have been a failure, Newton said.

Richard Kuehn, another speaker and consultant, said that costs for long-distance dial services will increase and that it is also probable that Wats tariffs will be phased out be-

CW at Interface 78

cause Bell will not be able to prove a justification for this type of service from an economic standpoint. If Bell is forced out of Wats by the Federal Communications Commission, it is quite possible Wats-like services will eventually be offered by the specialized carriers, he predicted.

Some type of "value of pricing service" is coming in phone company interstate rates between major cities, Kuehn said.

One alternative for users is to build short-distance local digital nets in urban areas by using point-to-point wire facilities, he said. Bell is already offering local area wire pairs,



Harry Newton

CW Photo by R. Frank

which could be used with all-digital transmission equipment for about \$350 per channel, he said.

Newton elaborated on this concept and said that in New York City, six large users are utilizing cable TV facilities for local use at rates 40% less than the phone company charges.

Many of the noncompetitive services for which Bell will raise rates will first show up at the intrastate level. For this reason, users should keep close touch with changes being proposed by the phone company before state regulatory commissions, Newton said.

McGill Urges Integration

By Ronald A. Frank
CW Staff

LAS VEGAS — Corporations must stop thinking about various communications functions as expenses that must be minimized. Instead, they should perceive voice, data video, image, message systems, sensor-based data and office operations as part of a single processing system that can benefit the company and contribute to earnings per share, according to Archibald J. McGill, director of market management and development business at AT&T.

Speaking at a recent Interface 78 session here dealing with issues in the informa-

(Continued on Page 42)

IBM, AT&T Show Innovations

LAS VEGAS — Both IBM and AT&T showed innovative equipment in their recent Interface 78 exhibits.

IBM demonstrated its recently announced programmable communications subsystem for the Series/1 minicomputer by attaching IBM and non-IBM terminals to the processor. The two non-IBM CRTs were a Bell System Dataspeed 40/2 terminal and a Lear Siegler, Inc. unit; the IBM terminals included the 4987 and a 5100 processor used as a terminal.

The units were interfaced to the Series/1 on an RS-232 level as the communications subsystem demonstrated message-routing in an administrative message system.

AT&T put on exhibit its Local Area Data Set (Lads), designed for short-distance data transmission. The unit can operate up to six miles at 2,400- and 4,800 bit/sec and up to three miles at 9,600 bit/sec, AT&T said.

Lads is based on the Codex Corp. 8200 and will be part of the Bell local area data service slated for introduction in most operating companies by the third quarter of this year. The speed of the unit is fixed at the time of installation; its tariffed cost is expected to be between \$35- and \$50/mo.

Bell also showed a version of the Plantronics Vuset CRT with an alphanumeric keyboard. Operating at 300 bit/sec, the small CRT was demonstrated working with an IBM 370/155 in New Jersey.

The alphanumeric version of the CRT, which will be available in dial-up and private-line models, is compatible with Bell 103 or 113 data sets. Tariffs for the unit will range from \$45- to \$60/mo, AT&T said.

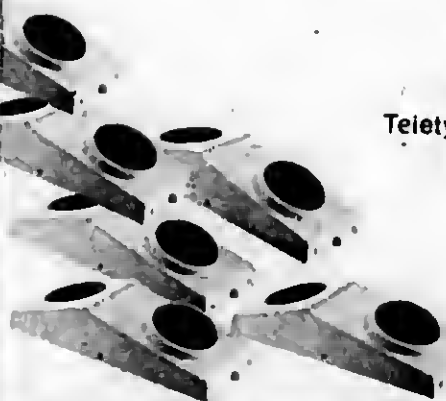
AT&T also demonstrated a Model 43 teleprinter from Teletype Corp. operating with a Dimension PBX. A data security feature on the PBX conditioned the phone line for the terminal, AT&T said.

CLIP AND RETURN FOR FAST RESPONSE

for a variety of terminals

Series 150A

300 baud, 31 models
Available for a
variety of terminals —
Teletype, Digital Equipment
Texas Instruments ...



\$147

with tape interface

302C2-13

Data rate to 300 baud
Magnetic tape interface
Operates with audio recorder
Provides block and record markers



\$425

with universal interface

Series 302A,B

300 baud, 19 models
Simultaneous EIA/20ma
interfaces
Hardwire options
Optional interfaces



\$245

☐ 200 - 1200 baud modem ☐ 2400 - 9600 baud modem ☐ Limited distance modem
Check models of interest and return to us for additional information

COMDATA

8115 Monticello
Stokio, N. 08876
312/677-3889

New York
212/267-8835

Los Angeles
213/244-8330

name _____
company _____
street _____
city _____ state _____ zip _____
telephone _____ ext. _____

acoustic
couplers

Users Pleased With Multiplexer Performance

By Marguerite Zientara
CW Staff

DELRAN, N.J. — Prospective users of data communications line multiplexers can expect good overall performance from major vendors' multiplexer offerings, the results of a recent survey indicate.

In its report, "All About Data Communications Multiplexers," Datapro Research Corp. found users of the Infotron Systems Corp. 180 time-division multiplexer (TDM) were pleased enough with its overall performance to give it an "excellent" rating. All 54 users surveyed gave their multiplexers an average overall performance rating of 3.4 points on a 4-point scale.

Since some users surveyed were us-

ing more than one type of multiplexer, a total of 315 multiplexers, largely from five vendors, were rated.

The users were asked to score their multiplexers' overall performance, hardware reliability, maintenance service, ease of installation and ease of expansion with a rating of 4 for "excellent", 3 for "good", 2 for "fair" and 1 for "poor".

Digital Equipment Corp.'s DH11 series and the Timeplex, Inc. T-20 (both TDMs) tied for second place with a rating of 3.7 in overall performance. The Codex Corp. 910 and Infotron 780 (also TDMs) shared third place with a rating of 3.6, the report indicated.

In the area of overall performance, no multiplexer received a rating lower

than 3.0. That score was shared by two General Datacomm Industries, Inc. products, the frequency-division multiplexing (FDM) 1101 and the TDM 1202.

The Infotron 180 got a second perfect score in the area of hardware reliability, an area where the average rating was 3.2. General Datacomm's FDM 1150 followed with 3.5, and the Codex 910 was third with 3.4.

With a 2.8, the Timeplex T-96 TDM was rated the lowest in this category, according to the report.

Low Upkeep Scores

Maintenance service was the category rated lowest by users, with an average of 2.6. The lowest rating in the survey (1.7) was given in this area to

General Datacomm's 1101.

The highest rating in this category was again for the Infotron 180 (3.3), shared equally with the Timeplex T-20, the survey indicated.

Rated on ease of installation, the Infotron 180 once again led with another perfect score. The Timeplex T-20 was second with a rating of 3.3, followed by the Infotron 780 with a 3.2 rating.

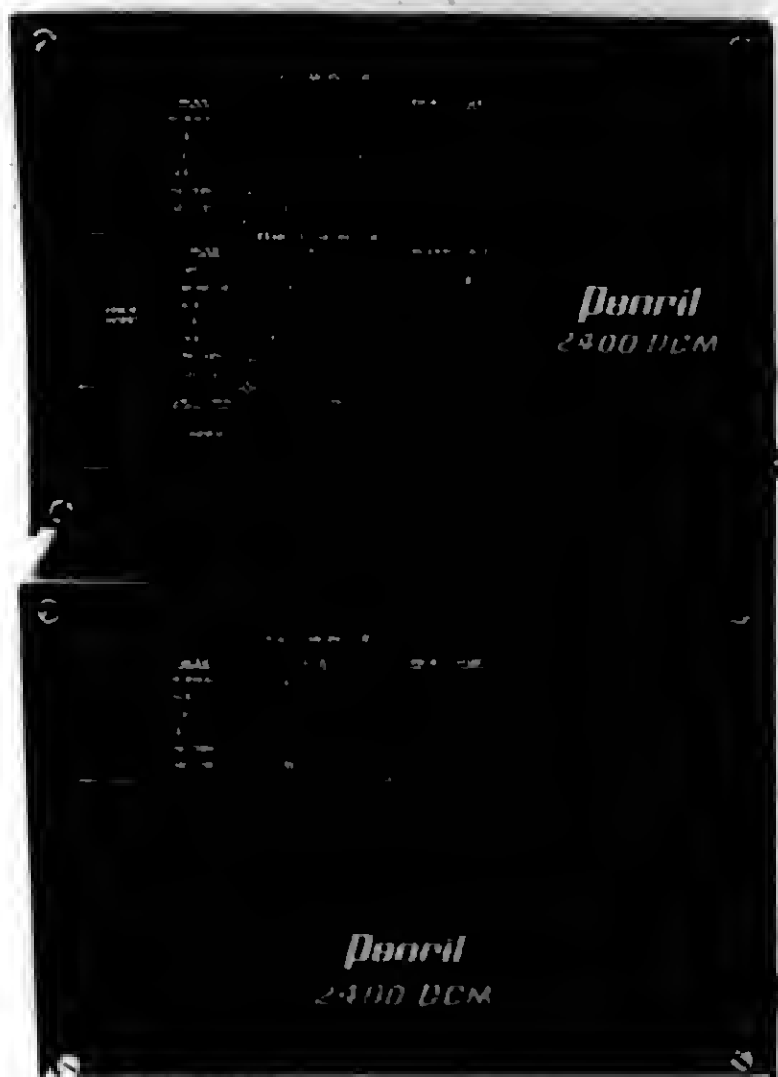
The low score in this area was again captured by a General Datacomm product, this time by the FDM 1150, with a rating of 2.2. The average rating in this category was 2.9, Datapro said.

Users gave ease of expansion scores an average rating of 2.9, with the Infotron 180 again claiming first place with 3.8. The second highest rating also went to an Infotron product, the 780, which received a 3.6. The Codex 920 came in third with a 3.5.

The lowest score in this area was 2.0, again given to General Datacomm's 1101.

The survey included several ques-
(Continued on Page 44)

COST EFFECTIVE NETWORK CONTROL



With The New Penril 2400 DCM Diagnostic Controlled Modem

The new Penril 2400 DCM with diagnostic features is the modem that becomes the controller for your entire communications network. The diagnostic features of the 2400 bps synchronous modem provide a secondary channel with command mode procedures. Test and control of remote site modems is accomplished over the secondary channel without interference to main-stream transmission.

Other standard features of the Penril 2400 DCM include LSI logic, built-in test pattern generator and detector, EIA standard RS-232 interface, and on-line compatibility with Bell system 201B and 201C data sets.

Models of the 2400 LSI without diagnostic control are available for dedicated line or direct dial operation.

COST EFFECTIVE NETWORK DIAGNOSTIC CONTROL WITH THE PENRIL 2400 DCM MODEM
call or write today for additional information.

Penril Data
Corp. Communications
Division

5520 RANDOLPH ROAD • ROCKVILLE, MARYLAND 20852 • (301) 891-8151 • TWX 710-828-0522

McGill Urges Integration

(Continued from Page 41)

tion age, McGill said the average company has invested \$25,000 in each production worker, but only \$1,500 in office workers engaged in corporate communications functions.

Companies today are typically organized into two separate areas, McGill noted. A vice-president of DP will generally have control over data communications while a vice-president of administration will control such things as office services, voice communications, word processing and in-plant printing.

In order for these now dispersed functions to contribute to corporate earnings, the management structure will have to be integrated, McGill contended. A director of information systems should oversee the various communications functions as part of a total applications-oriented structure, he suggested.

Telecommunications operations based on those applications can streamline personnel-intensive functions and contribute to the per-share earnings of a corporation, McGill said.

Some AT&T customers have already begun to look at their communications in a different manner and 34 "leading edge" customers have already organized according to this integrated approach, he said.

According to McGill, communications should be viewed as having three major segments: remote, travel and face-to-face types. Remote communications include electronic methods such as voice and data sensor control and paper methods such as text preparation and mail. Travel encompasses business, leisure and commuting; face-to-face types include conversion, discussion and delivery.

Today these functions are fragmented and their broad relation is not well understood by many executives, McGill said. If they can be integrated within corporations, he predicted, by 1985 \$400 billion will be spent on communications instead of the \$150 billion spent by industry in 1975.

"Making better business decisions means making comparisons."



"Because our peripheral customers are IBM users, you know they made a lot of comparisons before deciding on our Monolithic Memory or our Disk Storage Drives.

"Of course hardware compatibility was a must. Our products had to fit into their system. But the most important factors were price, performance, software compatibility and service.

"For example, many businesses decided on our new 33801 Data Module Drive instead of a 3350. Why? Because with our drive, they get more capacity, more fixed head storage, faster access time and without the need of costly software conversion. Another attractive comparison is our product's compatibility with either the 3350 or 3330 11 modes.

And a lot of our more than 1400 IBM user sites thought our Monolithic Memory made more sense when they discovered how economical it was and that we could deliver memory for the entire 370 line within 30 to 60 days.

"They compared reliability and service support too. Our customers can depend upon our broad product experience and our worldwide dedicated hardware and software specialists.

"But why not make your own comparisons. And review some of the other reasons our customers have made the better business decision. Call your local representative. For the number of our rep in your area call 612 853-7600."

CD CONTROL DATA
CORPORATION

More than a computer company

Multiplexers Pleasing Users, Datapro Finds

(Continued from Page 42)
tions to determine multiplexer usage patterns, including low-speed line types and speeds used, high-speed line types and speeds used and multi-drop usage.

Type of Facility

All but 13 responses indicated the type of facility used between the terminals and the multiplexer. About 20% used the public telephone network, and about 60% used leased lines to establish the low-speed connections, according to the report. A few used private or direct connections.

With responses on 79 products, Datapro found 59% of those users used a speed of 300 bit/sec, with 32% using a speed of 1,200 bit/sec.

Output Choices

On the output side, 50 responses indicated usage of a private voice-grade line; 16 responses indicated usage of a private network; and 13 responses indicated usage of a communications facility other than a leased line or private network.

Only the users of TDM multiplexers consistently reported speeds for the output side, according to the report. Of 57 TDM responses, 43% had a speed of 9,600 bit/sec (high-speed), 35% used 4,800 bit/sec and 33% reported a speed of 2,400 bit/sec, according to the survey.

Dispersed Multiplexers

In response to a question about the use of geographically separated multiplexers feeding the same line, 57 responses indicated that all feeder lines were terminated at the same location, and 16 responses indicated waystations were being used.

According to the report, 38% of the responses to the survey were sent by users who began using multiplexers during 1977.

Problem Areas

Based on the total sample, the survey found 25% ascribed significant difficulties to line outages, followed by 20% who ascribed difficulties to line quality. Nineteen percent found the hardware was the

root of the problem, while 15% felt diagnostic facilities were troublesome.

Eleven percent blamed modems for problems and a mere 2% cited control code recognition as culpable, according to the report.

The 27-page report is available for \$12 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Data 78 Set for Toronto in April

TORONTO — The Data 78 data communications conference and exhibition will be held April 4-6 here at Sheraton Centre.

Data 78 will include exhibits by both U.S. and Canadian vendors. Session topics include "Objectives of Network Architectures," "Trade-Offs in the Use of Public vs. Private Data Networks," "The Economics of Virtual Data Links" and "Software in Network Management."

A featured speaker will be Prof. Marshall McLuhan and those speaking at technical sessions include Dr. Dixon Doll, consultant; Ian P. Sharp, president of I.P. Sharp; Mur-

ray Robinson, consultant; and John E. Fox, vice-president for marketing with Satellite Business Systems.

Special sessions are planned on the merging of voice and data, X.25 protocol and network architectures, Infoswitch vs. Datapac, electronic funds transfer systems, satellite communications and computer-based message systems.

Additional information about Data 78 is available from the conference organizers at Suite 2504, 2 Bloor St. West, Toronto, Canada M4W3G1.

**Documation's
new breakthrough
gives you all
the advantages of
impact printing
at laser graphic
throughput rates**

**Texas Instruments
Portable Data Terminals
FOR SALE**



• 743
• 745

BEST PRICE
FAST DELIVERY

CALL TOLL FREE 800-323-2288
IN ILL. CALL 312-279-1960

Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

Virtual Data Link Gives Remote User Control

SLATERSVILLE, R.I. — A decision last year by North American Philips to provide DP services to all of its operating companies through two regional data centers presented an opportunity — but also a problem — for one of those companies.

The decision afforded Amperex Electronic Corp., headquartered here, the opportunity to connect to a virtual machine at a potentially sub-

stantial cost saving. The problem Amperex faced was how to make that connection without losing the capability offered by its own IBM 370/135.

Peter J. Horn, DP director at Amperex, said he found the answer in a "virtual data link" supplied by Paradyne Corp. Called PIX-II, the virtual data link allowed Amperex to replace its in-house mainframe while maintaining the same

level of control over the execution of its jobs on a processor miles away, Horn said.

The PIX-II lets Amperex's unit record gear and its IBM 3270 on-line terminals here operate as if they are locally connected to the mainframe at North American Philips' data center in Manhattan. The Paradyne system provides a synchronous Data Link Control (SDLC) path between these two locations and will

permit Amperex to extend computing capability to other manufacturing facilities in Rhode Island just as easily, Horn indicated.

Central 'Black Box'

North American Philips decided to expand its data center concept after a study of the company's operations by a consulting firm. "The parent company wanted some controls on its DP costs, since the

total expenditures by operating companies was increasing rapidly," Horn explained. "Its idea was to establish a central 'black box' and let the operating companies tie into it."

Horn said North American Philips also wanted to preserve the autonomy of managers at each of its operating companies. For that reason, it decided upon the virtual machine concept.

"That way, each company could continue to do its own thing, using its own operating system in a 'time-slice' of VM, just as if it still had its own computer," he noted.

The parent company's decision meant Amperex would have to abandon its in-house computer in favor of the corporate data center in Manhattan. Horn reasoned, however, that if he made the right choice of remote site hardware, Amperex could maintain control of its DP operations while gaining the advantages of a virtual machine.

Three Needs

Horn evaluated equipment from IBM and Data 100 Corp., in addition to Paradyne's PIX-II system, with three functional requirements in mind: he needed remote job entry equipment to control the execution of task on the North American Philips mainframe; he needed a system console; and he needed on-line terminals to replace the local CRTs he had in place at Hicksville, N.Y.

"We considered IBM 3777 remote job entry terminal equipment and were pleased with it," Horn said, "and we looked at the IBM 3786 terminal as a DOS/VS console to replace the 3215 attached to our own 370/135 processor. Then we had to worry about tying in 3270 equipment for our on-line system."

Horn said Data 100 could have supplied replacements for the IBM 3777 remote job entry equipment Amperex required, but added he would then have had to obtain a system console and interactive terminals from IBM.

"It was then that we looked at Paradyne's PIX-II which, in effect, extends the multiplexer channel on a 370 processor. Through the PIX-II we could

(Continued on Page 46)

Introducing IMPACT 3000



AKD

(402) 392-2606

VOLUME DATA ENTRY
SERVICES ...
TAPE OR CARDS

"QUALITY AT A LOWER COST"

AMERICAN
KEYDATA

Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68108

CRT Offered

ROCKFORD, Ill. — The Model P1-11 intelligent CRT terminal is being offered by Phone 1, Inc.

The terminal offers an 80-char. by 24-char. screen, local editing, upper and lower case display and 300 bit/sec coupler.

The terminal including modem sells for \$1,075. The P1-11 without modem sells for \$800 from 1330 E. State St., Rockford, Ill. 61108.

PIX-II Gives Remote User Control

(Continued from Page 45) attach not only the card reader, card punch and printer we required, but also the system console and the on-line CRTs we needed, and we could communicate from all of those devices via SDLC protocol over a single telephone line," Horn said.

Major components of the PIX-II are a Local Control Unit (LCU), which plugs directly into the byte multi-

plexer channel of the mainframe at North American Philips' regional data center, and Remote Control Units (RCU), to which peripheral devices are attached.

By placing intelligence at both ends of point-to-point communications links or at each node in multipoint networks, the virtual data link supports full-duplex communications under SDLC without the need to implement

Vtarn/NCP teleprocessing software at the host, Horn said.

"If we had kept our own mainframe, we would eventually have relocated it to Rhode Island, where Amperex is expanding its electronic component manufacturing operations," he noted. "Now, using PIX-II, we can provide Rhode Island with more effective computing capability than we would have had simply by in-

stalling an RCU and attaching to it the peripheral devices we need."

One Phone Line

As Amperex continued its evaluation of IBM, Data 100 and Paradyne, Horn recalled, it discovered equipment supplied by either IBM or Data 100 would have required a minimum of five telephone lines: one for the unit record gear, one for the CRTs and one for the system console, for a total of three lines from Manhattan to Hicksville; and two lines to Smithfield, R.I., for the unit record cluster and on-line terminals, respectively.

Paradyne's PIX-II system, by contrast, required a single phone line from Manhattan to Hicksville, rather than five, and only one pair of modems; it requires only one line and one modem pair for Rhode Island.

And instead of operating in a total remote job entry environment, as would have been the case with either IBM or Data 100, peripheral devices at both Amperex locations function in the local mode.

"For our part, the ability to operate remote peripheral devices as if they were locally connected to a mainframe means we do not have to make any changes to our Power job control language or retrain our operators on any new Power/VS commands. Also, we don't have to bother to upgrade from the local to the remote version of our teleprocessing monitor, Minicomm," Horn said.

Cost Savings

Horn estimated that the Minicomm conversion alone, if necessary, would have involved a one-time charge of approximately \$2,000. The three additional communications lines Amperex would have required if it had not installed Paradyne's PIX-II would have cost the company approximately \$18,000 per year.

"The major potential cost advantage to us is the ability to connect to the parent company's mainframe, to displace our own CPU and to use the remote peripheral and other system resources," Horn said.

"We no longer have to worry about the cost of upgrades to our own system where, for example, we might have had to buy a 100 million character disk even though we required only 30 million characters of additional storage.

"By using the facilities of the North American Philips regional data center, we stand to obtain greater capacity at a lower cost. We'll pay only for the piece of the system we use."

TI's 745 Portable Data Terminal can make the difference between closing doors and closing deals.

Sometimes, getting back to your customers tomorrow or next week just isn't good enough. It can mean a closed door now. And more closed doors to future business.

TI's Silent 700* Model 745 Portable Data Terminal gives you all the facts and figures you need to close your sale. On the spot.

All you need is a telephone and an electrical outlet. And you're ready to send or receive information from your home office computer that's configured for remote-dialed communications.

Immediately. Plus, you get an instant printed copy of the information for your records.

TI's 745 Portable Data Terminal weighs only 13 pounds. So, you can easily take it with you wherever you go. And get virtually silent printed copies of

critical orders at 30 characters-per-second. Inventory. Pricing. Deliveries. Listings. Policy analysis. And budget impact analysis.

With a TI microprocessor at the heart of the unit, the 745 is unbeatable for performance and reliability.

And with a price of only \$1995†, the 745 is several hundred dollars below



competitive models. With larger quantity discounts available, too.

So, if you're in real estate, insurance, finance, manufacturing, wholesale, retail or any other business with field operations, put our 745 to work for you. And start closing more deals.

For immediate response, contact your nearest TI office, or call Data Terminal Marketing, Texas Instruments Incorporated, at (713) 491-5115, extension 2126.

Or for more information, simply return this coupon.

TEXAS INSTRUMENTS
INCORPORATED

Yes! I am interested in the Model 745 Portable Data Terminal.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name _____

Title _____

Company _____

Phone _____

Address _____

City _____ State _____ Zip _____

Mail to: Texas Instruments Incorporated, P.O. Box 1444, M/S 784
Houston, Texas 77001

SILENT 700
electronic data terminals

12-3-CW

*Trademark of Texas Instruments

Copyright © 1977, Texas Instruments Incorporated
†U.S. Domestic Price

TEXAS INSTRUMENTS.

BASF invented magnetic tape back when IBM's growth was still in the cards.

Back in 1932, when Ronald Colman starred in *Arrowsmith* and a pound of sirloin cost 29 cents, BASF invented magnetic tape . . . the forerunner of all of today's high-density data processing media. The state of the art has progressed immensely since then, and we do have some well-known competition. That's why, at BASF, being first has to take a back seat to being best. And we've spared no effort to be the best. Over 1,500 scientists and engineers are involved in the BASF corporate research and development program, which operates with an annual budget of \$200 million. The results of this effort can be seen in the performance of all BASF magnetic products. At BASF we realize that it's not how long we've been around that make the difference; it's what we've done with our time. Ask our customers . . . most people who choose BASF make it their only choice. BASF Systems, Bedford, Massachusetts 01730.



Computer Tape Disk Packs
Diskettes Cassettes Mag Cards

 **BASF** The Original.



Tester Works as Monitor, Analyzer, Simulator

MOORESTOWN, N.J. — A data communications test and diagnostic instrument has been introduced by Spectron Corp.

The D-502B Datascope can be used as a data monitor, an analyzer and as a simulator and tester, according to the vendor.

Weighing less than 25 pounds, the D-502B offers a time-correlated full-duplex display of 375 characters; switch selection of program listing, output buffer contents, timers, counters and CRC display; and switch control of framing, code level, languages, markers, idle suppress, synchronization, sync reset, speed, independent inversion of data sense for send or receive and bit order reversal.

It also offers composite video output;

printer option; parallel interconnection with electrical isolation; test points for access to the interface leads; external signal input/output jacks for sync reset, marker input, marker output and stop.

The Datascope Model D-502B is further extended by a series of adapter and accessory options that include a full alphanumeric keyboard, tape unit, program storage adapter, remote connection units and interface adapters.

In use as a data monitor to isolate software, hardware and communications problems, the D-502B provides direct monitor operation with no programming necessary, a spokesman said. It is compatible with all line disciplines, protocols and codes, he added.

As a data analyzer, the D-502B was designed to measure line utilization, response times and block error rates.

When used as a data simulator and tester, it allows testing of software, modems, communications lines and terminals, both on-line and off-line. In

addition, it can be used to simulate any protocol and line discipline and to monitor both test sequence and response, the spokesman said.

The Datascope D-502B costs \$10,800. Spectron is at 344 New Albany Road, Moorestown, N.J. 08057.

Ann Arbor Adds Keyboard

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc.'s Model 400E terminals are now available with the KB400M keyboards, intended for use in specialized computer applications requiring the operator to call up pages of data via the use of specified codes, the firm said.

The keyboard consists of three

12-key pads. One is for numerics only, one contains cursor control and functions keys and the third has 12 function keys.

The units' refresh memory, which stores 2,000 characters, is standard with a display format of 24 lines by 80 characters and an extra line of memory that is accessible in either "roll" or "scroll" modes. The RS-232C interface is standard, as is the RS-170 video output for driving auxiliary monitors. Three character accents — blink, dim and reverse-video — are also standard. The cursor is displayed as a blinking field, the firm said.

Available options include user-specified output codes and key legends as well as upper/lower case character display, 40-character line and double-high characters.

The single-quantity price is \$1,100. Delivery is eight weeks from 6107 Jackson Road, Ann Arbor, Mich. 48103.

Telenet Offers Discount Plan

WASHINGTON, D.C. — Telenet Communications Corp. has introduced a volume discount plan for users of its public packet network.

Under the plan, which went into effect on Feb. 1, customers with monthly billings of over \$5,000 pay a lower rate on charges above that amount. The size of the discount ranges from 20% on monthly billings between \$5,000 and \$9,000 to 50% on billings over \$18,000.

The key items covered by the plan are traffic charges for the amount of data sent through the network; monthly charges for private dial and leased channel ports, including multiple connection, rotary and private network features; and usage of local public dial-in ports.

Economies of Scale

The lower rates for higher volume users reflect Telenet's economies of scale in providing network management and other services for these customers, a spokesman said. He added that a customer with several data centers connected to the network in different locations can, in most circumstances, combine charges to qualify for the discount.

With the Telenet discount plan, customers will reportedly be able to significantly lower their hourly communications costs. For example, the incremental cost of public dial-in service in the major cities (including traffic and connection time) will be approximately \$1.90 an hour at the 20% discount level and as low as \$1.20 an hour at the 50% level.

Telenet Communications Corp. is headquartered at 1050 17th St. N.W., Washington D.C. 20036.

Your top competition is going to meet your prime prospects. What are you going to do about it?

They've made a smart decision. Last year the nine computer market areas on our itinerary drew 42,178 qualified buyers.

This year we expect more than 50,000. Can you afford to miss this chance to present your products and services?

There's still room for you. But it's going fast. Get complete information with this coupon now, on how Computer Expo 78 can work for you. Or save time by calling Kim Wichert collect at 617-964-4550.

These companies have already signed to exhibit at Computer Expo 78:

NCR	Computerworld	Trac Associates
Varian Graphics	NCI	Sperry Univac
Informatics	AT&T	Xerox
Honeywell	Kodak	Sykes Datatronics
Datamation	BASF	Cummins Allison
Communication News	IBM	American Microprocessor
McCormack & Dodge	Anderson Jacobson	International Data Corp.
Data Rentals	Computer Input Services	Programs, Inc.
Computer Sales International	Paradyne	Beehive International
Intel	ComData	Intertec Data Systems
Electronic Ventures	Genesis One	Software AG
Computer Rooms	Data Processing Sciences	Creative Engineering
Customer Priorities	Applied Computer Systems	Graphic Controls
Computer Software Solutions	Agile	Mini-Computer Systems
Systems Marketing	Woodford Systems	Tandem Computer
S.E.A.	American Used Computer	PCC/Pertec
Tri-Data	Business Forms Service	Computrend
Midwest Marketing	Itel Corporation	Extel
Logabax	Deltak	Mentel
AAA Chicago Computer	Peripheral Products	Sycor
Intelligent Systems	General DataComm Industries	Digitronics
Shasta	Continental Peripherals	Computer Services
Mostek	Computer Associates	Datamart
DIVA	Qantel	Courier Terminals
SBC Magazine	Diablo Systems	Modems Plus
Tele-dynamics	Marketechs	Software Design
Control Data	Racal-Milgo	Curtis 1000
National Semiconductor	Data Systems Specialists	Spectron
Printonix	Key Tronic	K&K Associates
Codex	Administrative Management	Applied Digital Data
Lear Siegler	Small Systems World	Epic Data
E.M. & M.	American Terminal Leasing	Terminal Rentals
The Morley Company	Journal Systems Management	Applied Data Communications
Vanier Graphics	Optical Business Machines	Data Forms Company
Total Typography	McGinn Safe	Imperial Technology
Wang Labs	Allstate Computer	Mathematica
Computer Devices	H/G Professional Forms	Rianda Electronics
Ann Arbor Terminals	Nichols & Company	Computer Corp of America
Datapro Research	Datapro	Cullinane
Inforex	Input Services	Hewlett Packard
Perkin-Elmer	Plessey Services	Pansophic Systems
Telcon Industries	Industrial Computer Controls	
Versatec	Vincent Data Products	
Computer Performance	World Info Systems	
Advanced Systems	DP Power	
Delta Data Systems	Conrac	
Inform	Educational Data Systems	
Computer Decisions	Cybertek	
Infosystems	Cosmic	
T-Bar	Business Automation	
Corporate Systems	Insyte Datacomm	
Dynatech	YE Data	
Western Union	Arcus	
Calcomp	St. Louis Info	
General Computer	Digilog	
Atlantic Research	Herrera Kirby	
Telefile Computer Products	Foto-fun	
General Electric	Hamilton Sorter	
Qume	Dispotech	
Moore Business Forms	Consolidated Computer	
DataMedia	Cybersearch	
Texas Instruments	Wolfe Computer	

COMPUTER
CARAVAN'S



I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
☐ Have Sales Representative call me
☐ Send Reservation Agreement
☐ Send Copy of 1977 Attendee Analysis

- | | | |
|--|---------------|---------------|
| ☐ Southern California Computer Expo | Anaheim/LA | March 21-23 |
| ☐ Northwest Computer Expo | San Francisco | March 28-30 |
| ☐ Southwestern Computer Expo | Houston | April 11-13 |
| ☐ Southeastern Computer Expo | Atlanta | April 18-20 |
| ☐ Gateway Computer Expo | St. Louis | April 25-27 |
| ☐ Midwestern Computer Expo | Chicago | May 2-4 |
| ☐ Mid-Atlantic Computer Expo | New York | May 9-11 |
| ☐ Great Lakes Computer Expo | Detroit | May 23-25 |
| ☐ New England Computer Expo | Boston | May 30-June 1 |

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (_____) _____

At Bank of America

Micr Units Take on 10 Million Item/Day

SAN FRANCISCO — The Bank of America here, which normally processes an average of 10 million documents daily, has processed as many as 13 million documents in a single day.

The processing was done on 28 IBM 3890 document processors backed by the computing power of 12 large-scale systems: two IBM 370/195s, six 370/168s and four 360/65s.

The CPUs and document processors are located in two data centers, one in San Francisco for the northern area, and the other in Los Angeles for the southern area banks.

A magnetic ink character recognition (Micr) services unit is part of each data center. They are responsible for the Micr processing items received from branch offices, departments and other banks. Approximately 488 branches send work to the North Center, and the remaining 585 branches send their work "South."

Long distances must be covered (north to Oregon and south to Mexico), which add additional pressure to Micr processing time-tables in the centers. Nine airplanes and several hundred automobiles provide the needed courier service between the branches and data centers.

In order to contend with the large document volumes and provide better service to the branches, each Micr services unit installed 14 document processors.

Previous System

Previously, IBM 1419 reader-sorters and 1419-like machines were used to process drafts against the bank ("on-us" items), while still different equipment was used for the transit work. "We felt the 3890 was the only machine that would allow us to combine transit and on-us work under one software system, one machine type and one physical department," according to Andy Cote, vice-president and head of fund transfer research and control. "This was primarily because of the 3890's high productivity."

"We needed a high-volume machine," according to Tom Longworth, vice-president and manager of Micr services at the South Center. "Our document volume was increasing as our branches developed more applications. We still had only 24 hours in the day to get out the work so we needed more efficient processing."

"In addition, our level of exception processing because of nonreads was reaching a scary height. Exception processing has to be kept at the lowest possible level or it can put you out of business," he noted.

"We wanted a machine that would allow us to do a single-stream proof of deposit," Dick Clarke, Longworth's counterpart at the North Center, said. "Today, we have 100 branches running on a proof-of-deposit pilot program and we are studying the benefits."

Fine Sorting

Currently, the bank uses its 1419s, 1419-like machines and the 3890s to do fine sorting. A benefit study is being performed to determine the value of completely replacing the bank-owned 1419s with additional 3890s. It has been estimated that a total of 24 machines at South and 22 at North would be needed to do all the check-processing work.

A benefit realized through Bank of America's use of the IBM 3890s is the reduction in the reject rate. A 40% to 45% decrease in rejects has been achieved. A high-speed reject re-entry system processes the on-us rejects with a 94% recapture rate. In this way, the volume of exception processing

caused by rejects (nonreads) has been greatly reduced, the bank claimed.

A second benefit has been increased productivity. "We've been able to increase operator productivity in our sorter operation," Dick Clarke said, "because the additional pockets (13 on the 1419 vs. 24 on the 3890) have allowed more end points on the prime pass. The increased speed of the 3890 over the 1419 provided greater throughput (the

Bank of America is achieving 3890 throughput of 80,000 items per hour); and once the 3890 is mastered, it will be easier to operate than the 1419.

"Beside improving productivity in sorter operations, the inherently lower reject rate of the 3890 has reduced the reconcilers' work load and the number of slow-speed rejects sent back to the branch," he pointed

(Continued on Page 50)

Medium-Scale System Helps College Solve Record Problems

SAN DIEGO — Remember rushing for classes at college, the seemingly infinite line for registration, record checks and scheduling problems? Those perennial problems for both students and administrators have been virtually solved at National University here through the use of a medium-scale system.

"A student is always first in line at national," Dr. David Chigos, president of the 2,400-student university, said.

"We can register students for their entire degree any school day of the year. They can see counselors almost instantaneously,"

(Continued on Page 54)



Students at National University in San Diego are benefiting from improved access to record and other data through a computer-based access system.

Datapro Finds COM Advancing, But Not Displacing Printers

By Tim Scannell
CW Staff

DELRAN, N.J.— Even though computer output microfilm (COM) hasn't displaced traditional forms of computer output or revolutionized that aspect of DP, it has nevertheless made considerable progress both technologically and in the number of units installed, according to a report recently published by the Datapro Research Corp.

"All About Computer Output Microfilm" details, in part, the pros and cons of COM and explains why it hasn't generated the enthusiasm that was originally predicted.

"The early excitement ... was based upon predictions that COM would replace impact printers," just as optical character recognition (OCR) systems were supposed to replace "traditional forms of computer input such as manual keying," the report stated. Both techniques, however, failed to achieve

the goals set for them, Datapro observed.

Many disadvantages of COM remained, even though "it could be shown that a COM unit could 'print' data much faster than a line printer, that film was cheaper than multicopy forms, that the end product occupied much less space than printed reports, that distribution costs could be slashed, and that if occasional hard copies were necessary, a reader/printer could easily produce them," the report pointed out.

Disadvantages include an incompatibility with certain applications "where the data base must forego frequent and rapid changes"; the user's inability to "make notes, mark pages ... or use it at all without a microfilm reader"; limited retrieval techniques "in the opinion of many users and prospective users"; and poor file integrity, "because it is easy to remove one fiche or

(Continued on Page 58)

Are You a Used User?

Have you ever purchased used computers or used computer equipment?

If you have, *Computerworld* would like to be able to share some of your experiences with its readers. We would like to run a series of articles on used computers, dealing with the following:

From whom did you buy the equipment — another user, the original vendor or a used computer dealer?

What type of warranty did you get? Did the seller keep the warranty, or were you left holding the bag?

Did the system operate as advertised?

How well did it survive shipping?

Did you get any surprises you weren't

expecting?

The used computer purchase can be one of the best or worst experiences in a user's professional career. Help us and your fellow readers by writing up both your good and bad experiences.

Submissions should be between four and five typewritten pages, double-spaced, 65 characters to a line. Send articles to Frank Vaughan, c/o *Computerworld*, 797 Washington St., Newton, Mass. 02160.

If you are interested in submitting a story, but aren't quite sure where to begin, feel free to call Frank at (617) 965-5800.

Bank's Micr Units Handle 10 Million Item/Day

(Continued from Page 49)

out. "The microfilming feature has eliminated the need for a separate microfilm department, and the southern center has realized a reduced load in the adjustment department.

"Overall, considering all employees of both Micr service units, we've increased our productivity by 12% as a result of using the 3890," he said.

Longworth, concerned about employee morale, added, "The sorter operator and reconciler tasks tend to be monotonous, but the 3890 has enriched these jobs. The sorter operator has become more of a technician, and the reconciler is able to spend his other time more meaningfully since there are fewer incorrectly read items and fewer nonreads.

"The sheer volume of our adjustments made them nearly unmanageable," he added. "We're now reducing this workload and increasing our ability to manage it effectively. This is because of the reduction in exception processing.

"Since January 1976, we have had no high-speed processing hold-overs in work received. Before the 3890s, we held over fairly frequently. Even so, we're still learning to use all the capabilities of the 3890 — we'll continue to receive additional benefits for some time yet," he added.

The use of the 3890, more courier service and other innovations have improved Micr processing in the North Center, according to Clarke. "We're now meeting 99.9% of our Micr com-

mitments to our branches," he said. "That is, we are getting all the work — including accompanying reports — out the door to the branches by the established deadline 99.9 times out of 100. In 1975, we were meeting these commitments only 96% of the time."

Operator Training

Another recently completed project at Bank of America is the 3890 operator training course instituted in the first quarter of 1977. IBM assisted the bank in developing a formalized training program built around three video films and a workbook. Introduction, operation and maintenance of the 3890 document processor are covered. The films were professionally produced and directed.

"The value of the video films," Davis explained, "is that it is now economically feasible to train only one or two people at a time, since it's not necessary to tie up an instructor. We used to have an instructor teach a formalized class and we needed to wait until we had six or eight students before it was economically justifiable to hold it."

As an alternative to moving work manually to and from the desks of 200 reconcilers, the North Center is piloting a mailmobile. This automatic, battery-operated runner delivers unbalanced work and picks up completed work from the reconcilers on a scheduled basis. Efficiency and timeliness is expected to improve with the acquisition of this mobile unit.

A final bank endeavor that is expected to have a significant and favorable impact in the reconciling and adjustment areas is the IBM 3600. This system is now being programmed and tested in the North Center.

Initially, the 3600 will be a stand-alone minicomputer system that will be used as a tool to aid in reconciling. As adjustments are entered through the system terminals by the reconcilers, the 3600 system will print the adjustments, balance the control groups and store the data, which will be ultimately transferred via tape to the main computer files. The 3600 could be attached to an IBM 370 via a teleprocessing link, the bank added.

The most significant anticipated benefit of the 3600 system will be the clarity of the adjustments. Currently, many of the adjustment slips are incorrectly filled out, incomplete or illegible; when sent to the branches, they must be returned to the adjustment department, the bank explained.

Of the incoming adjustments to the North Center adjustment department, 17% are returns from the branches because of illegible or incomplete slips. Use of the 3600 will standardize information required on the adjustment slip and eliminate illegibility, which is expected to reduce the adjustment department workload. The reconciler, whose job will be enriched through use of the 3600, should become more productive, because the 3600 will take over total balancing. It is estimated that this will increase productivity by 10%.

The 3600 system will provide an element of production control through what amounts to on-line reconciling, the bank noted. Adjustment statistics maintained by the system will relate the adjustments to specific sorters, reconcilers and originators.

Noise-Cutting Cabinet Fits Teletype Model 40

CITY OF INDUSTRY, Calif. — The Van San Corp. has announced a noise-reducing cabinet enclosure for the Teletype Corp. Model 40 printer.

The 1720 series cabinet is available for 80- and 132-column tractor, friction-feed and forms-access Teletype Corp. printers and is designed to place the machine at operational height, the firm said. The unit is equipped with mounting rails, on-line/off-line switch and filtered AC wiring.

The 1720 costs \$378 in single quantities with OEM discounts available from the Van San Corp., 1180 Centre Drive, City of Industry, Calif. 91748.



THE STANDARD IN DISC STORAGE SYSTEMS

80, 100, 200, 300 m/byte systems

NEW
DEC 11/70
— DD 70 Series

High performance disc systems;
80, 100, 200 & 300 m/bytes for
cache bus interface on DEC 11/70.

• Compatibility

Plug compatible and transparent. Will run all standard operating software supplied by DEC, Interdata and Data General.

• Reliability

Multilayer construction, ECC and Self Diagnostic.

• Service

Installation, World Wide Service Support and Maintenance Contracts available.

• Price

OEM and Volume user discounts available. Save up to 50% relative to other mainframes pricing.



DIVA
FIRST & FOREMOST
IN DISC SYSTEMS
FOR MINICOMPUTERS
SINCE 1969

DIVA, INC. Eatontown, N.J.

Call toll free 800-631-2141



A COMMERCIAL WITH NO PROGRAM INTERRUPTIONS.

The Data General CS/40 Commercial Systems. They speed up program development using ANSI '74 COBOL and unique screen handling extensions. And these interactive small business systems can be enhanced without redesigning original programs. So CS/40 systems keep saving you time and money.

CS/40 systems, with multiple interactive terminals, put data processing power right in the hands of the people who need it. When they need it.

CS/40 systems won't interrupt your growth. Adding hardware such as larger discs or more terminals, or changing to other models, need not affect application design structure or programming.

CS/40 systems. The best way to minimize the application development investment. And the best commercial for a business system supplier's sales. For more information, call (617) 366-8911, Ext. 4735, or write.

Data General

We make computers that make sense.

Data General Corporation, Westboro, MA 01581, (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61 rue de Courcelles, Paris, France, 766.51.78. Data General Australia, (03) 82-1361. Data General Ltda., Sao Paulo, Brazil. © Data General Corporation, 1977.

Mom gives so much and

Never again will you have to pay top dollar for data processing components. Not if Mom has anything to say about it.

Because she operates Mom's Warehouse.

And she sells big name components at small prices. Microcomputers, video and printer terminals, accessories, even complete systems. And soon on these pages, she'll be offering accessories, supplies, unique interfaces, and even kits.

So shop around.

Compare prices.

And discover for yourself that Mom's prices are tough to beat.

Mom buys in volume, gets volume discounts, and passes the savings on to you. Then she cuts her prices even further by eliminating salesmen and unnecessary hand-holding.

These clever ads are almost her only overhead.

Mom operates on a cash and carry basis. Send cashier's check or money order and she'll ship your order immediately. Send a check and she'll ship as soon as it clears.

Mom believes the computer industry is finally ready for her new sales concept. And she thinks buyers like you are sophisticated enough to make it work.

Whether you're a user or system builder, Mom's waiting to hear from you.

But prices are subject to change.

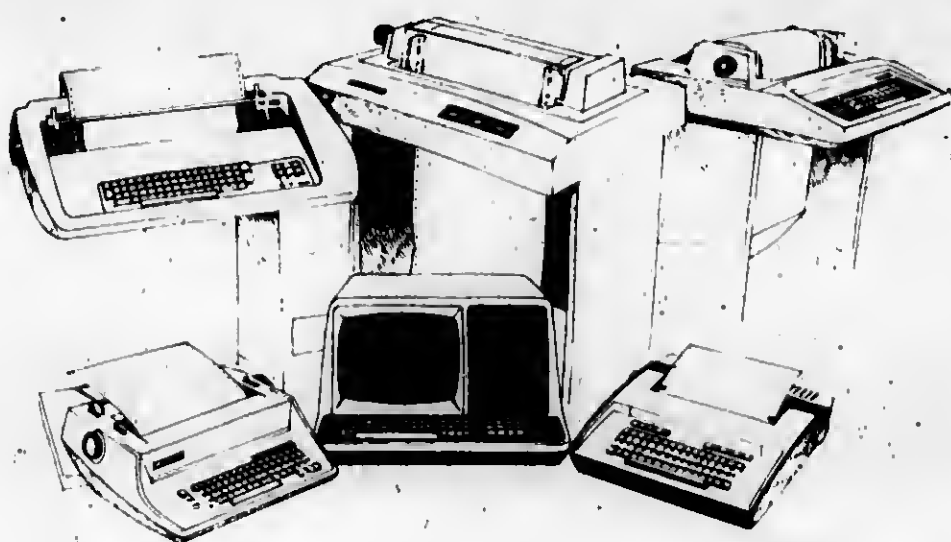
So write Mom soon.



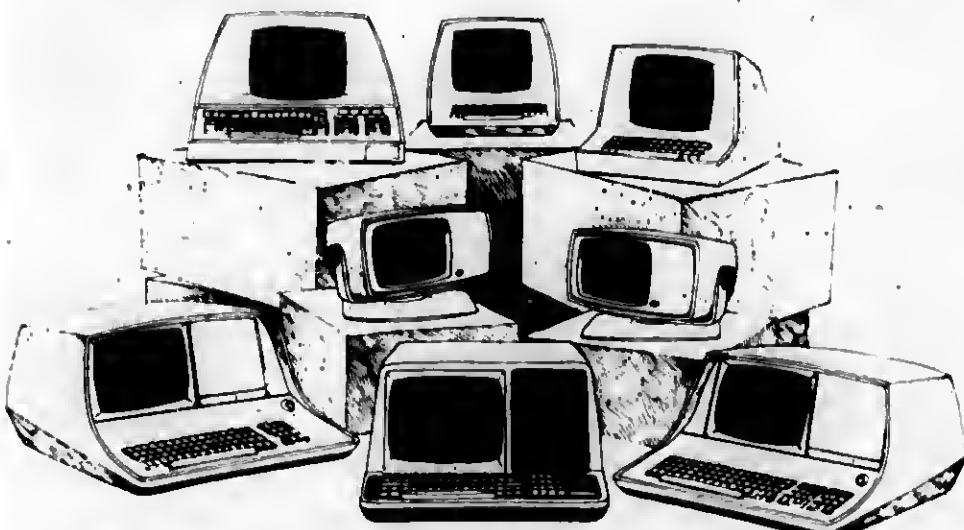
asks so little in return.



Dear Mom:
You certainly are a cheap mother. Please send me the following products at the ridiculously low prices quoted below:

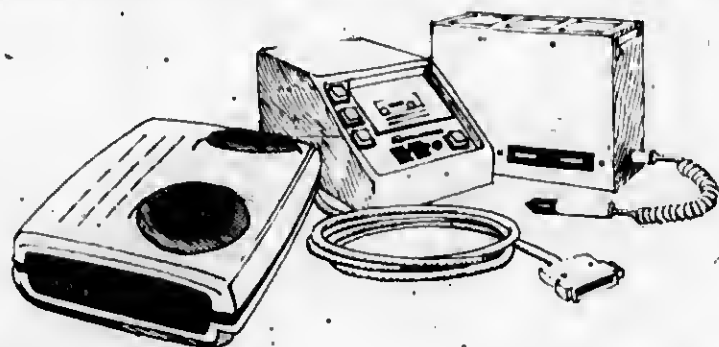


Qty.	Product	F.O.B. Price Each	Total
—	DECstation 78 Microcomputer System Save \$1000 Just \$7495 Includes Dual Floppy Disk System, Mom/2, OS-78, Fortran IV, Basic, Data Entry Package and Stand		
—	Options: Printer (Order LA36, LA180 or Diablo 1620 below)		
—	RX78 second dual floppy disk system with 256K, 12-bit word capacity	\$3950	
—	DECwriter 11 LA 36 Printer Terminal Save \$ 380 Just \$1490 With current loop interface		
—	Options: EIA RS-232C Serial Interface	60	
—	14-key numeric keypad	95	
—	Option mounting kit (required for the following options)	100	
—	Top of form	150	
—	Top of form, vertical tab, horizontal tab	285	
—	Buffered send/receive (BSR), 8000 character solid state storage with search and edit	895	
—	Teletype 43 30 cps Teleprinter Save \$ 182 Just \$1195		
—	Data General Dasher Printer Terminal Save \$ 710 Just \$1690		
—	Options: 11-key numeric keypad	100	
—	Top of form	175	
—	Combination top of form and numeric keypad	240	
—	Speed-up Kit (increases speed from 30 to 60 cps)	250	
—	DECprinter I LA 180 Save \$ 705 Just \$2695 With EIA RS-232C Serial Interface		
—	Diablo HyTerm Model 1620 Save \$ 385 Just \$2965		
—	Options: Forms tractor	215	
—	Pin feed platen	165	



—	Lear Siegler ADM-3A Video Terminal Save \$ 44 Just \$ 851 (The Dumb Terminal)		
—	Options: Lower case character set	100	
—	Numeric keypad	100	
—	RS-232 modem cable (10')	35	
—	(If you're buying more than one Dumb Terminal, call Mom to discuss quantity prices.)		

—	Lear Siegler ADM-1A Video Terminal Save \$ 79 Just \$1511 With Numeric Keypad		
—	Options: Lower case character set	70	
—	Edit	100	
—	Printer Interface	130	
—	End of line buzzer	20	
—	RS-232 modem cable (10')	35	
—	Lear Siegler ADM-2 Video Terminal Save \$ 104 Just \$1991		
—	Options: Printer Interface	130	
—	RS-232 modem cable (10')	35	
—	ADDS Regent 100 Video Terminal Save \$ 66 Just \$1259		
—	Options: Auxiliary I/O function keys	125	
—	Detachable keyboard	95	
—	ADDS Regent 200 Video Terminal Save \$ 89 Just \$1706		
—	Options: Editing	145	
—	Detachable keyboard	95	
—	DECscope VT-52 Video Terminal Save \$ 410 Just \$1490		
—	Options: Printer Interface	215	
—	Data General 6052 Video Terminal Save \$ 500 Just \$1490		
—	Options: Printer Interface	400	
—	Data General 6053 Video Terminal Save \$ 600 Just \$1690		
—	Options: Printer Interface	400	



—	Bar Code Starter Kit Save \$ 100 Just \$ 895 For Alpha-numeric bar code. Includes Intermec 9210 code 39 reader with dual RS-232C connectors, hand-held bar code reading wand, bar code labels and application notes on warehousing, production control and libraries.		
—	TC 3002 Acoustic Coupler Save \$ 66 Just \$ 199 Switch selectable originate or answer, 300 baud.		
—	Techtran 815 Datacassette Save \$ 150 Just \$ 795		

SUB-TOTAL

California residents add 6%
sales tax plus any local taxes.

GRAND TOTAL

I understand that these are just some of the products Mom carries. If I want a product that's not listed here, I'll call you, Mom, for your low price.

☐ Mom, I don't want to order now. But please see that I hear from you every time you come up with a new money-saving opportunity.

Ship to:

Name _____

Company _____

Street _____

City _____

State _____

Zip _____

P.O. Number (if applicable) _____

For product and ordering information, call toll-free (800) 854-2039, 8:30 a.m. to 5:30 p.m. PST. In California, call (714) 560-5300 collect.

Shipping information: All shipping charges are COD. Your order will be shipped by normal surface carrier unless otherwise indicated. Everything is shipped in factory cartons with manufacturer's warranty.

Make checks payable to Mom's Warehouse. Prices subject to change without notice.

**MOM'S
WAREHOUSE**
WE MOTHER YOU BY MAIL

MOM'S WAREHOUSE, P.O. Box 178300, San Diego, California 92117

Card Reader Bows

DAYTON, Ohio — The Standard Register Co. has released a card reader for use in label-preparation systems that can read 80-column tab cards at speeds of up to 285 card/min.

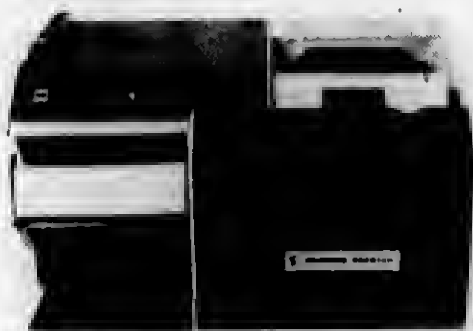
The Model 200 reader uses a phototransistor array to read punched cards in serial, column-by-column fashion, using an infrared light source, the firm stated. The unit holds up to 550 cards at one time and uses transistor-transistor logic circuitry.

Reads All Data

The unit can be programmed to read and transmit all data for a label regardless of the number of cards required to hold that information, a

spokesman said.

The Model 200 reader is priced at \$6,950 and is available for delivery in 90 days from The Standard Register Co., P.O. Box 1167, Dayton, Ohio 45401.



The Model 200 card reader can read 80-column tab cards at speeds of up to 285 card/min.

College Gets Record Assist

(Continued from Page 49)

and they can look at their records whenever they want," he added.

The key to eliminating troublesome lines has been an IBM 370/138 medium-scale system. More than 60 IBM 3270-type CRT terminals make relevant student and administrative records available to the 80-member staff and the students themselves.

"We do as little as possible on paper," Chigos said. "We put everything we can in the computer data base. It not only eliminates 90% of our paperwork — which is costly and inefficient — but it keeps our records constantly up-to-date.

"It also makes our job as administrators a lot easier. By letting the computer do most of the processing and recordkeeping, we have more time to

be people-oriented," he pointed out.

For example, he said, a newly created course goes immediately into the computer-stored curriculum so that all counselors know about it at once — there's no memo to get lost in office mail or in a stack of paperwork on a desk.

A student never has to worry about not being able to see a finance officer because another clerk has taken his file. The file is always in the system where all authorized administrators can get to it simultaneously.

And with 60 CRTs for a staff of 80, there's little waiting to get at the CPU.

Business Degrees

National students place a premium on time-saving systems. They are business executives, top-ranking military officers and high-level local government officials working for bachelor's and master's degrees in business administration under a unique program.

Students take one course per month as they earn their degrees. Classes meet two nights a week, four hours each night and for eight hours one Saturday per month. (One Orange County police chief and three of his aides drove 200 miles round trip to attend each class.)

The flexible scheduling enables students to miss a month for business or personal reasons without losing credit for an entire term or having to wait months before a new semester starts. This makes daily enrollment necessary and "we couldn't do it without the real-time computer," Chigos said.

"A person can come in, sit down for 45 minutes and we'll lay out his entire curriculum — by class, instructor, meeting time and room — for the entire degree," he said. "The student never has to come in again.

"If he wants to change his schedule, we can do it easily and instantaneously on the computer terminal."

Access Via Credit Card

A program called "Operation Access" enables students to use a bank or store credit card with a magnetic strip and a personal code to access their records on a terminal screen. Several hundred students use the system daily, Chigos said.

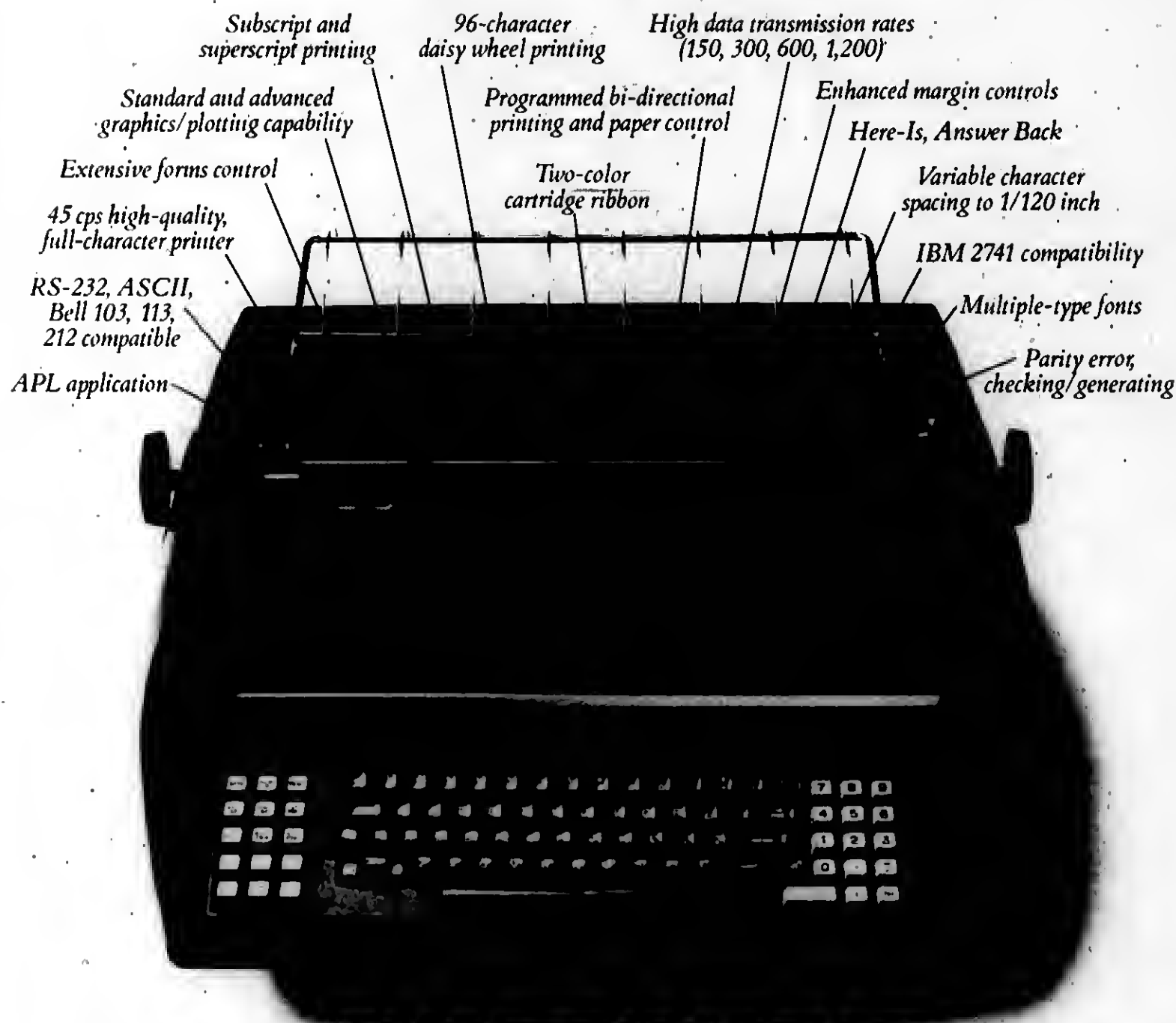
The computer system benefits not only students, but the administration as well. "It gives more comprehensive and timely information for making business decisions than we could ever get by more conventional means," Chigos said. "We can extract information from the computer in 1,029 ways."

"For instance, I can look at class schedules and student rosters for the next two years by using the terminal right by my desk. We have about 200 faculty members teaching courses, and enrollment statistics can tell me whether we need to add more classes or step up our student recruitment effort," he explained.

The computer also has enabled National to double its enrollment without significantly adding to the staff, Chigos said.

Another advantage has been reducing the problem of administering the Veterans Administration benefits program. Work that once took a month to do by hand now can be completed in four minutes, the university claimed.

You can't judge this Diablo terminal by its cover.

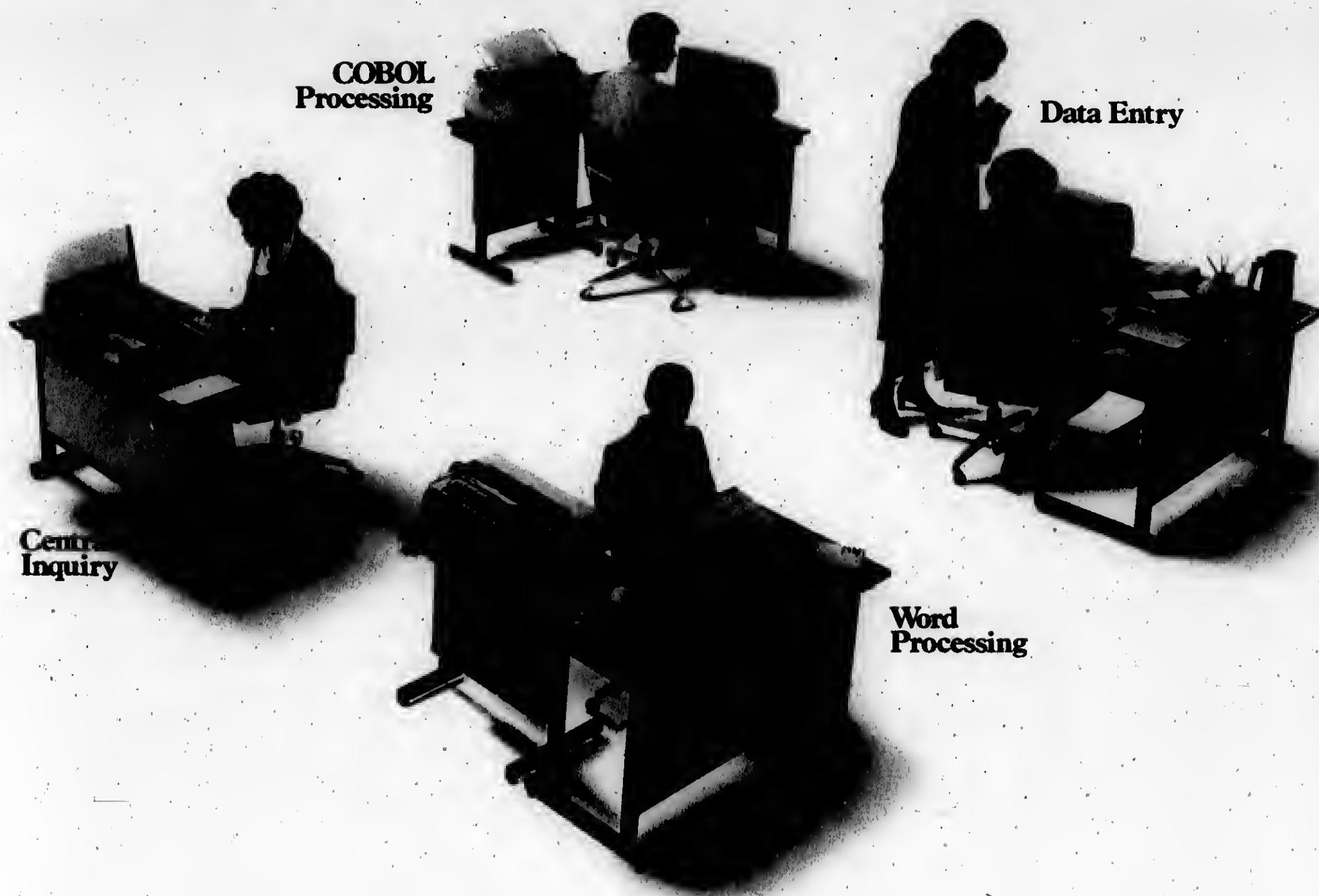


The new Diablo 1641 is what you make it. Because you choose the exact combination of features to fit your particular needs. To find out more, call Colleen Curatolo at (408) 733-2300, or write her at 545 Oakmead Parkway, Sunnyvale, CA 94082. When you get a Diablo terminal you also get Xerox quality, reliability, and availability. So you see, there's a lot more to the 1641 than meets the eye.

Diablo Systems

XEROX

**You may need
more than one
computer function...**



**...but you don't need
more than one
computer system.**



You can do all four functions at the same station with our



new Multifunction Executive.

For the first time, you can perform the four primary office computing activities on a single distributed processing system. Our new MFE/IV Multifunction Executive lets operators independently handle data entry, COBOL processing, word processing, and interactive 3270 inquiry to your central mainframe. And every function is instantly available at up to 16 System IV/90 display stations with the touch of a key.

The Multifunction Executive allocates CPU and I/O resources for optimum system performance, and allows our field proven software packages to operate concurrently and independently.

Save Money.

Multifunction means bottom-line savings for your organization. No more special-purpose systems sitting idle . . . no redundant and underutilized peripherals . . . no users struggling to crosstrain on dissimilar equipment. And because each Four-Phase display replaces several dedicated terminals, you should need fewer of them.

Save Effort.

As the balance of your workload changes, your multifunction system keeps up with it . . . automatically.

In a branch office, for example, an operator using the word processing mode to generate proposals can check current product availability by transferring to inquiry mode and accessing the headquarters data base. Or while new orders are keyed in fill-in-the-blanks formats, the system can independently retrieve and enter customer data from local files . . . price and delivery data from central files . . . and print an invoice. All while other activities proceed at other displays.

Grow Step-by-Step.

Begin now to benefit from multifunction distributed processing. Start by installing an economical system, combining data entry and file management. Or word processing and batch communications. Or data entry, central inquiry, and local processing.

Then add memory—up to 384K bytes for your local applications. Add discs—up to 270M bytes of online storage. Add printers—one for each display. And add software—with the Multifunction Executive for concurrent operation. Our family of systems lets you grow at your own rate, saving time and money at each step.

For more information, call your local Four-Phase Systems office. Or write for our new brochure.

 **Four-Phase Systems**

10700 North DeAnza Blvd., Cupertino, CA 95014

Business Systems**DISTRIBUTOR OPPORTUNITY**

Business Systems Products, Inc., manufacturers of the ADVISER® computer systems, is currently expanding its dealership program in selected marketing areas throughout the United States.

ADVISER systems are general business computers, developed by BSP to meet the needs of small to medium-sized companies, either as first time computer users, or to upgrade from outgrown mini-computers.

BSP is actively seeking distributorship candidates with prior successful experience in the business computer field.

Please submit your application to: George C. Erickson, Vice President, Marketing.

business systems products, inc.

2121 Campus Drive, Irvine, CA 92715
(714) 752-1799

Datapro Looks at COM Progress

(Continued from Page 49)
card from the file and never have the removal detected," the report continued.

"In the last few years, [yet] another competitor of COM has appeared in the form of the nonimpact printer," the report stated. "These machines offer speed approaching COM speeds, reduced report size and specialized fonts, yet they print on conventional paper." In short, "... they embody many of the advantages

which previously were the exclusive province of COM," the report noted.

Users' Comparisons

The Datapro report, besides defining and explaining COM and its various applications, also presents a user comparison chart rating a total of 92 in-house COM units.

Users were asked to rate their COM units on eight characteristics including print quality, throughput, ease of

operation, maintenance service, manufacturer's software, reliability and overall satisfaction, Datapro said. A total of 81 respondents evaluated their machines, taking into consideration such things as character-generation technique, on- and off-line usage, film type and graphic and alphanumeric capability, the research firm stated.

Bell & Howell Tops

The information, supplied through a reader survey form and submitted from Aug. 1 to Oct. 31, indicated that users of in-house Bell & Howell Corp. Model 3700 COM recorders were more satisfied with their equipment than users of competitive recorders, the report said. Bell & Howell units were followed by those of Quantor Corp., Eastman Kodak Co., Datagraphix, Inc., 3M Co., Memorex Corp. and NCR Corp.

COM Unprofitable?

Many companies have withdrawn from the field entirely, discovering COM to be an unprofitable ventures, the report observed. Firms that have dropped out include Burroughs Corp., IBM, Sperry Rand Corp., Gould, Inc., Per-tec Computer Corp. and the Harris Corp., the survey related.

On the other hand, "industry sources estimated the installed base at year-end 1976 to be 3,180 units, and it was forecast that this base would grow to 8,840 by 1980 and to 15,700 by 1985," Datapro reported.

A comparison list of prices and characteristics of the many COM units is also included as part of the report, which costs \$12 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

UL Approves Gould Units

CLEVELAND — Gould, Inc. has announced its complete line of electrostatic plotters, printer/plotters and its 5000 series has been safety-approved by Underwriters Laboratories (UL).

The units passed UL Specification 478 for DP equipment and are authorized to carry the UL label.

It would take this many HP 7920's



to equal this many MRX 677's.



We've become an old hand at improving the performance and economy of other systems. A new case in point: the HP-3000.

It's a powerful system. All it's lacking is a little more drive (the 7920 just can't give you the storage you need). So we came up with our MRX 667. With its 150 megabytes, one of our 677's does the job of three 7920's. And you'll get it at a much lower cost/megabyte—whether you take advantage of our one, two, or three-year lease, or our attractive purchase plan.

We've also seen to it that you don't have to modify your software. The 677 is fully transparent so it simply hooks up to your present system. One at a time, if you wish, or up to a total of eight per CPU.

As far as features go, you couldn't ask for more. An error correction code (ECC) is part of the package. So is an operator oriented self-test capability

and removable media. The latter is a big plus for protecting your data files. Maintenance is easy, too, because the 677 has only three moving parts. All read-write heads are easily accessible, and so is the entire electrical package which is housed at the top of the cabinet.

And to make your HP-3000 even more efficient, hook up one of our compatible printers. Chain-train models with speeds of 300, 425, 600 or 1000 lines per minute. Naturally, they're loaded with features and cost a lot less than any comparable model.

Contact us about our triple-threat Model 677 and our high-efficiency printers: Memorex, Business Systems Division, 3015 Daimler Street, Santa Ana, California 92705; or call us toll-free (800) 854-3111; or in California call (714) 549-9961.

MEMOREX

DECwriter II's & III's**For Sale**

•LA36

•LS120

BEST PRICE

FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-279-1960

Data Equipment Group

ICE, INC.

772 N. Church Rd.

Elmhurst, Ill. 60120

Pennsylvania User Gets First 5110

By Esther Surden
CW Staff

PUNXSUTAWNEY, Pa. — Price, performance and service — these were the reasons the first user of the IBM 5110 floppy disk-based system gave for his purchase of the recently announced unit.

The user, Punxsutawney Electric Repair Co., is a distributor of electrical products and employs about 19 people. The system will also be used to meet the DP needs of a sister company with 30 employees called B.F.G. Electroplating, according to Jeff Grube, vice-president of the repair firm.

Grube had been looking for a small business system for a while before settling on the 5110. "We had a problem

finding the right machine," he said recalling the search had as its object a system with sufficient access speed to mass storage and space enough to accommodate the firm's inventory list.

"Everything we found in the past would have been insufficient for the price we would have had to put into it," he added. "We assumed all along that if we would wait, we could get what we wanted."

The user also decided on the 5100 because "we liked IBM's service. We are isolated in a small town and, in investigating systems, we had to make sure we could get service," Grube said. The IBM office is located about an hour's drive away.

Installed in the beginning of February, the system is expected to handle billing,

inventory control, accounts receivable and sales analysis applications. "We are doing all our own programming," according to Grube, who took some programming courses in college. Grube also took IBM's one and a half day course in Basic before attempting to program his applications.

The payroll program has been completed and the rest of the accounting applications should be on-line soon, he predicted.

Grube expects the system will not only relieve the company's paperwork load, but will provide benefits in the management reports that will be prepared as a by-product of the processing.

Gains Doubled Workload

User Gets Bigger, Buys Smaller System

By Ann Dooley
CW Staff

DENVER — When First Independent Stock Transfer Agent, Inc. began increasing its share of the market, it decided to decrease the size of its computer system in order to keep up with company growth.

In switching from a large computer system to a minicomputer, the user cut its DP costs almost in half, according to T. Donald Brandes, former president of First Independent. The savings are definitely one of the main benefits of the smaller system, but it also provides greater data availability and greater ease of use, Brandes said.

First Independent previously used an IBM 360/40 through a service bureau and switched to an IBM System/32 in June of 1976. The switch went very smoothly, according to Brandes, who was able to train the existing clerical staff to use the system instead of needing to hire DP personnel.

The members of the staff like the system because it is easy to operate and "they can do their own work instead of waiting for someone else to get around to doing it," he said.

Same Cost, Double Work

In the stock transfer business, it is important to deliver fast service at competitive prices to publicly owned companies which don't necessarily want to get involved maintaining the thousands of shareholder records that need updating and tracking, Brandes

said.

First Independent had grown in a very short time from 37 clients and 45,000 shareholder records to more than 60 clients — ranging from oil companies to an ice cream franchise — with 75,000 records. DP costs ran about \$27,000 a year under the IBM 360/40.

"Since we've gone to the minicomputer system, our DP expenses are running about the same, but we're doing almost twice as much business," Brandes said.

One reason for the increased efficiency is the use of separate diskettes for each client. "We had massive files to work with, but the diskette can break down the information according to a client file and update it. In order to update a record with the old tape-oriented system, the whole tape had to be run before

the change could be made," he explained.

The diskette can be loaded into the system in about eight to 10 minutes, he added.

Plans for System/34

Last year, the company purchased another System/32 for added capacity. Both units have a fixed-disk capacity of 13.7M bytes and 16K memory. The system also includes a 150 line/min printer.

First Independent plans to upgrade to a System/34 next month for even greater capabilities in tracking shareholder records, according to its current president, Terry Kirchner.

In addition to a 27K minicomputer CPU, the \$75,000 System/34 will have four data entry spooling devices and a high-speed 300 line/min printer, Kirchner said.

Encryption Module Fits PDP-11

SCOTTSDALE, Ariz. — Encryption data security hardware for Digital Equipment Corp. PDP-11 minicomputers has been added to Motorola Corp.'s Infoguard line of encryption products, which reportedly conforms to the federal Data Encryption Standard (DES) [CW, Jan. 9].

Motorola's Government Electronics Division described the DES1100DSM as a self-contained encryption module that implements the DES within a customized, single-

chip NMOS LSI device.

The DES1100DSM features an M6800 microprocessor and is said to operate in cipher feedback or cipher block-chaining modes, handling such tasks as enciphering and deciphering data, encryption key loading and immediate key restoration.

The DES1100DSM costs \$1,995 from the Government Electronics Division of Motorola Corp. at 8201 E. McDowell Road, Scottsdale, Ariz. 95252.

DEC. CTS-500 DIBOL.

Business Software

- Accounts Receivable
- Order Entry with Inventory Control
- Sales Analysis
- Payroll • Accounts Payable
- General Ledger

End User and OEM/Distributor inquiries invited.

Call today (213-936-7131) or use the coupon.

MCBA

Mini-Computer Business Applications, Inc.
4929 Wilshire Blvd., #940
Los Angeles, CA 90010

Please send information about MCBA CTS-500 Software.

Name _____
Company _____
Address _____
City _____ State _____
Zip _____ Phone _____
____ End User ____ OEM/Distributor ____ Other _____

CW9

DEC® and DIBOL® are registered trademarks of Digital Equipment Corp.

MINI-TWO RTD

Warehouser Stows Away Inventory Problem

LANSING, Mich. — A small business system at an automobile warehouse here has helped solve the firm's massive inventory inquiry problems, according to the user.

"Before installation of our small business system, we did all of our inventory control and purchasing manually from the usual perpetual inventory cards," according to Stuart Morrison, owner of Mid State Automotive Warehouse, Inc.

"Every sale made and every part re-

ceived from a manufacturer had to be posted by hand. Our warehouse has an unusual number of phone orders as opposed to written salesman's orders. In those cases, we had to check our cards and let the customer know if we had the items on hand.

"If the customer wanted them, we would pull the parts and deduct them from our on-hand inventory. We were normally very fast in deducting outgoing merchandise, but our people were constantly criss-crossing and get-

ting into each other's way.

"We had difficulty in training new employees because of the need to learn each vendor and card location," Morrison recalled.

"When we wrote an order, it would sometimes require reviewing as many as 2,000 cards for a single vendor. This could take up as much as two days of our buyer's time because of the analysis required and the interruptions.

"We were well aware that the last part of these orders might not be as intelligently written as the first part because of the tediousness of the task," he said.

Breaking the Stranglehold

Once Mid State determined the growth pattern that brought them to a \$2 million corporation carrying 75 vendor lines and 25,000 part numbers and serving over 80 jobbers would soon strangle it in paperwork, Morrison decided there was only one way

from a manual system to a computer would be confusing, and I didn't want to foster even more problems by trying to force new methods down my people's throats."

Another criterion was that the system handle at least three workstations for the counter salespeople that would be tied into the central system for inventory, invoice and shipper updates.

Another key objective for the system was that it be "as quick and accurate as possible in handling our incoming phone orders. Therefore, in developing the system, we required on-line and preinventory capabilities," he noted.

Finally, Morrison said, he wanted a system that could be expanded in the future as Mid State grew.

The system Morrison finally decided upon was a Wang Laboratories, Inc. WCS-30 with three workstations, two printers and a 10M-byte hard disk for

Key to disc on Data General.

I doubt it.

Transaction processing on NOVA 3's.

Highly unlikely.

Both on one machine.

Never!

The product exists at Data Communications Corporation.

We sell **Unbelievable** systems.

Give us a call.

901-345-3544.

minicomputer division
DATA COMMUNICATIONS CORPORATION
3000 DIRECTORS ROW / MEMPHIS, TENNESSEE 38131

NOVA 3 is a trademark of Data General Corporation.

Down in the dump

INTERTEST eliminates the need to wade through those complex CICS dumps. INTERTEST automatically detects errors, tells you where the bugs are, keeps your CICS system from crashing, and lets you solve your problems on-line. It is used in CICS installations worldwide.

If you have CICS or CICS/VS, On-Line Software, the industry leader in teleprocessing software and services, provides a variety of solutions to your problems. Write to us, or, for immediate action on INTERTEST give us a call.



Workstations have eased warehouser's inquiry problems.

out without a substantial increase in personnel — a computer.

Morrison, who admitted he knew nothing about computers when he began his search brought in an outside consultant who looked at the size of the company, inventory, the kinds of reports generated, the people who would be running the system and the methods currently in use.

Although several manufacturers offered systems complete with software specifically for distributors, none of them met his exact requirements, Morrison said. "We started by interviewing about eight companies and developing a game plan as to what we really wanted. If there had been a program available that really met our requirements, we would have bought it. I guess now there is — ours."

Mid State therefore began to base its selection on a system that would accept the kinds of programs it needed and would be easy enough to use that any of its counter salespeople could operate it.

"We looked at the way we did things and decided against a computer that would force a major change," Morrison said. "We knew that the transition

on-line storage.

Because Morrison needed custom software, he called in an outside programmer to develop the exact programs he needed. The programmer was able to write all initial programs by the time the system arrived, and all inventory and related information was input in one weekend.

Sales records for each vendor were also input into the system the same weekend for use in management reports.

Backup Skipped

Morrison noted that the one area he did shortcut was running a backup manual system during the initial months of operation. "People told me that we had to run a backup manual system for at least six months," he reported. "We did it for two days and the computer was running so well that we dropped the manual system and went totally to the computer."

The three workstations at Mid State are downstairs, where the customer phones are located and customers come in for pickups. "When a customer phones in an order, the counter-

(Continued on Page 62)

For Marketing Department

Small System Fills 'Insatiable Demand' for Data

EDISON, N.J. — A small business system at Stendig International's Administrative and Distribution Center is helping that firm satisfy its marketing department's "insatiable demands" for information, according to a spokesman.

In developing a system, the contract furniture manufacturer "tried to anticipate all possible questions" the marketing department might ask, according to Dick Kamen, director of finance and administration. "These revolve particularly around who is specifying what type of product."

For example, the marketing development wants to know which architect specified what order. "We want to know if certain styles are falling off or others are moving up: Are new trends under way? Obviously, we want to spot them as soon as possible. You don't turn the production spigot on and off overnight," Kamen pointed out.

The system at Stendig consists of a Data General Corp. CPU with an eight-port multiplexer and 128K memory, two 40 M-byte disk drives, a 300 line/min printer and five CRT terminals. It runs under the Micos operating system from Mini-Computer Systems, Inc.

Bad Experience

Kamen helped choose the system when he was serving as a financial consultant to Stendig. Stendig's previous experience with a computer had been something less than satisfactory — too much had been promised too soon and too little was delivered too late at too large a cost, he said.

In making a fresh start, Kamen took cursory looks at about 300 systems and made very close examinations of about four dozen, most of the latter minicomputer-based.

The search resulted in recommendation of the Micos operating system, with customer applications design by Innovative Equipment, Ltd., a turnkey systems firm.

The system developed by Innovative Equipment to Kamen's specifications services all basic accounting and management information functions including order entry, inventory control, accounts payable, accounts receivable, invoicing, bill of materials, sales analysis, general ledger and multistate payroll.

Since the system can be used by people without DP experience, Stendig was able to meet its goal of reducing DP costs. Within several months after

the system was installed, Stendig had begun to cut costs which were expected upon completion to reach a \$70,000/year. To a company with sales under \$10 million, such a reduction is not insignificant.

Stendig produces and imports a comprehensive line of furniture sold under the Stendig and B&B America labels. The primary buying influence are architects and designers specifying office, public area or residential furniture on behalf of corporate or institutional clients.

The line is rather eclectic, covering such classics as the bentwood rocker and the tubular office chair, elegantly overstuffed sofas and such offbeat

items as a sofa in the shape of lips and another shaped like a baseball glove.

When the product line has such physical bulk, warehouse usage can be a significant cost factor. Every effort is made to get goods in and out of the attached warehouse as rapidly as possible, Kamen said.

It's also vital to keep up-to-the-moment on costs, especially for foreign goods, he noted, so the inventory control system includes landed costs and adjustments for fluctuations of the foreign exchange money market.

When multiplied by such variables as configuration, fabric color, the fairly long list of inventory items moves toward the astronomical. With the pro-

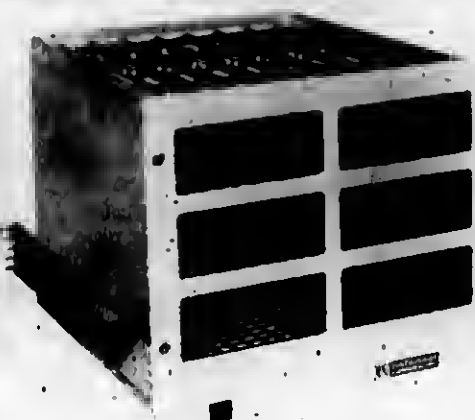
fessionals who serve as the main buyers, typically individuals who know what they want — and when they want it — tracking inventory and the status of an order is a complex affair.

Kamen feels the minicomputer system is equal to the job. In fact, he said, a person in Customer Service sitting at a CRT terminal often displays the entire order status so rapidly he can anticipate just what the caller is going to ask.

A 1,200 bit/sec modem connects Stendig in New Jersey with the Innovative Equipment office in New York so program modifications, updates and maintenance can often be done online.

SAVE 80%

ON PDP 11/70 MAIN MEMORY



WITH DATARAM BULK CORE

1024K x 18 (one megaword) PRICE COMPARISON

DEC				DATARAM			
Qty	Item	Unit Price	Sub-Total	Qty	Item	Unit Price	Sub-Total
1	MJ11-BC 256K word (512KB) system	\$ 55,500	\$ 55,500	1	BC-417 chassis and accessories	\$ 3,400	\$ 3,400
3	MJ11-BG 256K word (512KB) additional	53,240	159,720	8	128K x 18 (256KB) additional	5,140	41,120
Source: Datapro, February '77			\$215,220				\$ 44,520

SAVINGS $\frac{215,220 - 44,520}{215,220} = \frac{170,700}{215,220} = 79.3\%$

You read right!

Dataram's BULK CORE provides a dramatic main memory alternative for PDP-11/70 users. BULK CORE system BC-417 interfaces to DEC's 11/70 Memory Bus, and is completely compatible with DEC's MJ11 series of core systems.

The BULK CORE BC-417 system is offered in a 15 1/4" chassis with a minimum configuration of 256K x 18. It can be expanded in increments of 256K x 18 to a maximum of 1024K x 18 (one megaword).

BULK CORE. An economical, exciting... and proven alternative.



PRINCETON-HIGHTSTOWN ROAD
CRANBURY, NEW JERSEY 08512
TEL: 609-799-0071 TWX: 510-685-2542

I'd like to learn more about BULK CORE for my PDP 11/70

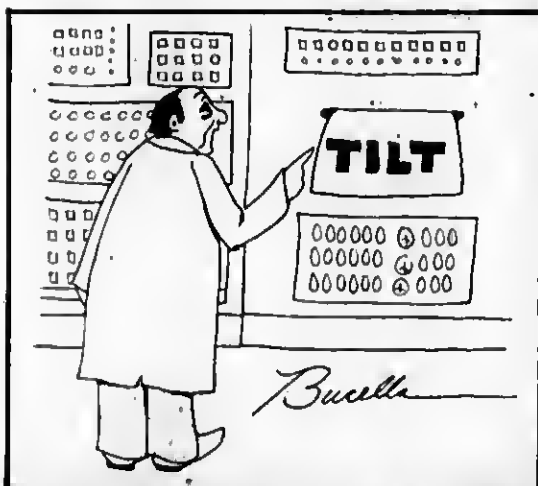
- ☐ Please send information
☐ Please have a salesman contact me

I'd also like to learn more about BULK CORE for Fixed Head Emulation on my ☐ PDP-11 ☐ Nova

Name _____
Title _____ Phone _____
Company _____
Address _____
City _____ State _____ Zip _____

☐ Please send me information about Dataram's ADD-ON/ADD-IN memory for minicomputers.

PDP and DEC are registered trademarks of Digital Equipment Corporation



Don't Tell Me That You Haven't Been Hanging Around With That Cute Little Pinball Machine Across the Street!

Canada: Tracac Electronics Corporation, Ontario/Quebec/British Columbia • Belgium/Luxembourg/Netherlands: Syntec Information Systems, (02) 647-67-12 • France: YREL, 950-2224 • Italy: Macronics, 35 38 041 • Sweden: M. Stenhardt AB, 08-739 0050 • Spain: Aupeca, (01) 457-53-12 • Switzerland: Stolz AG, 057 5 46 55 • United Kingdom: Sintrom Ellinor Ltd., (0734) 85464 • West Germany/Austria: O.E.M. Elektronik GmbH 0711-798047 • India: Industrial Electronic Instruments 79281 • Israel: K.O.M. Electronics Ltd. (03) 58232 • Japan: Matsushita Electric Trading Co. Ltd. (03) 433-4552 • Australia/New Zealand: Anderson Digital Electronics, (03) 543-2077

Custom Furniture Manufacturer System Helps Firm Keep Up With Competitors

CLEVELAND — When a company is just starting up in a competitive marketplace, sometimes the difference between success and failure can rest on how well its customers are served.

In the case of Professional Housewares Distributors, Inc., (PHD) a small business system is reportedly helping the firm provide the level of customer service required to allow it to keep up with the competition.

"Most distributors 'start out with a system designed to meet their internal needs and then expand it to provide DP services to their customers,' according to Richard F. Henry, controller. 'Because we would compete' against some very tough, long-entrenched distributors, the first requirement of our system had to be its ability to provide a full range of services and reports for our customers."

Henry drew up a list of 30 separate criteria by which to evaluate available systems. He then invited 10 different computer manufacturers to submit proposals for PHD's system.

Among the requirements were a two-month delivery date, programming in Cobol and RPG-11, extensive on-line capabilities, ease of operation, low cost, easy growth path and applications program support.

Several manufacturers declined to submit proposals, Henry recalled. Of the ones that did, about half were eliminated because they failed to meet one or more major requirements.

After several weeks of evaluating the remaining proposals, PHD ordered a Datashare system from Datapoint Corp. PHD's system is based on a Datapoint 6600 with 120K bytes of user memory.

"Most traditional computer systems are batch or sequential processing-oriented," Henry emphasized. "On-line capabilities have been added only as an afterthought to meet customer demands for interactive capabilities."

"Our system was designed primarily as an on-line interactive system with batch processing taking second place in importance. Therefore, it has enabled us to develop applications with a minimal amount of technical expertise and programming experience," he said.

Using programs executing on Datapoint 3600 CRTs, clerks enter each order by following the instructions and

formats displayed on the screens. From preprinted order forms sent in by salesmen or customers, a clerk uses the workstation's keyboard to enter customer's number, purchase order number, shipping data, advertising data, type of order, salesman's number, identification numbers of each item, quantity ordered and any special instructions relating to changes in retail prices stemming from customer promotions.

Already stored in the system's data base is information on PHD's approximately 3,000 electrical appliances, housewares, cleaning items and other household products, plus detailed information on each of the firm's more than 400 stores and shipping points.

As each order is entered, the system assigns a work-order number to identify and correlate actions and documents relating to the process of filling that order. At the same time, additional information from the system's customer and product files is added to the order file.

At the end of each day, the system prints out detailed warehouse picking lists for each order.

Pricing Task

The system also calculates retail price information. The customer's margin percentage for each item, his requested roundings of prices and his treatment of multiple-item prices are all computed by RPG-11 programs.

For most of its customers, PHD also applies price tickets to each item before shipment. These price tickets, which contain any information relating to the departments and product classes that the customer desires, are also printed out at the end of each day and forwarded to the warehouse along with the picking list.

Once an order has been assembled, a copy of the picking list, noting any partial shipments, is returned to PHD's computer center for the preparation of invoices and bills of lading.

The system also produces detailed invoices and bills of lading on its 600 line/min printer.

PHD's invoices contain management information. This data includes gross profit margins for each item, ordered plus total margins for each order by department, order and product class.

If promotional discounts have been in effect for any items on any order, the Datapoint system then identifies such items on the invoice so the customer can assess the effect of the promotion on his volume and margins.

The most time-consuming batch processing task performed by the system is the printing of customer order books. The books contain listings of all the PHD items customarily ordered by each store and are arranged according to the way the different stores stock these products.

Customer purchase analysis reports are also performed in batch. Each report contains a summary and analysis broken down by item, department and class of the customer's purchases during the period covered.

These reports also include the cost of each item, the customer's retail price and his gross profit margins for each item and for each bookkeeping category.



A Program Development System for ECLIPSE and Nova 3.
We developed it. We use it every day. We'll sell it to you.
The system supports the text editor and CLI on all your CRT's,
runs under RDOs and comes with complete documentation.
Give us a call. We'll wrap one up for you. **901-345-3544**

minicomputer division
DATA COMMUNICATIONS CORPORATION
3000 DIRECTORS ROW / MEMPHIS, TENNESSEE 38131

ECLIPSE and NOVA 3 are trademarks of Data General Corporation.

ASPEN SYSTEMS

The First Name In Text Processing Software

Aspen is the pioneer in full-text document processing systems for the IBM 360/370 environment. Aspen has a full range of integrated software products for document file management—

- **ASPENSEARCH V** — the fifth generation of Aspen's interactive document retrieval system.
- **QWIK-DRAFT III** — Aspen's latest version of the first commercial CRT-based, text-editing system.
- **AUTO-INDEX** — Aspen's system for producing word and phrase indexes from a corpus of text or bibliographic directories from a document collection.
- **TERMINAL MONITOR** — Aspen's own communication and transaction processing monitor to support the development and operations of interactive applications.

For more information on Aspen Software, call or write:



Aspen Systems Corporation
20010 Century Boulevard
Germantown, Maryland 20767
301/428-0700

A subsidiary of American Can Company's Information Technology Group

Warehouser Cuts Inquiry Problem

(Continued from Page 60)

person inputs the part number into the system. Complete information appears on the screen, giving us inventory on-hand, merchandise on back order, descriptions, supersessions, interchanges, etc.

"If we stock duplicating part numbers from more than one manufacturer, the counterperson is instructed to input a vendor code. After each part number is input, the counterperson may elect to ship, cancel or change the line order quantity."

"If the order is placed, the customer identification number must then be entered. At this point the customer's name is displayed for verification and the counterperson's initials are input. Immediately, the inventory file is updated, and a shipper is printed," Morrison explained.

"An important by-product we have gained is a record of lost sales. We always knew that we lost some sales on both the numbers we normally carried and on those not stocked, but we never had any concrete information as to how much was involved."

"We now get a stocking lost sales report, giving us each lost sale of a stock item as well as a recap in dollars by vendor. For numbers ordered that we don't stock, a report is available by part number and vendor only, but no dollar amount."

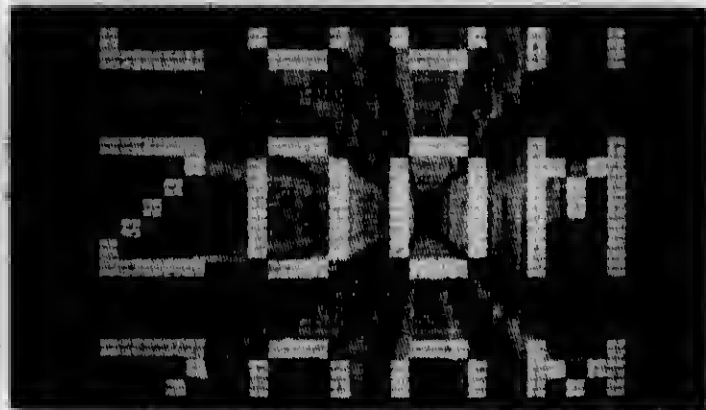
"We have begun an extensive program of evaluating these reports and adjusting our inventories," Morrison said.

Most graphics terminals are too dumb for words.

Even expensive models get tongue-tied when it comes to alpha-numerics. But now there's a bright new graphics terminal that has a lot to say for itself.

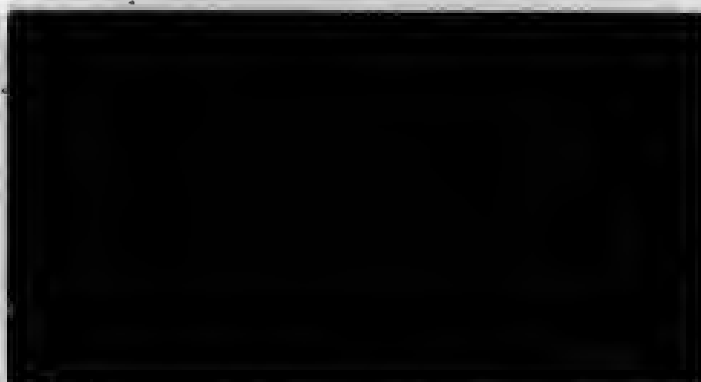
Alpha-graphics: the perfect combination.

It's the Hewlett-Packard 2648A alpha-graphics terminal. For just \$5500*, it will dazzle you with a



virtuoso display. You'll see zoom and pan, area shading, pattern definition, rubber band line, scientific plotting and graphics text composition. Having independent memories for graphics and alphanumeric, you can do auto-plots with or without words and figures on the screen.

And when you need a smart alphanumeric terminal for on or off-line work, stay right where you are.



How smart is smart?

Ever seen a graphics terminal scroll 200 lines of interactive dialogue? And store up to 220K bytes of data (words and pictures) on twin cartridges? And cut out repetitive routines by storing up to 80 characters on each of eight "soft keys"?

The HP 2648A can also edit with the best of them. Communicate with a computer at rates up to 9600

baud. And accept a plug-in forms drawing mode to generate just about any form your company uses.



Strong as well as intelligent.

Like all our terminals, the HP 2648A has a clean, tough, modular design. Open it up like a suitcase, and you'll see the neat row of plug-in PC boards.

That makes it easy to add options or take care of maintenance. Not that downtime is a problem. Our terminals have such a good track record that we've lowered our maintenance price three times in the past two years. When you do need service, more than 1000 Systems and Customer Engineers worldwide are ready to take care of you.

So why settle for any dumb graphics terminal when ours can figure in your picture?

See for yourself by calling the Hewlett-Packard office listed in the White Pages. Or send us the coupon and give our 2648A alpha-graphics terminal a screen test.



Yes, give me the good words (and pictures) on the HP 2648A terminal.

☐ I'd like a demonstration. ☐ Send me information.

Name _____ Title _____
Company _____
Address _____
City/State/Zip _____
Phone _____

Mail to: Ed Hayes, Marketing Manager,
Hewlett-Packard Data Terminals Division,
19400 Homestead Road, Dept. 314, Cupertino, CA 95014.

*U.S. domestic price

HEWLETT  PACKARD

42801HPT5

Business System Cures Hospital's Data Blues

HORGEN, Switzerland, — Expanding facilities and a corresponding increase in the demand for timely medical information forced the administration of a small hospital here to abandon its "almost historical" accounting machine and turn to a minicomputer.

For years, the administration department of Horgen Hospital relied on a 25-year-old NCR mechanical accounting machine to perform business tasks, according to Bruno Zuber, administrative director.

While the primary service at the 100-bed hospital is providing medical care, Horgen, like other businesses, must also pay wages and salaries to a large number of employees in diverse jobs. The hospital must also manage its pharmacy, purchase and manage an

inventory of medical and other supplies, bill patients and control its finances.

Several years ago, the institution's management began to consider how some of the administrative functions could be done more efficiently and at a lower cost. But it was not until 1975 that Horgen began looking for alternatives to its accounting machine.

In that year the hospital treated 1,727 patients, employed 152 people and recorded an average bed occupancy of 76.6%.

In contrast, the administration department consisted of five employees. Moreover, the burden on administrative personnel had been increased in recent years by the need to supply a growing amount of statistical informa-

tion required by the Association of Swiss Hospitals.

Then in 1975 the hospital was told it would in the future also be responsible for running a convalescent home with 100 beds for long-term patients. The twofold increase in bed capacity and a 150-employee increase forced Horgen into an evaluation of newer technology.

From April 1975 to the following September, a DP consultant for Horgen conducted a preevaluation of three minicomputer systems: a Data General Corp. Nova 3, a Hewlett-Packard Co. system and a Digital Equipment Corp. mini. Horgen selected the DG 3/12 because it could be upgraded in the future to handle a larger processing load.

For Horgen, getting a mini that could be easily upgraded seemed the only way to go because the hospital intended to initiate its entry into DP with relatively simple applications and then gradually add on more complex ones, Zuber said.

The 64K-word CPU with a 10M-byte disk, one CRT terminal and a matrix teleprinter were delivered to the hospital in the spring of 1976. Horgen initiated its first application the following July.

"In a hospital, wages and salary accounting, with all their attendant complications — pension and insurance contributions, overtime calculations — are particularly complex and time-consuming because of the irregular working hours," Zuber said.

"In the past, with our old account sheets and our almost historical machine, we needed several days for this work. Now the mini does the job in less than a day, and we have 250 employees," Zuber said.

In addition, the statistics required for the Association of Swiss Hospitals "and also for our annual report — data on types of illnesses, operations, outpatient treatment, laboratory work, deaths — are now available as a by-product, so to speak, of our invoicing procedure," he said.

"Since the beginning of this year, the mini has also been utilized for all our financial accounting and administration," he said.

How to avoid having the source of your data become the source of your problems.

A Special Report on Source Data Entry in our April 24th issue.

The trend in data collection is to get closer and closer to the data's source — with devices like OCR and Point-of-Sale systems. Which can be the source of lots of new problems for the user. What may be good for counting hamburger sales in a fast-food franchise, may be quite unsuited to a grocery store or egg wholesale business. And a system that's perfect for a big bank with many branches, may be useless at a medium-sized savings and loan.

In our April 24th supplement, edited by Frank Vaughan, we'll take a look at what it takes to get the data collection job done, accurately and efficiently, in a variety of different situations. Through a series of applications stories, we'll look at how others have solved their unique data collection problems, and give you an idea of some of the things you should do — as well as some of the things you shouldn't. The report will include:

- KEY-TO-DISK
- KEY-TO-TAPE
- KEYPUNCH
- OCR
- POINT-OF-SALE SYSTEMS
- AND A SPECIAL LOOK AT DISTRIBUTED DATA ENTRY SYSTEMS

If data entry is one of the things you have to cope with, then *Source Data Entry — Getting the Job Done* is data you should enter. It'll be in our April 24th issue.

If you'd like to advertise, the closing date is April 7th, and more information is available from your *Computerworld* sales representative. Or call Terry Williams at (617) 965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Mike Burman
Frank Collins
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 421-7330

Los Angeles
Judy Milford
Bill Healey
Jim Richardson
(213) 475-8486

Red Cross Unit Helps Refugees

GENEVA — A small business system used by the International Committee of the Red Cross at its headquarters here is playing a role in helping refugees emigrate to new countries.

Frequently, victims of political or military upheaval are forced to leave their homes with no passports or identity papers. Red Cross travel documents make it easier for refugees to emigrate to the country of their choice, according to a spokesman.

However, the preparation and monitoring of use requires a special indexing system that has details such as nationality, occupation, accompanying relatives and destination.

By compiling these details and making them available on CRTs, administrative matters are reportedly simplified, thus making the process of emigration somewhat easier for refugees.

The NCR Corp. 8200 small business system used by the Red Cross includes a 128K processor, four disk units, four CRT terminals and two printers.

In addition to handling information required for Red Cross travel documents, the system is also used for budgetary accounting. The accounting system is designed to meet three principal business processing needs.

The first involves normal operations of the 220-person permanent Red Cross staff. The second requirement is to track revenues and expenses connected with activities lasting more than one year.

The largest part of the budget, and the most demanding information-handling task, deals with the extraordinary budget — those projects stemming from disasters and conflicts.

If you're good, Boeing wants you to work in Seattle and hike and fish and ski and sail and enjoy the Pacific Northwest. Now.

Discover skiing just 90 minutes from work. Hike in abundant forests, catch a salmon, or set sail for scenic islands over the weekend.

You won't find a better opportunity to live in the Northwest than to work for Boeing Computer Services.

BCS provides local and remote computing, custom programming, application packages, training and consulting

services to The Boeing Company and a variety of commercial and government customers.

We're hiring people for the Seattle area right now, so if you're good, we'd like to hear from you.

Mail your résumé to Boeing Computer Services, P.O. Box 3707-JNI, Seattle, WA 98124.

An equal opportunity employer.



Firm Paves Way for Improved Throughput

WICHITA, KAN. — A local paving company may be on the right DP road since it upgraded to a system that is providing it with greater on-line inquiry capability and better throughput, according to a spokesman.

Ritchie Paving, Inc. here employs some 550 workers and grosses about \$20 million yearly, controller Leon Prior noted. The firm is involved in three major business areas — construction, real-estate management/development and retail sales. Not only does the firm operate ready-mix and dump trucks, but it markets ready-mix sand and concrete, handles building materials related to concrete construction and manages a shopping center/office park.

Controlling all of its business opera-

tions is a challenge that is met by the use of a small business system. A few years ago, the company did all of its processing manually, keeping a different sheet for each job. The company then moved to a tab system, which was more efficient but still cumbersome, Prior said.

In October 1973, the firm went to a Honeywell Information Systems, Inc. Model 105 for its payroll, job costing and accounts payable applications. More recently, the firm upgraded to the Level 62.

Ritchie decided to upgrade because it anticipated getting involved in communications-type activities, trying to use terminals for different purposes within the company, according to Prior. Some of the anticipated applica-

tions included delivery ticket preparation, truck scheduling and extensive job costing. In the property management area, the company hoped to use the system to check on apartment availability and rental payments.

Looked at Others

"Because we were going to get involved in communications applications, we felt it was not feasible to try to stay with the 105," Prior said. "We did look briefly at the possibility of getting another manufacturer's gear to do this," but the firm's satisfaction with HIS hardware and service, combined with a thorough examination of the systems available when it first chose HIS, convinced the company to stay with that vendor, he noted. Prior

added that he had kept up to date on systems available throughout the years.

The system was programmed by the firm's own DP staff, although some free-lance programmers have been used on occasion. "There was quite a lot of work involved in converting from the 105 to the 62," but the bulk of that work was performed by HIS personnel as part of the contract arrangement, he said.

The system performs check-writing, invoicing, general ledger, job costing, fuel reporting and budgeting applications. Soon to be put on the system is a truck-scheduling application, part of an order-entry system.

"We are working on being able to prepare delivery tickets for the ready-mix operation," Prior explained. This application will involve initial input of information relating to the order such as pricing and estimated delivery times. The first part of this application will print tickets; the subsequent phase will be more involved in scheduling, he said.

"In a lot of areas such as job costing and billing, we have cut DP time either because of the way we've been able to handle files with more file storage or faster speed or the capability to run multiple activities," Prior noted. The firm can do more work within the same number of hours, he said.

Ritchie presently has four CRTs, which are used for program development as well as a bid development application in the ready-mix area. The bidders "can input information relating to the number of years, delivery times, type of mix and other factors and calculate what the cost and bid should be.

"The biggest gain we've made by going to the Level 62 from the 105 has been our ability to add applications that we couldn't run previously," Prior noted, adding that Ritchie expects on-line inquiry to help the firm quite a bit.

Data Printer Unveils 600 Line/Min Model

CAMBRIDGE, Mass. — Data Printer Corp. has introduced a 600 line/min printer that is plug-compatible with the rest of its line.

Including several features often optional on printers, the 1260 is microprocessor-controlled and uses printing techniques of the firm's Chaintrain series. Enhanced upper and lower tractor positioning, a noise-reducing cabinet and self-test capability forms are packaged with the printer.

A 64-character, 600 line/min printer including all features costs \$10,720 from the firm at 600 Memorial Drive, Cambridge, Mass. 02139.

MICOS. THE MASTERPIECE Puts You In The Picture.

Art Nouveau: Created in 1969, Mini-Computer Systems, Inc. has installed over eight hundred business computer systems throughout the world.

Subtle Pastels: A perfect blend of the most powerful operating system on a mini, full hardware capability, and general application packages.

Bold Renditions: MICOS offers multi-terminal capacity on a distributed or a stand-alone processing system. MICOS supports up to 256,000 characters of main memory and 320,000,000 characters of disc capacity. Language is high level and interactive.

Brilliant Brushwork: MICOS systems are supported by a strong national team of computer professionals working to guarantee that every stroke is done by a skillful hand.

To really appreciate the Masterpiece, contact MICOS today.

Mini-Computer Systems, 525 Executive Blvd., Elmsford, N.Y. 10523 CW-3
I'm ready to appreciate the MICOS masterpiece.
☐ Send me more info. ☐ Have your sales representative contact me.
Name _____ Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Tel. _____

mini-computer systems, inc. 525 Executive Blvd., Elmsford, New York 10523 • (914) 592-8812 • Telex 131516
• Atlanta (404) 458-0093 • Boston (617) 933-8670 • California (714) 752-9329 • Dallas (817) 640-8800 • Houston (713) 493-9580
• Miami (305) 920-5313 • New Orleans (504) 454-6193 • New York City (212) 355-3160 • Philadelphia (215) 648-0080 • Tampa (813) 877-5331
• Vancouver (604) 681-1927 • Toronto (416) 624-0320 • Montreal (514) 337-2424 • London (06) 2836136 • Paris 3771263

AQUISITION

WANTED

Wanted to Buy
Minicomputer Turnkey
Company in Eastern Mass.

Write to CW Box 1501
797 Washington St.
Newton, MA 02160

Attendees Total 14,000

Second Faire Sees Busy Buying, Selling

By Frank Vaughan
CW Staff

SAN JOSE, Calif. — Both computer hobbyists and heavy rains poured into this city for the recent Second West Coast Computer Faire. The Faire drew 14,140 attendees over its three days and featured 150 exhibits that ranged over the gamut of microcomputer applications.

Robots, ray guns, books, business systems, video games, T-shirts, boards and chips were present at the Faire, where checkbooks and credit cards could be seen flashing at most of the selling booths. In the Faire's carnival-like atmosphere, the most popular exhibits were those where entire systems were "up and running." "Star Trek" remained the king of the mi-

crocomputer games.

Following the trends established at previous shows, Heath Co., Radio Shack Co., Imsai and Commodore (who won the "tallest booth award") were the heaviest draws, with Apple Computers, Inc. (second tallest and most colorful booth) joining the regulars with packed booths.

One of the most unusual sights of the show,

Special CW Photo Feature on the Second West Coast Computer Faire follows on Pages 68 and 69.

observers agreed, was IBM's exhibit of its 5110, underlining the trend of having shows cater more to the small business and less to the hobbyist. The computing giant's presence at the show did little to quell the spirits of the other vendors, who were too busy selling systems to worry about the giant from Armonk.

The show was, however, rife with rumors that IBM is planning to open a chain of retail stores. The number of stores ranged from 18 to 80, depending upon the rumor, with most people leaning toward the 28 figure. The rumors have since been clarified [CW, March 13].

Magazine Booths

On other fronts, all of the major hobbyist magazines were present. Byte had its usual dignified, blue-carpeted booth, while Bob Jones's *Interface Age* booth was the scene of many secret-looking huddles.

Wayne Green's *Kilobaud* booth did a brisk sales in magazines, while apronned Dave Ahl and his *Creative Computing* crew gave their booth the appearance of a country store.

Visitors to ROM magazine's booth had a chance to buy one of the Martha Herman computer T-shirts, along with a rare chance to see a photograph of the ROM staff atop a huge snowbank that was taken during the recent

Northeast blizzard. Few of the Californians who glimpsed the photo continued to complain about the rains that fell during the Faire.

In one of the more interesting battles that occurred during the Faire, Dr. Adam Osborne of Osborne Associates and Rodney Zaks of Sybex, Inc. — former associates and now competitors — found themselves with booths facing each other near one of the entrances. Both exhibitors did a brisk business in books that deal with higher technology subjects. Zaks took advantage of the show to introduce his latest book, *Microprocessor Lexicon*, a pocket-sized book of acronyms and definitions that sells for \$2.95.

Market Direction

Many of the exhibits showed vendors are hoping to get away from "hobbyist-only" reputations and get into the "small business" system business. This Faire had more exhibits directly aimed at the small business than any show during the 1977 season.

Most of the vendors were extremely pleased with the Friday turnout, which contained a high percentage of businesspeople, and a few confided that there is very little future in the "Star Trek"-playing hobbyist market.

Yet the component dealers such as Artec Electronics, Inc. Jade Computer Products, S.D. Sales Co., Technical Design Labs and Zilog, Inc. reported strong sales throughout the Faire. S.D. Sales reported higher first day sales here than total sales at almost any of the 1977 shows.

Despite the claims of another show sponsor who called the Faire "an overgrown meeting of the Homebrew Computer Club," most classified it a tremendous success. Or, as a gas station owner who turned most of his station into a parking lot said as he pocketed one attendee's \$2, "I never thought much of computers before, but I like the hell out of them now."

Micro Bytes

Cassette Tapes Offered

SUNNYVALE, Calif. — Microsette Co. here has introduced a line of cassette data tapes for home and hobby computer users. The cassettes are digital quality and come in lengths of 50-, 100-, 200- and 300 feet, according to the firm.

There are four tapes of one length per package, and each cassette comes with a hard box and two extra sets of labels.

Prices for each of the tapes are 60 cents, 70 cents, 85 cents and \$1, respectively, from Microsette at 777 Palomar Ave., Sunnyvale, Calif. 94086.

Program Reads Time-Coded Tapes

CHICAGO — Written in 8080 Assembler, a program designed to read and index time-coded films and tapes has been developed here by J.S. Weiner.

Based upon the Society of Motion Picture and Television Engineers Time Code Standards, the program resides in 3K of contiguous memory, requires two parallel input ports and will operate with most CRT modules having an on-board screen memory, the developer said.

Supplied on paper tape along with a manual and a source listing, the software costs \$49, which includes a presoldered, tested interface module, Weiner noted from 4440 N. Kedzie Ave., Chicago, Ill. 60625.

Module Provides 6800 Links

LAFAYETTE, Ind. — Wintek Corp. has developed an analog module that reportedly permits the 6800 microprocessor to be interfaced with servos, motors and transducers.

The Wince Analog Interface options include a 16-channel multiplexer, an 8-, 10- or 12-bit analog-to-digital converter and an 8-bit digital-to-analog converter, the firm said.

The module is available on the standard 4.5-by 6.5-in. 44-pin board. It costs \$99 from the firm at 902 N. 9th St., Lafayette, Inc. 47904.

Heath Catalog Free

BENTON HARBOR, Mich. — Heath Co. has announced the availability of the 1978 winter edition of its catalog, which lists more than 400 electronic kits and products.

The 104-page catalog includes Heath's line of personal computing systems, electronic test equipment, television receivers and electronic self-instruction courses covering digital techniques, microprocessors and programming in Basic, a spokesman said.

The free publication can be obtained by writing to the Heath Co., Department 350-530, Benton Harbor, Mich. 49022.

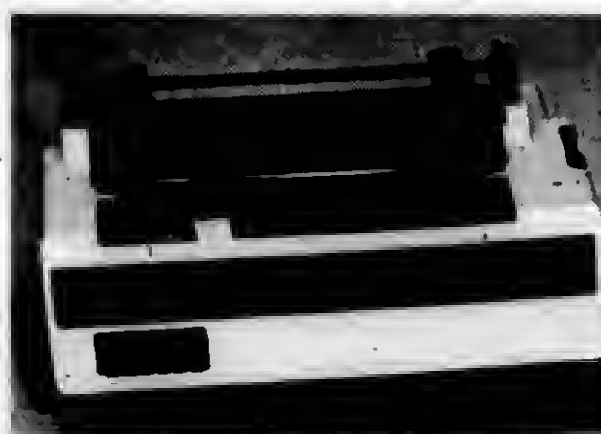
Motorola Dot Matrix Printers Built For Development Systems

PHOENIX — Motorola Semiconductor Products, Inc. has announced a line of dot matrix printers that are compatible with its microcomputer development systems, including the Exorcisor and Exorterm 100 and 200 models.

The Model 779 is capable of printing 80 to 132 columns in a 5 by 7 dot matrix at a rate ranging from 21- to 90 line/min and 60 char./sec, according to a spokesman. The Model 781, an 80-column character printer, features a bi-directional, logic-seeking movement of the print head enabling throughput of up to 120 line/min, he added.

The Model 702 is similar to the 781 except that it has 132-character print columns and can attain a throughput speed of 45- to 185 line/min, the firm noted. The Model 703 has a head speed of 180 char./sec and can provide a throughput rate of 70- to 280 line/min.

All printers except the Model 779 have a tractor feed with a paper-out sensor and use stan-



Motorola Model 779

dard computer paper, the spokesman said. The Model 779 has a pinch roll feed and uses teletypewriter roll paper.

The Models 779 and 781 are priced at \$1,495 and \$2,095, respectively, while the 702 and 703 cost \$2,500 and \$3,125, the firm stated from P.O. Box 20912, Phoenix, Ariz. 85036.

Extensys Adds Glitch Grabber

MOUNTAIN VIEW, Calif. — The Extensys Corp. has a printed circuit edge-connective device that is said to reduce noise, glitches and jitter on the S-100 microcomputer bus.

The Glitch Grabber was designed to plug into any open slot on the S-100 bus. It features a self-regulating transistor network that controls voltages and modifies circuitry to handle more

or less voltage, a spokesman noted.

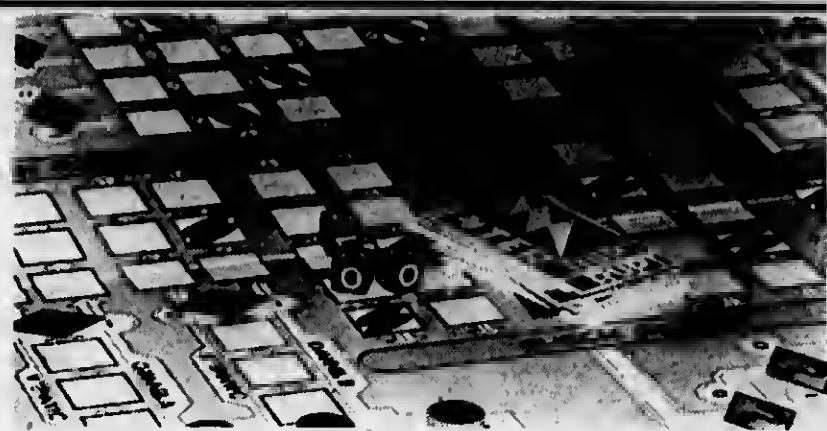
Circuitry of the device is activated only in the presence of a glitch, so the unit does not load the S-100 bus signals, the firm stated.

The Glitch Grabber is priced at \$79.50 from the Extensys Corp., 380 Bernardo Ave., Mountain View, Calif. 94040.

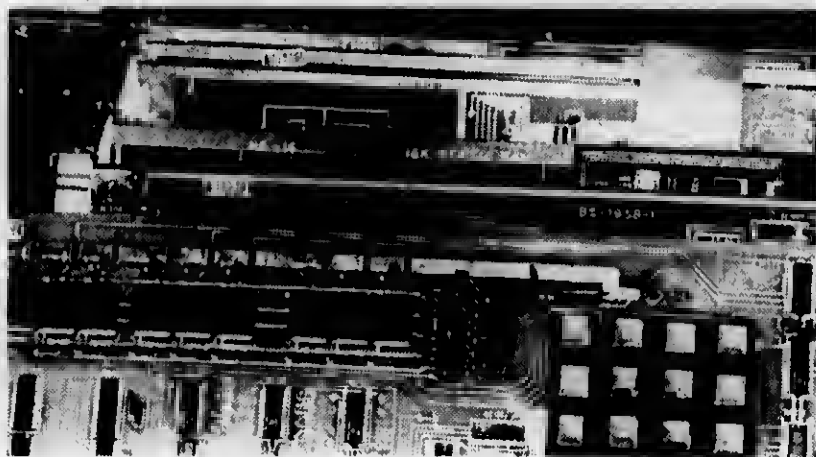
MICROCOMPUTING



The age-old chessboard fit in well with the technology of microcomputers as programmers pitted their skills in popular battles with opposing strategists.



From the basics of a children's board game (Creative Computing's "Computer Rage," above) to the complexities of microcomputer circuitry (Heath's H8, left), the Faire had exhibits of interest to most age groups.



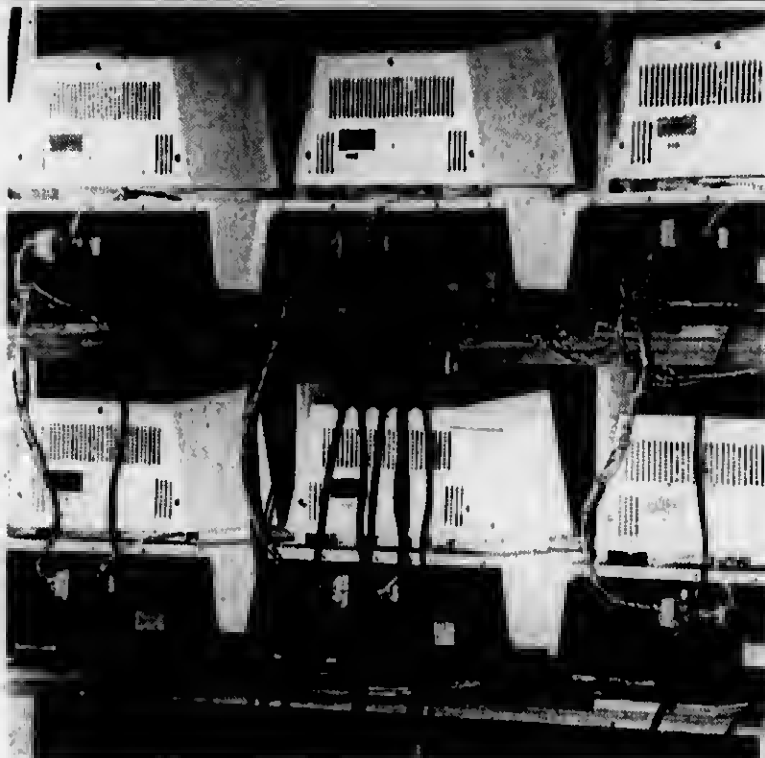
From Ray Guns To Micro Mice . . .



And the micro-cat was even larger . . .



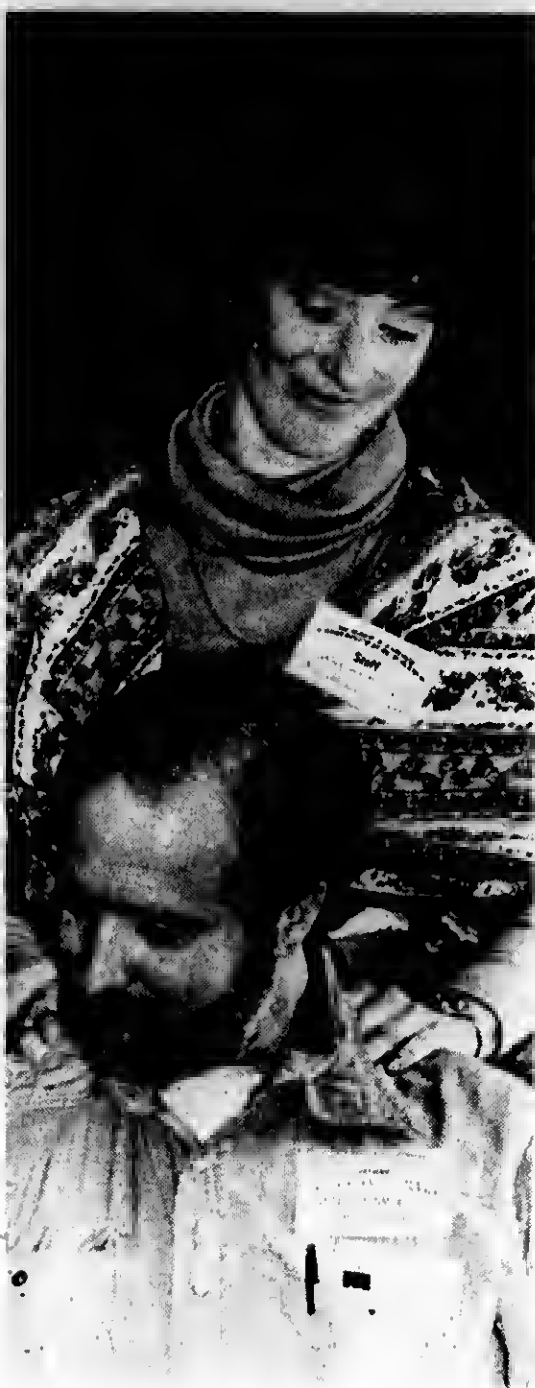
The Faire gave visitors an opportunity to get some hands-on experience with prospective purchases as well as a chance to see some of the latest products in the micro field.



A behind-the-scenes peek at Commodore's 'Pet Store' showed how six Pets were hooked up. Commodore had one of the largest booths at the show, with Pets available for hands-on use by prospective buyers and game players alike.



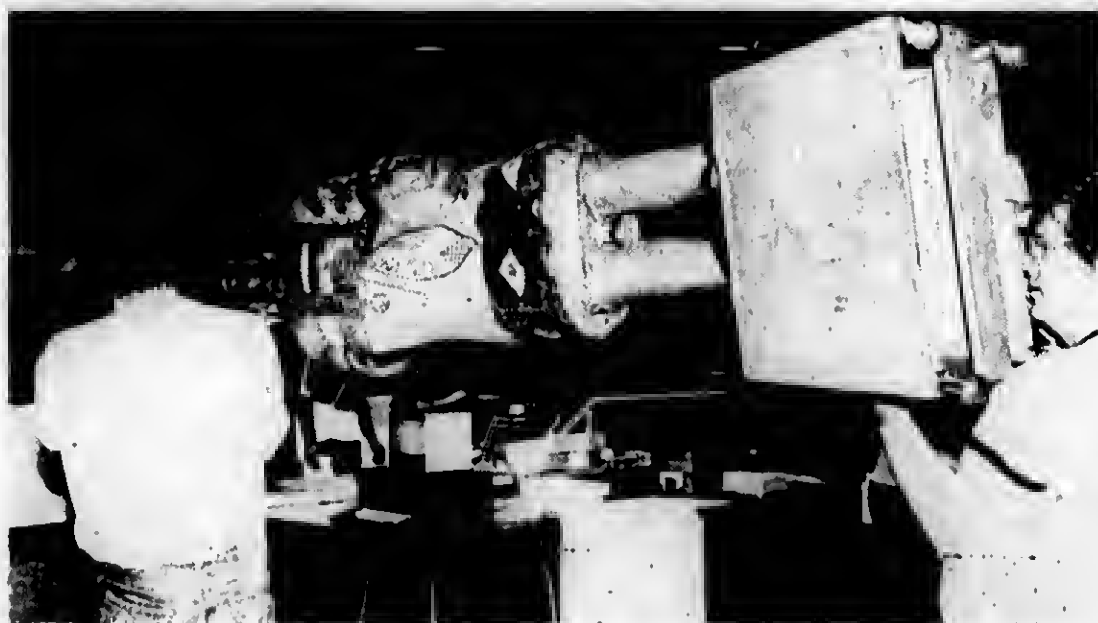
The purpose of any hobby is to have fun and this youngster, caught unaware by the camera, showed that children and microcomputers get along very well. At many exhibits, serious buyers had to battle their way past hoards of younger people to get their hands on the equipment.



Have you ever wondered where a conference chairman goes after introducing a speaker? Stephanie Buckholz helps Faire Chairman Jim Warren unwind.

At the Second West Coast Computer Faire

**A CW Photo Feature
By Frank Vaughan**



Visually, the Faire was something to behold as exhibitors went to great lengths to catch visitors' eyes. A wooden Indian (left) and a 'cosmic ray gun' (right) were just a few of the ways in which exhibitors tried to lure buyers.



Has 64K RAM Capacity

Infinite MPU Available Five Ways

MELBOURNE, Fla. — Infinite, Inc. is offering an 8080-based microcomputer system it said employs the S-100 bus structure and is capable of housing up to 64K of random-access memory (RAM).

The UC2000 is available in five configurations ranging from a basic system containing an eight-slot mainframe, power supply, CRT keyboard and cabinet to a system consisting of an MPU, video interface, 16K RAM, extended keyboard, RS-232 printer interface and a separate dual floppy disk drive, according to a spokesman.

The processor has a 78-instruction capability with 244 variations, 10 registers and an eight-level vectored inter-

rupts, he added.

The unit also has a bus output driving capability of 30 TTL loads and a 1K-byte read-only memory monitor expandable to 3K bytes. The processor was designed to function during direct memory access cycles as well as multiple processor operation, the firm pointed out.

The video portion of the UC2000 uses a 7 by 9 upper and lower case alphanumeric character font, a 96-character Ascii set, 32 special characters and a 64-character by 16-line display; it features a graphics capability, the spokesman said.

Options include a current-loop serial interface, a cassette tape interface,

larger keyboards and internally mounted floppy disk drives.

The price of the basic system with 8K RAM, CRT and cassette interface, power supply, CRT monitor, keyboard and cabinet is \$2,266. Infinite is located at 1924 Waverly Place, Melbourne, Fla. 32901.

Mailing Package Fits North Star

BROOKLYN, N.Y. — HSC Computer Services, Ltd. has developed a Mailing Label and Directory Lookup package for users of North Star Computer, Inc.'s disk operating systems.

The package, written in North Star Basic, allows the entry on each diskette of up to 480 records containing names, addresses and telephone numbers, the listing of all records on a file and the lookup of each name within a file with the retrieval of address and telephone numbers, a spokesman said.

Labels Printed

Also permitted is the printing of mailing labels in any region specified by the user, he added.

The package, contained on a diskette, sells for \$50 with documentation. A listing of North Star error messages and their meanings is also available for an additional \$5 from the firm at P.O. Box 43, Brooklyn, N.Y. 11236.

Controller Acts As DP Teacher

LOS ANGELES — Energy Electronic Products Corp. (EEP) has introduced a controller built around a Panasonic Corp. 4-bit microprocessor and designed to teach the basic concepts of computer technology.

The KX-33B includes 1K by 8 bits of read-only memory (ROM) for the system program and 64 words by 4 bits of random-access memory (RAM) for keyboard storage, according to a spokesman.

The unit also has two static RAM chips with 256 words of 4 bits each, an 8-bit latch, audio amplifier multi-vibrator integrated circuits and a speaker.

The KX-33B also has a cadmium-sulfide light-sensitive photocell, a moisture transducer and a reed switch, the spokesman noted.

The unit is priced at \$229 from EEP, 6060 Manchester Ave, Los Angeles, Calif. 90045.



Panasonic 4-bit microprocessor teaches basic DP concepts.

**"Look for our
MICROCOMPUTING
CLASSIFIED
EXCHANGE
in the classified pages."**

N NODE — A terminal of any branch of a network or a terminal common to two or more branches. Also called junction point, branch point, vertex or nodal point.

NONARITHMETIC SHIFT — Refers to a shift in which the digits dropped off at one end of a word are returned at the other in a circular fashion, i.e., if a register holds eight digits, 23456789, the result of a cyclic shift two columns to the left would be to change the contents of the register to 45678923. Synonymous with end-around shift, ring shift and cyclic shift.

NON-RETURN-TO-ZERO (NRZ) — 1. A method of writing information on a magnetic surface in which the current through the write-head winding does not return to zero after the write pulse. 2. A mode of recording in which each state of the medium corresponds to one binary state. In the mode, the state of the recording medium changes when the information changes from 1 to 0 or from 0 to 1. Note: NRZ modified is also often called NRZI.

NO OP — Refers to an instruction commanding the computer to do nothing except to proceed to the next instruction in sequence.

NUMBER SYSTEM — The following are names of the number systems with bases 2 through 20; 2, binary; 3 ter-

nary; 4, quaternary; 5, quinary; 6, senary; 7, septenary; 8, octal or octonary; 9, novenary; 10, decimal; 11, undecimal; 12, duodecimal; 13, terdenary; 14, quaterdenary; 15, quindenary; 16, sexadecimal or hexadecimal; 17, septendecimal; 18, octodenary; 19, novendenary; 20, vicenary. Also 32, duosexadecimal or duotridenary and 60, sexagenary. The binary, octal, decimal and sexadecimal systems are widely used in computers.

O OBJECT CODE — The basic program; the output from a compiler or assembler which is itself executable machine code or is suitable for processing to produce executable machine code.

OCR (OPERATING CHARACTER RECOGNITION) — Refers to recognition by machines of printed or written characters based on inputs from photoelectric transducers.

OFF-LINE — Refers to equipment or devices not under direct control of the central processing unit. Also concerns terminal equipment not connected to a transmission line.

ON-LINE — Relates to equipment, devices or systems in direct interactive communication with the central processing unit. May also be used to describe terminal equipment connected to a transmission line.

CI Notes

HIS Cancels Its 66/85, Continues CML Work

WALTHAM, Mass. — Honeywell Information Systems, Inc. will not market its Model 66/85 computer announced a year ago, apparently because of difficulties in development of Current Mode Logic (CML) technology.

Troubles in the firm's large-computer operation have been rumored for some time, particularly with the 77/85, whose delivery schedules have slipped several times.

The firm announced it would continue to develop CML technology and Stephen G. Jerrits, group vice-president, said "problems associated with CML and micropackaging technology have been solved."

In spite of that, however, he said the firm had decided to withdraw the 66/85 because "there are other, more cost-effective approaches to meeting the needs of our large-scale users in the near future."

Dataproducts Creates Network Of Independent Distributors

WOODLAND HILLS, Calif. — Dataproducts Corp. has announced it will establish an independent distributor network within its North American sales organization to sell printers to new markets.

To set up and direct this network, Dataproducts has named Lawrence E. Bowne to the new position of director of distributor sales.

Clarifications

Portions of two recent *Computerworld* stories deserve clarification.

First, an unfortunate juxtaposition of paragraphs in a report on John Imlay's remarks to the U.S. Senate Committee on Small Business might leave the impression that Management Science America, Inc. is facing possible bankruptcy [CW, Feb. 27]. This is not true. In fact, the firm is doing extremely well.

Second, Carl Jeremias, marketing vice-president at Basic/Four Corp., predicted that the small business computer market will grow at a rate of between 25% and 40% and that the firm will double its business in the next three years, rather than the 35% to 40% and 10 years quoted [CW, March 6]. The firm originally provided the incorrect numbers.

On Capitol Hill Procurement System Set, Library Service Brewing

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The Office of Management and Budget (OMB) recently announced that it will establish a central computerized system to keep track of federal contracts — contracts that command about \$80 billion in taxpayer monies each year.

At about the same time, the Library of Congress stated its intention to open some of its on-line files to selected federal agency libraries and to national libraries and library network centers.

The library in the Executive Office of the President, of which OMB is a part, along with the libraries of the Central Intelligence Agency (CIA) and those of the Departments of Commerce and the Interior have been chosen to initiate the Library of Congress's pilot project.

Observers close to the OMB effort to design a uniform procurement system hope the operation will mature from a batch to an on-line mode and that one day, terminals in the Library of Congress will have direct access to the federal procurement data computer.

The information exchange inside and outside of government is on.

"Incredible as it may sound, there is no one today who can identify everything that Uncle Sam is buying and from whom, or whether the dozens of agencies that let procurement contracts are getting adequate competitive bidding," Acting OMB Director James T. McIntyre said at the announcement of the procurement data system.

The Department of Defense (DOD), which accounts for 70% of the contracting done by the federal government, already has its own procurement data system in place and so has been chosen to establish and operate a similar system for as many as 80 civilian agencies, according to William J. Maraist, Deputy Assistant Administrator for Regulations in OMB's Office of Federal Procurement Policy.

DOD relies on the Air Force Data Services Center and Honeywell Information Systems, Inc. series 600 equipment to run its own procurement data base, which is maintained by the Office of the Secretary of Defense, Joseph G. Cannata, director of the

new Federal Procurement Data Center, explained. This equipment can't accommodate procurement data from the additional federal agencies, however, and the Air Force's resources can't be augmented, he added.

Cannata believes that either an outside remote-batch or time-sharing contractor or a minicomputer will have to be selected to do the job. DOD is footing the bill for creating and maintaining the system on civilian procurement data.

Come October, the system is to be up and operating and open to the public as well as government officials seeking to understand

(Continued on Page 72)

Exhibit Space Open For Personal DP At Anaheim NCC

MONTVALE, N.J. — Exhibit space is available for the 1978 National Computer Conference (NCC) Personal Computing Festival to be held June 6-8 in Anaheim, Calif., the American Federation of Information Processing Societies (Afips) has announced.

Reservations are being accepted from manufacturers and suppliers whose products and services are in the field of home/hobby personal computing, Afips said, noting that about 25,000 people attended the personal computing exhibition at last year's NCC in Dallas.

Afips predicted that attendance record will be broken this year since Southern California is more saturated with persons who produce, build, buy and use personal computers for business needs or personal enjoyment.

The festival will include more than 150 booths displaying such products as components, terminals, software, publications, kits, hobby items and disk and tape.

Each 10- by 10-foot booth is available for \$600; tabletop displays are priced at \$200; and packaged booth displays are available.

Additional information can be obtained by contacting Marie Stewart, NCC '78 Personal Computing Festival Exhibition, 210 Summit Ave., Montvale, N.J. 07645.

COMPUTER INDUSTRY

TI745's, 743's, 765's, and 763's IN STOCK!!!

Single Source—Coast to Coast ☐ Fast Delivery—Nationwide
National Service—Our Own Experts ☐ Low Cost—Big Savings

Believe it or not, Data Access Systems, Inc. has *hundreds* of portable data terminals available for fast delivery, with stocking points and service nationwide. Don't wait for promises, we are TI's largest data terminal dealer. We also stock DEC's LA36, LS120 & LA180; Diablo's 1620 & 1641; Lear Siegler's ADM 1, 2 & 3 and the Teletype 43. Compare suppliers for product, price, delivery and service; you'll come to "The Data Terminal People."

Call your local district office,
or toll free numbers: East 800-631-9604 West 800-227-4406



"THE DATA TERMINAL PEOPLE"

Data Access Systems, Inc.

Corporate offices:
100 Route 46, Mountain Lakes,
N.J. 07047 • (201) 335-3322
or Toll Free (800) 631-9604

District offices:
Boston — (617) 933-8822
Washington, D.C. Area — (703) 525-2923
Phila., So. Jersey — (609) 854-0070

Chicago — (312) 298-0777
Los Angeles — (213) 538-4100
San Francisco — (415) 391-5535



TERMINAL RENTALS

MODEL

43

TTY

\$67⁵⁰
MONTH



33 ASR-FF

\$54⁰⁰
MO.

TWX-DDD

79⁵⁰

TELEX

76⁵⁰

33

KSR-FF

\$49⁰⁰
MONTH



ADM-3A
\$49⁵⁰ MONTH
ADM-1A — \$73.00 mo.



COUPLERS/MODEMS

TC 3002
O/A Acoustic 12⁰⁰ mo.
TC 5001
202T 18⁰⁰ mo.
TC 4001
113B
Auto-Ans. 18⁰⁰ mo.



MODEL
40
TTY
LINE PRINTER
300 LPM
\$325⁰⁰
MONTH



All equipment includes national service
Get complete details with a direct call:

800/527-7700

or 214/252-7502 • Service 600/527-5608
TWX 910/806-5761 • TELEX 73-0022

vardon
& associates, Inc.

930 N. Bellline Road • Irving, Texas 75061
A Subsidiary of Pioneer Texas Corp.

SERVICE PROBLEMS?

NATIONWIDE SERVICE
356 CITIES
CALL

800/527-5608

IN TEXAS CALL
800/492-9602 or 214/258-2620

Procurement System, Library Service Near

(Continued from Page 71)

how much is being spent for what.

The Office of Federal Procurement Policy and a policy advisory board consisting of representatives from several major federal departments and agencies will run the procurement data system and make any changes to it, Maraist said.

Government Benefits

The system should provide potential contractors with essential information concerning the federal market place—how and where to offer products and services. More competition and potentially lower prices for federal purchasers are hoped-for government benefits of having data all in one place and stored and retrieved in a uniform manner, Maraist stated.

Not only could contract awards be traced by producer and location without going to any of the between 3,000 and 5,000 contract offices in the federal government, but the system will help the Office of Federal Procurement Policy in its efforts to reform existing contracting procedures, he added.

The Federal Procurement Data System and Center represent the culmination of work begun in the fall of 1974 when Congress directed the executive branch to establish such a system. The library has considered its plan for less time — over the past two years — and has ventured forth to find users beyond Capitol Hill without congressional approval.

'Logical' Library Extension

What the library considered merely "a logical extension of its on-line bibliographical services and catalog distribution system" and a library decision has raised the eyebrows and the ire of some members of Congress.

Others, in particular Neal Gregory, staff director for the House Administration Committee's Policy Group on Information and Computers, and John Swearingen, who heads the Technical Services Staff of the Senate Rules Committee, are concerned over the degradation of the library's services to Congress. They are thinking of the response time now received on Capitol Hill terminals.

At the same time, Gregory and Swearingen feel the library's vast fund of information should be made availa-

ble to the federal agencies and other libraries.

William R. Nugent, head of the library's information systems office, does not believe service to Congress will suffer.

Beginning in March, the library will open some of the files in its Subject-Content Oriented-Retriever for Processing Information On-Line (Scorpio) and Multiple Use Marc (MUMS) systems to dial-up access by 35 full-time "equivalent" terminals located in a variety of institutions.

Scorpio contains files involving the library's reference activities, and Mums is oriented toward technical processing. These systems will be accessed by 92 full-time equivalent terminals in library network centers and large research libraries, 10 in federal libraries and agencies and five in state libraries and agencies, Nugent said. He defined a "full-time equivalent termi-

nal" as handling 60 transactions per hour — a transaction being one round trip from the terminal to the computer and back.

Access for Outside Users

Outside users will access the library's Amdahl Corp. 470V/6, its teleprocessing CPU, just as Capitol Hill users do, Nugent stated. But unlike congressional users, outside libraries and federal agencies will have their access controlled in a manner similar to a telephone exchange, he explained.

Outside users "will share a fixed-diameter pipeline, if you will" Nugent said. Service may be degraded, but it will only be that service to these additional users. Degradation would show up in local queues to use the system and busy signals.

The library will charge 16 cents per transaction for access to its files — an average of \$9.60 per connect hour.

CENTRONICS

NEW LOWER PRICES START AT \$1250!

102A . . 330 Char/Sec TTL

101A . . 165 Char/Sec TTL

103 . . . 165 Char/Sec LSI

INTERFACES FOR PDP8, PDP11, RS232 & NOVA

★ IMMEDIATE DELIVERY! ★

84-PAGE CATALOG • 1500 ITEMS

DEC • MINIS • IBM • MICROS • PERIPHERALS

Send \$1 for 1st Class Postage/Handling

AMERICAN USED COMPUTER

CORPORATION

617-261-1100

P.O. BOX 68, KENMORE STA., BOSTON, MA 02215

Apple Obtains Equity Funding

SAN JOSE, Calif. — Apple Computer, Inc. announced at the West Coast Computer Faire here that it has obtained equity funding from Venrock Associates, Capital Management, Inc. and Arthur Rock.

The firm's initial financing was provided by the Bank of America and by individuals within the company, a spokesman said.

"The proceeds will be added to our working capital and used to increase the company's production, new product development and worldwide marketing programs," according to A.C. Markkula, Apple's board chairman.

Apple Computer, Inc. has been in the personal computing business since January 1976 and has been shipping the Apple computer since May 1977.

Discover

the one organized (and inexpensive) way to keep up with what's new in computer techniques and management—

The Library of Computer and Information Sciences

(Publishers' Prices shown)

and start with a whale of a value:
Take any 3 books for only \$3.95
(values to \$60.00)

If you will join now for a trial period and take three more books—at handsome discount prices—within the next 12 months



32485. ALGORITHMS + DATA STRUCTURES = PROGRAMS. Niklaus Wirth. A classic work on structured programming with practical examples. \$19.00

58085. LEARNING TO PROGRAM IN STRUCTURED COBOL. Edward Yourdon. Treats COBOL as a foreign language, and offers several dramatic, easy techniques to help you learn the basics of structured programming—process, decision, loop, CASE. \$19.50

35450-2. AUTOMATIC DATA PROCESSING HANDBOOK. The Diebold Group. Auxiliary memory, peripherals, systems design, consultant services, software packages. Counts as 2 of your 3 books. \$29.50

88000. WRITTEN COMMUNICATION FOR DATA PROCESSING. Randi Sigmund Smith. Guidelines to help prevent the leading cause of data processing catastrophes—ambiguous specifications. \$12.95

53795-2. HOW TO MANAGE STRUCTURED PROGRAMMING. Edward Yourdon. Based on the author's highly popular seminar series, this offers a detailed step-by-step presentation of just what programmer productivity techniques (PPT) can do for the DP manager. Counts as 2 of your 3 books. \$21.50

78356. SIMULATION WITH GPSS AND GPSS V. P. A. Bobillier, B. C. Kahan, and A. R. Probst. Provides a detailed approach to the effective planning and execution of simulation experiments and projects. With concrete examples. \$18.50



55920. INTERACTIVE DECISION ORIENTED DATA BASE SYSTEMS. Edited by William C. House. An extensive user's guide to the state-of-the-art in data base and management information systems (MIS) concepts. A skillful blend of management planning with technology. \$19.95

81910. SYSTEMS AND PROGRAMMING STANDARDS. Susan Woodbridge. An essential guide to establishing workable standards in any computer installation. \$12.50

82560. TECHNIQUES OF PROGRAM STRUCTURE AND DESIGN. Edward Yourdon. Over 300 illustrative problems, 90 valuable references, and four demonstration projects. \$17.50

54450. THE IBM 5100 PORTABLE COMPUTER: A Comprehensive Guide for Users and Programmers. Harry Katzan, Jr. Includes BASIC and APL programs for payroll/inventory control applications. \$19.95

70110. PRINCIPLES OF DATA-BASE MANAGEMENT. James Martin. Detailed introduction to the concepts, principles, and applications of data base technology. Covers data structures, security, file storage, real-time vs. non-real time, more. \$19.95

42303. A DISCIPLINE OF PROGRAMMING. Edsger W. Dijkstra. A world-renowned computer scientist forges some impressive new programming tools to solve problems that range from the everyday to the complex. \$18.95

52900. HIGH LEVEL COBOL PROGRAMMING. Gerald M. Weinberg, Stephen E. Wright, Richard Kaufman and Martin A. Goetz. An advanced guide to proper and efficient COBOL usage. Introduces "sheltered programming" concepts, stresses modular design and maintainability of code. \$17.95



44900-3. ENCYCLOPEDIA OF COMPUTER SCIENCE. Edited by Anthony Ralston and Chester L. Meek. Accurate information on hardware, software, systems, theory, economic, social, and professional issues. Counts as 3 of your 3 books. \$60.00

84385. TOP-DOWN STRUCTURED PROGRAMMING TECHNIQUES. Clement McGowan and John R. Kelly. Practical solutions in actual code serve to introduce this revolutionary concept. \$14.95

62620. MICROCOMPUTER HANDBOOK. Charles J. Sippl. Detailed reference to the technology and applications of microprocessors. \$19.95

41670-2. DATA BASE DESIGN. Gio Wiederhold. Excellent sourcebook for the methods, principles, and concepts relevant to the design of data base software. Useful to those without data base experience. Counts as 2 of your 3 books. \$21.50

49355. FUNDAMENTALS OF DATA STRUCTURE. Ellis Horowitz and Sartaj Sahni. A practical handbook outlining the principles of data structure design and manipulation. Includes in-depth coverage of file organizations, indexing techniques, internal and external sorting and tree structures. With detailed illustrations. \$17.95

80830. STRUCTURED COMPUTER ORGANIZATION. Andrew S. Tanenbaum. A non-mathematical approach to computer organization and assembly language programming that provides a practical look at computer architecture concepts from the microprogramming level to the operating system. \$18.50

59920. MANAGEMENT: Tasks, Responsibilities, Practices. Peter F. Drucker. A brilliant task-focused handbook of the skills, techniques and tools a good executive needs to stay effective in modern management. \$17.50

MEMBERSHIP BENEFITS • In addition to getting three books for only \$3.95 when you join, you keep saving substantially on the books you buy. • If you continue membership past the trial period, you will be eligible for our Bonus Book Plan, with savings of at least 70% off publishers' prices. • At 3-4 week intervals (15 times per year) you will receive the Book Club News, describing the coming Main Selection and Alternate Selections, together with a dated reply card. In addition, up to 4 times a year, you may receive offers of special selections, always at substantial discounts. • If you want the Main Selection, or the special selection, do nothing and it will be sent to you automatically. • If you prefer another selection, or no book at all, simply indicate your choice on the card, and return it by the date specified. • You will have at least 10 days to decide. If because of late mail delivery of the News, you should receive a book you do not want, we guarantee return postage.

70115. PRINCIPLES OF COMPILER DESIGN. Alfred V. Aho and Jeffrey D. Ullman. A step-by-step approach to developing the "software tools" necessary to design the major component of a compiler. \$18.95

80845. STRUCTURED SYSTEMS DEVELOPMENT. Kenneth T. Orr. A practical handbook containing the basic steps for analyzing, developing, and installing systems with the emphasis on a structured "problem-solving" approach to systems building. \$17.00

76900. SCIENTIFIC ANALYSIS ON THE POCKET CALCULATOR. 2nd edition. Jon M. Smith. Numerical techniques and approximations, tables, graphs, and flow charts make scientific and engineering applications possible on an inexpensive electronic calculator. \$15.95

55335. INFORMATION MANAGEMENT SYSTEMS: Data Base Primer. Vivian C. Prothro. Examines every aspect of data base operations: revising software, reducing storage costs, data sharing, cost control. \$10.00

39970. COMPUTER ARCHITECTURE. Second Edition. Coston C. Foster. Covers microprogramming, switching circuitry, memory speed increases in mainframes. \$16.95

39980. COMPUTER-COMMUNICATION NETWORK DESIGN AND ANALYSIS. Mischa Schwartz. An organized, quantitative approach to the design of communications networks. Documents and consolidates many of the widely spread research efforts in recent years. \$18.95



The Library of Computer and Information Sciences
Riverside, New Jersey 08075

7-A2E

Please accept my application for membership and send me the three volumes indicated, billing me only \$3.95. I agree to purchase at least three additional Selections or Alternates during the first 12 months I am a member, under the club plan described in this ad. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three books. A shipping and handling charge is added to all shipments.

3 books for \$3.95

Indicate by number the books you want.

A few expensive books (noted in book descriptions) count as 2 or 3 choices.

Name _____

Address _____

City _____

State _____ Zip _____

(Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)

FCC Will Deregulate Terminal Gear: Wiley

WASHINGTON, D.C. — The Federal Communications Commission (FCC) will one day deregulate terminal equipment, according to former FCC Chairman Richard E. Wiley, who also believes deregulation of the entire data communications marketplace should be considered.

In the keynote at the recent DataComm 78 here, Wiley noted that one partner in the "marriage" of computer and communications "comes to the alter with freedom of action as its hallmark, while the other approaches with all the trappings of regulation."

While government regulation is needed to protect the public interest, "the free market should be inhibited only where it is absolutely necessary to do so," Wiley said.

In the late '60s, the FCC began a "determined effort" to inject competition into certain selected areas of the telecommunications market that had been dominated by AT&T, he noted.

"Over the last decade," he said, "the policies adopted by the commission have permitted new entry in private line and specialized communications services; have permitted the interconnection to the nationwide telephone network of new and innovative terminal equipment registered with the FCC; have opened the skies to a first generation of domestic satellites; have increased the usefulness of new services by requiring unrestricted shared use and resale of common carrier private lines; and, in the process, have opened the door to the age of computer and data communications."

He recalled that in 1971, the FCC attempted to define the "regulatory interface" between DP and communications. Within five years, the line drawn between DP and message switching has become technologically outdated. Drawing such a line today becomes, in his words, "increasingly a metaphysical undertaking."

"The intelligent Dataspeed 40/0, for example, marketed by a subsidiary of AT&T, was considered to be DP by the

FCC's Common Carrier Bureau but data communications by a narrow majority of commissioners," he noted.

"It is clear that the cases will get even closer. No matter what demarcation points the agency may adopt, technology will blur them. I predict the FCC will have to go one way or the other."

"For the commission to take on the regulation of the huge and complex DP market is, to me, simply unthinkable. And thus, eventually, I believe that the FCC will have to deregulate terminal equipment altogether," Wiley said.

That suggestion raises at least three problems, according to Wiley. "The first involves the current Communications Act, although I do not feel that congressional action would be needed.

"The second issue is the 1956 consent decree which bars AT&T from engaging in an unregulated business. To bar Western Electric from the data communications market, in my opinion, would not serve the public interest. Thus, I would hope that serious consideration might be given to modifying the decree. Finally, there is the question of what is part of the equipment and what part of the communications system," he noted.

Wiley cited as an example the controversy regarding Bell's Dataphone Digital Service as to whether the Customer Service Unit is a true terminal device or an integral aspect of the entire system. "IBM-Comsat's Satellite Business Systems also requires terminal installations which are interactive

with the satellite. Are these to be terminals, and unregulated, or part of the communications service and regulated?

"I don't have the answers to the issues I pose," Wiley conceded. "However, as a former regulator who has never been completely enamored of the virtues of regulation, I think it is healthy to at least consider the possibilities of deregulation. Indeed, while we're at it, we might even consider whether data communications should be deregulated altogether. This, of course, would require legislation."

Wiley estimated that 50% of the U.S. gross national product — including more than half of our total wage bill — is devoted to the production, processing or distribution of information.

Are you a user?

Sophisticated?
Becoming experienced?
First time?
Or still thinking it over?

Whatever your level, one thing is certain. You'll be more of a computer user in the near future. And Computer Expo 78's Conference* has vital information you can't afford to miss. At least one of these days should be a must on your calendar:

TUESDAY

You're on the executive level. You deal with data processing personnel, problems, payments and plans. Today is yours.

The Executive Briefing

- Keynote speech: "Strategic Systems Planning: a View from the Top," by an official of the consulting firm, 8002, Allen & Hamilton
- Case Studies: Data Base and the Executive; Potentials of Distributed Data Processing
- Presentations: Trends and Opportunities in System Financing; The Computer Resource of the Future.

WEDNESDAY

Double Conference Day

(Two simultaneous conferences)

You're bringing in a first computer system for a small company, you're involved in light, inhouse use of computers (maybe about to trade up), or just thinking of your own system. You'll want to attend the Program on Small Business Systems.

You're interfacing with computer personnel on a day to day basis. The Program on Managing People Problems is designed just for you.

Here's your schedule:

Small Business Systems

- Keynote Speech: "Data Processing in Small Business Today," by an official of Arthur Andersen and Company
- Case Studies: Computer Uses in Financial Reports; Computer Uses in Operations Planning & Reporting
- Presentation: How to Negotiate with Vendors • Days end panel that includes you, your questions, views and comments.

Managing People Problems

- Keynote Speech: Given by a recognized expert in data processing personnel management • Case Studies: Career Pathing for Operators and Programmers; Improving the User/DP Relationship • Presentations: Testing for DP Competence; Coping with Security/Privacy Regulations.

THURSDAY

You're a manager or technician, and your organization is thinking of distributing its computer resources to regional offices and plants. This is your can't-miss day: Distributed Data Processing

- Keynote Speech: "Critical Issues in DDP" • Case Studies: Applications for DDP; Equipment Selection
- Presentations: Networking Aspects of DDP; The Data Base Question.



Anaheim

Southern California Computer Expo

March 21, 22, 23
Disneyland Hotel

San Francisco

Northwestern Computer Expo

March 28, 29, 30
San Francisco Civic Aud.

Houston

Southwestern Computer Expo

April 11, 12, 13
Astrohall

Atlanta

Southeastern Computer Expo

April 18, 19, 20
World Congress Center

St. Louis

Gateway Computer Expo

April 25, 26, 27
Gateway Convention Ctr.

Chicago

Midwestern Computer Expo

May 2, 3, 4
McCormick Place

New York

Mid Atlantic Computer Expo

May 9, 10, 11
New York Coliseum

Detroit

Great Lakes Computer Expo

May 23, 24, 25
Cobo Hall

Boston

New England Computer Expo

May 30, 31, June 1
Northeast Trade Center

Each Conference day is just \$55. All three days only \$135. The Exposition is FREE.

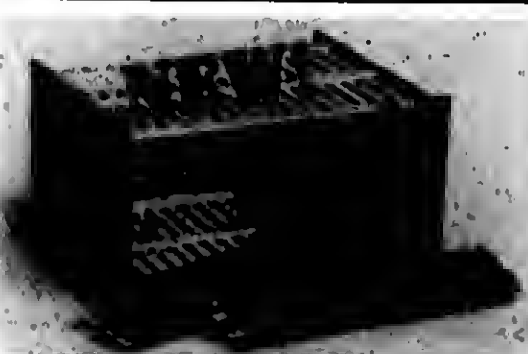
Take one, two, or all three days. And send your key personnel to the days that will benefit them most. You'll profit! Come to Computer Expo 78's Conference and Exposition, and come away a smarter user.

*All conferences will be held from 9AM to 1PM

COMPUTER CARAVAN'S



REGISTER EARLY!
RETURN YOUR
REGISTRATION
FORM NOW!



9113R RACK MOUNT MODEM WITH BELL 212A COMPATIBILITY

A second generation CMOS Logic Originate/Auto Answer hardwired modem designed to fit the standard 19-inch relay chassis. The modem rack case (also available from OMNITEC) houses up to 16 cards including 103, 202 or a mixture. Bell compatibility also includes 103 and 113, 0-300 baud standard with 600 baud optional. Black anodized face includes LED's for CC, CD, CE, CT, CF, CA, CB, BA, and BB. 9113R stand-alone units also available.

For more information
write Dept. 320 or
call (802) 252-2083 collect.



OMNITEC DATA
"New Dimensions in Modems"
2405 South 24th Street • Phoenix, Arizona 85034

U.S. Providing 70%

Taiwan's Hardware Demand Remaining High

By Jeffrey Beeler
CW Staff

WASHINGTON, D.C. — Healthy economic growth and expanding DP applications in assorted industries have ensured continuing high demand for computer hardware in the Republic of China (Taiwan), according to market projections released here recently by the U.S. Commerce Department.

Between 1976 and 1977, the computer and peripherals market grew 19% from \$35.7 million to \$42.6 million, and growth will average 21% annually through 1981, when sales will total \$78.8 million, the Commerce Department predicted.

Because the Republic of China

produces none of its own CPUs and few of its own peripherals, the country relies almost exclusively on foreign suppliers, especially the U.S., for its DP needs. Even though U.S. hardware prices average 20% to 40% higher than those of competing nations, American vendors still accounted for more than \$29 million, or 70% of Taiwan's total DP imports.

By the end of this year, U.S. shipments will surpass \$55 million for 71% share of all imports, Commerce predicted.

Japan, the second highest exporter of DP equipment to the Republic of China, shipped almost \$5.9 million worth of computers and peripherals

last year and will boost that volume to \$10.8 million during 1978, Commerce officials noted.

Of the total computer and peripheral market in Taiwan, sales of large- and medium-scale CPUs accounted for an estimated \$21 million in 1977 and will rise to nearly \$39 million in 1981, for an average annual growth of more than 16%.

Medium, Large Systems

Last year, U.S. sales of large- and medium-scale computers to the Republic of China totaled \$16.2 million and accounted for about 76% of the country's total imports in that hardware category, according to the depart-

ment. During the next four years, the U.S. share of the Taiwanese medium- and large-scale market will drop slightly, although volume will rise an average of 13% to exceed \$26 million.

In the minicomputer and microprocessor sector, sales will increase from \$4.7 million last year to an estimated \$12.5 million in 1981, for an average annual growth of 27%. As with large- and medium-scale CPUs, the minicomputer and microprocessor sector will be dominated by U.S. vendors, who will account for about an 80% share of the market through 1981, the Commerce Department predicted.

Taiwan did not begin using minicomputers and microprocessors until 1967, when NCR Corp. installed a 399 system at the Taipei Post Office headquarters. Since then, their use has expanded rapidly; today minis and micros outnumber large computer systems in the island nation, the market predictions noted.

In the peripherals sector, sales will jump from \$17.3 million in 1977 to \$27.7 million in 1981. At the same time, the U.S. share of that market will jump from 56% to 71% as American sales to the Republic of China double from the 1977 level of \$9 million, the department added.

Because of their speed, diskette drives account for most of the storage systems sold in Taiwan, although some users also favor tape cassettes for their storage and handling advantages. Extended core units and external semiconductor memories, on the other hand, are almost unknown in the country, Commerce officials noted.

Among data entry devices, keypunch units still dominate the land, although some industry observers have detected a trend toward key-to-disk systems. Through 1976, only Taiwan's Tax Reform Bureau operated an optical character reader system, but five optical mark readers have been installed throughout the country, some in universities for checking examinations and others for demonstration by sales representatives, the department said.

Magnetic ink character recognition equipment, meanwhile, has failed to gain a foothold in Taiwan except at the Central Post Office and Chang Hwa Bank.

In the output device sector, CRT terminals will continue to operate primarily with minicomputers, although the units have also found increasing applications with large-scale systems. Direct, on-line CRT systems operate chiefly in the Taiwanese military, which has an estimated 150 of the devices, compared with about 50 in the private sector, the Commerce Department noted.



CONFERENCE REGISTRATION FORM

(No advance registration or fee is required of qualified professionals for the Exhibition portion of COMPUTER EXPO 78.)

COMPLETE AND RETURN THIS FORM TODAY TO:

COMPUTER EXPO 78
The Conference Company
60 Austin Street
Newton, Mass. 02160

FOR "IMMEDIATE" REGISTRATION...
Call toll-free (800) 225-4242.
In Massachusetts call 964-4550 (collect).
Ask for COMPUTER EXPO Registrations.
We'll bill you later.

Register me for ☐ Tuesday — Executive Briefing
☐ All 3 days, or: ☐ Wednesday — Small Business Systems
☐ Wednesday — Managing People Problems
☐ Thursday — Distributed Data Processing

Name _____
Title _____
Company _____
Street and Number _____
City _____
State _____ Zip _____
Telephone () _____
Industry Number _____ Function Number _____
Company Size: A ☐ or B ☐ or C ☐ or D ☐
See box listing codes

Register this person for
☐ All 3 days, or: ☐ Tuesday — Executive Briefing
☐ Wednesday — Small Business Systems
☐ Wednesday — Managing People Problems
☐ Thursday — Distributed Data Processing

Name _____
Title _____
Company _____
Street and Number _____
City _____
State _____ Zip _____
Telephone () _____
Industry Number _____ Function Number _____
Company Size: A ☐ or B ☐ or C ☐ or D ☐
See box listing codes

Register this person for
☐ All 3 days, or: ☐ Tuesday — Executive Briefing
☐ Wednesday — Small Business Systems
☐ Wednesday — Managing People Problems
☐ Thursday — Distributed Data Processing

Name _____
Title _____
Company _____
Street and Number _____
City _____
State _____ Zip _____
Telephone () _____
Industry Number _____ Function Number _____
Company Size: A ☐ or B ☐ or C ☐ or D ☐
See box listing codes

The complete 3-day COMPUTER EXPO 78 Conference Program — including Workshops, Exhibits, Exhibitor Seminars — plus Workbook/Notebook is \$135.

Single Days are \$55 each. (Entitles you to attend all sessions on any single day of your choice, plus exhibit area all 3 days.)

You May Charge Registration To Your American Express, VISA/BankAmericard, or Master Charge Credit Card. (See Check Box Below.)

CHECK DATES YOU PLAN TO ATTEND:

- ☐ March 21, 22, 23 — Anaheim
☐ March 28, 29, 30 — San Francisco
☐ April 11, 12, 13 — Houston
☐ April 18, 19, 20 — Atlanta
☐ April 25, 26, 27 — St. Louis
☐ May 2, 3, 4 — Chicago
☐ May 9, 10, 11 — New York
☐ May 23, 24, 25 — Detroit
☐ May 30, 31, June 1 — Boston

Total Number of COMPUTER EXPO 78 Conference Days Registered For All People On This Form _____

1 Day @ \$55, 2 Days @ \$110, 3 Days @ \$135 _____ = \$ _____ per person

☐ Check Enclosed ☐ Purchase Order Enclosed ☐ Bill Me
☐ Charge Registration to my credit card: ☐ American Express
☐ VISA/BankAmericard
☐ Master Charge

Expiration Date _____
Cardholder Signature _____

INDUSTRY AND FUNCTION KEY

Business/Industry	Title/Occupation/Function
10 Manufacturer of Computer or DP Hardware/Peripherals	11 President/Owner/Partner/General Manager
20 Manufacturer (other)	12 VP/Assistant VP
30 DP Service Bureau/Software/Planning/Consulting	13 Treasurer/Controller/Finance Officer
40 Public Utility/Communication Systems/Transportation	21 Director/Manager of Operation/Planning/Administrative Service
50 Wholesale/Retail Trade	22 Director/Manager/Supervisor DP
60 Finance/Insurance/Real Estate	23 Systems Manager/Systems Analyst
70 Mining/Construction/Petroleum/Refining	31 Manager/Supervisor Programming
75 Business Service (except DP)	32 Programmer/Methods Analyst
80 Education/Medicine/Law	41 Application Engineer
85 Government — Federal/State/Local	42 Other Engineering
90 Printing/Publishing/Other Communication Service	51 Mfg. Sales Representative
95 Other	52 Other Sales/Marketing
	60 Consultant
	70 Lawyer/Accountant
	80 Librarian/Educator/Student
	90 Other

Company Size

- A Under 50
B 50 to 200
C 200 to 500
D Over 500



Amdahl's First Use 'Down Under'

Two U.S. Firms Get \$7.5 Million Qantas Order

SAN FRANCISCO — Qantas Airways has placed a \$7.5 million order with two Bay Area computer equipment vendors.

Most of the order went to Amdahl Corp., which will supply the Australian airline with two 470V/5s. Memorex Corp. will fill the rest of the order by supplying peripherals for the CPUs.

Qantas installed the first CPU at its Sydney, Australia, headquarters early in March. The companion CPU will follow in April, Qantas officials said.

Together, the two machines, which will replace an equal number of IBM 360/65s, will perform all the airline's DP functions except reservations, departure control and data communications and message switching. The two

IBM machines will continue to control reservations and departure, while data communications and message switching will be transferred to Interdata, Inc., equipment, Qantas spokesmen said.

Explaining why the airlines chose the Amdahl CPUs, Ron Benjamin, computer and communications manager for Qantas, said, "One of the deciding factors in Amdahl's favor was the ability to deliver and install computers before our peak April-June period." The company's current DP load for ac-

counting, stores inventory, payroll and other standard applications had outstripped the capabilities of its previous machines, he noted.

The Qantas order marks the first time an Australian company has bought an Amdahl computer, Benjamin added.

Though only half the size of the computers being replaced, the Amdahl CPUs will provide four to six times the computing capacity and serve the company's DP needs for at least five years, he said.

Get STRUCTURED . . . for only \$20 — and the time it takes to read this book!

Since publication of the first edition in 1975, Yourdon and Constantine's *Structured Design: Fundamentals of a Discipline of Computer Program and Systems Design* has become the standard in the field of computer systems and program design. Hundreds of organizations and universities throughout North America rely on it as their reference manual for such important software design concepts as coupling, cohesion, structure charts, and transform-centered design. The techniques presented have produced, time and time again, systems in which reliability and maintainability are an order of magnitude higher than in those developed with conventional techniques.

Now, in 464 pages and with more than 200 diagrams and illustrations, Edward Yourdon and Larry L. Constantine have come out with a completely revised and updated second edition of what the DP industry calls "the orange bible." This important new edition includes

- a discussion of the data-structure design techniques of Jackson and Warnier
- a complete glossary of the 247 technical terms used in the field of structured design
- a comprehensive index

If you have the first edition of *Structured Design*, chances are good that it's pretty dog-eared — so now's the time to replace it with the 1978 version. If you haven't read *Structured Design* before, here's your chance to make up for lost time! Or, if you just want to get ahead in your profession, buy this book. You can't afford not to!

— Payment enclosed for _____ copies STRUCTURED DESIGN @ \$20.

— Please send me information on other YOURDON Press titles.

Name and title: _____

Organization: _____

Address: _____

City, State, Zip: _____

Telephone: _____

YOURDON Press, 1133 Avenue of the Americas, New York, N.Y. 10036

Too Many Regulations Seen Slowing Industry Invention

WASHINGTON, D.C. — Regulatory actions in this city work to the disadvantage of users and the rapidly changing computer industry alike, John M. Eger, former head of the White House Office of Telecommunications Policy, said here recently.

"The government is killing the goose that lays the golden egg through regulation," Eger, now a private attorney and consultant, charged.

These government regulations, he contended, have had a severe impact on invention and innovation and have caused the rate of innovation to slow in this country.

At the same time, he said, the information society is with us already and a new world order for controlling developments in that area is "just around the corner."

But while this is happening, few here are grappling with the crucial issue of how to spur innovation, he indicated. For example, Eger pointed to AT&T.

He noted that AT&T has a plant worth \$80 billion, but because of the 1956 consent decree with the Justice Department, it is not allowed to use that plant for anything other than communications.

Because of this, "[it tries] to make everything look like communications" and that "distorts the marketplace," he said.

With the close marriage of computers

and communications, we may be slipping into a state where developments in the computer industry will be regulated, he added.

It would be better, he said, to "free AT&T" and allow the firm to compete in all areas.

This could be done through the rewrite of the Communications Act of 1934 that is presently under way in Congress, he said.

Congress could define what areas of the present AT&T business are suitable for monopoly status and have only those areas of the business regulated.

At the same time, Congress could deregulate the rest of the communications field, allowing AT&T and others to compete at will — through separate unregulated subsidiaries in the case of AT&T.

Orders & Installations

Brock & Blevins Co., Inc. of Rossville, Ga., a power plant fabrication and construction firm, has ordered a Univac 90/30 system.

The City of Sacramento, Calif., has ordered a Univac 90/70 system valued at more than \$1 million.

Introducing the \$3890



Meet Lear Siegler's Dumb Connection™ Peripheral Package.

At first glance, it might seem a lot to pay for a cable. But when you consider that it comes connected to the Dumb Terminal™ on one end, and to the Ballistic™ Printer on the other, it becomes a pretty smart buy.

From a single source, you get the world famous video terminal, the Dumb Terminal, and hardcopy from Lear Siegler's new Ballistic Printer.

The Dumb Terminal is, of course, that same reliable terminal, with loads of standard features, that specializes in dependable performance with a minimum of frills.

Our new Ballistic Printer is designed for heavy duty applications. Thanks to its unique head design, it'll give you output

Sponsors Detail Jerusalem Conference Program

JERUSALEM — Sponsors of the Third Jerusalem Conference on Information Technology have announced speakers and program details for the event, which will take place here Aug. 6-9.

Regarded by some as the summer's major world computing conference, the show will stress the theme "Computers, Communications and Technology Transfer."

Invited speakers and their topics include Jean Sammet (the state of programming languages); George Glaser (electronic funds transfer systems); Iann Barron (the future of computer technology); Uzia Galia (building computers in a developing country); David Golden (technology transfer); Jacques Stern (communications systems); Robert Weissman (time-sharing service companies); D. Ben-David (computer-aided design); and R. Schteingart (hospital systems in developing countries).

Sessions and panels planned for the subject of technology transfer include "A General Approach to Technology

Transfer"; "Technical Developments Supporting Technology Transfer"; "Medical Technology Transfer; and Industrial/Commercial Experience With Technology Transfer."

In the area of computer and communications technology, sessions will include the following subjects: fault tolerant computing; applications of machine descriptions; hardware and software technologies for developing countries; emerging domestic and regional communications satellite systems; advances in data communications; future of peripheral devices and network.

In addition, attendees will be able to take advantage of a program of social, historical, travel and professional interest.

Sponsors expect a major Israeli political figure will greet the delegates to the Third Annual Jerusalem Conference, as Golda Meir and Ephraim Katzir did at previous conferences. Student competitions between teams from the U.S., UK and Israel will also take place as will a computer chess tournament, so-

cial events and professional tours to various Israeli university and industrial computer installations.

The computer chess tournament, the first in Israel, will involve at least four programs, including Chess 4.6.

Those wishing to attend the conference as delegates may obtain program information by writing to JCIT3 Secretariat, Department of Computer Science, 4226 Ridge Lea Road, Amherst, N.Y. 14226.

Foreign Orders & Installations

The Dutch Ministry of Finance has ordered a terminal network for its tax service from Philips Data Systems Nederland B.V. in Rijswijk.

Marcol Computer Services, Ltd., a systems house based in London, has signed an OEM agreement with Honeywell Information Systems Ltd. to purchase 10 Level 6 minicomputer systems.

Bentalls, Ltd., a British department store chain, has ordered an NCR Corp. point-of-sale system valued at approximately \$2 million. The network will eventually include about 240 NCR 2151 terminals in stores. All terminals will be linked to an NCR 8400 system, which will be installed in Kingston.

Argos Distributors Ltd., a catalog showroom chain in Britain, has ordered additional point-of-sale equipment to provide more timely and accurate inventory and sales information. The company will install 90 NCR 280

retail terminals equipped with Cassette recording units. As sales are recorded on the terminals, data is captured on the cassettes for subsequent processing.

The Republic of Korea Ministry of Education, located in Seoul, has ordered nine Hewlett-Packard Co. 3000 Series II general-purpose systems to be installed in major universities and colleges throughout the country and eventually to link the campuses with a distributed computing network. The systems are worth more than \$3 million.

Kundenskreditbank-Deutsche Haushaltsbank, KGaA, of Dusseldorf, W. Germany, has ordered 571 Bunker Ramo Bank Control System 90 terminals. In the final expansion phase, all of the bank's branches will be integrated into the system, and it is expected that the number of display terminals will double. The order is valued at \$4 million.

SAVE EVEN MORE... RENT FOR 2 YEARS!

Hazeltine 1000

A bright, sharp 960-character display - consisting of twelve 80-character lines. Your choice of two transmission speeds, switch-selectable, in various combinations up to 9600 baud, as well as parity generation and checking. Regularly \$49* per month for 1-year rental.

Special \$34* per month 2-year rental



Hazeltine 1200

All the features of the Hazeltine 1000 plus twice the screen capacity - 1920 characters in twenty-four 80-character lines. Backed by worldwide sales, service and technical support. Regularly \$65* per month for 1-year rental.

Special \$44* per month 2-year rental



**Hurry! Only a limited number available.
Offer good while the supply lasts.
Call your nearest Hazeltine
representative today!**



Hazeltine Puts Performance Into Economy Terminals

* Maintenance Included -
Additional Service Charge for
Certain Remote Areas

Hazeltine Corporation, Computer Terminal Equipment
Greentown, N.Y. 11740 (516) 549-5800 Telex 96-1435

Dumb Connection.™

almost as long as you want to give it input.
At 180 cps.

The Dumb Connection. Another reasonable, cost-effective product from Lear Siegler. For those who always wanted a Dumb Terminal, but needed hardcopy, too.

Now you can have the best of both worlds. And the connection to go with them. In one package.

**Dumb Connection.
Smart Buy.**



LEAR SIEGLER, INC.
ELECTRONIC INSTRUMENTATION DIVISION
DATA PRODUCTS



Lear Siegler, Inc./E.I.D., Data Products,
714 N. Brookhurst St., Anaheim, CA 92803; (800) 854-3806. In California (714) 774-1010.

Executive Corner

• M. Ron Duies Jr. has been named executive vice-president at DSG, Inc.

• Dr. David M. Carlson has been elected president and chief executive officer at International Automated Machines, Inc.

• David M. Goodman has been elected chairman of the board of directors of Wavetek.

• George F. Knapp Jr. has been elected chairman and chief executive officer at U.S. Telephone and Telegraph Corp. Frederick W. Gibbs has been elected president and chief operating officer.

• At Norden Systems, Leo Botwin has been promoted to senior vice-president of engineering of the United Technologies subsidiary. Promoted from managerial posts were James J. Alimena to vice-president of product engineering; William W. Kingston, vice-president of systems engineering; and Daniel R. Nuzzo, vice-president of contracts and product support.

• Carl F. Freeland has joined the management team of Pan-sophic Systems, Inc. as vice-president of research and development.

• Data Card Corp. has announced the appointment of

two vice-presidents: Robert J. Keyport as vice-president for Minneapolis operations and Charles M. Frank as vice-president and controller.

• Charles A. Zraket has been elected executive vice-president and a member of the board of trustees of the Mitre Corp.

• Burt Isaacson has been appointed executive vice-president of operations at Cramer Electronics.

• David Mack has been elected chairman of the board and secretary of DDP Products, Inc.

• Wilbur S. Mann has joined the Gerber Scientific Instrument Co. as a vice-president and general manager of its

systems division.

• Frederick L. Zieber has been elected vice-president of Dataquest, Inc.

• Herbert D. Montgomery has been named corporate vice-president for operations administration at Pertec Computer Corp.

• William L. Goldstein has been appointed vice-president of marketing/sales at Digital Communications Associates, Inc.

• Herbert G. Waite has resigned as vice-president of marketing at Persci, Inc. to assume the presidency of Technical Design Labs of Princeton, N.J. Bob Erickson will assume all of Waite's responsibilities until Waite's successor

is named.

• Harry A. Steinberg has been appointed director of Decision Data Computer Corp.

• Walter H. Trumbull Jr. has been named president and chairman of the board at Electro-Mach Components, Inc. Vincent P. Tarushka has joined the firm as manufacturing manager.

• John W. Luke has been elected a director of Computer Sciences Corp. This follows his recent election to a corporate vice-president post and appointment as president of CSC's Data Services Group. John J. Kramer has been promoted to president of the Infonet Division.

• Edgar M. Fields, Jr., has been named a vice-president of Planning Research Corp. Data Services Co.

EDP AUDITORS ASSOCIATION

6th INTERNATIONAL CONFERENCE

HYATT-REGENCY DEARBORN, MI.

JUNE 19-21, 1978

TOPICS INCLUDE AUDITING APPLICATIONS, ON-LINE SYSTEMS, DATA BASE, EFTS, SECURITY/PRIVACY.

FOR MORE INFORMATION CONTACT:

EDPAA 1978 CONFERENCE

P.O. BOX 61

Sterling Heights, Michigan 48078

Attention: Mr. Baker

PLEASE PRINT

NAME

COMPANY

ADDRESS

Earnings Reports

ANDERSON JACOBSON

	1977	1976
Shr Ernd	\$.15	\$.12
Revenue	6,833,000	5,282,000
Earnings	382,000	273,000
9 Mo Shr	.43	.33
Revenue	19,711,000	15,279,000
Earnings	983,000	769,000

APPLIED DIGITAL DATA

	1977	1976
Shr Ernd	\$1.91	\$1.21
Revenue	33,150,025	23,437,161
Earnings	5,255,251	4,595,340
3 Mo Shr	.27	.35
Revenue	10,529,376	6,676,776
Earnings	1,417,296	1,322,166

CALIFORNIA COMPUTER

	1977	1976
Shr Ernd		\$.12
Revenue	\$29,242,000	29,084,000
Earnings	(62,000)	390,000
6 Mo Shr		.20
Revenue	55,615,000	59,807,000
Earnings	(669,000)	657,000

COMPUTER USAGE

	1977	1976
Revenue	\$9,183,474	\$9,180,014
Loss	654,820	446,321

DATA DESIGN LABS

	1977	1976
Shr Ernd	\$.22	\$.13
Revenue	6,946,000	6,695,000
Earnings	221,000	297,000
6 Mo Shr	.42	.26
Revenue	13,446,000	11,305,000
Earnings	419,000	297,000

THRESHOLD TECHNOLOGY

	1977	1976
Revenue	\$393,883	
Loss	114,467	
6 Mo Shr	762,780	
Loss	199,568	

a-Comparable figures unavailable; company changed its fiscal year-end from July 31 to June

AMPEX

	1976	1977
Shr Ernd	\$.47	\$.34
Revenue	62,884,000	69,905,000
Tax Cred	1,807,000	1,338,000
Earnings	5,122,000	3,726,000
9 Mo Shr	1.35	.77
Revenue	234,258,000	209,190,000
Tax Cred	5,886,000	2,838,000
Earnings	14,744,000	6,371,000

CINCINNATI MILACRON

	1976	1977
Shr Ernd	\$2.64	\$1.36
Revenue	531,848,000	448,422,000
Earnings	20,888,000	19,991,000
3 Mo Shr	.91	.55
Revenue	143,448,000	113,923,000
Earnings	6,844,000	6,394,000

a-Includes \$807,000 net gain from liquidation of subsidiary.
b-Reflects two-for-one stock split paid Jan. 10, 1978.

COMPUTER NETWORK

	1977	1976
Shr Ernd	\$.26	\$.08
Revenue	4,399,000	1,595,000
Earnings	326,000	126,000
9 Mo Shr	.76	.27
Revenue	11,853,000	4,510,000
Tax Cred		60,000
Earnings	975,000	392,000

DATAPOINT

	1976	1977
Shr Ernd	\$1.05	\$.65
Revenue	36,825,000	24,300,000
Earnings	3,572,000	2,122,000
6 Mo Shr	1.88	1.24
Revenue	72,326,000	46,833,000
Earnings	6,412,000	4,076,000

GENERAL DATACOMM

	1977	1976
Shr Ernd	\$.30	\$.14
Revenue	6,499,000	4,280,000
Earnings	481,000	210,000

INFORMATION INTERNATIONAL

	1976	1977
Shr Ernd	\$.11	\$.19
Revenue	3,312,208	3,734,534
Earnings	286,267	498,832
9 Mo Shr	.34	.58
Revenue	9,209,436	11,297,643
Earnings	683,242	1,524,715

MEGADATA

	1977	1976
Shr Ernd		\$.34
Revenue	\$6,207,712	5,647,884
Earnings	(68,622)	294,723

TANDEM COMPUTERS

	1977	1976
Shr Ernd	\$.21	
Revenue	3,909,000	\$766,000
Tax Cred	301,000	
Earnings	836,000	(301,000)

Proven Mini-Software Designed For Your Business

Pre-Packaged, Off-The-Shelf Programs Covering:

- ☐ accounts payable ☐ other accounting ☐ marketing
☐ accounts receivable ☐ financial analysis ☐ education
☐ general ledger ☐ statistical analysis ☐
☐ payroll

Programs Designed For:

- ☐ BASIC Four ☐ PDP 8/11 ☐ Four Phase
☐ Burroughs ☐ IBM 3/32/34 ☐
☐ Datapoint ☐ Hewlett Packard

Call now or return this ad for complete details to:

Douglas R. Johnson
 Resource Software International, Inc.
 140 Route 9W
 Englewood Cliffs, New Jersey 07632
 (201) 947-6104

CW

Name _____
 Title _____
 Company _____
 Industry _____
 Address _____
 City _____ State _____ Zip _____
 Telephone _____

**CRT
PRICE
BREAK!**
HAZELTINE 1500

HAZELTINE
MODULAR 1

OEM
Distributors
for
Data Printer
Line Printers

ADL

ITEL UTILITY DATA SERVICES

CDC 7600
IBM 370/158-CMS
UT1108-EXEC 8

The
Scientific
Engineering
Data Base
Problem Solver

Cyber 73
IBM 370/158-VS
UT1110-EXEC 8

COMPETITIVE PRICES

7540 LBJ Freeway Suite 510
 Dallas, Texas 75251
 (214) 233-0679

But CAT Shakedown Predicted

Medical Imaging Mart to Top \$1 Billion by '82

SAN JOSE, Calif. — Sales of medical diagnostic imaging systems will top \$1 billion by 1982, but the computer-assisted tomography (CAT) scanner segment of that market will experience a major shakedown by 1980, Creative Strategies International (CSI) predicted in a recent market study.

Report Examines Growth Outlook For Medical DP

SAN JOSE, Calif. — "Medical Information Systems," an industry report prepared by Creative Strategies International (CSI), examines the future growth of the medical information industry.

Although sales estimates for 1982 are \$1 billion, compared with 1977 sales of \$476 million, the report pointed out major obstacles to the industry's growth.

Considered particularly critical are resistance by health administrators who question the cost-effectiveness of the capital investment required to implement a medical information system and the growing concern over the confidentiality of patient data.

Potential Boon

Yet the Carter Administration's push to improve health care delivery may prove a boon to the industry. CSI predicted the industry will benefit from the cost control and reporting legislation favored by the administration.

Patient care applications such as admission-discharge-transfer and medical records are the most significant market segment, according to the report.

The report sells for \$695. For further information, contact CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

Forecasting sales trends in the diagnostic imaging systems market, the study said sales in the scanner sector of the market have peaked and will decline in the U.S. during the next five years. Although growth in non-U.S. markets will partly offset these losses, scanner sales will flatten by 1982, the market research and consulting firm added.

Particular Growth

Two segments of the diagnostic imaging systems market — ultrasound scanners and nuclear medical systems — will experience especially large growth through 1982, CSI predicted.

Spurred by developments in real-

time scanning, ultrasound scanners will lead the market in sales growth with compound yearly increases approaching 28% by 1982, the study said. Nuclear medical products, meanwhile, will integrate with computers to form new products that promise to complement CAT scanners, CSI added.

By 1982, ultrasound imaging will constitute the most significant sector of the diagnostic imaging systems market, with annual sales of \$269 million. As with CAT scanner suppliers, however, vendors of ultrasound imaging equipment will experience a major shakedown that will eliminate almost all the competitors except those with

interests in other imaging technologies, the report warned.

Legislation Influential

CSI also predicted, that government legislation and review committee regulation will play a significant role in the development of the diagnostic imaging systems market. Between July 1976 and July 1977, state review agencies rejected 35% of the proposed purchases of CAT scanners, and the future promises more of the same, the market research firm said.

The study, *Medical Diagnostic Imaging*, costs \$695 and is available from CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

Acquisitions

Computer Automation, Inc. said recently that negotiations for the acquisition of General Computer Systems, Inc. of Addison, Texas, have been broken off.

Both firms had previously announced the execution of a letter of intent for Computer Automation to acquire General Computer Systems, but the parties have been unable to reach a definitive agreement on the terms of the proposed acquisition, according to Computer Automation president D.H. Methvin.

U.S. Datacorp has acquired Valley Datacorp, a computer output microfilm service firm headquartered in Phoenix. No changes are planned in the operation of the firm.

Control Data Corp. has an agreement to acquire selected assets of Micro-Bit Corp., a privately held firm in Lexington, Mass. Terms of the agreement were not disclosed.

Quanta Data Systems has acquired the Commercial Processing Division of the Louisiana Computing Corp.

WALK AWAY LEASES
for
IBM
3031
3032
3033

158,168 and most other
Processors and Peripherals

• Lowest Lease
Rates

• Contract
Flexibility

• Simple
Documentation

Call or Write

alanthus leasing company

1114 1/2 Rte. 10, P.O. Box 1114

1114 1/2 Rte. 10, P.O. Box 1114

1114 1/2 Rte. 10, P.O. Box 1114

1114 1/2 Rte. 10, P.O. Box 1114

1114 1/2 Rte. 10, P.O. Box 1114

1114 1/2 Rte. 10, P.O. Box 1114

1114 1/2 Rte. 10, P.O. Box 1114

1114 1/2 Rte. 10, P.O. Box 1114

CHARGE!

Stop reading month-old issues of Computerworld with holes where important articles used to be.

COMPUTERWORLD

WEEKLY FOR THE COMPUTER COMMUNITY

11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mktg. Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other:

position announcements

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS TECHNICIAN F/R

New Jersey Blue Cross is seeking candidate for our Third Shift Data Processing. Qualified applicant would have 1 to 2 years experience in Failure and Recovery on IBM 370/158; knowledge of JCL, OS Utilities. Excellent benefit package. Salary \$16K to \$17K plus differential. Please send resume and salary requirements to:

MANAGEMENT RECRUITER

 **Blue Cross
Blue Shield**
OF NEW JERSEY
33 Washington St.
Newark, N.J. 07102

Equal Opportunity
Employer M/F



WHY EDP SEARCH?

Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

SYSTEM DEVELOPMENT CORP. HAS EMPLOYMENT OPPORTUNITIES FOR QUALIFIED AND EXPERIENCED SYSTEM DESIGNERS - SYSTEM ANALYSTS SYSTEM PROGRAMMERS

THE COMPANY

SDC has been the industry leader in Systems Software Development for over 20 years. We are undergoing rapid expansion due to our demonstrated technical excellence.

THE ACTIVITY

SDC has initiated a large Research and Development project to design an advanced standard architecture for the U.S. Navy's computer based Real-Time Command and Control Systems. Our R&D effort will utilize top down design techniques, structured analysis and structured programming. Additionally, we will define and design new automated techniques for producing operating systems software.



*San Diego &
Virginia Beach*

THE FUTURE

Your opportunity is now! SDC offers top compensation and liberal fringe benefits including paid relocation. As one of our Software Professionals, you will enjoy our technically challenging but casual work environment. For consideration or information contact T.W. Salmon, Personnel Administrator, (804) 461-6662.

System Development Corporation

13 Koger Executive Center, Norfolk, Virginia 23502

SENIOR PROGRAMMERS

Knowledge of IBM, OS, JCL, COBOL and/or ALC is required. CICS experience is desirable. Degree and programming experience in business applications desirable.

★ EXCELLENT BENEFITS

★ PERMANENT LOCATION

SEND RESUME TO

FEDERAL RESERVE BANK OF DALLAS

Station K
Dallas, Texas 75222
(214) 651-6304

Equal Opportunity Employer

PROGRAMMERS

FLORIDA OPPORTUNITIES

Join the 32-bit
Super Mini Leader!

REAL-TIME ASSEMBLY LANGUAGE Programmers with experience in the following areas are invited to share in our success:

- OPERATING SYSTEMS
- INTER C.P.U. COMMUNICATIONS
- DATA BASE COMPILER DESIGN
- FIRMWARE DESIGN
- MAN MACHINE INTERFACE

Systems Engineering Laboratories is a dynamic, fast-growing computer manufacturer located in a very desirable suburb of Ft. Lauderdale, Florida. We offer health and dental plan along with 100% tuition refund program and completely paid relocation.

Please send resume and current or last salary to Frederick J. Brillante.

SYSTEMS

ENGINEERING LABORATORIES

6901 West Sunrise Blvd., Fort Lauderdale, Florida 33313

Equal Opportunity Employer Male/Female

position announcements

position announcements

position announcements

position announcements

position announcements

HUGHES AIRCRAFT

Corporate Data Processing Division Offers Key Career Positions To Computer Professionals

The Business Computer Applications Department of Hughes Corporate Data Processing has immediate positions available for senior-level management and systems analysis professionals.

These positions, located in the Los Angeles Airport area, offer top pay, excellent fringe benefits and outstanding work environment. Specific activities center on major business systems development in a multi-divisional corporate environment. These developments cover the full spectrum from conceptual analysis thru implementation.

The following opportunities exist in support of Financial, Personnel, Industrial Relations and Project Management Systems:

BUSINESS APPLICATIONS MANAGEMENT

Responsibilities include direction of Senior Project Leaders/Analyst/Programmers in the development of new business Data Processing Applications.

Qualified applicants will possess:

- Management experience in a Business Data Processing environment.
- Applications Development background ranging from design thru implementation.
- Solid project management skills.
- Strong oral and written communications ability.
- Technical background with IBM Software, Structured Design, On-line IMS or related DBMS experience.

COMPUTER SPECIALISTS

Qualified applicants will participate in Business Development projects in the capacity of Project Manager or Senior Systems Analyst.

- Major systems development, experience to include:
 - Database development
 - On-line applications development
 - IBM Software
 - Structured Design
 - Structured Programming
- Project Management skills to include:
 - Strong oral and written communication
 - Economic analysis and proposal preparation
 - Work flow and task planning

Education for all positions should include a Bachelors or Masters Degree in Business with emphasis in Finance, Accounting or Business Data Processing.

In addition to excellent employee benefits, these positions offer an opportunity to work and advance in a large scale state-of-the-art environment.

• Systems Configuration and Software include:

- Dual Amdahl 470 central computer site
- 12 Megabyte Core
- Extensive remote network covering Southwestern U.S.
- Latest IBM Software
- IMS/System 2000/Mark IV/DTSS

Interested applicants are invited to send resumes to: Hughes Aircraft Company, Computing and Data Processing, Dept. 63-31, Bldg. 2, M.S. A-180, Centinela and Teale, Culver City, CA 90230.

HUGHES

HUGHES AIRCRAFT COMPANY

U.S. Citizenship required • Equal opportunity M/F/H/C employer

DATA BASE ADMINISTRATOR LOUISIANA STATE UNIVERSITY

Minimum Qualifications: College graduate with at least five years of data processing experience, two years of which must be in data base design or administration. Preference given to experience in IMS, DLI, DC, and large systems. Successful candidate will control data base activities at LSU and will supervise the activities of one junior DBA. The salary is very competitive with a 3033 support computer. Send confidential resume to:

Dr. John M. Tylar
System Network
Computer Center
Louisiana State University
Baton Rouge, LA 70803

An Equal Opportunity
Affirmative Action Employer

Smart & Dumb Data Terminals

Are our Business, We continue to grow and need.

SALESMEN/W

in six locations nationally

SR. SOFTWARE

Systems Designers
A Computer Scientists Dream

ENGINEERS

PRODUCT ENGR'S &
APPLICATIONS ENGR'S

New Product Development

For Detailed Information

Write or Call Personnel

800-631-7050

data
services

70 McKee Drive
Mahwah, N.J. 07430
Equal Opportunity Employer M/F

PROGRAMMERS ANALYST

"Free Resume Service"

NORTHWEST • SOUTHEAST
SOUTHWEST • MIDWEST

- Scientific and commercial applications
- Software development and systems programming
- Telecommunications
- Control Systems
- Computer Engineering

Send resume or rough note of objectives, salary, location restrictions, education and experience (including computers, models, operating systems, and languages). Our client companies pay all of our fees.

- NATIONAL
- PLACEMENT
- FOR PROFESSIONAL
- WOMEN

P.O. Box 834
HARTFORD, CT. 06142
We Aggressively Support
Affirmative Action

MANAGEMENT CONSULTING

Leading management consulting firm with excellent reputation in federal, state, and local governmental consulting is seeking to expand its Washington, D.C. practice in the following areas:

• SYSTEMS ACCOUNTING

Requires 2-5 years experience in design and implementation of financial systems and thorough knowledge of governmental accounting, budgeting, and management reporting, MBA (CPA desirable).

• SYSTEMS/DATA PROCESSING

Requires 3 to 10 Years experience in translating requirements and conceptual designs into transferable, state of the art systems for a wide range of technological environments. Other skills needed are computer performance evaluation, teleprocessing and data communications, EDP auditing, data base management systems, and the design and implementation of mini-computer systems, MBA.

For prompt consideration, please send your resume in confidence to Donald C. Bird, P.O. Box 2626, Washington, D.C. 20013.

An equal opportunity employer M/F

DATA BASE ADMINISTRATOR

Salary area \$30,000
Our Houston area energy company client is currently developing a new MIS department. This unusual opportunity will offer:

Lucrative future salary prospects due to anticipated company growth, the personal benefits of living in one of the most dynamic and prosperous cities in the world today and the professional challenge of developing an entirely new data base.

For further information on this and other data processing openings, contact Connie Hanlon or Tom Fischer at

(713) 658-9898

All Fees Assumed by Client Companies

M. David Lowe
PERSONNEL SERVICES

403 Houston Natural Gas Building
Houston, Texas 77002

sr. technical services analyst (SOFTWARE)

Travenol Laboratories, a health care industry leader, is seeking a qualified individual to generate, install and maintain MVS, JES2 end teleprocessing software. The chosen applicant will tune operating systems, provide general consulting services to the user community and install/maintain vendor packages.

A minimum of 1 year experience with MVS and JES2 internals and some TCAM background is required. Familiarity with TSO end/or knowledge of VTAM or 3705 NCP is desirable.

We provide a competitive salary commensurate with experience and a liberal benefits package. To arrange a confidential interview, send your resume to:

S. C. Washington

**TRAVENOL
LABORATORIES, INC.**
One Baxter Parkway
Deerfield, Ill. 60015

An Equal Opportunity/Affirmative
Action Employer

position announcements

position announcements

position announcements

position announcements

position announcements

isd

Technical openings being created thru expansion of one of the nations largest service bureaus using UNIVAC equipment. Please contact

INFORMATION SYSTEMS DESIGN

3205 Coronado Drive
Santa Clara, Calif. 95051
(408) 249-8100

DATA PROCESSING MANAGER-CONNECTICUT

Assume total responsibility to run three-person department in growing mid-size manufacturing company. Responsibilities include operations, systems analysis, software package selection and implementation of manufacturing and financial applications. Excellent opportunity for growth and challenge in a sound company environment.

Qualifications should include 5-10 years data processing experience, production and inventory control applications, RPG and COBOL programming, system design and user interface. Degree required. Salary mid-\$20's; send resume with salary history and requirements to:

CW Box 1485
787 Washington St.
Newton, MA 02160
Equal Opportunity Employer

N.E.W.S.

OUR CLIENTS NEED YOU

Nationwide positions available for Hardware, Software & Programming Professionals. Entry level to seasoned Pros.

1. Software systems analysts/designers. All hardware-prefer Mini/Micro. General Systems background.
2. Mini/Micro Programmers — Entry level and UP.
3. Software & Applications Programmers/Analysts. All Hardware-All Languages.
4. EE's — Computer systems software background. General design. All Hardware-prefer Mini/Micro.

Send resume with salary history & location preference to:

AMEC ASSOCIATES, INC.
1525 N. Central Ave.
Phoenix, Arizona 85004
(602) 253-9242

NEW ENGLAND OPPORTUNITIES SOFTWARE PROS TO 32K

Our broad base of computer vendors, users, engineering and research firms have listed over 400 urgent requirements with us for: MINICOMPUTER SYSTEMS PROGRAMMERS, MICROPROGRAMMERS, DIAGNOSTIC PROGRAMMERS, DATA BASE SPECIALISTS, SOFTWARE CONSULTANTS, SYSTEMS ANALYSTS. Several project and management level positions.

Send your resume in confidence. Contact:

Jim Masciarelli

WINTER, WYMAN & COMPANY

Personnel Consultants
60 William St.
Wellesley, MA 02181
(617) 235-8505

others talk about it — we've got it

Add Dimension To Your Future!

"Upon receiving my BS in Computer Science, I was hired to work in Software Maintenance. I progressed to project leader and am presently manager of Software Sustaining Program. At Sperry Univac, your personal contributions are rewarded."

SYSTEMS SOFTWARE DEVELOPMENT

As a leader in the world of mini-computers, Sperry Univac will double in size within the next year! If you are a mini-computer professional, looking for responsibility and growth, NOW, not later, look into the opportunities at Mini-Computer Operations.

New Systems Research and Development projects are starting now...

- State-of-the-art Operating Systems for Interactive, Real-time, and Batch Environments.
- Distributed Data Base Management Systems.
- On-line System Diagnostics.
- Sustain and Enhance Present Software.
- High Performance Business and Scientific Compilers.
- Advanced Data Communications Software.

Diagnostics Analysts

Individuals will be members of hardware/software design team involved in mini-computer test systems development. Positions will include project responsibility for all phases of assembly language and microprogramming language implemented programs and development of system level testing and fault-isolation software.

Data Communications Analysts

Design software and be responsible for the implementation of asynchronous and synchronous protocols. Design transaction oriented systems, Distributive Communications Architecture, and front-end processors. Project Management opportunities. Direct assembly language experience required.

Data Communications Analysts

Estimate time and cost of Data Communications software for customers. Evaluate customer software RFQ/RFP's, design creative solutions for customer's needs, and provide state-of-the-art technical leadership.

Software Applications Analysts

Conduct pre/post sales software support for Mini-Computer Operations products, including benchmarks, performance analysis and competitive analysis. Requires direct experience in Operating Systems, Data Base design and high level languages.

Special Software Design Analysts

Provide real-time systems programming, special interfaces/device drivers, diagnostic hardware/software, project control, cost estimates and assembler languages.

Performance Measurements Analysts

Establish procedures and develop necessary tools to perform the system measurements of our on-line transaction oriented system and analytic and simulation modeling.

Custom Applications Analysts

Position responsibilities will include industrial automation, distributed processing networks, assembly and high level language, on-line transaction systems, Data Base Management Systems, proposal writing, specification design and project management.

Operating Systems Analysts

Design and development of data communications software for operating systems development, DBMS design/implementation, use of DBMS in distributed environments, on-line teleprocessing and line and network protocols.

Software Sustaining Analysts

Provide enhancement and support of operating systems, Telecommunications systems and Fortran Compilers.

We offer competitive salaries and a comprehensive benefits package that includes dental insurance. We invite you to send your resume to the address below, or call Employment at 714/833-2400 for more information.

SPERRY  UNIVAC

MINI-COMPUTER OPERATIONS
2722 Michelson Drive, Irvine, CA 92713
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

ENGINEERS / PROGRAMMER/ANALYSTS

Announcing better-than-equal opportunities.

Think about it.

Computer Sciences Corporation isn't the only company in America aggressively seeking out talented and technically qualified women and minority group members.

You see more affirmative action recruitment programs every day. But.

Don't let them blind you to the fact that all "equal opportunities" aren't necessarily equal in terms of the long term growth potential open to you as an individual...after you're on board.

In the middle of one of the most competitive job markets for technical talent in recent years, CSC's success in attracting women and minority group engineers and computer software specialists has been largely the result of one important fact—the growth and technical accomplishments achieved by so many of the women and minority group professionals already on the staff.

So, if what you're looking for is substantially more than token opportunity, we warmly invite you to look into the "better-than-equal" opportunities waiting for every qualified candidate at CSC.

EXPERIENCE IN ANY OF THESE AREAS CAN QUALIFY YOU:

CSC opportunities are as numerous and diverse as the whole world of communications and computers, from undersea to outer space, including challenging programs for every branch and mission of industry and government, from military to municipal. CSC is the largest information sciences company in the nation, yet each operation and technical team maintains its own identity and individuality.

ENGINEERS

- Communication Systems Engineering
- Satellite Communication Systems
- Spacecraft Control Systems
- Naval Communication Systems
- Digital Telecommunication Systems
- Command and Control
- Minicomputer Systems
- Computer Communication Systems
- Computer Architecture
- Computer Security
- Network Protocol Design
- Distributed Mini-Based Processing
- Communications Simulation
- Process Control

PROGRAMMER/ANALYSTS

- | | |
|--------------|---------------|
| H6000 | MINICOMPUTERS |
| H716, 516 | PDP 11 |
| WWDMS (MDQS) | UNIX |
| IDS, ISP | ELF II |
| GCOS | RSX 11D |
| GMAP | Assembly |
| FORTTRAN | Language |
| COBOL | FORTTRAN IV |
| WWMCCS | |
| COMPUTER | 360/370 |
| NETWORKS | COBOL |
| ARPANET | OS/VS/MVS |
| Protocol | TSO |
| Design | IMS |
| Terminal | SYSTEM 2000 |
| Interface | OS/VS |
| | COBOL |
| | PLI |

**LOCAL INTERVIEWS ARE PLANNED FOR YOUR CITY
IN THE NEAR FUTURE, SO BE SURE TO MAIL US
YOUR RESUME TODAY OR TELEPHONE
CHRIS PAPPAS TOLL FREE AT (800) 336-0173 ANY
DAY THIS WEEK.**

For promptest attention, address your resume directly to Chris Pappas, Employment Manager, Box 300, Computer Sciences Corporation, Systems Division, 8566 Arlington Blvd., Falls Church, Virginia 22040. (Just outside of Washington, D.C.)

**CSC COMPUTER
SCIENCES
CORPORATION**

SYSTEMS DIVISION

Major Offices and Facilities Throughout the World

WE AGGRESSIVELY SUPPORT EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION.

Immediate Career Opportunities

Morrison Incorporated in Mobile, Alabama is growing rapidly and needs the following career EDP positions filled as soon as possible:

Systems Engineer — 3 to 5 years functioning as a systems engineer/programmer with knowledge of DOS/power/VS INTERNALS, CICS, INTERNALS, Telecommunications and 370 Assembler Language.

Senior Systems Analyst — 3 to 5 years functioning as a systems analyst with experience including DOS/power/VS; ANS COBOL; DATA COMMUNICATIONS/DATA BASE (CICS); Requirements definition and systems design of financial and merchandising applications.

Programmer Analyst — 2 years functioning as a programmer writing program specs and designing COBOL programs. Specific experience should include DOS/POWER/VS, ANS COBOL, CICS and developing programs for financial, merchandising and inventory control applications.

Competitive starting salaries, excellent benefits program and opportunities for career growth.

Call now or send resume to:

MORRISON INCORPORATED



Human Resources Department
First National Bank Building
P.O. Box 2608
Mobile, Alabama 36625
205/432-9711 Extension 263

DATA PROCESSING POSITIONS SAUDI ARABIA

A rapidly growing systems management company has immediate openings in Riyadh, Saudi Arabia.

PROJECT MANAGERS

Challenging positions involve development and operation of innovative TP systems for government agencies. Will manage international staff of DP and micrographics professionals with interaction at the highest levels of government. Must have at least 10 years solid DP experience and at least 5 years in significant management positions. Experience with large scale IBM TP systems required.

OPERATIONS MANAGERS

Challenging positions involve operation of large-scale IBM Teleprocessing system, multi-shift data conversion efforts, and micrographics production. Must have at least six years solid Data Processing experience and at least two years in significant management positions.

SYSTEMS PROGRAMMERS

Positions involve implementation and maintenance of an innovative IBM 370 TP system with CRT and Microfiche terminals. At least two years in-depth experience maintaining IBM OS TP systems required, preferably CICS with 3270 terminals. Must be able to maintain system single-handedly.

SENIOR SYSTEMS ANALYSTS

Minimum of five years experience in analysis and design of business TP applications. Must be knowledgeable in COBOL and IBM OS TP systems, preferably CICS and 3270 terminals. Should be capable of leading large projects.

PROGRAMMER ANALYSTS

Minimum five years experience in applications design and programming in a TP environment on IBM 370 OS systems. Must be fluent in COBOL and assembler and possess knowledge of IBM's CICS and 3270 terminals.

COMPUTER OPERATORS

Minimum two years experience as Senior Operator of IBM OS teleprocessing system.

OPERATIONS INSTRUCTORS

Will be responsible for operations training of Arabian personnel. Must be completely familiar with IBM computer operations and possess instructor skills.

KEYPUNCH INSTRUCTORS

Will train Arabian personnel in keypunch and verification skills. Must have significant practical experience, possess instructor skills, and speak Arabic.

Salaries commensurate with experience. Excellent benefits. Six weeks paid vacation annually with round-trip air fares to place of residence. Free furnished housing and free education for children. Send resume and salary history to:

SYSOREX INTERNATIONAL, INC.

10590 North Tantau Avenue
Cupertino, CA 95014
Attn: J. Singleton

position announcements

MTTR ASSOCIATES
1107 Mannheim Road **\$12-30K**
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

RSVP SERVICES
Employment Agency for Computer Professionals

position announcements

position announcements

position announcements

position announcements

position announcements

Hewlett-Packard needs computer systems engineers and sales representatives.

- If you want to be part of a team that last year boosted sales of technical and commercial computers and terminals more than 50%...
 - If you have a technical degree and would rather be out with people than in the lab all day...
 - Or if you have a background in computer sales or applications...
- Get in touch with us right away.

Why is moving to Hewlett-Packard a move in the right direction? Well, think about this:

You'll be working with a line of leadership products, with a reputation for quality and innovation.

You'll have a choice of good places to work. Right now, we need people in Chicago, Atlanta, Los Angeles, Washington, D.C., Boston and other major metropolitan areas.

You'll have a long-term opportunity for growth. (A cliché at most companies, but at Hewlett-Packard it's an everyday reality. We promote from within rather than hiring people over your head.)

You'll have a real sense of security. (Another well-worn promise, so here's a fact to back it up. We haven't had a layoff in our entire 35 years.)

You'll get a good salary and benefits. (At HP, a percentage of profits is distributed to all employees every six months. The last semi-annual bonus exceeded \$18 million.)

You'll receive first-rate support and service for your customers, both from the factory and engineers in the field.

You'll also be working for one of the leading small-computer companies. Hewlett-Packard is a diversified manufacturer of electronic and computational products, with 40 divisions worldwide, offices in 65 countries and annual shipments of \$1.36 billion. And *Dun's Review* has called HP one of the five best-managed companies in the country.

There's plenty of challenge and satisfaction working at Hewlett-Packard. If that's what you're looking for, write to us today.

We are an equal opportunity employer dedicated to affirmative action.

John Sundry, Regional Sales Mgr., 4 Choke Cherry Road, Rockville MD 20850

Bob Stringer, Regional Sales Mgr., 5201 Tollview Dr., Rolling Meadows IL 60008

Ruee Stewart, Regional Sales Mgr., P.O. Box 105005, Atlanta GA 30348

Bob Sudkamp, Regional Sales Mgr., 23855 Research Drive, Farmington Hills MI 48024

Mike Leavell, Regional Sales Mgr., 3939 Lankershim Blvd., North Hollywood CA 91604

Mike Naggia, Regional Sales Mgr., 6877 Goreway Drive, Mississauga, Ontario, Canada L4V 1M8

HEWLETT  PACKARD

programmer / analyst

A Nationally known corporation with division headquarters in the south suburban, Chicagoland area, has a growth orientated position available in Data Processing.

The person we select, should have a minimum of 3 years experience in heavy manufacturing and financial systems, and also should be familiar with Batch end/or On-Line systems, COBOL, Assembler end/or Basic Languages.

We offer an excellent starting salary, outstanding company paid fringe benefits and ideal working conditions.

Send complete resume, including salary history to:

CW box No. 1493
797 Washington St.
Newton, MA. 02160

Equal Opportunity Employer M/F

New! 1978 Computer Salary Survey



Call for your Free copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

This comprehensive free report also gives you expert advice on a variety of important career topics such as: when you should consider a job change; what you need to do to break into management; how to make sure you're getting the proper exposure; why timing is so crucial in your long range career development; how you can avoid stagnation... and much more.

The 1978 Computer Salary Survey has been compiled by Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

For your Free copy, call the Source Edp office nearest you.

East:	Midwest:	St. Louis	West Coast:
Boston 617/482-7813	Chicago 312/782-0857	314/882-3800	Encino CA 213/995-8866
Hartford 203/522-8590	Clarendon 218/771-2070	St. Paul 612/771-0544	Irvine CA 714/833-1730
New York City 212/738-7445	Detroit 313/963-0510	South/Southwest: Atlanta 404/325-8370	Los Angeles 213/386-5500
Philadelphia 215/685-1717	Kansas City 816/474-3393	Dallas 214/387-1600	Oakland 415/444-5955
Stamford CT 203/329-8411	Minneapolis 612/544-3800	Denver 303/773-3700	Palo Alto 415/328-7155
Union NJ 201/687-8700	Northfield IL 312/446-8395	Fort Worth 817/338-9300	San Francisco 415/434-2410
Washington DC 703/790-5810	Oak Brook IL 312/986-0422	Houston 713/626-8705	Seattle 206/454-8400
Wellesley MA 617/237-3120	Rolling Meadows IL 312/392-0244	New Orleans 504/561-8000	Torrance CA 213/540-7500
	Southfield MI 313/352-6520		Canada: Toronto 416/364-2919

source  edp

If unable to call, write: Source Edp, Department G3
721 Enterprise Drive, Oak Brook, Illinois 60521
(When writing, please be sure to use home address and indicate position title.)

DUNHILL EDP talks YOUR LANGUAGE

You are currently needed and wanted for immediate nationwide EDP opportunities.

Software - Internals and Data Security	TO \$25K
Software - IBM - MVS, S/VS, CICS, IMS, INTNLS	TO \$25K
IMS Specialists - OS/DC, OIC, TUNE, GEN	TO \$25K
Communications - BTAM, QTAM, CICS, 3705	TO \$21K
Communications - UNIVAC, EXEC 8, S/VS, Any Comm	TO \$20K
Programmer/Analyst - Heavy DBOM/MP	TO \$20K
Programmer/Analyst - OIL & GAS, COB, OS/VS	TO \$22K
Software Specialists - OEC, RST, COBOL, RSX	TO \$22K
Software Programmer - Need 2 for OS/VS - CICS	TO \$19K
Programmer/Analyst - Heavy Bank, OS/DOS, VS, COBOL	TO \$20K
Programmer/Analyst - ALC, PARS, FINANCIAL	TO \$19K
Programmer/Analyst - OMS 1100, COBOL, Some INTNLS	TO \$20K
Programmer/Analyst - INTERCOMM/ADABASE	TO \$21K

Rush your resume including salary history to: TED A. LEHR, EDP Specialist - DUNHILL EDP, 22 E. Mitchell Dr., Phoenix, AZ 85012... or call (602) 264-1166... Company inquiries are also invited... 100% EMPLOYER RETAINED... Member of DPMA and ASM.

COMPUTER SCIENTIST HOLLINS COLLEGE

Ph.D. to teach undergraduate courses in computer science and to coordinate academic computer services at private liberal arts college for women.

Send resume and references to Dean Roberta A. Stewart, Hollins College, VA. 24020.
An Equal Opportunity Employer.

CCP PROGRAMMER

As the fastest growing small package and freight delivery service in the world, Air Couriers International offers a career opportunity in our Data Processing Dept. for an experienced CCP Programmer. Successful candidate should have 2-4 years programming experience with RPG II, System 3, Model 15 familiarity. Included in this background will be 1-2 years experience in CCP.

Excellent salary and fringe benefits package offered. Great open living and plenty of sunshine at no additional cost. In strict confidence send resume with salary history and requirements to: Personnel Manager, P.O. Box 32069, Phoenix, Arizona 85064.

position announcements

position announcements

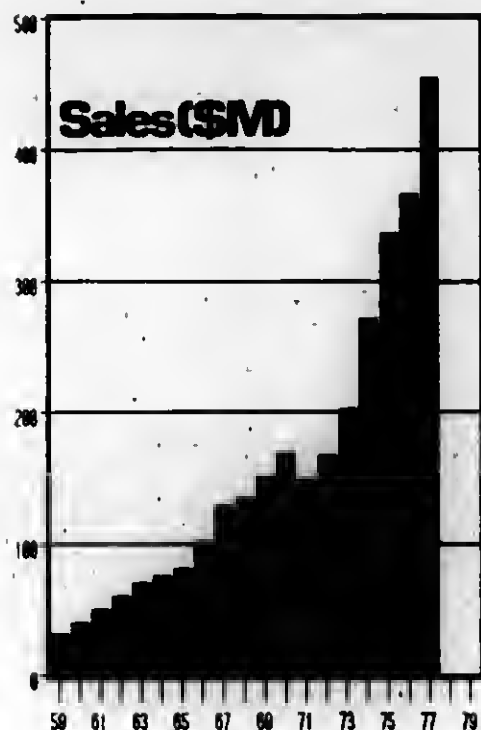
position announcements

position announcements

position announcements

Opportunities In Data Processing

We're Growing, So Can You



Tektronix
COMMITTED TO EXCELLENCE

Due to increased growth within the company, demanding positions are open in the following areas:

Systems Planning and Development

Business Systems Applications-Project Manager

To provide leadership, planning and coordination between interorganizational groups in the design of business application systems which support corporate MIS needs. Ability to identify logical system alternatives, forecast impact and communicate effectively with multi-corporate levels. Six to eight years D.P. experience with emphasis in systems analysis and project management. Degree in computer science/business is desired.

Systems Analyst

Develop business application systems utilizing advanced computer technology to achieve management information capabilities and requirements. Interaction with interorganizational groups requires effective communication skills. Requires extensive experience in systems design, development and installation; BS in computer science with business minor or equivalent experience.

EDP Operations

Data Base Analyst

Experienced data base analysts are needed to create IMS control blocks, debug IMS software problems and design IMS data bases based upon systems requirements.

Requires extensive experience in using IMS in an application environment, training in file structure and design; developing standards for use of IMS. Ability to communicate technical information with programming and systems analysts plus the aptitude to absorb advanced concepts of Data Based Management.

Programmer Analysts

Experienced in the design, development of program specifications. Candidates will have strong COBOL and BAL backgrounds with the ability to interface with EDP users and implement computer programs. IMS PANVALET and TSO experience; use of structured design and programming techniques are goals for candidate.

International Information Systems Group

Join this newly formed organization in support of international systems design and development.

Systems Analysts

Develop and construct system design solutions depicting systems functions, modules, interfaces and programming specifications in support of international projects. 3 to 5 years experience in order processing, accounting/commercial applications, order entry and on-line systems. Ability to view, describe and define business processes in systems definitions. Some travel may be required.

Tektronix, Inc. develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Larry Green, TEKTRONIX, INC., P.O. Box 500, C16, Beaverton, Oregon 97077.

An Equal Opportunity Employer M/F/H

PROGRAMMER/ANALYSTS

Numerous openings in the South and Southwest for professional Prog/Analysts with 1-5 years experience using COBOL, ALC, PL1 or FORTRAN; Business and Scientific applications development for Banks, Insurance Companies, Manufacturers, Consulting Firms and Oil Companies. Our client companies pay interview expenses, relocation and our fee.

Dunhill Employment Agency of Fort Worth, Inc.
901 Ridglea Bank Bldg., Fort Worth TX 76116
(817) 732-8191

OUR STANDARDS ARE HIGH THEY HAVE TO BE

Our vice presidents personally hire each programmer/analyst (over 100 will be in 1978) because they know that a professional service firm's FUTURE IS YOU.

Immediate openings in Miami, Houston, Washington, D.C., and Philadelphia areas. Call collect or send resume with current salary requirements to:

Mr. Fred Trimble

Data Technology Industries, Inc.
6611 Kanliworth Ave., Suite 413
Riverdale, Maryland 20840
(301) 775-8628

GENERAL ELECTRIC COMPANY TELECOMMUNICATIONS & INFORMATION PROCESSING OPERATIONS IN SCHENECTADY, NEW YORK HAS OPENINGS FOR:

- **SPECIALIST — DATA PROCESSING TRAINING**
Develop and conduct computer languages, data base design, and transaction processing courses in support of one of General Electric's largest computing services. Candidate must have college degree and at least 5 years experience on Honeywell Series 6000 computers.
- **SPECIALIST — FILE SYSTEMS INTEGRITY**
Establish and maintain procedures to assure maximum file system integrity and security. B.S. degree in Computer Science required or equal with 6 years experience in information systems work. Experience with H6000 GCOS File Management Supervisor desirable.

GENERAL ELECTRIC

Send resume & salary requirements to:
R.B. ELLIS, GENERAL ELECTRIC COMPANY,
2500 CAMBRIDGE ROAD, SCHENECTADY, NY 12345

An Equal Opportunity Employer



COMPUTER PROFESSIONALS

Don't Just 'WATCH US SHINE'

Join in the excitement of our expanding airline — new service to Europe — Paris, London, Amsterdam, Frankfurt; new innovations in our service to the fastest growing areas of the USA — Miami, Houston, Las Vegas, San Diego, Los Angeles, San Francisco, New York. To be the best in our field, we are acquiring the newest in IBM large scale computers — 3031, 3032, 3033 — the first one to be delivered this fall.

TELECOMMUNICATIONS PROGRAMMERS

Network design, message switching. Minimum of 5 years experience, CC-80 or 3705 preferred.

PARS PROGRAMMERS

ACP, Support and on-line applications. Minimum of 2 years experience. Control Program preferred.

COBOL/FORTRAN PROGRAMMERS

360-370 OS-IMS Applications. Minimum of 2 years programming experience. Operations Research knowledge beneficial.

The above positions are newly created and located at our Miami headquarters. Levels and salaries are commensurate with experience and liberal travel and fringe benefits are available. Send resume, including education and salary history to:

Personnel Department
NATIONAL AIRLINES
PO Box 592055 AMF
Miami, Florida 33159

Equal Opportunity Employer M/F

National Airlines

position announcements

position announcements

position announcements

position announcements

position announcements



COMTEN and YOU...

Opportunities Throughout the U.S.!

Comten Incorporated, a computer engineering and manufacturing firm enjoying dramatic growth in the telecommunications industry, has many challenging and exciting career opportunities throughout the country. With 53 national service centers and 1,000 employees, we have the need to expand the strength of our forces. Comten is almost 10 years old; and has always specialized in the data communications field. In addition, we have major product offerings, both software and hardware, in the computer performance monitoring industry.

Even if you aren't looking for a position now, Comten is worth the effort to investigate. You may be surprised at the immediate advantage you will have by becoming a part of the Comten organization. We assure you of long-term security, competitive income, and excellent opportunities for professional achievement and personal growth.

Software Openings Now Available Include:

Systems Programmers:

For the individual desiring the opportunity to apply original ideas toward a project from conception to completion. Enjoy the satisfaction of designing and developing operating system software for a distributive process environment. Multiple software development openings exist in the following product areas: front end communications systems, network processors, performance measurement systems and high level language.

Systems Analysts:

For the problem solver who thrives on a challenge. Gain maximum corporate visibility while enjoying the contact and variety of customer support and implementation, small project software development, situation/project management, and product test, quality assurance. Learn the details of data communications within a concrete environment and broaden your opportunities for career mobility.

Test Programmers:

Openings exist in the expanding Test Software Department for systems programmers with assembler language test programming experience. Design, code, debug, and document test software for the latest state-of-the-art equipment.

Software Instructor:

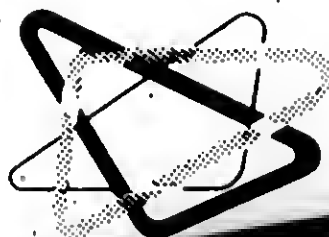
Excellent opportunity for the experienced systems software individual who will develop training courses for an assist with implementation of telecommunication systems while working with customer and service people to increase their technical expertise.

REQUIREMENTS FOR THE ABOVE INCLUDE:

At least 2 years in the design, development, test, and documentation of assembly language programs in a real time environment. IBM 360/370 systems, data communications, and compiler design experience a definite plus.

Comten is an equal opportunity employer with all normal benefits plus extras such as full tuition reimbursement and stock purchase plan. If you're interested in a career opportunity, we encourage you to submit your resume or call Jane Christianson at (800) 328-9122 for immediate attention.

1950 West County Road B-2
St. Paul, MN 55113



COMTEN

We Are An Equal Opportunity Employer M/F

SR Programmer/Analysts

Phila. based holding company has position openings due to recent expansion. We are seeking experienced programmer/analysts to work in a progressive environment.

- Systems include 370/188 using TSO & VS-2, 370/188 using MVT.
- Knowledge of COBOL and JCL essential.

Excellent company paid benefits.

Salary to \$20K

Send resume stating salary history to:

CW Box 1503

797 Washington St., Newton, MA 02160

Equal Opportunity Employer M/F

"CAREER OPPORTUNITIES" FEE PAID

Analysts
Systems Analysts
Programmers
Send Resume To
Melba McCracken

PORTER, KEE & ASSOCIATES

1100 Kermik Drive
Suite 105
Nashville, TN 37217

PMI Computer Professionals

Informatics' professional services family has grown to over 600 computer software professionals working in domestic and international locations. Assignments are primarily new development or major enhancement to commercially oriented systems, many involving data base and/or data communications technology.

Our growing client base provides additional career opportunities for individuals with background in one or more of the following areas:

*IBM OS COBOL or BAL *CICS COBOL or BAL
*IBM BAL, INTERNALS *IMS/DB/DC COBOL
*UNIVAC 1100 COBOL *IMS/TSO/STRUCT/COBOL
*UNIVAC 1100 FORTRAN *MARK IV
*UNIVAC 1100 DMS, TIP *INTERCOMM

*ASSEMBLER, MICROPROGRAMMERS

Positions are available in San Francisco, Los Angeles, Austin, Seattle, Portland, Bloomington, Chicago and a few scattered sites. If you are a bright, aggressive individual who enjoys client contact and want a career, not a job, we want to hear from you.

For individuals who meet our standards, we offer the opportunity to gain a large variety of experience in a short period of time, generous compensation and a career with an organization where top quality results are our primary concern.

Please send resume to: Informatics PMI, 1121 San Antonio Rd., Palo Alto, CA 94303, Attn: Lois Flury; or telephone Lois Flury at (206) 385-0387 or (415) 964-9900 for additional information.



informatics inc

Member SIA

Software Industry Association

An equal opportunity employer, m/f

PROGRAMMER ANALYSTS

Exceptional People Excellent Growth Opportunities

WHO WE ARE:

AUXCO is a major New York metropolitan area data processing management consulting firm. Currently in our 10th year, we are publicly owned, have just declared our third dividend, and anticipate a year of solid growth.

WHAT WE NEED:

We are especially interested in ambitious people experienced in data base design and telecommunications on IBM/370, IMS, CICS, TOTAL, ADABAS and TASKMASTER are particularly needed.

WHAT YOU'LL DO:

Our assignments are for numerous Blue Chip clients who are starting up new projects during 1978. On our team, your technical, business, and inter-personal skills will be extensively drawn upon. Client contact will be high. Travel is virtually non-existent.

WHY WORK FOR AUXCO?

We offer the opportunity to learn new skills in a high earnings potential situation (salary plus incentive bonus programs). Included in the package are tuition refund, company paid health and life insurance, in-house education, on-the-job training, frequent reviews with management, a pension program, and super assignments in New York, New Jersey and Connecticut. Relocation expenses will be considered.

Send Resume or Call:
Norman B. Merkin, V.P.

AUXCO

AUXTON COMPUTER ENTERPRISES, INC.

1348 Ave. of the Americas
New York, N.Y. 10019
(212) 489-7620

2 Kilmer Road
Edison, N.J. 07033
(201) 572-5078

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS ANALYST:

The city of Lansing, Michigan is seeking a person with a degree in mathematics, statistics, industrial engineering with 2-5 years technical experience in data processing with priorities in development, distribution, quantity and quality control, structural placement, mini-systems installation and debugging aided with personal communication skills. Salary \$17,892 with excellent employee benefits. Send all inquiries with complete resume to:

D.J. Bodwin
Personnel Director
119 N. Washington Mall
Lansing, Michigan 48933

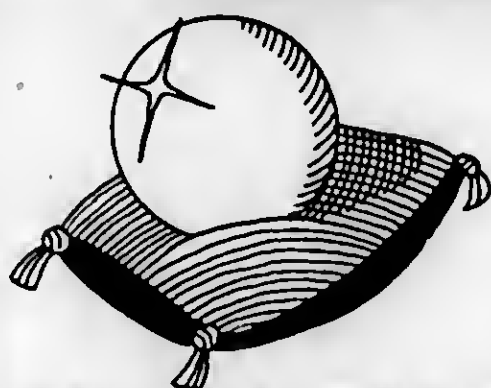
SENIOR IMS PROGRAMMERS

Positions available in North and South Carolina for Senior IMS Programmers. Requirements are: good design background, prefer DL1 and data communications, heavy on-line experience, strong in internals, project responsibility level individual. This particular corporation is putting together a corporate data base and will look for expertise.

All positions are fee paid by our employer. Interviews and relocation expenses are also paid by employer.

Please refer resumes and/or inquiries to:

Creative Personnel Services
Data Processing Division
Attn: M. Sullivan
Suite 512, Charlotte Mall
Charlotte, N.C. 28204
(704) 372-9393
Professionals in the
Placement of DP Individuals

YOU DON'T NEED A CRYSTAL BALL

...To See the Remarkable Future You Can Enjoy in Advanced Switching Systems at ITT TELECOMMUNICATIONS SWITCHING CENTER

We are looking forward to expanding our leadership in the telecommunications industry - utilizing the most advanced technology to develop the next generation of telephone switching systems. Immediate career opportunities exist for professionals experienced in the following:

SOFTWARE DESIGN

Will be involved in designing, writing and testing of software for telephony systems. Should have worked on software for similar systems.

SUPPORT SOFTWARE

Should have software experience in the design of loaders, assemblers, simulators, editors and/or compilers.

SYSTEMS ANALYSIS

Requires knowledge of telecommunications operating procedures, and requirements and needs.

PCM

Knowledge of PCM transmission and/or switching hardware is required.

HIGH LEVEL LANGUAGE DEVELOPMENT AND USAGE

Should have been involved in the planning and/or writing of high level language compiler.

DATA BASE ENGINEERING

Openings at all levels. Responsible for customer data base interfaces, and incorporating customer information into switching systems.

SIMULATION

Experience in software simulation of computers and/or telephony systems desired.

TELEPHONY SYSTEMS ENGINEERING

Requires 5 or more years telephony related experience to define systems, hardware and software requirements for switching systems for the North American and International markets. Experience with International signaling is a plus.

If qualified, please send resume and salary history to: Tom Edmison, ITT Telecommunications, 2000 S. Wolf Road, Des Plaines, Illinois 60018, or phone (312) 296-0550. An Equal Opportunity Affirmative Action Employer M/F

TELECOMMUNICATIONS
Switching Center

Computer Graphics Sales Reps and Systems Analysts

OPENINGS NATIONWIDE

CalComp, a leader in the world of computer graphics, has positions available nationwide for qualified senior level sales representatives and systems analysts to work with our myriad of customers

FOR THE SALES REP POSITIONS

We are seeking sales reps with 5+ years experience who feel that they are ready for promotion to branch manager positions. Familiarity with plotters and interactive graphics terminals and their applications in resolving engineering problems would be desirable. A degree in a technical discipline is helpful. These opportunities offer attractive compensation in the form of a base salary plus extensive commissions plus liberal fringe benefits.

FOR THE SYSTEMS ANALYSTS POSITIONS

We prefer a BS in Computer Science (or equivalent) and 3 or more years' experience as a systems programmer on minicomputers. Strong FORTRAN and some assembly language knowledge needed. Familiarity with interactive graphics would be a plus. You must have the ability to communicate technical knowledge of computer hardware and software systems to technical and non-technical audiences. These positions provide an excellent opportunity for a software individual to try the world of marketing. Compensation will be salary plus extra dollars earned through the sale of software packages along with outstanding fringe benefits.

FOR FURTHER INFORMATION:

Send your resume and salary history to or call collect:

Beth Schermer
2411 W. La Palma
Anaheim, CA 92801
(714) 821-2221

CALCOMP

CALIFORNIA COMPUTER PRODUCTS, INC.
An equal opportunity/affirmative action employer

The ROMAC DIFFERENCE**We Never Pass Out A Laundry List**

Romac policy forbids using the "Laundry List Technique." Other personnel consultants send out huge lists of names to prospective employers, we never do. Romac supplies its clients with only the best qualified professionals.

No professional wants his career bunched with countless other more or less qualified candidates. He wants special attention and consideration from his personnel consultant. The Romac Partners see to it that he gets it. That's the Romac Difference.



ROMAC

& ASSOCIATES/
Personnel Consultants

Contact Romac & Associates, A. L. Lemay, President, 2 Sun Life Executive Park, Wellesley Hills, MA 02181 for transmission to our Partners in Atlanta, Boston, Buffalo, Charlotte, Hartford, New Haven, New York, Philadelphia, Portland, Rhode Island, Rochester/Syracuse, Stamford.

Data Processing Professionals

Control Data Cybersearch® DOES make a difference:

HERE ARE SOME OPPORTUNITIES YOU MAY WANT TO CONSIDER:

If you're exploring career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS • SOFTWARE SPECIALISTS and SALES REPRESENTATIVES for companies nationwide, at no cost to you.

Systems Programmers-MVS	To \$30K
Systems Programmers-IBM "OS"	To \$25K
Mini-Programmers-Scientific	To \$22K
Mini-Programmers-Business	To \$22K
Programmer Analysts-CICS	To \$22K
Programmer Analysts-Business	To \$19K
Programmer Analysts-Insurance	To \$19K
Real-Time Mini Sales-Sci.-Comctns, Potential	To \$35K
Sr. Systems Analysts-Mfg-Ins.-DL-1+Deg.	To \$24K
Mini-Computer Analysts-All levels	To \$24K
Software App. Anal.-Exp.DBS, Telecom, Op Sys	To \$26K
Software Anal-Exp. CDC Prog. Scope	To \$26K
3,4 or NOSBE	
Programmers-Exp. in Telecommunications	To \$20K
EDP Audit Admin-MBA + 5 Yrs. Exp. Auto. Sys	To \$30K
Systems Designer-New Systems Implementation	To \$25K
Instructor-2 Yrs. Exp. Cobol, BAL or Fortran	To \$18K
Operating System Consultant-5-8 Yrs. Exp. IBM S.E.	To \$30K

For more information, please contact our local office.

CONTROL DATA CYBERSEARCH INC.

a subsidiary of
CONTROL DATA CORPORATION

CHICAGO, IL
214 North Michigan
60601
312-454-8490

DALLAS, TX
8585 Stemmons Freeway
75247
214-688-5810

IRVINE, CA
17744 Sky Park Boulevard
92714
714-754-7701

LOS ANGELES, CA
8616 La Tijera Boulevard
90045
213-642-2462

HOUSTON, TX
2000 West Loop South
77027
713-965-5666

MINNEAPOLIS, MN
6800 France Ave South
55435
612-830-6650

PHILADELPHIA, PA
Two Balacynwyd Plaza
19004
215-667-2400

SAN JOSE, CA
2025 Gateway Place
95110
408-866-3186

position announcements

position announcements

position announcements

position announcements

position announcements

SOFTech

The Software Technology Company

**That's not just a slogan,
it's a commitment.**

**TO INNOVATION IN
STATE-OF-THE-ART
SOFTWARE ENGINEERING**

**TO OUR CLIENTS
THROUGHOUT THE WORLD**

**TO THE PEOPLE
OF SOFTECH**

If you're a talented software professional looking for high visibility in a small, growing company, we're eager to talk with you; especially if you are qualified in the following area:

We offer excellent salary arrangements and outstanding benefits, including life, health, dental and orthodontics coverage, long term disability, retirement plan, and bonus based on individual productivity. Send resume to Sally Jablon Silver, Dept. 160, SofTech, Inc., 460 Totten Pond Rd., Waltham, MA 02154.

Positions are available in Dayton, Ohio, Nutley, NJ, Waltham, MA, and Washington, D.C.

We are a recognized world leader in applying engineering principles to systems analysis, design and software development. SofTech is involved in constant improvement of systems, software tools, and techniques used in developing a variety of applications; from inception through delivery.

In both the private and government sectors, SofTech is daily meeting the demands and requirements of our clients. Whether the problem is the solution to a highly complex design issue or the production of application software for large systems, SofTech engineers are there with the know-how and creativity to be responsive and adaptable to changing client needs throughout the life cycle of the system.

An ongoing reaffirmation of the principle and spirit of independent action has been a basic tenet of the SofTech philosophy from inception. We recognize individual contribution as the primary force behind our vigorous growth and success. The people of SofTech ARE SofTech.

COMPILER DESIGNERS

There are several openings for individuals with significant experience in designing or implementing and optimizing compilers for high order languages such as ALGOL, JOVIAL, PASCAL, or PL-1. Background in analysis or design of programming languages or compilers is required. Experience with structured programming techniques and the use of high order language for implementing large software systems would be a distinct advantage.

SOFTech

an affirmative action equal opportunity employer

The Software Technology Company

PROGRAMMER/ANALYSTS

Kranzley and Company, a leading systems development firm, requires professional personnel in the following fields:

APPLICATIONS PROGRAMMING

- COBOL — 2 years or more
- Financial, accounting applications a plus
- OS/VS or DOS/VS

TELEPROCESSING — if your skills range over the following:

- BAL — 3 years or more
- Data base access methods
- OS/VS or DOS/VS or Minicomputer
- Communications line control and access methods
- CICS or equivalent T.P. Monitor
- Sysgen experience a plus

DATA COMMUNICATIONS — if your skills range over the following:

- Line protocols
- Network design and simulation
- Front-end processors
- Line servicing routines

For consideration, send your resume or call —

Kranzley & Co.

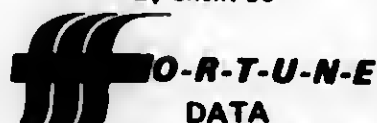
1010 South Kings Highway
Cherry Hill, New Jersey 08034
609 795-1515

AN EQUAL
OPPORTUNITY
EMPLOYER

SYSTEMS PROFESSIONALS NATIONWIDE SERVICE

MGR. N.E. To \$29K
370 Sys. PGM. Opins MFG & Maint Control Sys Dev
2 Person N.E. To 28K.
Become MIS Dir., Consumr Mfg IBM, Degree, Mgt Ability
Proj Ldr Midwest To \$27K
MFG Sys, WIP, MRP, IBM, Career Oppty.

Reloc & Fees Paid
By Client Co



Oliv. Fortune Prsnl Agency
505 5th Av., NYC 10017
(212) 682-8600
Company Inquiries Invited

COMPUTER/ELECTRONICS SPECIALIST

Exceptionally qualified person to establish and direct PDP-11 mini-computer network, including DECLAB 11/34 system and several 11/03 microcomputer satellites. Responsibilities include: implementing initial system software; developing software package to run and analyze psychology experiments; writing other specialized programs; designing interfaces for peripheral devices. Experience with PDP-11 family and solid electronics background necessary; experience with psychology applications preferable. Salary negotiable. Write: Chairman, Psychology Department, Mezes Hall 330, University of Texas at Austin, Austin, Texas 78712. An Equal Opportunity/Affirmative Action Employer.

BUSINESS MANAGER

IBM COMPATIBLE PRODUCTS

We are seeking a seasoned Business Manager to direct our efforts in adding non impact printers to our line of IBM software compatible products.

Position carries complete P&L responsibility. Initial task will be to define product requirements and make vendor selection. Position also includes responsibility for our existing tape and impact printer lines.

Requires minimum 10 years directly related experience and an in-depth understanding of the IBM EDP market. Knowledge of non impact printing technologies and user applications a must. MBA with technical undergrad degree is desirable. SEND RESUME INCLUDING SALARY HISTORY TO:

D.G. Robinson
Peripheral Systems Group

**CONTROL DATA
CORPORATION**

2200 Berkshire Lane
Plymouth, Minn. 55441

An Affirmative Action Employer M/F

ENGINEERS AND PROGRAMMERS

Lockheed Electronics Company is seeking qualified applicants for immediate positions at NASA's Johnson Space Center in Houston, Texas. These positions are in support of the Space Shuttle and Earth Resource Programs and require applicants experienced in the following areas:

• PUBLICATIONS SPECIALIST:

To originate scientific/engineering publications and coordinate efforts of editors and proofreaders. Prefer applicants with a minimum of eight years experience.

• DIGITAL DESIGN ENGINEERS:

With experience in design and development of digital/analog equipment including computer interface, display, control and signal conditioning hardware.

• MECHANICAL/AEROSPACE ENGINEERS:

Responsible for structural, thermal or environmental control systems analysis. Applicants should have knowledge of FORTRAN computer programming, math modeling, and be capable of using large scale digital computers in the analysis of engineering problems.

• SIMULATION APPLICATIONS:

Required to support dynamics simulation development and operations. Experience required in realtime, digital, analog and hybrid computer program development and operation of large man-in-the-loop simulations. Prefer applicants who have worked with spacecraft/aircraft GUIDANCE and CONTROL systems.

• COMPUTER MAINTENANCE ENGINEERS:

To be cross-trained to support a large, diverse simulation laboratory. Facility includes analog computers, mini-computers and second and third generation medium-to-large scale systems manufactured by several companies.

• CONTROL SYSTEMS ENGINEERS:

With experience in flight controls; guidance, navigation and controls; digital design; computer interface, and data systems programming experience on HP 2100 computers.

• PROGRAMMING ANALYSTS:

Responsible for performing analysis and developing appropriate computer models. Experience in FORTRAN IV and ASSEMBLY language required. Some positions require UNIVAC 1108 programming experience.

• COMMERCIAL/BUSINESS APPLICATIONS PROGRAMMERS:

With experience in design, development of financial, accounting and control systems using COBOL, FORTRAN, or ASSEMBLY languages.

• STATISTICIANS:

With advanced degree and experience in pattern recognition, clustering, feature selection, discriminant or multivariate analysis.

Send resume in confidence to Bill Janche at Lockheed Electronics Company, Dept. C-20-22, 1830 NASA Road #1, Houston, Texas 77058.

LOCKHEED

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMERS

Multi-unit South Jersey firm, seeks individuals desiring to develop analytical abilities as well as programming skills. Must be effective communicator with USER departments, technical personnel and management. Background should include familiarity with IBM DOS/VS multi-programming environment. Must have 1-2 years actual programming experience in ANS-COBOL and RPG II. Exposure to DB/DC concepts desirable.

We are located 40 miles from Philadelphia in a desirable community. Successful candidates will enjoy an attractive starting salary, career growth potential and competitive benefit program. For prompt consideration, please forward resume and salary history to:

Industrial Relations Department
NATIONAL FREIGHT, INC.

71 West Park Avenue
Vineland, NJ 08360

An Equal Opportunity Employer M/F

Share Yourself...Teach

Just another cliché or a career opportunity?

Our success and growth have resulted in an exceptional career opportunity for you if you've been honing your MVS or JES3 skills by doing, and now desire to take the next step in the "learn-do-teach" cycle. Join the growing software instruction team at Amdahl and learn why so many people say that teaching is the most fun they've had in their DP careers.

SOFTWARE INSTRUCTORS

We currently have openings at our Sunnyvale, California headquarters for qualified professionals ready to take that next step. We invite you to send your resume in confidence to Phil Beckhelm, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. If you're not quite ready or need more information, please call Charlie Wareing, 408/735-4326 (collect), in our Software Education Department. He'll be happy to talk with you. We are an equal opportunity employer.

amdahl

Power Systems Engineers

Analysts

Programmers

Arizona Public Service Company, a major Southwestern utility has the following outstanding opportunities in the computer area:

Software Systems Analyst

Systems Engineer with experience in software design and implementation in the areas of CRT display and supervisory control software for electric utilities. Will work in both conceptual and detailed phases of projects.

Programmers Operating Systems

Experience in scientific programming with specific knowledge of real-time operating systems, I/O operations, interrupt processing and basic executive services. Experience in Leeds and Northrup LN-5500 operating systems desirable.

Programmer/Analysts

Business applications programming and analysis. Financial, payroll/personnel, construction systems experience desirable. PL/I, OS/MVS, background required, COBOL desirable.

The Southwest provides unlimited year 'round recreational activities, a unique blend of Spanish and Indian heritage and expanding cultural opportunities. Arizona Public Service is a growth-oriented utility offering a good salary and benefits package and an excellent working environment. To apply for these career openings, send your resume including salary history to Mr. Tom York, Employment Manager, APS, P.O. Box 21666, Station 1199, Phoenix, AZ 85036.

**Arizona
Public Service
Company**

an equal opportunity employer m/f

PROMOTE YOURSELF

Move up to increased pay and promotional opportunities
and the life style of your choice

**SAN FRANCISCO
NEW ORLEANS
TEXAS &
SOUTHWEST
WASHINGTON
RICHMOND
FLORIDA
ATLANTA
NEW ENGLAND
MID-WEST
PHILA. AREA
TWIN CITIES
NEW YORK**

Mgr Tech Svcs

Fin Designer
Syst Progs
Syst Progs

IMS Designers
DB Administr
Analyst/Progs
Mini Progs
Syst Designers
Progr/Analyst
Analyst/Progs

Progr/Analyst
Programmers

Urgent Openings

	To
Lge scale IBM. East & West coast openings. Mini exp a plus	\$35M.
Univsty Syst exp reqd	\$34M
370/168 a must. 3033 ordered	\$30M
Lge scale 370/OS/VS. Many openings nationally	\$30M
Lead projects: mfg, finance	\$28M
IMS DB/DC. Calif.	\$27M
Top consult firm. Deg.	\$26M
Fortran. Proc control	\$25M
Banking, lge scale. Calif.	\$25M
PL/I. Insurance a plus. SW	\$24M
Student & fin. applications. University environment.	\$24M
H6000, COBOL. Easy Coder	\$24M
Learn IMS, TOTAL. Deg.	\$20M

No fees or contracts. Our client companies pay all expenses. Career consultation prior to any action. Over 700 EDP positions represented.

Send your current resume (or an old one with pencil update) together with salary history in complete confidence to our suburban Philadelphia headquarters:

Systems Personnel, Inc.
SUITE A-12
207 Fox Lane
Wallingford, PA 19086
215-565-2920

Systems Personnel, Inc.
A NATIONWIDE CAREER SERVICE

FLORIDA URGENT!

SYS/PROG-OS/VS, HASP/JES2, SYSGEN (1.7or3), IMS, 3704em.des To 23K
min 1 yr BAL To 18K
SYS/PROG-CICS Ints. To 18K
SYS/PROG-380/MVT, HASP TSO To 23K
OS/ANAL-IMS, util. Cobol To 23K
OS/JCL, DB des (2) To 23K
SYS/PLAN-Bank, apps. To 22K
OS/VS+ To 22K
S/A-Fin. apps, des, best only OPEN
Applications Prog/Anal: BAL, CICS, apps OOS To 17K
BAL apps, DOS To 16K
PL/I, OS/JCL, des To 18K
Cobol, IMS, OS/JCL To 17K
MSA Payroll, Cobol To 15K

OTHER SUNBELT

SYS/ANAL-Network design SNA, OS/VS, CICS/IMS, apps To 25K
Applications Prog/Anal PL/I, BAL, CICS, apps To 21K
PL/I, OS/JCL To 19K
Many Cobol, OS/DOS To 18K
Len Payden (305) 733-0110
Frank Leonard Personnel
2331 N. St. Rd. #7, Ste. 124
Ft. Lauderdale, FL 33313

DATA PROCESSING OPERATIONS MANAGER

Detroit based building materials retailer with 8 home centers and related businesses seeks individual who will be responsible for the operation of the DP department. Position reports to Vice President of Finance. Specific responsibilities to include system development and implementation and control of all aspects of data processing function, including acquisitions of hardware and software.

Experience with Singer System 10 and retail POS highly desirable, but not necessary. Should be familiar with on line environment, and must be able to work effectively with administrators at all levels. Minimum of 3 years experience necessary. If qualified, please send resume and salary history and requirements in confidence. Contact Oaniel Toms.

**BRAVER LUMBER
AND SUPPLY CO.**

**PINE LUMBERS
HOME CENTERS**

3300 E. Nevada
Detroit, MI 48234
(313) 368-2100

Equal Opportunity Employer

DATA PROCESSING OPERATIONS MANAGER

A progressive corporation with operating headquarters in Eastern Pennsylvania seeks an experienced Data Processing Operations Manager. This position offers responsibility for 60 people involved in Data Entry, Data Control, Computer Operations, and COM activities. It also provides an opportunity to work with Systems Design and Technical Support Professionals in the design and utilizing of sophisticated information systems. As a key member of a data processing staff, this individual will interact directly with senior management to define operating schedules and capabilities and document operating procedures.

Interested candidates should have 3-6 years of data processing experience including 2 years of data processing operations management. Previous demonstrated ability to motivate all levels of data processing personnel, creation and implementation of work-flow schemes, and excellent written and verbal communication skills are desired. Familiarity with on-line as well as batch processing operations, mini-computer applications, and data base technology are critical to successful achievement of position objectives.

Compensation will include a starting salary to the low 20's, relocation assistance and a competitive fringe benefit program.

Please forward a resume including salary history to:

**CW Box 1500
797 Washington St.
Newton, MA 02160**

An Affirmative Action
Equal Opportunity Employer m/f/h/v

position announcements

position announcements

position announcements

position announcements

position announcements

ENGINEERING & MANUFACTURING-DAYTON

NCR's Engineering & Manufacturing Division in Dayton, Ohio, develops and produces financial terminal products. The requirements of the systems business are constantly changing, providing unlimited opportunities for the creative individual.

Opportunities currently exist at all levels (Trainees to Project Leaders) for individuals possessing a background in the following areas:

ELECTRICAL DESIGN ENGINEERS

- Microprocessor Applications
- Digital & Analog Circuits
- Electrical Control Circuitry
- Terminal Peripherals
- Familiarity with Microprocessor Programming Helpful

SOFTWARE EVALUATION ANALYSTS QUALITY ASSURANCE

- Design Analysis
- QA Certification
- Multi-tasking OS concepts
- 8080 Assembly Language
- COBOL language

PROGRAMMER/SYSTEMS ANALYST SOFTWARE DESIGN

- Microprocessors
- Minicomputers
- Operating Systems
- Distributed Processing Systems
- Systems Constructors & Generators
- Communications Software
- 8080 Assembly Language
- COBOL Language

These positions require a BS in EE, CS or related discipline. We encourage responses from new graduates.

We invite you to be a part of our future in a rapidly changing and challenging industry. Please submit your resume and salary requirements to:

NCR

Mrs. Judith E. Chorazewitz
Engineering & Manufacturing-Dayton
Employment, CW 320
NCR Corporation
Dayton, Ohio 45479
An Equal Opportunity Employer

FIELD SERVICE ENGINEERS

THE NIXDORF CHALLENGE

Immediate openings are available in New York City, Philadelphia, New Jersey, Los Angeles, Detroit and San Francisco. Openings also available nationwide.

You will be joining a company whose remote batch terminals, distributed data processing systems, on-line interactive displays, and general-purpose business computers are recognized worldwide for their excellence. Our challenge is to increase these markets and increase the demand for our sophisticated state-of-the-art equipment.

FIELD SERVICE ENGINEERS

Responsibilities will include the installation, maintenance, and repair of Nixdorf computer systems and equipment. Background should include a thorough knowledge of electro-mechanical and state-of-the-art peripheral equipment gained through technical schooling, military service, or work experience.

Meet this challenge and earn an excellent income, a generous benefits package which includes dental insurance and educational reimbursement. This is a unique opportunity to realize your career objectives.

For immediate consideration, send your resume to:

Hugh McGettigan



ENTREX

is now a part of NIXDORF. We now offer a greater range of state-of-the-art minicomputer systems.

NIXDORF COMPUTER

NIXDORF COMPUTER CORPORATION
188 Middlesex Turnpike, Burlington, MA 01803
An Equal Opportunity Employer M/F

SUN BELT - HOUSTON

Large Distributor is expanding Staff for Data Base Environment. Need Programmer/Analysts, Systems Programmers, Project Leaders. 3031, 145, PL/1, ALC, COBOL, CICS. Ground Floor Opportunity. Excellent Benefits. No Travel. Relocation Paid.

Send Resume in Confidence to:

Dick Arehart

Grocers Supply Co.

P.O. Box 14200
Houston, Texas 77021
(713) 747-5000

PROGRAMMER/ANALYST

Self-starter with 2-6 years BAL, COBOL, IBM 360/370 OS JCL, or CICS experience a plus. Proven design and programming skills, financial (savings & loan) knowledge desirable. College degree preferred. If you wish to work in a highly competitive, progressive environment, please send your resume with salary history and requirements to Nancy Williams:

GREAT WESTERN SAVINGS

450 Newport Center Dr.
Newport Beach, CA 92660
An Equal Opportunity
Affirmative Employer M/F

Dynamic systems development shop has two openings:

Programmer Analyst Systems Programmer

Software needs include CICS, DL-1, SVS/MVS. Applications development languages are COBOL, ALC and PL/I. Send resume and salary requirement to:

Personnel Office
Dallas County
Hospital District
5201 Harry Hines Blvd.
Dallas, TX 75235
Equal Opportunity Employer

SUPERVISOR OF DATA PROCESSING:

\$20,332-\$29,172

Plans, initiates and coordinates city-wide electronic data processing services. Seven (7) years of electronic data processing experience three (3) of which shall have been in a supervisor capacity. Forward resume to:

Sim Bernstein
Personnel Director
City of Stamford
429 Atlantic St.
Stamford, Conn. 06901

REAL TIME BANKING

Swiss Bank Corporation, one of the leaders in the International Banking field is actively designing a Real Time Banking system.

Several positions are open immediately in the following areas:

Communications/Systems Programmer

- Duties include design thru realization of a new Data Base On-Line System.
- CICS Applications and Internals, DL/1 and IBM (Bal) are required.
- ANSI-COBOL and Banking Applications a plus.

Analyst/Programmer

- Duties include Analysis and Development of Real Time Banking Applications, Utilizing Structured Design/Programming Techniques. 2-3 years experience in ANSI-COBOL in a banking environment is required.
- CICS, Librarian and DL/1 definite pluses.

If you are looking for an excellent future, based on individual performance, competitive salary and top benefits package, call (collect) Mr. Lou Garcia, EDP Manager (212) 938-3587 or write him in confidence at:

Swiss Bank Corporation

EDP Department, 4 World Trade Center
Box 395, Church Street Station, N.Y., N.Y. 10008
An Equal Opportunity Employer.

DATA PROCESSING

SYSTEMS DESIGN/SUPPORT

Brodart, an industry leader in information services for the library marketplace, is expanding its systems design and programming capabilities in line with the increasing demand for its "products".

SYSTEMS ANALYST

Operating in a project team environment, analysts participate in the full range of systems design and analysis activities for a variety of applications areas: Inventory Control, Order Entry, Marketing, Accounting. Project assignments will provide exposure to large CPU as well as on-line mini-computer environments. One to three years of systems design experience including completion of one major project, a working knowledge of design techniques (file structures, access techniques, etc.) and programming requirements, and a familiarity with on-line mini-computer applications will be useful in satisfying position objectives.

PROGRAMMER

In support of project team design efforts this individual will modify existing programs or create new programs to satisfy systems requirements. Position activities include design of program logic, selection of subroutines, coding of program instructions, preparation of test data and analysis of program test performance, and program documentation. This assignment will provide significant exposures to mini-computer applications. At least one year of applications programming experience in a mini-computer environment and a familiarity with BASIC PLUS are highly desirable. (PDP programming experience most desirable.)

These positions offer competitive compensation plans including a comprehensive fringe benefits program. Assistance is provided to facilitate your relocation to our headquarters operation in Williamsport.

Interested candidates are requested to submit a full resume and salary history for consideration. Qualified candidates will be contacted by April 3, 1978.

Constance G. Bone
Selection & Placement

BRODART

THE LIBRARY COMPANY

BRODART, Inc.
1609 Memorial Avenue
Williamsport, PA 17701

An Affirmative Action
Equal Opportunity Employer (M/F/V/H)

position announcements

position announcements

position announcements

position announcements

position announcements

DATA MANAGER

Needed for Professional Standards Review Organization. Must have experience and proven ability in working with collection, processing and display of data. Must be familiar with statistical evaluation techniques and data confidentiality. Will be responsible for working with and monitoring a data processing subcontractor. Familiarity with abstracting and coding medical care data is desirable. Must be able to work effectively with a variety of people and have a desire to assume management responsibility.

Starting salary to \$16,000.

Send resume and salary requirements to:

Indiana Area III PSRO
310 Medical Center Building
Fort Wayne, Indiana 46802
We are an equal opportunity employer.

Computer/Data
Processing Instructor

Responsibilities: Conduct feasibility studies, prepare alternative programs for computer/data processing; make evaluations; implement the results of the curriculum; teach the courses as designed.

Qualifications: Masters preferred, including 18 or more credit hours in data processing with 3 years of practical and teaching experience; Bachelors minimum with 3 years of related experience.

Salary and rank commensurate with preparation and experience. To begin July 1, 1978. Send resume by April 15, 1978 to: Mrs. Joan C. Weaver, Personnel Director, Volunteer State Community College, Nashville Pike, Gallatin, Tenn. 37066. Volunteer State Community College is an Equal Opportunity/Affirmative Action Employer.

Software
Service

We're looking for software technicians to assist our customers in using our products. Openings exist for people with all levels of experience in on-line systems. Minimum requirements include proficiency in 360/370 Assembler and a working knowledge of COBOL, PL/I, or FORTRAN. If you enjoy a problem-solving environment and like the instant feedback that comes from making customers happy, we'd like to hear from you.

Software
Development

We're looking for junior-level programmers to participate in the design and development of new products for on-line systems. You'll work side-by-side with top-notch software specialists in a challenging environment that offers ample opportunities for growth and reward. Candidates should know 360/370 Assembler, be familiar with DOS or OS job control, and have a working knowledge of standard IBM file access methods.

TSI has just completed its 11th successful year. We have a reputation for on-line system expertise and a growing product line that now includes TASK/MASTER, KEY/MASTER, and Flexicom. We offer excellent benefits, top wages, and an enjoyable and challenging work environment. Resumes, including an indication of which job opportunities are of interest, should be sent to the Personnel Department at our Norwalk address.

SOFTWARE DEVELOPMENT
CORPORATE OFFICE OPENINGS

United Computing Systems, Inc., an established and growing national and international firm in Kansas City, has senior and junior level openings in:

SYSTEMS SOFTWARE: Development of software for state-of-the-art computers, CDC and Cray, operating systems permanent files for inter-systems communication, and language development.

COMMUNICATIONS SOFTWARE & DEVELOPMENT: Qualified individuals are needed to participate in the growth of UCS's international telecommunications network - UNINET. This growing network serves multiple data centers from over 150 cities within the U.S. and Europe. Responsibilities include design, development, and implementation of software for a network of mini-computer based systems consisting of front ends, nodes, and local concentrators. You must have a minimum of 1 to 2 years experience in Assembler language with a general understanding of real time programming. Senior level applicants should have network experience with knowledge of BISYNC, 200 UT, HASP, HDLC, SDLC, X.25 or other communications protocols desirable.

In addition to a good salary and excellent benefits, we will offer you a stock purchase plan, tuition reimbursement, and pension program.

Please submit resume, including salary history, to:

Personnel Department
United Computing Systems, Inc.
2525 Washington
Kansas City, MO 64108
or call (816) 221-9700

PEOPLE, SYSTEMS AND SOLUTIONS UNITED

equal opportunity employer m/f/h

EDP
SOUTHEAST

PROG: OS, Cobol	\$18K
SR. PROG: CICS	\$20K
SOFT: DOS	\$22K
SOFT: OS	\$24K
SYS ANAL: Mfg.	\$25K

Several positions open in the above categories with leading Southeastern companies. Mail confidential resume or call Joe Sawyer, the EDP Personnel Specialist, (803) 233-2546.

EXCEL
PERSONNEL

1421 Laurens Rd., Suite 200A
Greenville, S.C. 29607

PROJECT
MANAGER

COMPUTER SYSTEMS
+22,344-\$29,268 yearly

The Orange County Assessor's Department is seeking an individual who is thoroughly experienced in all phases of computer services and systems management. Requires a proven record in computer related management and computer systems development plus a thorough comprehension of systems analysis and design, mathematical analysis, and computer hardware capabilities and limitations.

Experience should include land data systems, project management techniques such as CPM and PERT, project resource requirements, estimating, scientific computer modeling, business applications, plus presentations of analyses to non-technical persons or groups. No resumes; deadline March 31, 1978.

COUNTY OF ORANGE
PERSONNEL DEPT.

625 N. Ross St., Rm 0180
Santa Ana, CA 92701
(714) 834-2844
Equal Opportunity Employer M/F

FLORIDA
DEC PROGRAMMER
ANALYST

Immediate opening for programmer analyst with a minimum of two years experience on Digital Equipment Corporation's PDP 8 and/or PDP 11. Heavy COBOL experience. We are a rapidly expanding Florida based firm looking for an aggressive, innovative individual to develop business oriented application software. Accounting and general business background is a definite plus.

Send resume and salary requirements to:
Robert Minshall
D.P. Services, Inc.
P.O. Box 20106
St. Petersburg, FL 33742

Programmers
Systems Pros:

TAKE TTI
TO THE LIMIT!

TTI is Transaction Technology, Inc., a fast-rising subsidiary of Citicorp. New York, specializing in design and development of electronic funds transfer systems. Our continued success in this fascinating field, vital to the banking industry, creates the need for more talented people with a background in on-line real-time systems, experience with large data bases and knowledge of communications networks for these growth-gated career openings:

• SYSTEMS ENGINEER

This position requires a Systems Analyst with a functional orientation, with recent transaction processing design and some project management experience. Will handle requirements analysis, feasibility designs, specifications and general Systems Engineering functions. Should have experience with large and medium scale hardware and knowledge of a high level language such as COBOL, ALGOL or PL1 BSEE or BSCS, with 5 or more years experience.

• SYSTEMS ENGINEER

This opening involves general network systems design, with responsibilities for high-level flowcharting. Background in architecture and structured programming necessary. BSEE or BSCS with 5 years experience, with at least 2 years in network design.

• SYSTEMS ENGINEER

We seek a technical type with equal capabilities in software and hardware for this position, which will entail primary responsibilities in performing analysis (including computer configuration, modeling and architecture) BSEE, MSEE or CS plus 3 years experience will be required. Exposure to transaction processing and medium to large scale main frame would be a plus.

• NETWORK OPERATIONS PLANNER

Candidate will interface with field operations group in this position, which involves planning of network control center capabilities and functions, maintenance tools, diagnostic packages and data collection and analysis. Requirements include a BSEE coupled with at least 2 years experience, with operations and data communications network design background.

• SENIOR COMMUNICATIONS
PROGRAMMER

Qualified individual will design, develop, and maintain communications software for our large scale distributed network. Experience with BISYNC and SDLC protocols and assembly language BSEE or equivalent experience.

• REAL-TIME SYSTEMS PROGRAMMERS

Responsibilities will include design, development, and maintenance of network control functions for our large scale distributed transaction network. Real-time assembler programming experience required BSEE or BSCS or equivalent experience.

Exercise your own capabilities to the limit, and at the same time work in an atmosphere where technology itself is at its highest - at TTI. We also offer exceptional salaries, tangible growth potential and a wide-ranging benefits program that is designed to cover most all of your needs. Take us for all you're worth - forward resume with salary history to:

Karen McFarlane

TRANSACTION
TECHNOLOGY, INC.

10880 Wilshire Blvd.
Los Angeles, CA 90024

An Equal Opportunity Employer M/F

A Subsidiary of
CITICORP

TTI

SYSTEMS PROGRAMMERS

The Central Intelligence Agency has several positions for experienced Systems Programmers to work in a complex, multi-system, IBM 370-oriented computer installation. There is special interest in persons with backgrounds in any of the following areas:

- CICS
- Operating System Internals (OS/MVS, JES II/JES III)
- VM/370 System Internals
- Computer Systems Measurement and Performance Enhancement
- Systems Configuration and Selection
- Telecommunications and Front End Processors
- 360/370 Assembly Language Programming
- Minicomputer Systems Internals (UNIX)

Salary range: \$17,056 to \$28,725 depending upon qualifications, plus all normal Federal employment benefits. Location: McLean, Va.

U.S. Citizenship is required.

Please send complete resume in confidence to: Personnel Representative, Dept. A, Room 821, P.O. Box 1925, Washington, D.C. 20013.

An Equal Opportunity/Affirmative Action Employer

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER/ANALYSTANSI COBOL; IBM 370/158,
MVS with IMS and TSO**We offer an
environment for
achievement and success**

Bucyrus-Erie, a major manufacturer of mining machinery and construction equipment, has an immediate and challenging position available for the individual with a minimum of 3 to 5 years experience (preferably with manufacturing systems exposure). This is primarily an on-line, real-time opportunity that offers a generous starting income, a comprehensive benefits program and outstanding opportunities for both professional achievement and personal growth.

FOR IMMEDIATE ATTENTION, PLEASE
SEND YOUR RESUME IN COMPLETE CONFIDENCE TO:

BUCYRUS-ERIE

1100 Milwaukee Ave.
South Milwaukee, WI 53172
We are an Equal Opportunity Employer M/F

**CADILLAC EDP OPPORTUNITIES**

ALL FEE PAID NATIONWIDE COVERAGE

CONFIDENTIAL

CADILLAC offers you assistance in finding a position that meets your objectives... NATIONWIDE or in your present locality. For 45 years CADILLAC has been helping professional people find new positions that offer greater growth more responsibility, new experience, relocation, higher salary, etc... we'll make every effort to do the same for you. Just send your resume, or a note outlining your experience... no cost or obligation to you.

Sys Prog (Tech Support)	\$20-30	Prog (Applications)	\$14-20
Sr. Anal/Proj Mgrs	\$22-30	Prog (MINI, PDP, etc)	\$16-23
System Anal	\$20-25	EDP Auditors	\$18-22
Prog/Anal	\$16-22	Managers IBM Sys/3	\$16-23



Mark Fuller
CADILLAC ASSOCIATES, INC.

32 W. Randolph St., Chicago, IL 60601

(312) 346-9400

EDP Professionals ...

**You know your
capabilities -
now here's your
chance to use them.**

Digital's Corporate Information Systems organization (CIS) offers EDP professionals a true growth environment... one where you're encouraged to acquire new skills and take on new responsibilities.

Because we provide corporate-level support to many areas of Digital, and must keep up with the corporation's rapid growth, we're constantly seeking talented, highly motivated EDP professionals for newly-created positions.

**SENIOR SYSTEMS ANALYSTS
PROJECT MANAGERS**

This is an excellent opportunity for knowledgeable professionals to become internal consultants or project leaders in a fast-growing area. You should have a proven track record in the development and implementation of major business systems as well as a solid background in system development and programming in a business environment. A knowledge of data communications or order processing in a timesharing environment would be a plus.

**PROGRAMMER/
ANALYSTS**

We're looking for Programmers with at least 1 year of experience with COBOL or BASIC-PLUS who are interested in becoming Programmer/Analysts. Also, we are seeking Programmer/Analysts with at least 3-5 years experience for a variety of challenging growth positions.

For these positions, a knowledge of large-scale interactive timesharing systems is a plus. Experience with DECsystems 10 or PDP 11 would be helpful.

These opportunities with Digital's CIS offer the chance to assume wider responsibilities, utilize your communications skills, and pursue a dual career path into either management or senior technical areas. And successful CIS experience provides an opportunity to move into other organizations within Digital.

If your present company isn't offering this type of challenge and growth, you should investigate your possibilities in Digital's dynamic, user-oriented environment. Please forward your resume, including salary history to Bill Gredy, Digital Equipment Corporation, Dept. C3203807, 129 Parker Street, Maynard, Mass. 01754. We are an equal opportunity employer m/f.

digital

Data Processing

**SYSTEMS SOFTWARE
SECURITY SPECIALIST**

Virginia based bank holding company seeks highly motivated individual to establish procedures and controls to insure integrity and security of Computer Hardware and Systems Software. Responsibilities to include the planning and scheduling of reviews for EDP Systems. Software and Systems procedures, the preparation of short term and long range audit plans and other related functions. Minimum 3-4 years systems programming is preferred. Degree in Computer Science is required. Must have thorough knowledge of ALC programming and familiarity with COBOL. IBM 370 DOS/VS GRASP environment. Excellent salary and benefits package. Submit resume with salary requirements to:

CW Box 1502
797 Washington St.
Newton, MA 02160
Equal Opportunity Employer M/F

Faculty
School of Business
Administration

George Mason University, growing State university located in Washington, D.C. metropolitan area, is seeking one or more qualified persons for appointment to the School of Business Administration for teaching in Management Science or Information Systems. Duties will include teaching graduate and undergraduate courses, committee work, and some research. Associate Professor: doctorate required; business and/or teaching/research-publication experience expected; Associate Professor: doctorate (or significant progress on dissertation) business and/or teaching/research-publication experience is desired. For persons with less credentials than those desired, appointment may be at the rank of instructor. All positions begin September 1978. Salary is competitive. Send resume by March 31, 1978 to Dr. Willis H. Martin, Director, School of Business Administration, George Mason University, Fairfax, Virginia 22030. AA/EDE.

**Computer
Professionals**

San Francisco Bay Area
Opportunities exist in the San Francisco Bay Area for people with experience in the following areas:

**Software Product
Manager**

Requires good customer interface ability, strong feel for software marketplace (systems and applications) and ability to deal with technical staff. Position will lead a small group of product planners in software development.

Salary to \$36,000

**Manager of Systems
Programming**

Requires a senior systems programming background with project leader experience. Experience should include work in a development environment. Mini/micro operating systems experience helpful.

Salary to \$35,000

EDP Consultant

Requires financial systems design and implementation experience with a knowledge of COBOL. Work involves consulting to client companies. Minimum travel required.

Salary to \$30,000

**Project Manager and
Senior Software
Development Manager**

These 2 positions work in a strong development environment with a group of highly skilled systems professionals. Desired experience includes a project management, OS/VS1 or OS/MVS internals, assembly language and DASD knowledge.

Salary to \$28,000

Call, Come In, or forward your resume to:
Rich Clark -- Ed Ioli -- Carl McNell
220 Sansome St., Suite 1390
San Francisco, CA 94104
(415) 981-6500

an employer retained personnel service
The Computer Branch, Inc.
Personnel Services

**Product Planner
Terminal Systems
\$28,000-\$35,000
Exeter Associates
Executive Recruiters**



Bruce A. Montville
P.O. Box 523
Computer Park
Hampton, N.H. 03842
(603) 926-6712

**COMPUTER
CUSTOMER
ENGINEER**

Position available in Princeton, New Jersey to join an in-house computer maintenance group that maintains all equipment on site. We are looking for people with maintenance experience on D.G. Eclipse, CDC 6600, Cray 1 or any other large computer. If you enjoy a challenge and want to learn state-of-the-art equipment let us hear from you. IDA/CRD offers prime shift work hours, no travel except for training and a liberal fringe benefits package.

Submit resume to:

Administrative Officer
**Institute for
Defense Analyses**
Thonet Road
Princeton, N.J. 08540
Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

EDP Professional

Newark, New Jersey

We are seeking an EDP professional looking to advance your career opportunities. This position on our expanding EDP audit staff will offer the following challenges:

- Preinstallation system reviews
- Postinstallation system reviews
- Design and implementation of computer assisted audit techniques
- Support internal audit staff

You should have a college degree and a minimum of 3-4 years' systems/programming experience in a sophisticated computer environment. You will be trained in EDP auditing techniques, and good written and oral communications skills are essential. Familiarity with accounting and insurance concepts is desirable.

Salary range is mid to upper teens. We offer a comprehensive employee benefits package. Please send resume and salary history in strict confidence to: Director of Personnel.

**Mutual Benefit Life**

520 Broad St., Newark, N.J. 07101

Equal Opportunity Employer M/F

EDP PROFESSIONALS

• Internal Consultants (2) \$33,000

Major NY bank seeks EDP Professional with solid project management exp in a 370/OS/VS environment. Excellent interpersonal skills & formal project life cycle exp required. Excellent opportunity to move into top EDP management.

• Hardware/Technology Evaluation \$30,000

A number of client firms have very challenging opportunities for individuals with experience evaluating hardware (large scale & mini), software, word processing, etc.

• Management Consultant \$29,000

Prestigious midtown NYC management consulting firm has positions open for Senior Analysts with experience designing & implementing IMS application systems. Very visible, excellent opportunity for growth.

• Systems Leader \$27,000

NY financial firm needs Analyst/Programmer with solid OS/VS COBOL experience to function as a Project Leader. College degree plus financial applications desired.

For information on these & other career positions, please call or send letter/resume in confidence to:

JOHN SULLIVAN/DAN JARVIS

the jarvis walker group

535-5th Ave, NYC 10017 (212) 867-2650

SCIENTIFIC SYSTEMS ENGINEERS

McDonnell Douglas, St. Louis is seeking individuals with degree in Industrial Engineering or Computer Science and with experience in FORTRAN programming. Must have background in one or more of the following areas:

Geometric Modeling Computer Graphics
Simulation Models Data Base Systems
Distributed Processing

Explore the possibility of joining our team of skilled professionals in the expanding Computer Aided Manufacturing area developing advanced systems and technology by sending your resume to:

W. B. Kellenberger
Section Manager,
Professional Employment
Department CW-78SE
P.O. Box 516
St. Louis, Missouri 63166

MCDONNELL DOUGLAS

CORPORATION

An Equal Opportunity Employer m/f

Systems Analysts/Programmers

G. D. Searle & Co., an international leader known for quality and innovation in the Health Care industry, is seeking experienced DP professionals in the Systems and Programming areas at Corporate Headquarters located in Skokie. Positions currently available include:

LEAD ANALYST—SYSTEMS ANALYSTS

These positions will deal with the development of large-scale management information and retrieval systems, including problem definition, systems design, technical writing, and user interfacing associated with pharmaceutical research. Three to five years DP experience and systems analysis design, programming, timesharing and pharmaceutical research with COBOL and/or FORTRAN as well as a Bachelor's degree or the equivalent are required.

PROGRAMMERS

These positions will support the development and maintenance of information systems for scientific evaluation. Functions include programming and user interfacing for modification/maintenance of existing systems. A minimum of two years programming experience in FORTRAN, file management, and timesharing experience required. A Bachelor's degree in Math or Computer Science, or equivalent work experience, is preferred.

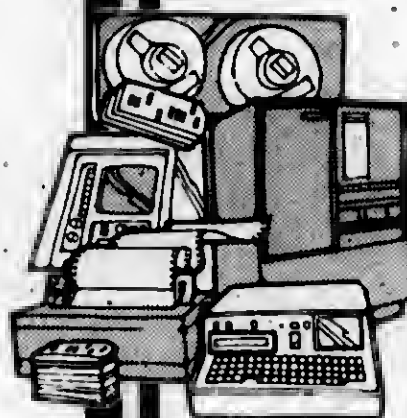
We offer an excellent salary and benefits program in a growing and stimulating atmosphere. Send comprehensive resume with salary history, in confidence, or call:

Darlene Brill
312/982-7513

SEARLE**G. D. Searle & Co.**

P.O. Box 1045
Skokie, IL 60076

An Equal Opportunity Employer M/F/H



APPLICATIONS PROGRAMMERS

Excellent 8 to 5 shop seeks stable applicant with 2-5 years COBOL-IBM environment experience. Client's management approach is people oriented with emphasis on team development, top-down design, structured programming, structured walk-throughs, and rotating assignments between development and maintenance. Degree NOT required. Top benefits package and good upward mobility. Salary to \$18K; Fee Paid. Call or send resume to Carolyn Stewart, (214) 235-8371, P.O. Box 38271, Dallas, TX 75238.

PHOENIX CAREERS

APPLIED DATA SYSTEMS, A PHOENIX SOFTWARE COMPANY WITH NATIONAL MARKET, SEEKS PROGRAMMER/ANALYSTS WITH MIN 2 YRS COBOL EXP. SAL TO 24K. LIMITED TRAVEL. SEND CONFIDENTIAL RESUME TO A.D.S., P.O. BOX 2088, SCOTTSDALE, AZ 85252

SUNNY SOUTH

Urgent Needs

Companies Pay Our Fees

18 Prog/Analysts with mfg. applications \$14-24,000
16 Systems Programmers-Mfg. or Commercial \$19-30,000
10 Systems/Analysts-Mfg. Applications CICS a plus \$17-24,000
16 Prog/Analysts with banking or insurance exp. \$14-22,000
9 Project Leaders-To \$26,000

Call collect: DUNHILL OF COLUMBIA, 4700 Forest Dr., Suite 217, Columbia, SC 29206 (803) 787-9767.

SYSTEMS PROGRAMMER

We have a challenging opportunity for an individual capable of filling a key position within our company. The person we seek will be responsible for the generation and performance evaluation of OOS/VS, CICS/VS, and VSAM as well as other related systems software. If you would enjoy having an excellent opportunity to grow and learn, a salary limited only by your ability, a competitive benefit program, a chance to work with the latest IBM hardware and software systems, and the excitement of working in a pleasant midwestern city, please contact:

Ronald D. Long, AVP

BRENCO AUTOMATION CENTER, INC.

717 Mulberry, Suite 503
Des Moines, IA 50308
(515) 283-2415
A subsidiary of
Brenton Banks, Inc.

PROGRAMMER/ANALYST SENIOR

Experienced project leader in financial and accounting systems needed for business systems group—minimum 5 years exp. Background in COBOL, on line systems, design & analysis, OS. Must be able to communicate with all levels of management. Bachelor's degree preferred. Competitive salary and fringe benefits. Submit resume & salary history to Personnel Department.

PROGRAMMER/ANALYST TECHNICAL

Challenging position for person possessing BSEE degree & 2 years experience with the IBM 370 system & an operating knowledge of FORTRAN. Prior power system analysis programming exp. preferred. Career opportunities. Competitive salary & fringe benefits. Submit detailed resume including salary history to Personnel Department.

DELMARVA POWER

800 King Street
Wilmington, De. 19899
Equal Opportunity Employer M/F

Software Engineers

Call COLLECT

(415) 966-2995

GTE Sylvania Electronic Systems Group, Western Division, is a San Francisco Bay Area firm engaged in sophisticated communication command and control systems with some applications interfacing with large-scale data bases. We are seeking Software Engineers at ALL LEVELS who wish to participate in a professional, high-technology environment using structured design and coding techniques. Experience on the following computer/languages would be especially desirable.

PDP/11-45 & 70, UYK-7, NOVA, ECLIPSE, PASCAL, IFTAN, CMS-2, and SIMSCRIPT.

Positions are available in the San Francisco Bay Area, Arizona, Washington DC, and in Europe. All positions offer an excellent salary, plenty of career challenge and growth opportunities, plus generous benefits including tuition reimbursement, medical, dental and life insurance, and stock purchase plan.

For immediate consideration, please call COLLECT (415) 966-2995 weekdays, 9:00am to 4:00pm PACIFIC STANDARD TIME. If unable to call, please forward resume with salary history to GTE Sylvania, P.O. Box 188, Mountain View, CA 94042, Attn: Dept. CW-476. An equal opportunity employer, minorities and females encouraged to apply. U.S. citizenship is required.

GTE SYLVANIA

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER SCIENCE PROFESSIONALS MEET THE CHALLENGE WITH GULF

Build a meaningful career in southwest Houston at Gulf Oil's newest and most advanced computer complex. Gulf Science & Technology, one of the operating companies of Gulf Oil, offers an excellent benefit package and competitive starting salaries for...

APPLICATIONS PROGRAMMERS

These positions offer the qualified data processing professionals challenging work assignments in a state of the art computer complex. These positions also offer outstanding potential for career growth and advancement for the person who is willing to meet the challenge.

Prerequisites include a degree in Computer Science or related field, 2-5 years experience in commercial applications programming using COBOL and/or ALC in a 370/OS-VS or MVS environment. Good working knowledge of IBM JCL and experience with IMS, TSO, and VSAM a definite advantage.

Salaries will be commensurate with education and experience. Qualified applicants are invited to submit their resumes including salary history to:

Mr. J.P. Haney



**GULF SCIENCE
& TECHNOLOGY CO.**

Drawer F-71
P.O. Box 36506
Houston, TX 77036

An Equal Opportunity Employer M/F

data base analyst

Travenol Laboratories, a health care industry leader, is currently seeking a qualified individual to support the development of IMS systems. The qualified candidate will provide technical assistance in system, program and data base design. Additional responsibilities will include the generation of required IMS control blocks and interface with programmers on coding, testing and establishment of test data bases.

To qualify, you should have a minimum of 3 years experience as an IMS Data Base Analyst or Programmer/Analyst for on-line IMS systems. Experience in data base design, MFS, PSB, and DBD control block generation and COBOL coding is also required. A background in manufacturing systems, data dictionary or IMS tuning techniques is highly desirable.

We provide an excellent salary and liberal benefits program. To arrange a confidential interview, send your resume with salary history to:

S. C. Washington



**TRAVENOL
LABORATORIES, INC.**
One Baxter Parkway
Deerfield, Ill. 60015

An Equal Opportunity/Affirmative
Action Employer

PROGRAMMER/ANALYSTS

**WE WANT TO DISCUSS
YOUR TOMORROW TODAY
IN SUNNY FLORIDA**

Are you interested in a challenging career where you can enjoy the quality of life that only Central Florida can offer? With a high school diploma and a minimum of three years programming experience, you have earned a Florida career. Prefer applicants who have IBM DOS/VS-POWER/VS shop experience. Must be able to code in COBOL. Prefer CICS experience. Qualified applicants should contact:

Mrs. C.M. Fredericks, Personnel Office

Board of Polk County Commissioners

P.O. Box 60
Bartow, Florida 33830
(813) 533-1161, Ext. 274
Equal Opportunity Employer M/F

MIAMI-DADE COMMUNITY COLLEGE Systems Analyst

Assumes functional responsibility for analysis and programming support of part of the college's administrative activities, designs data processing systems, supervises subordinate personnel, establishes and maintains documentation, and trains personnel in the usage of new systems. Minimum requirements: Bachelor's degree in appropriate field and four years of data processing experience. Salary to \$20,020, based on experience and qualifications, plus liberal employee benefits. Submit detailed resume to Personnel Services, 11011 S.W. 104 St., Miami, Florida 33176.

An Equal Access/Equal
Opportunity Community College

BANK or INSURANCE

We currently represent many banks & insurance Co.'s throughout the country who are looking for qualified EDP personnel. Our prime needs are for people with financial experience in the \$16-25,000 range. We need programmers, analysts, data communications, and management personnel. If you are currently in a bank or insurance company or would like to be in this environment, send your resume along with salary and geographical preferences to Tom Roberts. Companies always pay our fee.

don HOWARD Personnel, Inc.

360 N. Michigan Ave.
Chicago, IL 60601
(312) 332-2341

Offices in Atlanta, N.Y.,
Dallas, N.J., S.F.

SYSTEMS ANALYST

\$15,654 - \$19,079

New position offering opportunity to work with DBMS and Tele-Processing or IBM 370, DDS/VS. Requires combination of education and experience in design and installation of EDP applications. Final filing date is March 28, 1978. Send resume to:

**Tulare Co.
Personnel Dept.**
Courthouse, Room 106
Visalia, CA 93277
(209) 733-6266
Equal Opportunity Employer

PROGRAMMER ANALYST

Our mid-town New York based International Public Accounting firm needs a versatile pro to work in Systems Development.

VARIETY:

minicomputers to OS environment

KNOWLEDGE:

4 years experience required in
RPG2, COBOL, FORTRAN & BASIC

A PLUS:

experience in BAL, PL1, DBMS

Minimum travel
salary commensurate with experience.
(our employees know of this ad)

Send Resume To CW Box 1506, 797 Washington St.,
Newton, MA. 02160.
an equal opportunity employer

SENIOR SOFTWARE ANALYST (Tele-Processing)

A unique opportunity exists within our data processing area for the talented DP professional who possesses a proper mix of education and experience to be able to tackle this challenging software assignment.

The individual selected will provide software enhancements and support Honeywell DN-355 and IBM 3704-5. To facilitate new teleprocessing oriented systems, give software support on specialized data transmission emulators and support IBM-3780 and 3270 along with giving terminal user support.

The successful individual will bring an intimate working knowledge of IBM "Binary Synchronous" transmission protocol, including in-depth knowledge of at least one terminal which uses it (IBM 3270, 2780, 3780), complete familiarity with the "EIA RS-232" interface convention, two years experience with communications software internals on a programmable "front-end processor" and knowledge of commonly used data transmission hardware.

If you have the "proper mix" which will be required to meet the challenge of this opportunity, please send your resume with an indication of current salary to:

Rich Pochowicz

SEARLE

G. D. Searle & Co.

4711 Golf Rd.
Skokie, IL 60076

An Equal Opportunity Employer M/F/H

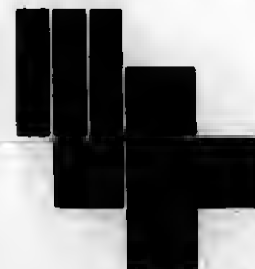
ANALYST PROGRAMMER PROFESSIONALS

Medicus is a progressive company providing data processing and management services to hospitals. We are rapidly expanding our client base and scope of services throughout the nation.

We are currently seeking analysts/programmers who are interested in working with dynamic professionals to develop and install health care systems on IBM and Data General computers.

We currently have positions open in Georgia, New York, Illinois, Texas, and California.

If you would like to grow as a professional with a successful corporation, please write to the Personnel Coordinator at the address below.



**MEDICUS SYSTEMS
CORPORATION**

1800 East 105th Street
Cleveland, Ohio 44106

An Equal Opportunity Employer

Fold and insert order form (attached through binding) and remittance here

Thank you for your order.

USE THE ATTACHED
ORDER FORM AND
THIS ENVELOPE FOR

a new subscription
new address
new title
new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



**797 Washington Street
Newton MA 02160**

position announcements

position announcements

position announcements

position announcements

position announcements

FLORIDA**Data Processing Opportunities**

Here is your opportunity to join Ryder Truck Rental, Inc., the world's largest truck rental and leasing corporation. We currently have a 370/168 running under SVS supporting both online CRT systems and an international intelligent terminal network under IMS/VS. We are seeking qualified individuals in the following capacities:

Senior Systems Analyst

Minimum of 3 years design experience using COBOL and OS/JCL in a large scale IBM system environment. Knowledge of online systems, structured programming, 3270 CRT's, TSO and IMS, as well as a college degree highly desirable.

Programmer/Analysts

We require heavy COBOL programming experience in large IBM system environment. IMS data base and teleprocessing background would be desirable.

Systems Programmer

The individual we seek must have prior experience with IBM 370 operating systems. Experience with SVS, MVS, HASP and/or JES-2 would be beneficial. The position to be filled will have responsibility including systems generation, systems performance evaluation and tuning, system software maintenance, and application programmer support.

If you feel you possess the background to join a successful professional team and desire an atmosphere of challenge in a growing MIS operation, please send your resume with salary listing to:

Barbara Edwards
Personnel Manager, MIS
Ryder Truck Rental
2850 Tigertail Avenue
Miami, Florida 33133
We are an EEO Employer M/F

**STAFF ASSISTANT/
APL PROGRAMMER**

The University Computing Center of the University of Massachusetts at Amherst is looking for a talented person to help in the design and implementation of a new APL system. The successful applicant must have at least a B.S. in Computer Science or equivalent, and should have extensive experience with APL and assembly language programming. A background in Code Generation, Theory of Computation, or Compiler Design is desired. Salary commensurate with experience. Send resume to Charles O. Lyman, University Computing Center, University of Massachusetts, Amherst, MA 01003. The University is an Affirmative Action/Equal Opportunity Employer.

**DATA PROCESSING
INSTRUCTOR**

Req.: Master's data processing or equiv. Teaching exper. preferred. Knowledge of curriculum development would be an asset.

Triton College is one of the largest community colleges in Illinois, located in the western suburbs of Chicago. We serve 23,000 students.

We offer a competitive salary and excellent fringe benefits.

Send letters of application to:

Dr. Frederick J. Gaskin
Vice President-Personnel
Triton College
2000 Fifth Avenue
River Grove, Illinois 60171
An Affirmative Action
Equal Opportunity Employer

**PROGRAMMER
ANALYST**

to \$25,000

Software specialist reporting to mgr. M.I.S. 5-8 yrs exp in programming. BAL, COBOL, Honeywell and a plus. Mfg. environment. Prime area. Co. pays all fees. Contact Art Toht (312) 665-4455. S-H-S INTERNATIONAL, 1616 E. Roosevelt Rd., Wheaton, IL 60187 (Priv. search firm)

**DATA PROCESSING
MANAGER**

Moraine Park Technical Institute is accepting applications for a Data Processing Manager. Bachelors of Business Administration with Computer Science major or equivalent; three years of progressively responsible experience in data processing one year of advanced or responsible professional experience. Salary range \$17,000-\$21,000 with fully paid fringe benefits. Contact Phillo Stoll, Moraine Park Technical Institute, 235 North National Avenue, Fond du Lac, WI 54935. Telephone: (414) 922-8611. April 1 deadline. EOE.

**PACIFIC N.W.
& ALASKA**

Special needs for Technical Systems Engrs. knowledgeable with IBM, IMS Data Base Internal #1, VSAM #2. Salary approx. \$20K. Our clients range from mfgg, banking, insurance, hospitals. Also need programmer/analysts, and supervisory systems analysts. Send resume or call KEN MURNEY collect (206) 455-0582. All fees paid.

CAREER SPECIALISTS, Inc.
1200 112th N.E., #101
Bellevue, WA 98004

**SYSTEMS
PROGRAMMERS
SUNBELT-To \$25,000**

Our client, a Fortune 500 mfg co., due to continued growth seeks several IMS/VS Systems Programmers. Excellent growth potential and career benefits. Desirable Carolina location. All fees paid by client to include interview and relocation. Reply in strict confidence including salary to J.K. Schwab.

**FOX-MORRIS
PERSONNEL CONSULTANTS**
1742 Southern National Center
Charlotte, NC 28202
SPECIALIST IN EOP PLACEMENT

MUMPS/RSTS

Versatile programmer/technician needed to assist in development of hospital information system based on a MUMPS/RSTS/8080 network. Intimate knowledge of POP-11 hardware and software desired. BS in CS, EE or 1-3 yrs experience in data base design and management preferred. Contact Eva Yarns, Employment Manager, Good Samaritan Hospital, 1016 N.W. 22nd Ave., Portland, OR 97210. An equal opportunity employer.

**SCIENTIFIC
PROGRAMMER
\$28K**

We require a superior programmer who can rapidly grasp the nuances of special purpose architecture and software development facilities, and make a prime contribution to the software development effort. Because of the real-time nature of the applications, the individual we seek must be a highly qualified and sophisticated Programmer, with at least 3 years experience in assembly language programming for real-time (interrupt driven) applications. Experience with Data General Eclipse or OEC POP-11 mini-computers very helpful, but not mandatory.

We offer in addition to excellent compensation solid benefits and an informal, stimulating environment.

Please forward resume in confidence or call:

**BILL JACKSON
COMDATA**

161 Highland Ave., Needham, MA 02194
(617) 449-4350

We are an equal opportunity employer.

**Systems Analysts
Programmer Analysts**

HANES HOSIERY is seeking aggressive, EXPERIENCED, career-oriented systems professionals with a broad range of business systems skills.

These positions offer opportunity to participate in the development of sophisticated EDP systems using the latest in software and hardware features including: powerful on-line program development software, data base management, transaction processing software, and distributed processing. We are committed to a position of leadership in EDP utilization and consequently offer excellent opportunity for professional growth and accomplishments.

Experience with large system series HONEYWELL software will be an advantage but NOT a prerequisite. From a central dual 66/60 system, we utilize the advanced GCOS operating system, TDS, TSS, and IDS.

HANES HOSIERY offers attractive fully competitive salaries plus comprehensive benefits, and the security of being with a very strong successful expanding company. Another plus is our southeastern location affording very pleasant living in a mild, sunny climate, in a community of 230,000 people that is nationally recognized for its cultural achievements.

If you feel that you qualify, please call collect, Allen Spicar.

(919) 744-2724 or (919) 744-2518

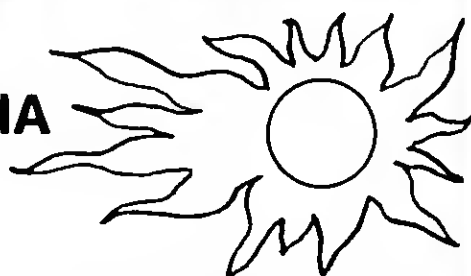
If unable to call, please send resume including SALARY DATA in confidence to:

Management
Recruitment Coordinator
HANES HOSIERY

A Division of the Hanes Corporation
A "FORTUNE" 500 COMPANY
P.O. Box 1413, Winston-Salem, N.C. 27102
NO EMPLOYMENT AGENCIES, PLEASE!
Affirmative Action Employer

Hanes Hosiery manufacturer of:

Hanes beautymist, may queen
Today's girl, Underalls, Slenderalls

PROGRAMMER / ANALYSTS**CALIFORNIA**

We need articulate, versatile people to do a lot of things: analyze requirements...develop specifications...create documentation...write programs using COBOL and/or ALC...write JCL for OS/VS2 MVS.

The environment includes: IBM 370/158-3... MVS 3.7... IMS 1.1.4... TSO/SPF II... VTAM/NCP... Panvair... 100 local terminals.

Qualified applicants will have at least six years of experience as a programmer using COBOL, ALC, JCL. Large scale complex on-line systems experience would be helpful...and interactive programming and IMS (DL/I) experience would be extremely helpful.

We're a substantial life insurance company operating in the West, a member of one of the nation's largest diversified financial services organizations. Salary and employee benefits are excellent.

Please send your resume and salary history to the Personnel Director, 2020 L Street, Sacramento, CA 95814.



California-Western States Life Insurance Company
An American General Company

An Equal Opportunity Employer (M/F)

Data Professionals

**YOUR FUTURE
STARTS HERE**

We're Blue Cross of Wisconsin, a recognized progressive leader in the health care insurance industry and a pioneer in advanced data processing technology. Our future looks fabulous...so can yours! Our continuous growth has created unique opportunities for data professionals with drive, imagination, and experience in the following areas:

**PROJECT LEADERS
SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS
PROGRAMMERS
DATA BASE ANALYSTS**

We offer an excellent salary, an outstanding benefits program plus urban/suburban living in Southeastern Wisconsin with easy access to some of the best recreational facilities in the Midwest.

Interested individuals may send a brief letter or resume including salary requirements to:



Richard Schmidt,
Employment Services Department
Blue Cross

of Wisconsin
401 West Michigan Street
Milwaukee, Wisconsin 53201

Equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

WANGWANGWANG

FOR OUR OPERATIONS IN BURLINGTON EDUCATION CENTER

Program Development Consultant

An opportunity exists at the Education Center for an experienced program and course developer. This person will interface between the Training Center, Marketing Organizations as well as the Development Center for New Products. This position requires a person qualified to develop and write training materials for sales, support courses and in-field personnel.

REQUIREMENTS:

- excellent writing skills
- word processing or data processing experience
- the ability to communicate well with Marketing Organizations
- preter college degree

This career position offers growth and challenge with a dynamic growing corporation.

Excellent salaries and earning potential plus superior company benefits. Please send resume, including academic background and salary history and requirements to:

Linda G. O'Connor
Career Opportunities
(617) 851-4111

WANG

LABORATORIES, INC.

One Industrial Avenue, Lowell, MA 01851

We are an affirmative action/equal opportunity employer.

SOFTWARE PROFESSIONALS

Immediate openings exist at our St. Louis headquarters for qualified Software Personnel

Qualified candidates should have experience in SYSGEN, PTF application, problem determination, and assembler language coding.

Currently we are using the SVS operating system with future plans to move to MVS, on IBM 370's Model 158 and Model 145 with HASP shared pool. A BS degree is required and experience with MVS and CICS/VS is a definite plus.

We offer an excellent salary, comprehensive benefits and opportunity for advancement. Please send resume and salary history in confidence to:

Anheuser-Busch, Inc.

Manager, Salaried Employment
Department G-5
721 Pestalozzi
St. Louis, MO 63118

An Equal Opportunity Employer M/F.



MINI PROGRAMMER ANALYST

Our Information Systems Center has an immediate requirement for an experienced mini programmer analyst for business applications. The position involves online-interactive systems development/programming and distributed processing with communication links to a 370-168 system. The successful candidate will have previous experience with minicomputers, preferably Hewlett Packard or Data General equipment. A background in 370-168, MVS, IMS with COBOL/PL-1 languages would be helpful.

Please submit detailed resume with salary history to:

Ms. Janyce Albert
Professional Staffing Office
Collins Divisions
Rockwell International
400 Collins Rd. N.E., M/S 120-126 RDS
Cedar Rapids, Iowa 52406

Rockwell
International

Equal Opportunity Employer M/F

UNIVERSITY OF HONG KONG

Teaching Staff in Computer Science

The University of Hong Kong is considering the establishment of a new Department of Computer Science in the next Triennium 1978-81 and will be appointing teaching staff at the following levels:

Chair
Senior Lecturer
Lecturer
Assistant Lecturer

Applications from suitably qualified candidates are invited. Annual salaries (superannuable) are: Chair: will be within the professional range and not less than HK\$131,640
Senior Lecturer: HK\$92,280 x 3,960 - 123,960
Lecturer: HK\$59,340 x 4,020 - 67,380
Assistant Lecturer: HK\$43,260 x 4,020 - 79,440 x 3,960 - 99,240
(US\$1 = HK\$4.60 approx.)

Starting salary will depend on qualifications and experience.

Further particulars and application forms may be obtained from the Secretary-General, Association of Commonwealth Universities, 36 Gordon Square, London, WC1H 0PF, England, or the Assistant Secretary (Recruitment), University of Hong Kong, Hong Kong. Closing date for applications is April 7, 1978.

OPERATING SYSTEMS MANAGER

Managerial/professional position with the University of Nebraska Computer Network. Duties include: supervise the generation and maintenance of the operating system, job entry subsystem and conversational remote job entry subsystem in a large IBM 360/65 and 370/148 environment using DOS/VS, OS, and SVS; configure hardware and software including telecommunications services; supervise staff of professional programmer/analysts.

QUALIFICATIONS: Bachelors degree in Computer Science, Electrical Engineering or equivalent. Five years of experience in data processing including a minimum of two years in programming modifications to computer operating system components and a minimum of two years of supervisory experience. Application deadline date 4/4/78. Mail resume to: University of Nebraska-Lincoln, Personnel Dept., Employment Section, Room 128, 501 N. Tenth St., Lincoln, NE 68588.

EOE/AA

Deen, School of Business Southwest Texas State University

Southwest Texas State University invites nominations and applications for the position of Dean of the School of Business.

Minimum requirements: Earned Doctorate required. College or University teaching experience in a related area preferred; administrative experience desirable. Inquiries must be postmarked by March 17, 1978.

Southwest Texas State University is an affirmative action, equal opportunity employer. Starting date: September 1, 1978.

APPLY: Dr. Cella Morgan, Chair, Search and Screen Committee Department of Finance and Economics, School of Business, Southwest Texas State University, San Marcos, TX 78666, (512) 245-2566.

R S T S in COLORADO

Expanding company has two positions available for individuals experienced in the following fields:

TIMESHARING SALES

- Represent packaged applications software
- Offer generic computer resource
- Develop new market areas
- Salary plus commission

PROGRAMMER/ ANALYST

- BASIC PLUS under RSTS/E
- MBA degree or accounting background
- Good personal communications skills
- Salary range \$14K-\$19K

EDI Computer Service
13693 East 11th Ave.
Denver, CO 80014
(303) 758-4619

Programmer/ Designer

Fuel Oil O.S.

Tymshare, Inc., an international leader in the computer services industry, is offering an excellent opportunity to join a creative team in our fast-paced Fuel Oil Division.

You'll be responsible for designing detailed machine logic flow charting for the solution of business problems, analyzing equipment requirements and capabilities, and modifying programs to suit changes in systems requirements or reconfigurations. Three years' experience with BAL on the IBM 360 required. DOS/JCL teleprocessing knowledge a must.

We offer a salary commensurate with experience and company benefits. Send resume in confidence to, or call: Dennis Raynoha (516) 420-1122


TYMSHARE INC.
275 Broadhollow Road
Melville, New York 11746

SYSTEMS PERFORMANCE SPECIALIST

Amtrak has an immediate opening for an experienced Systems Performance Specialist to work in the area of performance measurement/capacity planning.

Successful candidate will have 4-6 years experience with hardware/software monitors, MVS performance group tuning, IMS tuning, TSO tuning, DASD performance analysis, and applications tuning and monitoring.

Individual will work in an environment consisting of two 370/158's, shared DASD, 330/3350's, MVS/JES2, TSO, IMS DB/DC, VTAM/NCP and a large distributed processing network.

Excellent salary, benefits, growth opportunities. Send resume, in confidence to: J.R. Brune, Personnel, Amtrak, 400 N. Capitol Street N.W., Washington, D.C. 20001.

An Equal Opportunity Employer M/F

Amtrak

N/C SYSTEMS ENGINEERS

McDonnell Douglas, St. Louis, has openings for individuals with BS or MSEE with experience in digital logic & computer programming to work in Computer Aided Manufacturing (CAM), particularly in area of real-time monitoring and control. Areas of responsibility will include advancing technology in area of N/C and other machine tool related applications. If you meet the above requirements, explore the possibility of joining our creative team by sending your resume to:

W. B. Kellenberger
Section Manager,
Professional Employment
Department CW-78N
P.O. Box 516
St. Louis, Missouri 63166

MCDONNELL DOUGLAS

CORPORATION

An Equal Opportunity Employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

EDP

San Francisco Bay Area Location

Growth, growth, growth—1977 sales volume went well over \$200 million—has created these openings for experienced, high energy performers. Shaklee Corporation, a Fortune 500 manufacturer and marketer of consumer products, offers exceptional rewards, benefits, working conditions and career growth opportunities.

Senior Programmer Analyst

You will assist in the design and implementation of many of Shaklee's new systems. You must be able to interface with users on all problems, and be capable of directing in detail upgrades to the system. You must have a minimum of three years' COBOL programming experience in DOS, systems analysis and data base application. Financial and marketing systems experience would be helpful.

Programmer Analysts

Several new openings have been created for programmer analysts with at least three years' experience. Knowledge of IBM, DOS and COBOL is essential; you will be writing and implementing detailed program specifications.

For consideration, please send your resume with salary history and requirements to:

Tom Waterman, Personnel
2036 National Avenue
Hayward, CA 94544

We are an equal opportunity employer m/f

SHAKLEE CORPORATION



SYSTEMS PROGRAMMER

The Regional Information Systems (RIS) located at Eugene, Oregon is looking for a systems programmer who has actual experience in systems generation, implementation and maintenance of MVS. Experience in JES 2, TP and OBMS a plus. RIS is a cooperative data processing center dedicated to providing services to the county and other local government agencies. The current hardware configuration includes an IBM 158, 155 and over 200 terminals and RJE stations. Salary starting up to \$21,700. Please send resume to: Lane County Personnel Department, 2nd Floor Public Service Building, 125 East 6th Ave., Eugene, OR 97401.

COMPUTER SCIENCE

An imaginative and innovative teacher for introductory courses with applications in various disciplines. MBA with strong computer programming background or MS in Computer Science with strong business background preferred. Salary and rank open and competitive. Findley College, located in a secure medium-sized town in NW Ohio, provides ideal support for professional, intellectual, and academic pursuits. Faculty emphasis is on excellence in teaching. Application deadline April 15. Send vitae and credentials to: W. J. McBride, V.P. for Academic Affairs, Findley College, Findley, Ohio 45840. Equal Opportunity Employer.

RELOCATE

PACIFIC NORTHWEST

System Analysts 17-20K
3 plus yrs. exp., much user contact COBOL, OOS or OS.
Prog Analysts 14-19K
1 plus yrs. exp. Financial, Mfg. Ins., Retail, Medical, COBOL and/or RPG II.
Systems Progs 22-25K
OS, IMS, Internals, Assembler.

The above represents a sampling of the excellent positions available to you in the Northwest. All inquiries will be held in strictest confidence. All fees employer paid.



Hansen, Martin,
Morris & Assoc.
12081 455-9800
1621 114th S.E., Suite 219
Bellevue, WA 98004

PROGRAMMER/ANALYST

Immediate opening for Programmer/Analyst at Ulster County Community College.
Minimum qualifications include 2-4 years COBOL and OOS/VSE experience. Knowledge of administrative applications in an educational environment a definite plus. B.S. degree preferred. Individual will be working with an on-line system (CICS) and will be expected to work with various campus offices in the development and maintenance of their applications. Starting salary range \$13,500 to \$15,000.
Please send resume to Director of Computer Center, Ulster County Community College, Stone Ridge, NY 12484 no later than March 27, 1978. EOE/AA

Management Methods

ANALYST POSITION

An Academic/Professional appointment as Project Coordinator to develop and install Library Control System for multi-campus environment. Degree in data processing or library automation, or equivalent data processing experience required. IBM JCL and utilities, IBM 360 Assembler or PL-1. Salary \$17,000-\$20,000. Application, resume, names/addresses of three references, by March 10, 1978 to Larry J. Smith, Office of Administrative Information Systems and Services, 54 Administration Building, University of Illinois, Urbana, Illinois 61801, telephone (217) 333-4831. Position available o/a April 1, 1978. The University of Illinois is an Affirmative Action/Equal Opportunity employer, and encourages applications from minority groups and women, as well as handicapped persons and veterans.

MANAGER QUALITY ASSURANCE

Taxes, the energy capital of the country. Large Petro company. Review plans and make recommendations to management to better utilize large IBM 370 OS equipment. Analyze development projects for quality and complete specs. Tremendous potential. \$33,000 FEE PAID

ROBERT HALF
PERSONNEL AGENCIES, INC.

322 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

Our goal is to place career-minded data processing individuals with the right companies. We've done it for 10 years with continued success. Our one-on-one approach helps us to present client companies with a caliber of dedicated people who are destined to become top achievers.

So, if you're looking for a better opportunity, contact any one of the five offices of Data Processing Careers — providing the personnel needs of the data processing industry!



WE PLACE TOP ACHIEVERS...

DALLAS
Suite 1109
Stemmons Tower West
Dallas, TX 75207
(214) 637-6360

FORT WORTH
Suite 911
One Summit Avenue
Ft. Worth, TX 76102
(817) 336-4565

HOUSTON
Suite 960E
4615 Southwest Frwy
Houston, TX 77027
(713) 960-9102

KANSAS CITY
Suite 502
6405 Metcalf
Shawnee Mission
Kansas 66202
(913) 236-8288

TULSA
Suite 12
Park 21 Building
2624 East 21st St
Tulsa, OK 74114
(918) 747-3621

DATA PROCESSING CAREERS

Senior Programmer/ Analyst

Bechtel, a world leader in the engineering construction industry, has an immediate opening in San Francisco for a programmer analyst to work on the development of a computerized isometric drawing system. This individual will work as a member of the project team responsible for analysis, system design, program design and implementation.

The qualified candidate will have at least 4 years' experience as a programmer/analyst on large developmental projects. A minimum of 2 years' experience in the computerized graphics area is required. Knowledge of Cobol, Fortran and Structured Programming is preferred and a degree in engineering is desirable.

Please call K. David Bates (collect) at
(415) 768-5942 or write immediately to:
K.D. Bates, Bechtel Corporation,
Employment Dept. 15-6B-8,
P.O. Box 3965, San Francisco,
CA 94119.

an equal opportunity
employer m/f



MARINE DATA SYSTEMS Senior Systems Analyst

Three to five years computer experience, including at least two years in design of on-line systems. GE Mark III Network experience desirable. Fortran a plus.



MMS develops and implements systems for the international shipping industry. Send resume and salary history.

MARINE MANAGEMENT SYSTEMS, INC.

300 Broad St., Stamford, Conn. 06901 (U.S.A.)
an equal opportunity employer

EDP SYSTEMS PROFESSIONALS

Due to recent expansion, a major international consulting organization currently has over 50 openings throughout the U.S. for qualified EDP Systems professionals. These consulting positions are for staff through manager level, with compensation ranges from \$22,000 to \$35,000 depending on experience. Ideal candidates will have:

- Undergraduate degree in Engineering, Accounting, Business, Computer Science.
- Graduate degree in Computer Science, Business Administration, Quantitative Methods.
- 2-7 years experience in major computing environment.
- CDP highly desirable.
- COBOL Programming experience.
- Industry experience in Governmental, Banking, Manufacturing, Health Care or Financial Systems.

Positions available in most major cities. Client offers outstanding benefit and rapid advancement potential. Interviewing and relocation expenses will be paid.

Send detailed resume with compensation requirements and 3 preferred city locations to search consultants, CW Box 1494, 797 Washington St., Newton, MA. 02160 or call (415) 433-0535 or (714) 758-0515.

COMPUTATION CENTER DIRECTOR CARNEGIE-MELLON UNIVERSITY PITTSBURGH, PA.

Carnegie-Mellon University is seeking a Director of its Computation Center. This department provides information processing services to educational, research, and administrative users throughout the campus. The Director reports to the Vice Provost for Information Services and has the management responsibility for operations, systems programming, and engineering activities such as the installation of new computing equipment.

Candidates should have broad management experience, in-depth technical knowledge, and a thorough understanding of the complexities of university administration. A Ph.D. is desirable but not required. Salary will depend on qualifications and experience. Send vite to the Chairman of the Search Committee: Dr. John W. McCredie, Vice Provost for Information Services, Carnegie-Mellon University, Pittsburgh, PA 15213.

Carnegie-Mellon is an Equal Opportunity
Affirmative Action Employer

BANKING

Reserve Personnel specializes in the placement of data processing and other professionals in banking. The following positions are all with major money banks and offer full utilization of talents and growth opportunities. Internal consultants-some IMS Exp... to \$26,000, ATM-All Levels, including data comm, spec... to \$27,000. Respond in confidence to Rich Bruening,

RESERVE PERSONNEL

2805 Butterfield Rd.
Oak Brook, IL 60521
(312) 654-3480
(Pvt. Empl. Agency)

Programmer

Must have at least one year experience with Cobol. Environment consists of 370/145 (das/vs and cics) Health Care or City/County Applications Experience Beneficial. Submit resume to: Hans J. Kuss, Director Computer Services, Illinois Valley Community College, R.R. 1, Ogleby, IL 61438 (815) 224-6438.

position announcements	position announcements	position announcements	position announcements	position announcements
------------------------	------------------------	------------------------	------------------------	------------------------

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM 11, Assembler and COBOL.

Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:

W.M. Jones



Harper-Grace Hospitals

Harper Hospital Division
Human Resources Department

3990 John R., Detroit, Michigan 48201
(313) 464-8082

An Equal Opportunity Employer M/F

COMPUTER SERVICES ADMINISTRATOR OREGON

Salary—\$20,304—\$26,508

Requirements: College degree plus five (5) years professional experience in computer based systems design or operation, including two (2) years supervisory level. Preference given to experience with Burroughs on-line terminal applications and RJE environment.

Request application from: Personnel Department, Clatsop Community College, 19600 South Molalla Avenue, Oregon City, Oregon (503) 656-2631, Ext. 318.

PROGRAMMER ANALYST

Are you an experienced programmer with exceptional career motivations and interest in expanding into P/A with 370-148 Data Base Manufacturing applications. For confidential consideration, forward resume or call Vick Anderson, E.D.P. Specialist, Snelling and Snelling, 1415 Directors Row, Suite 12A, Fort Wayne IN 46808 (219) 482-1511. Licensed Employment Agency.

STAFF ASSISTANT/ APPLICATIONS PROGRAMMER

The successful applicant will work under the general supervision of the Associate Director for User Services. He/she will have responsibility for some of the standard packages, system or library programs supported by the center and will act as liaison person with various groups within the University on given projects. Salary commensurate with experience. Send resume to Charles D. Lyman, University Computing Center, University of Massachusetts, Amherst, MA 01003. The University is an Affirmative Action/Equal Opportunity Employer.

MARSHALL UNIVERSITY

Huntington,
West Virginia 25701

ASST/ASSOC. PROFESSOR. (Department of Computer and Information Sciences). Salary range: Dependent upon qualifications and experience. Professional experience in academic life and business will be considered in making selection and determining rank and salary. Minimum qualifications: An appropriate doctoral degree with commitment and competence as a teacher and researcher. Responsibilities: Outlets will include teaching undergraduate and graduate students in Computer and Information Sciences and closely related subject areas. In addition, incumbents should engage in meaningful research, perform professional service activities, and the normal faculty duties associated with a teaching appointment. Appointment date: August 1978. This appointment is a regular probationary appointment. Application deadline: April 18, 1978. Send applications and credentials to: Mr. Charles Cochran, Chairman, Department of Computer and Information Sciences, Marshall University, Huntington, West Virginia 25701. Telephone: (304) 696-2313. An equal opportunity employer.

SUNBELT OPTYS

D.P. MANAGER

To \$30,000. Mid-South client seeks "hands-on" decision maker to set up D.P. Center, select equipment & systems. 5-10 yrs exp medium to large shop. Must be "promotable" within short period of time. Females & minorities encouraged to respond.

SR ANALYSTS

To \$23,000. Blue chip Florida clients seek professionals able to define, lead & implement projects. No programming but must have "track record" and know Project Mgmt. Excellent career opportunity within these growing firms located near the ocean.

EOP AUDITORS

\$15-25,000. Prestigious Atlanta "Big 8" accounting firm seeking individuals looking forward to the challenge and excitement of dealing with many diversified client companies. Degree desirable; 1-5 yrs exp. COBOL, RPG II. Highly visible position with excellent growth potential.

SALES REPS

\$20-22,000 base, \$25-40,000 possible first year. Local clients seek mini-computer reps. Supplementary \$ (not a draw) while training. 3-5 yrs EDP sales background, degree preferred, familiar with minis. Rewarding career opportunities in Atlanta & other desirable S.E. locations. All are sound companies projecting 50-70% local growth in 1978.

FOX-MORRIS

PERSONNEL CONSULTANTS

47 Parimeter Center East, N.E.
Atlanta, GA 30346



Americas
Airline
for Packages

MANAGER COMPUTER CENTER OPERATIONS

Immediate opening for highly skilled professional with 3-5 years managerial experience in computer operations. Our ideal candidate will have experience in 7 day on-line multiple vendor operations. Degree in computer science, hardware planning experience and applications programming knowledge strongly preferred. Excellent human relations skills and supervisory ability a must.

We offer excellent compensation, benefit package and advancement opportunity in a growth-oriented, creative environment. To apply send confidential resume including salary history to:

Kay Coop

Sr. Personnel Representative

Federal Express Corp.

AMF Box 30167

Memphis, TN 38130

Equal Opportunity Employer M/F

PROGRAMMER/ ANALYST To \$23K

Rapidly expanding PHILADELPHIA area consulting firm seeks multi-faceted EDP professional w/2+ yrs design, development & modification of varied commercial systems. COBOL proficiency from lgs scale IBM environ essential. Knldg RPG II & BAL highly pfd. Exciting career opportunity w/real potential for growth into mgmt.

For immediate confidential attention, please call or forward resume to:

ROBERT HALF

PERSONNEL AGENCIES

2 Penn Center Plaza

Suite 706

Philadelphia, PA 19101

(215) 566-4380

SYSTEMS/PROG. MANAGER

Enjoy Blue Grass County living in a University influenced cultural environment. Challenging position with Ky's fastest growing computer co. Selectee will manage staff of 10-12 for implementation of new bank applications including On-Line CIF and Teller Terminals. IBM COBOL, ALC, QOS and online experience desired. Salary up to \$24K based on qualifications. Other Analyst/Prog. positions available. Submit resume to Quane Robinson, MetriDate Computing, Inc., P.O. Box 1748, Lexington, KY 40507.



INTERGLOBAL is...

a subsidiary of a NYSE listed company, with an EDP service bureau placing Consultants throughout the United States and foreign countries.

To take advantage of our nearby and worldwide EDP opportunities, please submit your resume for inclusion in our worldwide computerized retrieval system, to our corporate headquarters in New York City.

Ralph Young

INTERGLOBAL

TECHNICAL SERVICES, INC.

56 W. 35 St., NY, NY 10001

(212) 695-7773

Equal Opportunity Employer M/F

SOFTWARE BROKERS

Software commission salesmen or rep organizations to sell marketing models all territories USA.

Write W.F. Slade
The Forta Warran Corporation
280 Lincoln St.
Boston, MA 02134

COMPUTER PROGRAMMER III

(14,520 - \$19,212). Responsible for designing and writing applications programs for on-line library circulation system; also, writing documentation and instructions manuals for system. Excellent skills in PL/I and BAL essential; experience with PDP11, VS, VM or MVS desirable. Bachelor's degree (or equivalent), preferably in computer science, with two years experience. Library experience, particularly with OCLC and MARC records helpful. Apply to: William C. Horner, D.H. Hill Library, P.O. Box 5007, N.C. State University, Raleigh, N.C. 27650. An Equal Opportunity/Affirmative Action Employer.

M.I.S. MANAGEMENT OPPORTUNITY

- Mid-Atlantic Location
- Dynamic Billion Dollar Corporation
- Attractive Compensation Package

Qualified candidates will have current management experience involving large IBM 370 systems, with proven track record in systems planning and organization, systems programming, and facilities management. For consideration, send resume to:



Scientific Placement, Inc.

Employment Service
2700 S. Post Oak Rd., Dept. 73
Houston, Texas 77056
(713) 621-9911

BLOOMSBURG STATE COLLEGE

Tenure Track Position, beginning September 1978 in Computer and Information Processing. Qualifications: graduate degree in computer field or in business field with experience in computer applications. Teaching experience and earned doctorate preferred but not required. Responsibilities include half-time teaching/half-time computer center services to the academic needs of the college. B.S.C. has a new, expanding computer degree program. Involved in conversion to interactive computing equipment with CAI capabilities. Salary commensurate with experience and background (\$13,000 to \$26,000). Contact: Dr. Norman L. Hilger, Chairperson, Department of Business Administration, Bloomsburg State College, Bloomsburg, PA 17815, by April 1, 1978.

An Affirmative Action/Equal Opportunity Employer

Storage Technology Corporation

The world's largest manufacturer of high density tape data storage products and a major manufacturer of disk subsystems and supplier of memory products has an immediate need for a

SR. BUSINESS ANALYST

Must have a verifiable track record in deriving the real business problem when faced with a profusion of symptoms, and proven ability to translate problem definitions into operational or systems solutions. Willingness to roll-up sleeves and execute solutions a must.

Should be strong in defining manual procedures and select cost effective solutions from among the multitude of automated options available.

Must have experience with the following:

- PROJECT MANAGEMENT
- COST BENEFIT ANALYSIS
- ACCOUNTING APPLICATIONS
- LARGE COMPUTERS
- MINI COMPUTERS
- DATA COMMUNICATIONS
- HARDWARE & SOFTWARE SELECTION
- SYSTEMS ANALYSIS

A Degree and significant experience in a profit-oriented business environment is absolutely a must.

We offer an excellent salary including health and insurance benefits, stock purchase and retirement plan. Please send resume to:

STORAGE TECHNOLOGY CORPORATION

2270 South 88th Street,
Louisville, Colorado 80027

We are an equal opportunity employer M/F.



position announcements

IMS PROGRAMMER ANALYST

We are growing and we need qualified professionals who are willing to learn and grow with us. If you know or are interested in learning IMS/DB-DC and have two plus years of paid experience in the development of Application Systems in a multi programming environment utilizing COBOL, O/S we would like to hear from you.

We provide a challenging environment, with opportunities for advancement as well as liberal fringe benefits.

For immediate consideration send resume in confidence, including salary history to:

Division of Personnel
Administrative Services Building
RUTGERS UNIVERSITY
New Brunswick, New Jersey 08903

An Equal Opportunity/Affirmative Action Employer-M/F

DATA ENTRY
(KEYPUNCH)

Requires minimum of eight years recent, relevant, full time work experience as a data entry operator of a buffered keypunch machine, key-to-diskette machine, familiarity with programmable and interactive data entry equipment and one year supervisory experience in data entry operations. Desirable experience includes: related teaching experience at the post-secondary level, knowledge and experience with occupational advisory committees and curriculum development. Also desirable to have additional post secondary operation and skill development training in specialized and unusual data entry end related areas. Minimum of associate degree will be required for those faculty renewed through the end of the fifth contract year. To be considered for the above position, please send a complete resume including position applied for, education, professional teaching experience, attested work experience, specialized training, and other information pertinent to the requirements and preferences of the position to the office listed below. Documentation supporting resume information will be required when and if candidates are submitted for possible employment.

PIMA COUNTY COLLEGE
Faculty Personnel Office
AL-28
2202 W. Anklam Rd.
Tucson AZ 85799
(602) 884-6620

Equal Opportunity Employer M/F

EDP/TC
Training
Specialist

This challenging position provides an unusual opportunity to combine EOP and training knowledge to contribute to the growth and effectiveness of our national health care telecommunications system. Major responsibilities include development and instruction of EOP/TC related education training programs.

Requirements include current knowledge of state-of-the-art distributive systems and experience with implementation including development of formal training programs for users and operations people, as well as excellent writing skills, good oral and human relations skills, and a college degree.

We are headquartered in downtown Chicago and offer an excellent salary and outstanding company paid benefits. Send resume including salary history, in complete confidence, to:

Roberta M. Teillon
Blue Cross Association
500 N. Michigan Ave.
Chicago, IL 60611
equal opportunity employer m/f

Purdue University's laboratory for applications of remote sensing (Lars) has openings for experienced system analysts/programmers interested in the applications of computers to national and international earth resources problems. Responsibilities include development, implementation and maintenance of software systems and specialized hardware systems. Qualifications: B.S. or M.S. in an area relating to digital computer systems. Familiarity with medium/large scale computer hardware and supervisory software design and implementation. Familiarity with assembler language programming, system programming, system design and documentation. Management skills desired. Forward resume to Terry L. Phillips, Lars 1220 Potter Drive, W. Lafayette, IN 47906. Equal Opportunity/Affirmative Action Employer.

position announcements

POSITIONS
NATIONWIDE

CALL TOLL FREE
800-426-0342

PROGRAMMERS To 21K
Degraded, DS/COBOL, several openings.
SR. APP. CODR. To 28K
Two yrs. IMS exp., good comm. skills.
SYSTEMS PRGGS To 30K
IBM, CDC and Honeywell
T.P. SPECIAL To 24K
B.S. in E.E. desirable.
PRG/ANALYSTS To 25K
Mfg., Prod./Control experience.

BILL ISGRIG
PARKER PAGE ASSOC.
P.O. Box 12308
Seattle, WA 98111
Offices in Wash., D.C.,
Chicago, Atlanta, Portland, Or.

computer hardware

and
software
candidates
RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

SUPERIOR RESOURCES
18400 Ventura Blvd.
Encino (L.A.) CA 91438
(213) 988-4400

ANDERSON-TAYLOR
P.O. Box 21
Exton, PA 19341
Philadelphia Area
(215) 383-1800

COMPUTER CAREERS INC.
Specialists-Data Processing
4720 Montgomery Lane
503
Bethesda, MD 20814
(301) 654-8225

members of

National Personnel Associates

Specializing in DP

FACULTY POSITIONS
IN
COMPUTER SCIENCE

Starting September, 1978, two new positions are available. Assistant Professor (1) and Visiting Assistant or Associate Professor (1) are invited to teach undergraduate and graduate courses. Teaching and Research interests are preferred in areas of system software, data base systems, information storage and retrieval or programming languages. Ph.D. in Computer Science or related field is desired. Please send resume to: Dr. Richard Cheng, Director, School of Computer Science and Technology, Rochester Institute of Technology, Rochester, N.Y. 14623.

RIT is an Equal Opportunity Employer

FACULTY
POSITION

Available August, 1978, to teach DR/Management Science/Computer Science in degree program similar to ACM/AICPA recommendations. Emphasis on teaching. Masters required, doctorate preferred. Rank and salary dependent on qualifications. Applications must be received by April 15, 1978. Contact: Don B. Mitchell, Head, Computer and Management Science Department, Arkansas Tech University, Russellville, ARK 72801. An Equal Opportunity/Affirmative Action Employer.

position announcements

COMPUTER
OPERATORS

Growing Western Colorado electric utility seeking qualified candidates. IBM 370-135, DOS/VS, POWER/VS, CICS. Send resume to:

Dept. JS

Box 1149
Montrose, CO 81401

SENIOR SYSTEMS
ANALYST:

Immediate opening for senior systems analyst to lead data processing efforts in implementation of totally integrated manufacturing system. Requires minimum 5 years experience with a manufacturing company. Should be knowledgeable of MRP, CRP, shop-floor control, and data base design. Position offers excellent exposure to management, challenge, and opportunity. Send resume and salary history to Don Hughes, American Furniture Co., P.O. Box 5071, Martinsville, VA 24112.

PROGRAMMER
ANALYST

is required immediately to help develop rapidly expanding new applications. Applicants should possess solid COBOL skills and a desire to progress within a DB/DC environment. Send resume and salary history to Don Hughes, American Furniture Co., P.O. Box 5071, Martinsville, VA 24112.

BUY
SELL
SWAPDATA GENERAL
FOR SALE

System A- Available
May 1, 1978
NOVA 840-131KB Core;
Expansion Chassis; 3 cabinets
2-800bpi 75ips D.G.
6021/6023 Tapes;
3-25MB Century Discs;
8 line MUX;
Teletype;
8 Superbee Terminals

System B-Available
March 15, 1978
NOVA 840-131KB Core;
Jumbo Chassis; 2 cabinets
1-800bpi 45ips Wang Tape;
2-25MB Century Discs;
4 line MUX;
Teletype;
4-DG 6012 Terminals

MISCELLANEOUS

1-EDS310 DMA Multiplexer
(never used) - \$3,000
1-4026/4027 4 line MUX - \$500
1-4010/4007/4008 I/O Interface - \$250
1-4010/4029/ 4007/4029 I/O Interface 150 & 1200 baud - \$400
1-D.G. Extender Board - \$150
These systems are in daily use and can be seen running. Prices are where is/as is. Payment in advance by certified check.

Call
Frederick L. Faulkner, Sr.
(312) 263-4222
GRAPHIC ARTS DATA SERVICE
200 West Monroe
Chicago, Ill. 60606

FOR SALE/LEASE

DEC LSI 11
PDP 11V03 SYSTEMS
LA 36 DECwriters
LA 180 * VT 52
In Stock For
IMMEDIATE DELIVERY

UNITRONIX CORP
1081 U.S. Hwy 22
P.O. Box 8515
Bridgewater, N.J. 08807
(201) 725-2660

buy sell swap

LIQUID COOLED MAIN
FRAME USERS

We have a cooling unit for liquid cooled CPU's that operates up to 50% cheaper than other available units. Saves installation time and money. Does not take up space in computer room. Comes complete with 100% back-up system.

CONTROLLED
ENVIRONMENT CORP.

840 Reynolds
Kansas City, KS 66101
(913) 342-3599

Over ten years experience in computer room environments. Ask about a heat recovery system for your EDP site. Could save you a small fortune in utilities.



OPERATING LEASES

16 IBM 3420-4Dual Density
2 IBM 3803-2

Available May 12, 1978

Net 90% IBM ETP

2 Year Basis

Contact

At Emery

Systems Marketing, Inc.

200 E. Thomas Rd.
Phoenix, Arizona 85012
(602) 264-5600 Telex 667-334

COMPUTER
TAPE SALE

"QUALITY & SAVINGS"
Slightly used, Money-Back Guarantee
FULL REELS

2400' 1600'bpi/3200'ci

w/Hanging Seal \$4.50 ea.

Freight prepaid on orders over 200

Tapes. Shipped within 48 Hrs.

CALL or WRITE:

Computer Tape Mart

31 Sprague Ave., Amityville, NY 11701

(516) 691-2309

COAL STRIKE
BROWNOUTS?

IMMEDIATE DELIVERY*
REGULATORS

MG SETS
UPS

*1000 KVA inventory as of 3/17/78

CALL: 213-575-0755

ATLAS ENERGY SYSTEMS
4151 BROADWAY, CHICO, CA 95926

FOR SALE

REI ERCP/RIPC

OCR Scanner for cards & full page incl: data craft PC2, 3 tape drives, & 1 line printer.

Interested Parties Contact:

Mr. W.C. Cooper
MARYLAND NATIONAL BANK
225 North Calvert St.
Baltimore, MD 21202

FOR LEASE

IBM SYSTEM 32

13.7 M disk; 285 lpm; 16K IBM Maintenance contract.

\$100's less than IBM Lease Available 6/1/78.

Stephen M. Walrath, C.P.A.
30100 Crown Valley Pkwy.
Laguna Niguel, CA 92677
714-831-2131

buy sell swap

FOR SALE

Univac 1001 Card Controller
Univac 1004 Card Punch
Univac 1005 Card Processor
7 Boards for 1001

7 1001/1005 Instruct. Books

Bids Accepted

Until April 7, 1978

D.A. Cantl

6889 Snowville Rd.
Brecksville, Ohio 44141
(216) 838-2283

FOR SALE

Hx Mod One \$1,100.00
1500 \$1,025.00
Beehive B-4 \$1,100.00

INTERNATIONAL
COMPUTER EXCHANGE

220 Bush St. #440
San Francisco, CA 94104
(707) 525-8592

FOR LEASE

370-125-H-2
30 month lease
\$3500/month
3203-2, 3504, 3525
also available

Contact: George Bergst

MCM LEASING CORP.

1135 Saratoga-Sunnyvale Rd.
San Jose, CA 95129

408-252-2400

IBM 158

Attached Processor

AVAILABLE
MAY, 1978

Contact: Jerry Borisy

JB1 ASSOCIATES, INC.

445 Union Blvd., Suite 303

Lakewood, CO 80228

(303) 988-0820

FOR SALE

3 Decision Data
8035 Card Punches
10 CDC 9425 CDD
30 CDC Disk Packs
9 Kennedy Data
208 Floppy Twin Packs

Information:

(213) 889-4455

WORDPLEX CORP

DID YOU MISS IT? See our ad on page 11
COMDI/CO

3033-U6

\$52,500/mo.

5 yr. net lease
avail. 10/1/80

Financial Institution

CW Box 1496

797 Washington St.
Newton, MA 02160

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

AVAILABLE

STARTING MAY, 1978

SYSTEM/34s - 5110s

IBM/GSD LEASING SPECIALISTS

DATELEASE CORPORATION

283 Greenway Avenue
Greenwich, CT 06830
(203) 869-1151

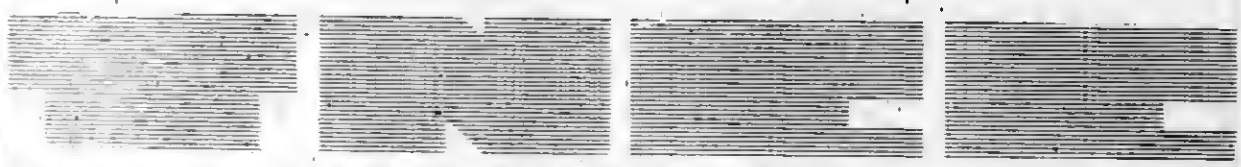
UNIVAC SYSTEMS FOR SALE/LEASE

90/30
90/60
1900

Complete Peripherals
CW Box 1409
797 Washington St.
Newton, MA 02160

THREE AND FOUR YEAR WALK-AWAY LEASES

1. ATTACHED PROCESSOR FOR **3158**
2. **3158 - 3 MEG** WITH APU FEATURE
SPRING AVAILABILITY
3. **3158 - 3 MEG MOD 3**
SUMMER AVAILABILITY



THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle — (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman — (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Huntington Station, New York 11746

370/158 Serial Number 23566 Available May, 1978 Contact: Ann Rhame Commonwealth Computer Advisers, Inc. 707 East Main St. Suite 1650 Richmond, Virginia 23219 (804) 643-9123	For Sale or Lease 370/168 with attached processor July, 1978 Call R. Van Hellemont (313) 642-8000 CMI Corporation	★ NEW DG NOVA 3/12's WITH BATTERY BACKUP AND AUTO PROGRAM LOAD AND RESTART NEW DG MEMORY 32 OR 16 KB IMMEDIATE DELIVERY WITH 22% DISCOUNT CALL CLARK & ASSOC. (816) 741-3183
---	---	--

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115 370/125



ECONOCOM

MEMBER COMPUTER DEALERS ASSOCIATION

ECONOCOM
1255 LYNNFIELD ROAD
P.O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

360/65 WANTED Principal wants to purchase for April-June delivery: Min. 1 MGBYTE TWO I/O SETS 1 x 8 1600 BPI TAPES Reply with specs, price, terms, avail. date. CW Box 1498 797 Washington St. Newton, MA 02160	For Sale RP04 Available Immediately \$18,500.00 Contact: Jerry Bender 216-687-0100	FOR SALE BY OWNER HONEYWELL TAPE DRIVES (1) 204B-1 Master Tape Unit (4) 204B-2 Tape Units (1) 203B-6 Tape Controller Associated Cables Included Asking Price \$3,000 For All Call or Write: Paul Saker PKS ASSOCIATES 614 Cedarcrest Dr. Brielle, N.J. 08730 (201) 628-7348
WANTED TO BUY 370 / 135 CPU 256K Disk 400 mbyt minimum Tape 2 or 3 drive 1600 bpi Printer I Card reader I CW Box 1497 797 Washington St. Newton, MA 02160	BUY SELL LEASE SYSTEM/3 Models 15, 10, 8, 6 Systems 32 & 34 All Support Peripherals COMPUTER BROKERS, INC. P.O. BOX 28298 Memphis, Tn. 38128 Phone 901/372-2622 Member CDA	TP PROBLEMS? • TSO RJE CICS ... • TCAM BTAM HASP ... • 3270 2780 TTY ... Our LINE ACTIVITY RECORDER software package helps diagnose Access Method, TCU, and Terminal Protocol problems. (MVT, VS/1, VS/2, IBM 270X compatible TCUs.) Communications Diagnostic Systems, Inc. • P.O. Box 706 Falls Church, Virginia 22046 (703) 533-0483

DATRONIC RENTAL CORP. AVAILABLE IMMEDIATELY SALE OR LEASE 3803-1 with (3) 3420-7 135 with 512K 135 with 144K for sub-lease 3411-3 with (2) 3410-3, DD CALL WILL FOSS (312/992-0760)	FOR SALE IBM 370/138 (1 Meg) 3330/3340 IFA FOR LEASE OR SALE IBM 370/135 (512K) with 3046 Loaded! Features Include: 4 ICA Lines, 1 ICA ODATA SYNC, IPA, IFA, 3210/1 AOAPTER, EP FLOATING POINT, 1st SELEC- TOR CHANNEL AND 1st 12K CONTROL STORAGE INCRE- MENT. Available Immediately Contact: Mr. MacLeod (212) 825-7801 Mr. Lee (212) 825-5813
---	--

BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK!

FOR SALE

3505-B1 and 3525 P3
3155-J with Dat Box
3158-U36 — Del. 9/78
3158-K — Del. 6/78
3165-K — Del. 6/78
(BUY OR LEASE)

WANT TO BUY

370/145 I2-J2
370/135 GF-1
3-1403 N 1
1442 N 1
3420-5 Single Density
3420-8 Dual Density



COMPUTER INDUSTRIES INC.

3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO — 312/298-5650
WASHINGTON — 703/525-3074
LOS ANGELES — 213/370-4844

Data Systems Marketing Delivery from Stock

Microcomputer Systems
Digital: PDP 11/03 Family with 80th Floppy and Hard Disks,
VT-78 Micro 8, Word Station 78
Data General: Micronova Family
Printer Terminals
Digital: LA-36, LA-35, LA-180, LS-120
Teletype: Model 43
Data General: Dasher 30 and 60 CPS
Diablo: Hyterm 1620 and 1610
Lear Siegler: Hydra Series 200 180 CPS
Texas Instruments: 743, 745, 810
Video Terminals
Lear Siegler: ADM-3A, ADM-2, ADM-2B, ADM-1A, VDP-400
User Programmable
ADDS: Regent 100 and 200
Digital: VT-52
Data General: Dasher 6053 and 6052
Data Communications and Accessories
DSM: Acoustic Couplers, 103F, 113A, 113B
General Data Comm: 1138 Direct Connect, Frequency Division
Multiplex Equipment
Sykes: Single and Dual Drive RS-232 Floppy Disk, IBM 5100
Compatible Floppy Disk
Techtran: 815, 8410, 8400, 8420, 8421 Single and Dual Cassette
Systems
Software
General Purpose: Disk Operating System, Fortran and Business
Basic for PDP 11/03 and Micronova Families
Distributed Processing: Remote Job Entry, Asynchronous and
Bisync Communication for PDP 11/03 and Micronova
Families
Business: Public Accountant Client Write Up and Complete Set
of Business Accounting Packages for PDP 11V03

Call 714-560-9222, 800-532-3717 (California)
or 800-854-2684 for DSM Showroom Nearest You

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

**WANTED TO PURCHASE
IBM SYS-3 MODEL-8**

(Not a Broker)
Private company wishes to purchase an IBM System 3, Model 8, with the following:
32K Min.
3741 Directly attached
5471 Keyboard
5444-A2 Two Drives
1403-2 600 LPM Printer
5421 Printer Controller
Please reply in writing to:
Computer Network Ltd.
P.O. Box 246
Ste. Genevieve, MO 63670

FOR SALE

FOR SALE

**BASIC FOUR
MODEL 600**

40K Bytes of Memory, 10 megabyte disc 4 Video display terminals, 300 LPM Printer, 2 Disk Packs available and Boss Pack.

**AVAILABLE
IMMEDIATELY**

Call R. Sharpe
(602) 264-8308

LEASE

3033's

June Thru Oct.
Short or Long Term

ITC to Lessee
Or Lessor

CW Box 1495
797 Washington St.
Newton, MA 02160

FOR SALE**IBM Printer 600LPM**

1403 Model 7 with
1133 Multilever

**ATTENTION
1130 USER!****\$12,500**

Call Gene Kijanowski
(312) 758-0900
Available April 1, 1978

CMI BUY LINES**BUY-SELL-LEASE-TRADE****3031/3032/3033**

(Lease Only)

John Mills
(313) 642-8000

370/165 370/168

Bob Van Hellemont
(313) 642-8000

370/158

Ron Baker
(313) 642-8000

370/155

Gary Smith
(313) 642-8000

**370
148/145/138/135**

Pam Hoban
(313) 642-8000

370/115/125

Bob Southwell
(313) 642-8000

3420 3803**3333 3830****3330 3340**

Darryl Hastings
(313) 642-8000

**IN CANADA
IBM 360 370**

Oon Ou Puit
Windsor, Ont.
(519) 258-8910

Ron Ridding
Toronto, Ont.
(416) 683-3704

Jacques Oagenais
Montreal, Que.
(514) 374-5920

CMI Company

**1403 2821
2501 1442****1443**

If you rent any of these and are returning them to IBM call me. I'll show you how to make money using your rental credits. We buy and sell all of these units.

Kathy Housey
(313) 642-8000

360**30/40/50/65**

Gary Smith
(313) 642-8000

3270 CRT's

Printers/Controllers

1130
Call Jim Carleton
(313) 642-8000

System/3

Model 15
Jerry Roberts
(313) 642-8000

3742**3741****5496**

Jerry Sharon
(313) 642-8000

360/20

083-029-059-026

Call Marie Bednarz
(313) 642-8000

FOR SALE

Complete 360/30, 65K system. This system is disk oriented with four 2311 drives, 2973 drive switching unit, 2540 card read punch, 1403 Mod 2 printer, 2841 controller has 2 channel switch and 1403 has standard business character set.

This system is currently in daily operation and has been under IBM maintenance since installation. All units are at current E.C. levels.

Availability is 90 days from date of accepted purchase contract. Delivery is F.O.B. sellers loading dock.

Must Be Sold As a System
Please Contact

Richard J. Baxter, A.V.P.
Onondaga Savings Bank
101 S. Saline St.
Syracuse, N.Y. 13221
(316) 424-4480

FOR SALE BY OWNER

HEWLETT-PACKARD 3000
SERIES II MODEL 5
(1 Year Old)

Product Number 32415A

256 KB Bytes

2.15 MB Disk Drives

300 LPM Printer

800 BPI Tape

6-2640B Terminals + Console
CRT, MPE II, EDIT, OEBUG,
TRACE, FCOPY, SORT, COBOL,
RPG, IMAGE and QUERY (H-P
Maintenance) 15 KVA Ultra Isolation Transformer, 2 Vadic
VA3405A/1601 Modems.

\$125,000

Available April 1, 1978

Contact:

Wayne Hamilton 415/986-3900
Robert Boni 408/275-9000

FOR SALE

IBM 370/138 (1 MEG)
3330/3340 IFA

FOR SALE OR LEASE

IBM 370/136 (612K) with 3046

Loaded! Features Include:

4 ICA Lines, 1 ICA ODATA
SYNC, IPA, IFA, 3210/1
AOAPTER, EP FLOATING
POINT, 1st SELECTOR CHANNEL
AND 1st 12K CONTROL
STORAGE INCREMENT.

AVAILABLE IMMEDIATELY

CONTACT:

Mr. MacLeod (212) 825-7801
Mr. Lee (212) 825-5813

ECLIPSE C300

—SURPLUS—

20 meg. dual disks, mag tape
300 LPM printer, 8 line communications
4 CRT'S. Full software, 1 1/2 yrs. old

BUY OR LEASE FROM OWNER

PHIL THOMAS

(305) 272-8753

Thomas Business Systems, Inc.**LEASE**

145/1

138/1

145/112

135/1

135 & 145 Memory and Features

SALE OR LEASE

3340/B2

3210/1.2

3411/1, 7360, 3221

1131/2B (3)

3333/1 (2)

1442/7

3330/1 (3)

3340/A2 (May)

3360/5 (4)

3411/3, 7360, 3221

2870/1

(May)

3344/B2

Marv Berger

**Computer Systems
of America, Inc.**

141 MILK ST. BOSTON, MA. 02109
Tel: (617) 482-4671 or 1-(800) 225 2036

FOR SALE**PDP11****IMMEDIATE DELIVERY
Datasystem 354**

Includes:

PDP11/34, 64K, 2-RK05
Disk Drives, 1-VT52
terminal, 1-LA36 terminal,
1-LA180 Printer
Including full accounting
applications software.

Also immediately available:

• PR11 High Speed paper tape
reader
• PDP11/03-KA with 16K and
power supply

Spiridellis & Assoc., Inc.

14 W. 40th St.

New York, N.Y. 10018

(212) 221-7270

FOR SALE

NCR Century

100 32K Memory

2 - 655 Spindles

450 LPM printer

30-955 disk packs

300 CPM card reader

Under NCR Service Agreement

June 1, 1978 Delivery

Incl. Gen. Accounting Systems

\$19,500**VALCO, INC.****BOX 550**

Rocky Ford, CO 81067

Contact: Allen Joseph
(303) 254-7464

**compuduct****TAPE SYSTEMS
AVAILABLE****Sale/Lease****3803-1 3420-3 3420-5**

6116 - 28th St., S.E., Grand Rapids, MI 49506 (616) 949-0281

ADMINS

We are currently delivering a modified CRT utilizing sixteen (16) function keys which have been programmed to perform various multiple keystrokes admin functions with a single keystroke.

No matter what your data base management system may be look to us for the possibility of utilizing our programmable function keys to improve your operational efficiency.

Write or call for additional information:

MANAGEMENT SERVICE COMPANY

716 Connell Building
Scranton, PA 18503
(717) 344-1732

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

When you plan to buy or sell your computer equipment...

For complete information call the Greyhound Representative in your area.

WANT TO BUY

370/158 370/155 370/145

U.S.	Home Office New York Chicago Dallas San Francisco	T. A. Takash Dick Ventola Pete Ahern M. W. "Bill" Tucker Henry Paulson	602-248-6037 914-949-1515 312-298-3910 214-233-1818 415-283-8980
INTERNATIONAL	Canada U.K./Europe Mexico Austria-Asia Eurasia	Don Maunders Joe Gold Andres Conrillas John Hallmark Don Haworth	416-366-1513 022-61-27-54 905-543-6850 214-233-1818 214-233-1818
NON IBM	Dallas	John Hallmark	214-233-1818

GO GREYHOUND

 Greyhound Computer Corporation
 Greyhound Tower, Phoenix, Arizona 85077

SALE/LEASE

360/65
1 1/4 MEG.

 2870, 2860-03 with
 High Speed I/O

**HARRY CLARK
 APC**

(203) 661-4146

FOR SALE BY OWNER

**HONEYWELL
 2200 SYSTEM**

 Complete system currently oper-
 ating under full Honeywell main-
 tenance available near 7/1/78.

 128K, printer, card reader and
 punch 6 tape drives, 6 disk drives.

 contact: **DALE JOHNSTON**

 American Association of
 Insurance Services
 221 N. La Salle St.
 Chicago, IL 60601
 (312) 236-6325

FOR SALE BY OWNER.

NCR Century 200
256-K
640-200 132 Position 1500
LPM Printer
682-100 Integrated Card Reader
300 CPM
6101 Integrated I/O Writer

 Contains all NCR features for
 multi-programming on line opera-
 tions.

Available June 1978, contact:

Mr. Gerald W. Bachmann

General Manager

Computer Network Ltd.

P.O. Box 248

Ste. Genevieve, MO 63670

(314) 883-5780

WANTED TO BUY

 Moore Interstacker
 Models 315A or B or 319A
 Also Wanted: Moore
 Bursters & Decollators

DATA PROX

 311 Hillside Ave.
 Hillside, N.J. 07205
 (201) 242-3300

 Several Hundred
 Calcomp DD140
 Disk Drives

FOR SALE

MAKE OFFER

 Write to: 41 Pondview Rd.
 Morris Plains, N.J. 07950

or call

(201) 267-2680 after 7 PM

FOR SALE

 Relocatable
 Computer Center
 Structure

 A 24' x 65' building constructed
 and used for computer center.
 Special air conditioning, electrical
 power and raised floor facilities
 for computer equipment. Facility
 in good condition. Transportable
 in 12' x 65' sections. Price
 \$24,000. Contact: Purchasing
 Agent at Forsyth Memorial Hos-
 pital, 3333 Silas Creek Parkway,
 Winston-Salem, N.C. Telephone
 (919) 768-2200 ext. 2931.

EQUIPMENT

FOR SALE

 FOR SALE: Hewlett Packard
 7905 (15MB) disk drive. Always
 under HP maintenance. \$9650/of-
 fer. Contact:

Denny Singer

 Taco Time International
 3880 W. 11 Avenue
 Eugene, OR 97402

LEASE

3031-3032
3033
SHORT
ATTRACTIVE
**AND LONG
 TERMS**
RATES
360/ 30,40,50,65
CPU 138,148,158,168
370/ 125,135
145,155
**DISK-
 TAPES**
BUY
SELL

National Computer Rental

415 Madison Avenue

New York, New York 10017

Tel. No. (212) 532-1500

Member of Tiger Leasing Group Member of Computer Lessors Assoc.

BUY

**Surplus DEC And
 Data General
 Hardware**

For Sale

PHIL THOMAS

(305) 272-8753

SELL

Thomas Business Systems, Inc.

WANTED TO BUY

IBM 370/155

with or without DAT

Contact: Harry Blair

(713) 524-8249

**DEC
 PROCESSORS
 PERIPHERALS & MODULES**

BUY - SELL - LEASE - RENT

\$1,000,000
NEW & USED DEC INVENTORY

 —DEC CPU'S
 —DEC DISKS & CONTROLLERS
 —DEC TAPES
 —DEC TERMINALS
 —DEC PERIPHERALS
 —MISC. BOARDS & MEMORY

 Hundreds of Misc. Modules & Cables Available
 Call for other components in stock

SAVE 33%

NEW 11T34 CONFIGURATION
\$23,333.33

 For fast delivery and substantial savings
 CALL the DATALEASE Digital HOTLINE

800-854-0359
DATALEASE

 700 No. Valley St., Ste. A, Anaheim, California 92801
 (714) 533-3920 Telex 692439

dataserv

buy • sell • lease • trade

370
 115/125/135
 Steve Locny
 800-328-2406

 For Sale or Lease
 Any 115/125 configuration

 Sending 115/125
 Back to IBM

 Call us! We'll show
 you how to make money
 using your rental credits.

370
 138 THROUGH 158
 Dave Miller
 616-637-8481

 For Sale or Lease
138 - 145 - 155 - 158

 CPUs — Peripherals —
 Memory

370/145-1H2
7855
8810
6982
6983
3215 Console
3047 Power Units

Avail. Now

WTB

3271-2 3271 3330/3333
3340-B2 3272 3410/11
3410-3 S.D. 3275 3420
3277 3340
3286 3344
3803
3830

 STOP! Before you send
 any of the above machines
 back to IBM call us. We'll
 show you how to make money.

370
 Peripherals
 800-328-2406
 Tom Anderson

For Sale or Lease

360/30 - 40 - 50 - 65s

CPU — Peripherals —

Memory

We'll Buy

Any 360 CPU

IBM Peripheral

Non-IBM Perph/Memory

360
 CPUs and Peripherals
 Neal Johnson
 800-328-2406

SYS/3
 CPUs and Peripherals
 800-328-2406
 SYS/32's

SYSTEM/3
5410-5415
SYSTEM/32
ALL MODELS
SYSTEM 34

Delivery Positions

 Call Toll Free 800-328-2406
 or 612-544-0335

 Or write Dataserv Equipment, Inc. 9901 Wayzata Blvd.
 P.O. Box 9488, Minneapolis MN 55440

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE

Two (2) Electronic Retina Computer Reader (ERCR) w/associated CPU's, tape drives, line printers, and misc. peripherals.

Also eight (8) Bar Code Reader/Sorter (BCRS) systems, Models 1A and 1B, w/associated CPU's, tape drives and misc. peripherals.

Manufacturer
Recognition Equipment, Inc.

For further details contact:
E. Hutchinson

**AMERICAN EXPRESS
COMPANY**

Phoenix, Ariz.
(602) 248-3082

FOR SALE OR LEASE

IBM 3277-2's with
4630 Keyboards

30 Day Delivery

Call Collect or Write
Berlent Industries, Inc.
1975 Hempstead Turnpike
East Meadow, N.Y. 11554

516-794-9722

Member CDA

**INVENTORY REDUCTION
MUST SELL NEW
EQUIPMENT
AT OR BELOW OUR
DISCOUNTED COST**

Data General CS40 Systems
(with printers and CRTs)

Wangco Model 712 Tape Drives

Ball Computer Model 3120
Tape Controller for Data
General Nova CPU

EDS Model 300 Multiplexers
for Data General Nova CPU

Tally Model 2200, 200 lpm
printer with interface for
Data General Nova CPU

Data General Nova 3/12
W/16k memory & I/O CTL

ACT NOW—SUPPLY LIMITED

CONTACT:



Agency Records Control, Inc.,
Technical Systems, Ext. 223

(713) 693-6122

P.O. Box 1009

Bryan, TX 77801



BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

AVAILABLE

Mar 78 165-II
168 memory, pre-owned
168 1435 buffer expansion
2860-2
2870-1
2880-2

Apr 78 135
145
155-II
158 pre-owned
165-II
158 AP, ITC qualified
168
158-3 upgrade
2880-2
3271's, 72's, & 77's

May 78 135
158, pre-owned
168, pre-owned
3360-5 (4)
2 MB 158 INTEL
2860-2

Jun 78 158, pre-owned
2880-2
158

We will also take your currently installed IBM equipment in trade on a new system.

Peripherals and I/O

All 360/370 Disk, Tape
Printers, Readers, and T/P

Gene Chappell

Wanted:

3330's, 3340's & 3420's

Call Us!

CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900

CIS is very interested in
buying pre-owned
IBM 370 systems.
If you are thinking
about selling, let us
make you an offer.

FOR SALE

IBM Printer 600LPM

1403 Model 7 with
1133 Multiplexor

**ATTENTION
1130 USER!**

\$12,500

Call Gene Kijanowski
(312) 758-0900
Available April 1, 1978

3033 3032

48 month term
1978 delivery
Financing available to
ITC Qualifying Account

CW Box 1461
797 Washington St.
Newton, MA 02160

FOR SALE

- One Data Products line printer/Model 2318/80 col.
- One Model 3673 Memorex disk controller
- Two True Data 400 cpm card readers
- One GRI-99 Model 30 mini-computer with 10MB CDC disk storage.

Telefile
COMPUTER PRODUCTS, INC.

17131 Dalmier St.
Irvine, CA 92714
(714) 557-6660

Ask for Joe Letbetter

FOR SALE

DEC PDP8-E
COS 340, 16K
(2) RK05 Drives
Data Products
LP05 Printer
VT05 Terminal
DEC Maintained

(516) 433-9191

BUYING • SELLING • LEASING • TRADING

call... the **Matchmakers**

1-800-654-9179

TOLL FREE!

CEI COMPUTER SALES INTERNATIONAL, INC.

148

New Equipment Leases • Purchase/Leasebacks

CALL: CHUCK STABLE

(201) 947-4200

IPS COMPUTER MARKETING

2460 Lemoine Avenue

Fort Lee, N.J. 07024

FOR SALE

IBM SYSTEM 32

9.1 MB Disk, 16K CPU
100 LPM Printer
IBM Maintained

Available July, 1978

Call: Lester Coggins, Jr.
(813) 334-4517
Fort Myers, Florida

FOR LEASE-FROM LESSEE

370/168-U36 avail. June 1978
3855, 4525, 4560, 2150, 2151, 6111,
3066-II, 3067, 2860-3, 2870-1, 2880-2(2)

Will lease for 2, 3, or 4 years

Contact: Mr. Frederick D. Lehmann

MARTIN MARIETTA DATA SYSTEMS

P.O. Box 5837, MP-263

Orlando, Florida 32855

(305) 855-1050, Ext. 7410

efm computer
leasing, Inc.



3000 Marcus Avenue
Lake Success, NY 11040
(516) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65

360/50 370/135

**FOR SALE
OR LEASE**

Available

3271-2 Ser.	#18785, 4-8-78
	17547, etc.
3277-2/KB4833	#88351, 4-8-78
	D0969, etc.
3277-2/KB4831	#D7802, 4-8-78
	D7803, etc.
3277-2/KB4832	#88809 4-16-78
3271-2 Ser.	#18731 4-17-78
3271-2 Ser.	#23880 5-1-78
3340-82 Ser.	#21807 7-1-78
3330-11 Ser.	#28751 3-15-78

Call Dwight L. Miesse
(404) 892-9880

**FOR SALE
OR LEASE**

370/

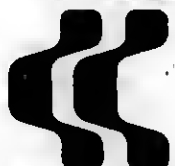
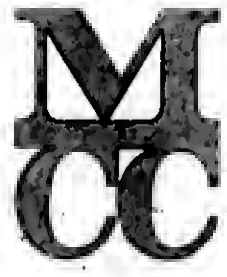
168

AVAILABLE JUNE 78

Bob VanHellemont

CMI CORPORATION — (313) 642-8000

(MODEL 1, 3 or A)

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap																																				
LEASES 3138 March 24, 1978 April 21, 1978 3148 March 31, 1978 April 14, 1978 May 19, 1978 3158 Six to 24 Month Leases (or longer) on your Rented or Owned System. Upgrades to 303X Available. 3168  Computer Capital Corporation 1351 Washington Boulevard Stamford, Connecticut 06902 Tel 203 357-9663		FOR LEASE ONLY ITC QUALIFIED LESSEE ONLY 3033 Currently available May 1979 Anticipated improvement February 1979 WESTERN MARKETING & FINANCIAL (415) 526-9221 (312) 397-3311 Fred Hegeman Jack Air	WANT TO BUY IBM 3271-2 IBM 3272-2																																					
Short or Long Term Leases From RANDOLPH 370/138 370/148 370/135 370/145 ... and all other IBM systems ... from S/3's and 115's ... to 168's and all 303X. CPU's or full systems. Up to 8-year leases available. CALL THE 370 HOTLINE 800-243-5307  Randolph Computer Company 537 Steamboat Rd., Greenwich, CT 06830 (203) 661-4200		WANT TO BUY ACCOUNTS RECEIVABLE PACKAGE MUSTS: - Burroughs COBOL - card orientation - modular in structure - complete user & systems documentation - on-site training - receivable aging - sales analysis by product line/customer - capture data upon order entry - handle credits - develop pay histories by customers Send Sample Output With Total Costs To: Orchard Corp. of America 1154 Reco Avenue St. Louis, MO 63126 Attn: John Viviano, DP Mgr.	FOR SALE <table border="1" style="width: 100%; text-align: center;"> <tr><td>024</td><td>084</td><td>419</td><td>552</td><td>*2402</td></tr> <tr><td>026</td><td>085</td><td>514</td><td>557</td><td>*2403</td></tr> <tr><td>029</td><td>088</td><td>519</td><td>602</td><td>*2405</td></tr> <tr><td>056</td><td>089</td><td>521</td><td>604</td><td>*2406</td></tr> <tr><td>077</td><td>402</td><td>523</td><td>824</td><td>7330</td></tr> <tr><td>082</td><td>403</td><td>526</td><td>826</td><td></td></tr> <tr><td>083</td><td>407</td><td>548</td><td>867</td><td></td></tr> </table> (* Potter)			024	084	419	552	*2402	026	085	514	557	*2403	029	088	519	602	*2405	056	089	521	604	*2406	077	402	523	824	7330	082	403	526	826		083	407	548	867	
024	084	419	552	*2402																																				
026	085	514	557	*2403																																				
029	088	519	602	*2405																																				
056	089	521	604	*2406																																				
077	402	523	824	7330																																				
082	403	526	826																																					
083	407	548	867																																					
BROKER IN DEC COMPUTER SYSTEMS AND COMPONENTS C.D. SMITH 730 N. Post Oak Road # 301 Houston, Texas 77024 (713) 686-9405		GENESIS ONE COMPUTER CORPORATION an MAI company 300 East 44th St., New York, NY 10017																																						
BUY SELL LEASE 370, 360, 1401 & 1440 SYSTEMS & PERIPHERALS PURCHASE/LEASEBACK 029, 129, 3741, 3742, 3540, 3803, 3420, 3340's IBM UNIT RECORD EQUIPMENT 026, 082, 083, 084, 085, 087, 088, 402, 407, 514, 519, 548, 552, 557, 029-059-129 Call us for all your needs, we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. Contact ACS for proposal. ACS 7126 Mullins Houston TX 77081 (713) 666-2122 TWX 910-881-1526 EQUIPMENT CORP.		370/125's For Sale * Lease * Purchase * Purchase Leaseback Specialists in 125 Systems 3410's and 3411's Also Available  CORPORATE COMPUTERS, INC. (203) 661-1500 115 Mason St., Greenwich, CT 06830																																						
BUY-SELL-LEASE-TRADE PURCHASE LEASEBACK / RENTAL CREDITS Write or call collect today to these representatives! SYSTEM / 3 All Peripherals call Ted Arbuckle 370's All Peripherals call Don Norris EAM EQUIPMENT Refurbished, eligible for IBM M/A call Don Norris or Duke Crumpton SYSTEM 32's, 34's 3270 CRT's call Marilyn Morris 360's All Peripherals call Duke Crumpton  (214) 634-2750 TWX 910-861-4171 METROPLEX COMPUTER COMPANY, INC. Suite 1208 Honeywell Bldg. 1111 W. Mockingbird Lane Dallas, Texas 75247 <i>Industry's Fastest Growing Computer Dealer</i>		BUY SELL LEASE BROKERAGE Let's be "NATION'S LARGEST WHOLESALE DEALER" Buy, sell, lease, sub lease, or be your agent in placement of your pre-owned IBM 360/370/System 3, or other units COMPUTER INTERNATIONAL LTD CWC's international division experts in foreign markets, freight, customs REACH COMPUTER CORPORATION CWC's Leasing Division COMPUTER WHOLESALE CORP. (504) 581-7741 SUITE 507 508 FIRST NATIONAL BANK OF COMMERCE BLDG NEW ORLEANS, LOUISIANA 70112 MEMBER OF COMPUTER DEALERS ASSOCIATION																																						
COMPUTER PRICE GUIDE "The Blue Book of Used Computers" Quarterly publication contains current price information about used IBM computers and peripherals. Includes newsletter about current price trends and availabilities. \$5 per issue - \$18 annual subscription Computer Merchants Inc. 75 South Greeley Avenue, Chappaqua, New York 10514 Member Computer Dealers Association 19141 238-9631		ATTENTION IBM 360/370 USERS  DATA AUTOMATION COMPANY, INC. buy • sell • lease • trade 370 Peripherals 360 We'll Buy Any 360 CPU Today Peripherals Lowest Price <table border="1" style="width: 100%; text-align: center;"> <tr><td>2401-5</td><td>2804-2</td></tr> <tr><td>2402-2</td><td>1403-N1</td></tr> <tr><td>2403-1</td><td>2403-4</td></tr> </table> W/DD 3410/3411 3330/3333 3211/3811 3420/3803 3340/A2, B2 3272/3277 360/20 LEASE or SALE 2020 C1 w/2203 120pp 2560 w/2 line printer 360/40-50-65's Available  Data Automation Company 4858 Cash Road Dallas, Texas 75247 214-637-6570			2401-5	2804-2	2402-2	1403-N1	2403-1	2403-4																														
2401-5	2804-2																																							
2402-2	1403-N1																																							
2403-1	2403-4																																							

buy sell swap		buy sell swap		buy sell swap		buy sell swap		buy sell swap																																																																																					
IBM UNIT RECORD EQUIPMENT <table border="1"> <thead> <tr> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> </tr> </thead> <tbody> <tr> <td>024</td> <td>\$ 200</td> <td>\$20/Mo</td> <td>088</td> <td>\$1400</td> <td>\$80/Mo</td> <td>128</td> <td>\$3400</td> <td>\$110/Mo</td> <td></td> <td></td> <td></td> </tr> <tr> <td>028</td> <td>\$ 800</td> <td>\$30/Mo</td> <td>082</td> <td>\$ 900</td> <td>\$30/Mo</td> <td>514</td> <td>\$ 800</td> <td>\$ 45/Mo</td> <td></td> <td></td> <td></td> </tr> <tr> <td>028</td> <td>\$1800</td> <td>\$85/Mo</td> <td>083</td> <td>\$1700</td> <td>\$60/Mo</td> <td>519</td> <td>\$1000</td> <td>\$ 88/Mo</td> <td></td> <td></td> <td></td> </tr> <tr> <td>048</td> <td>\$ 900</td> <td>\$40/Mo</td> <td>084</td> <td>\$2800</td> <td>\$90/Mo</td> <td>526</td> <td>\$1200</td> <td>\$ 50/Mo</td> <td></td> <td></td> <td></td> </tr> <tr> <td>047</td> <td>\$1400</td> <td>\$60/Mo</td> <td>085</td> <td>\$1200</td> <td>\$80/Mo</td> <td>548</td> <td>\$1800</td> <td>\$ 80/Mo</td> <td></td> <td></td> <td></td> </tr> <tr> <td>088</td> <td>\$ 200</td> <td>\$15/Mo</td> <td>098</td> <td>\$2800</td> <td>\$150/Mo</td> <td>557</td> <td>\$2900</td> <td>\$100/Mo</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Sala: 380/20 system: \$8800. WANTED TO BUY: IBM rental Credit 029- and -129. THOMAS COMPUTER CORPORATION 600 N. McClurg Court - Suite 4202 Chicago, Illinois 60611 (312) 944-1401 Calif. Branch 115 Harbor Island Rd. Newport Beach, CA 92660 (714) 675-2810										MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE	024	\$ 200	\$20/Mo	088	\$1400	\$80/Mo	128	\$3400	\$110/Mo				028	\$ 800	\$30/Mo	082	\$ 900	\$30/Mo	514	\$ 800	\$ 45/Mo				028	\$1800	\$85/Mo	083	\$1700	\$60/Mo	519	\$1000	\$ 88/Mo				048	\$ 900	\$40/Mo	084	\$2800	\$90/Mo	526	\$1200	\$ 50/Mo				047	\$1400	\$60/Mo	085	\$1200	\$80/Mo	548	\$1800	\$ 80/Mo				088	\$ 200	\$15/Mo	098	\$2800	\$150/Mo	557	\$2900	\$100/Mo			
MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE																																																																																		
024	\$ 200	\$20/Mo	088	\$1400	\$80/Mo	128	\$3400	\$110/Mo																																																																																					
028	\$ 800	\$30/Mo	082	\$ 900	\$30/Mo	514	\$ 800	\$ 45/Mo																																																																																					
028	\$1800	\$85/Mo	083	\$1700	\$60/Mo	519	\$1000	\$ 88/Mo																																																																																					
048	\$ 900	\$40/Mo	084	\$2800	\$90/Mo	526	\$1200	\$ 50/Mo																																																																																					
047	\$1400	\$60/Mo	085	\$1200	\$80/Mo	548	\$1800	\$ 80/Mo																																																																																					
088	\$ 200	\$15/Mo	098	\$2800	\$150/Mo	557	\$2900	\$100/Mo																																																																																					
BUY-SELL TRADE For Computer Call Action Write CAC 404/458-4425 P.O. Box 80572 Atlanta, Ga 30366																																																																																													
FOR SALE (2) 3286-2 2821-2 3284-2 (2) 3410-3 w/D.D. 1442-N2 64K Indep. 30 Mem. Kennsco 7232 BOONE AVE. NO. / MINNEAPOLIS, MN 55428 PHONE: 612/533-5800																																																																																													

**PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS**

Bob Russell
Jack Emery
Dave Hephurn
Paul Baillie

SYSTEMS MARKETING, INC.
 200 E. Thomas Road
 Phoenix, Arizona 85012
 (602) 264-5600 Telex: 667134

DAI 

914-723-3800 The End User Connection

Available in June for Sale or Lease:
Powerful IBM 165 DAT, Processor Speedup, 4 MEGS.
 2-2880-2, 2860-2, 2870-1

Your Best Option - Data Options Corp. Station Plaza
 Hartsdale, N.Y. 10530

SELLING

**PREVIOUSLY OWNED
EQUIPMENT & SYSTEMS
N.C.R. & BURROUGHS**

N.C.R. 31, 32 & 151 & 152 Teller Units
 735/735 & 745 Mag. Tape Enc. & Line Printers
 N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
 BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S
 Also B-700 Thru B-4700 Systems w/wo Peripherals

WE ARE AUTHORIZED N.C.R. DEALERS OF
 210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS

BUYING OR SELLING-CALL US FIRST.

KEY-EXIMPORT CORP.

256 LIVINGSTON ST. P.O. BOX 129 NORTHVALE N.J. 07647
 TELE. N.J. (201) 767-3444 N.Y.C. (212) 736-7736
 TELEX 135149 CABLE KEYEXIMP NORTHVALE NJ

BUYING

**FOR SALE
NCR DATA
RECORDER EQUIPMENT
AVAILABLE IMMEDIATELY**

27 735-101's
 4 735-901's
 2 736-922's

CONTACT
 J.R. BOYD

**AVCO
FINANCIAL SERVICES
CANADA LIMITED**
 201 QUEENS AVENUE
 LONDON, ONTARIO
 N6A 1J1
 (519) 672-4220

**For Sale Or Lease
System 3/15
Complete Systems**

Any configuration from B 19 to D 24
 30 to 90 days delivery depending
 upon your requirements.
 Also complete inventory tapes — disks.
 Printers — CPU Upgrades

**Call Avery Reynolds 214-630-6700
TWX 910-861-4936**

ACM Pioneer Computer Marketing
 1165 Empire Central
 Dallas, Texas 75247

Member of Computer Dealers Association

BUY SELL LEASE SUBLEASE

201-947-4200

370/168, 165, 155 call TED MOLINARI	370/158 call JEFF KLEIN
370/148, 145 call CHUCK STABILE	370/138, 135 125, 115 call RICK THEILE
INTERNATIONAL call ED CHAMPAGNE	IBM CRT'S call ED JOSEPH
3420, 3330, 3830, 3333, & I/O call ED JOSEPH	360/65, 50, 40 & I/O call DAVE TAIT

IPB Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024
"THE SOURCE" since 1963

FOR SALE
370/138 J
 1.0 Meg.
 with 3046 Power Supply
 and 3340 IFA

Available April 10, 1978

data3 

computer corporation 114 central avenue box 266 buffalo minn 55513 (612) 482-4884

3830's

Model 2's
 ITC Qualified

20 AVAILABLE

4 Each

6/78, 7/78, 10/78,
 11/78, 12/78

 **INTERCAP**
 214/387-2652

Leo Minor or Chris Angulo

dc 

dearborn taketh your surplus IBM
 equipment and make it disappear
 or leaseth it back to you

Call Tom Millunchick
 (312) 827-9200

or any dearborn office

dc **dearborn** dealer-IBM computers
 computer company systems software
 leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
 toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788 • dallas (214) 748-5899

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
 AND PERIPHERALS
 WE BUY • SELL • LEASE • TRADE

transdata 

P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

RANDOLPH NEEDS:
135s, 145s
Any Model
Sub-lease or Purchase
CALL MIKE SEEKINGS
TOLL FREE
800-243-5308

IBM Unit Record Equipment 129 & 029's

East Coast
(717) 564-8870
West Coast
(415) 332-6265

Unit Record
Leasing Company
110 Hi Vista Rd.
Sausalito, CA

BUY • SELL • LEASE

026 - \$ 850	085 - \$ 750
029 - 1850	088 - 2500
059 - 1375	129 - 3350
082 - 800	514 - 800
083 - 1800	548 - 1500
084 - 2500	552 - 900
	557 - 2800

MOHAWK-6401-6403 NCR-736

Want to buy IBM 029's, 129's, 3741's, 3742's

COMPLETE LINE BURSTERS, SHREDDERS,
DECOLLATORS AND BINDERS.
ECONOMICAL LEASE PURCHASE PLANS

DP SERVICE INC.
STAN PELCO & NATALIE REYES

312-774-2556

5505 N. MEHARD AVENUE, CHICAGO, ILLINOIS 60630

SALE OR LEASE

- 3410/3411 Tapes & Control
- 3271/002 Controller (with 4 CRT's)
- 3033 8 Meg System

Fall '78 Delivery
(I.O.A. sole owner)

WANTED

3803-2 with
2 Channel Switch



383 LAFAYETTE ST. N.W. #100
244 523 900



INDEPENDENT

**WE BUY - SELL -
INSTALL & REPAIR**
AT REASONABLE PRICES

**HONEYWELL USED
SERIES 200 EQUIPMENT**
COMPUTER SYSTEMS
PARTS — PERIPHERALS

Now in stock

2040-64K M7-32K M9
120-1250 — TAPE DRIVES
READERS, PRINTERS, PUNCHES
3200-131K Avail. 6/78

CALL NOW

Wilson Grubbs (513) 874-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati, Ohio 45246

SELL

NEW • REBUILT

**TELETYPE
MODELS**

43-33-32

**NATIONAL
TELETYPEWRITER CORP.**

207 Newtown Rd.
Plainville, N.Y. 11803
(516) 293-0444

FOR SALE

The following Honeywell 1200 computer configuration in excellent operating condition:

Qty.	Model/Feature	Description
1	1201-2	CPU, 32K, Control Panel, Power Supply
1	203B-4	Tape Control
3	204B-8	64KC Tape Units @ 800 BPI
1	205-1	Card Punch Control
1	214-1	100/400 CPM Punch
1	220-3	Console
1	222-4	850 LPM Printer
1	223	800 CPM Reader
1	032	132 Print Positions
1	044	Direct Transcription

Also, The Following Data Entry Equipment:
700-000 Basic Keytapes @ 800 BPI

BIG DUTCHMAN
Zeeland, MI 49664, 818/772-4621 or 404/473-2200

SALE OR LEASE

Available
Immediately

3344-B2 3330's
3420's 3410-2
3411-2

WANTED 3340-A2, B2
CPU-115, 125, 135, 145
3420's & 3277's

Contact: Ben G. Galt

215 635 1700

Computer

Marketing Inc.

7704 Seminole Ave

Melrose Park, Pa

19126

Member Computer Dealers Assoc



BUY-SELL-TRADE □ WE'RE THE BEST IN THE WEST
FOR DEC, DG, INTERDATA EQUIPMENT
SAVE 10% to 50% ON YOUR MINI NEEDS

THIS MONTH'S SPECIALS

CDL-11 A,B,C,D,E Asynch Interface	\$ 420
Shugart SA800/1 Drive	\$ 399
200MB Disk & Controller	\$ 24,500

2080 South Grand, Santa Ana, CA 92705
In Santa Ana call Merle In San Jose call John
(714) 979-9920 (408) 225-3844

BROKER-DISTRIBUTOR-MANUFACTURER

Have 3033 delivery position in January, 1979 to offer. Interested in getting an early 3031 position. We are not a dealer.

CW Box 1504

797 Washington St.
Newton, MA 02160

128K NOVA 3 MEMORY

We have a number of 128K word Data General Nova 3 Compatible Memories.

NEW SACRIFICE
CALL (215) 646-8997

THIS IS NOT A REQUEST FOR PROPOSALS OR AN INVITATION FOR BIDS

The State of California Department of Health Services is planning to implement an automated organizational and program cost accounting information system. This system will require the following capabilities consistent with GAFFR principles:

- Capability to maintain appropriation, program, and organizational cost information
- Ability to provide direct, indirect, and overhead cost distributions using several rates
- Accounting for reimbursements and collections
- Integrating fund, general ledger, and appropriation revenue and subsidiary ledgers
- Preparing fund cash reports and cash projections by period
- Providing timely financial information for program budgeting and evaluation
- Federal grant accounting

This is a request for information to those vendors interested in bidding subsequently on providing software systems whether proprietary or in the public domain which could meet the above needs. If your firm has a package which could meet these needs, information about your system and its capabilities should be directed to the attention of:

STATE OF CALIFORNIA DEPARTMENT OF HEALTH
Accounting Systems Development
714 P Street, Room 1092, Sacramento, CA 95814

If you wish to be considered on any future procurement for professional software services, please notify the above agency.

C.E.I.B.

"The world's largest used computer listing service."

***MULTIPLE-SOURCE LISTINGS** - CEIB's listings represent the largest pool of used computer equipment in the world - over 8,000 current offerings from more than 500 brokers, dealers, and private sellers - from 370/168s to minicomputers, terminals, accessories, and unit record equipment.

***BUYERS** - Contact CEIB today for free, up-to-date information on any specific listings you are interested in - or write for our comprehensive new monthly catalog (\$5/issue or \$50/year, ppd).

***SELLERS** - CEIB provides a very convenient, inexpensive approach to locating potential buyers. If you have't already received our brochure and listing forms, please write or call ...

CEIB - PO Box 163, Boston, Mass. 02117 - (617) 247-2290
R. Ferrara, President

370/148
3148 J w/ISC Available
Purchase/Leaseback Wanted
370/138
Purchase/Leaseback Wanted
Available

2313 A01	\$4,700
2312 A01	\$1,300
3145 100; 3345-005	August
2914-001	Wanted
1287-001	Wanted
360/40 G00	Wanted

ACCORD COMPUTER CORPORATION

P.O. Box 288
Summit, N.J. 07801
(201) 277-6401 Telex 138-407

3 PDP11's Priced for quick sale

**11/34 128K, 67M disk, 9 track
tape, LA36, ROM bootboard,
2 racks \$44,000**

**11/34 196K, 10M disk, LA36
\$28,000**

**11/45 128K, 67M disk, 9 track
tape, expander box, 16 line
asynch mux, ROM bootboard,
LP11, 2 racks \$78,000**

Will mix or match-Systems
running RSX11, RSTS/E
Immediate Delivery

Call today: **617/661-6444**

Cybertel 334 Broadway
Cambridge, MA 02138

\$1,000,000 INVENTORY CLEARANCE

**DEC
PDPII EQUIPMENT**

RK05F	\$ 3,200
RP11-RP03 NEW 40MB	18,000
RP11-RP02 DUAL 20MB	19,000
RP11-RP02 ADD ON	7,000
MJ11-BA 11/70 CORE	14,000
MJ11-BE 11/70 CORE	8,000
MS11-JP 11/34 MOS	1,800
MM11-DP 11/34 CORE	2,000
DL11-W	600
DZ11-A	2,100
VT50	750
VT05	900
VT52	1,500
LP11-JA	7,000
LP11-VA	6,000
TS03	4,800

**PDPII
COMPATIBLE EQUIPMENT**

300LPM PRINTRONIC & CTRL.	\$ 5,800
45ips TAPE, 800BPI(PERTEC)SYS	9,000
125ips OUAL OENS. PERTEC SYS.	13,500
176MB DISK & CONTROL	19,700
10MB DISK & CONTROL	7,000
128KB UNIBUS MOS MEMORY	3,550
512KB 11/70 MEMORY ECC MOS	19,500
HAZELTINE 1500	1,500
11/34 CACHE MEMORY	3,800
80 MB DISK & CONTROL (USEO)	13,000
11/45, 11/34, 11/04, 11/03, 11/35 & 11/70 CPU(s) AND SYSTEMS	ALL AVAILABLE NOW

ALPHABYTE, INC.
1440 N. HARBOR BLVD.
FULLERTON, CA 92635
(714) 738-1411

buy sell swap

buy sell swap

buy sell swap

software for sale

software for sale

WANTED BY USER**2 YR. SUB-LEASE****370/158 - K or U34**

#1433 - 3rd Block Mpx. Channel
 #2150 - ISC Control Storage Ext.
 #2151 - Expanded Control Storage
 #6111 - Register Expansion
 #4650 - Integ. Storage Control
 #7905 - Two Channel Switch for ISC
 #7840 - 3213 Printer Attachment
 3213-1 Console Printer
 Principals Only
 Respond To
 CW Box 1506
 797 Washington St.
 Newton, MA 02160

**AVAILABLE
FOR SALE OR LEASE****IBM 3705-1 Model A1**
with following features:**1642-4650-8002****4701-4714-1302****1541****WESTERN MARKETING****AND FINANCIAL**

(415) 526-9221

(312) 397-3311

Fred Hegeman

Jack Air

**FOR SALE
PRIME 300
MINI-SYSTEM**

128K MOS Memory
 300 LPM Printer
 Disk Ctl. Unit
 16 AMLC Lines
 Virtual Mem O.S.
 Under Maint. Contr.

Contact:

Jim Long

RAPIDATA INC.

20 New Dutch Lane

Fairfield, N.J. 07006

201-227-0035

TWX 710-734-4385

**SOFTWARE
FOR SALE****TSX**

TIME SHARING FOR RT-11 and CTS-300

VERSION 6 NOW AVAILABLE NEW FEATURES:

- Concise Command Language.
- Extensive Spooler Enhancements.
- DZ11 Support.
- Handles up to ten terminals.
- Runs on any PDP-11 with 20k words, program swapping disk, and line frequency clock.
- Supports FORTRAN, MACRO, BASIC, DIBOL, LINK, PIP, AND EDIT.
- Automatic spooling to line printers.
- DL11 and DLV11 support.
- Command file capability.
- Virtual time-sharing lines allow one terminal to control multiple jobs.
- \$1275 distributed on floppy disk.
- \$1350 distributed on RK05 cartridge.
- \$85 for updates.

S&H COMPUTER LEASING, INC.

3709 Trimble Road

Nashville, TN 37215

(615) 385-3875

*Trademark of Digital Equipment Corp.

We are buying:

3803, 3420,

selling:

360/65, 360/40

& leasing:

360/65, 370/135

Please contact:

Linda Vaughn / (415) 955-0220

Tommy Talbot / (415) 955-0238

ITEL
CORPORATION
Data Products Group**WANTED**

BURROUGHS 'L' Series
DEC & DATA GENERAL
 Minis & Peripherals
 NCR: 399 & 299

Boynton Business Systems

87 Route 208

Walkill, N.Y. 12584

914-895-2007

**DEC
HARDWARE****PDP 11 PDP 8****Processors Peripherals
Memories**

VT52's, LA36's, LS120's, LA180's

BROOKVALE ASSOCIATES

Seekers and Sellers

(516) 585-0800

2314-B1

- Up to 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

COMDISCO
312-698-3000

WILLIAM MARION COMPANY, INC.
 P.O. BOX 309 • HACKENSACK, N.J. 07602

N.C.R.

270-299-399-775

31, 32, 41, 42 etc.

BURROUGHS

"L" TC 500, TC 700

I.B.M.

029-Systems 32/34

BUYING

SELLING

029's & 059's

immediate delivery

Also: 026 - 056 - 082 - 083

084 - 085 - 088 - 402 - 403

407 - 514 - 519 - 548 - 552

557 - Eligible For IBM M/A

FOR MORE INFORMATION CALL (201) 343-4554

FOR SALE/LEASE**I.B.M., 360/20**

360/20 Includes:

1403 Printer
 2311 Disk Units
 2560 Card Reader

Call: Lou Dixon
 (815) 877-8076

**FOR LEASE
IBM 370 SYSTEMS**

Available June

168-AP 6 MEG**158-3 3 MEG****158-AP 3 MEG**

Available September

158-AP 2 MEG**2, 3 and 4 year****operating leases**

also available October

168-U34

Call or write

Jerry Minsky**Alanthus Leasing
Company**

111 High Ridge Road

Stamford,

Connecticut 06905

203-348-4820

FOR SALE

One Qantel 30megabyte
 Disc Drive
 and Controller
 Two Qantel CRT's
 Five Qantel IOU's
 Comm Controllers

Contact:

Scott Campbell

**CENTURY-NATIONAL
INSURANCE CO.**

12200 Sylvan St.
 No. Hollywood, CA 91606
 (213) 760-0880 Ex. 220

303X**Leasing**

Large industrial corpora-
 tion wishes to purchase
 and lease back to sub-
 stantial corporations IBM
 303X Systems. We will
 only deal with end users
 and equipment must be
 scheduled for delivery in
 1978.

CW Box 1410
 797 Washington St.
 Newton, Mass. 02160

**ACCOUNTING SOFTWARE
FOR DEC RSTS/E OR
CTS-500 USERS**

From one of the pioneers in com-
 mercial data processing using
 RSTS. Completely on-line, inter-
 active systems available for AC-
 COUNTS-PAYABLE, GENERAL-
 LEDGER, FINANCIAL-REPORT-
 ING, ACCOUNTS-RECEIVABLE
 and PAYROLL applications.

These are consolidating pack-
 ages and support multi-division
 company and multi-company cor-
 porate accounting functions.

If you are installing or have in-
 stalled a Digital Equipment Cor-
 poration RSTS/E or CTS-500 sys-
 tem, contact us for cost-effective
 solutions to your core accounting
 problems.

Plycom services, Inc.

(219) 935-5121

P.O. Box 160

Plymouth, IN 46563

**WORD
PROCESSING
Complete
Package**for
**Data General
Nova or Eclipse****Equipment
BASIC
LANGUAGE
\$5,000**

Call: Den Paty
GMS SYSTEMS, INC.
 3475 Breinerd Rd.
 Chattanooga, TN 37411
 (615) 629-2691

**GENERAL LEDGER
SYSTEM?****What was the only one on the
1977 Datapro Honor Roll?**

The answer is: The UCC General Ledger/Financial
 Control System. It can solve the Accounting Depart-
 ment's financial information problems... without
 creating new ones for EDP. Call 1(800) 527-3250 toll-
 free (In Texas, call 214/688-7313) for more information.

UCC
UNIVERSITY COMPUTING COMPANY
 P. O. Box 47911 • Dallas, Texas 75247

1977
datapro
HONOR
ROLL**MINICOMPUTERS
& SYSTEMS**

Don't waste company time or money. Check with us before you buy or sell.

New DEC Equipment

Immediate Delivery

RK11-RK05 Disk Systems -

\$8500

PDP 11/04s and 11/34s - 20% off

list

DZ 11

DEC Station 78

New DG Equipment

Immediate Delivery

DG 10 Mbyte Disk Systems from

\$7500

DASHES - 15% to 25% off list

Nova 3/12 or 3D - 20% off list

Immediate delivery for MOSI

Inventory Clearance

call us for free brochure

**MINICOMPUTER
EXCHANGE**

(408) 733-4400

TWX 910-339-9272

software for sale

software for sale

software for sale

time for sale

ACCOUNTS PAYABLE

Now a low-cost software package for mini or mainframe computers with many cost-saving features:

- Batch processing using single data base for fast processing
- Modularly structured COBOL programs reduces maint. costs
- Multi-company facility avoids duplicate software
- Flexible retrieval facility for printing reports & more.

For full details on how our APS software can save you time and money, call (415) 254-1264, write: **LEGLER SYSTEMS COMPANY**, 23 Charles Hill Rd., Orinda, CA 94563.

MEDICAL/DENTAL BILLING

Complete Billing and Insurance Processing for doctors, groups and clinics.

- Complete Insurance Forms
- Profile, RVS, ICDA Files
- Bal. Forward, Ledger
- COBOL or RPG II
- 30+ users
- 360/370 or mini-computers
- On line, Real-Time or Batch Processing

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 783-5144

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCOOPER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCOOPER (7070) to COBOL
- COBOL to COBOL
- AUTOCOOPER/OPS to COBOL

For more information on our translators, write or call today.

Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 895-1412

**WE ARE
BROKERS OF
COMPUTER
TIME**

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

**MICRO-
EXCHANGE**

Radio Shack - TRS-80 USERS software available on cassette - financial programs, depreciation, Income tax, real estate projections, loan amortization, and others. Write the Accountant's Computer Company, 3390 Peachtree Road N.E., Atlanta, GA 30326.

MSAI 8080, 8K, ADM3, MIO, plus misc. INVESTED \$3,000; sell for \$1500/best offer. Joe Flora, WKNDSEVES (209) 239-1717, DAYS (209) 823-7881.

Experienced, Microprocessor Consulting Engineering Team available to place any product into Completely Documented Production in less time than anybody. ICESYS Consulting Corporation, 1820 Union St., San Francisco, CA 94123 (415) 922-7775. 2158 31st St., Sanle Monica, CA 90405 (213) 450-0505.

FOR SALE - MICRODATA 8K MEM. BDS, 1800 CPUS, Printed Circuit Board Repair, MILACRON Boards, WTB: REALITY System Boards & Parapherals. Mike Shabasta, Cinil., Ohio 45230, 1-(513) 474-1760.

OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS. California Microcomputer Company's (CMC) previous ads in Computerworld has resulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved business software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927 (916) 891-1420.

MICRODATA REALITY CORE MEMORY John Hardman (201) 751-3000.

MU Basic RT-11, Proven Programs, DEC PDP 11/03, Floating Decimal Point, General Ledger, Payroll, Accounts Receivable, Accounts Payable, Depreciation.

DATAPAK

(505) 266-4207

416 Fontana Pl. N.E.
Albuquerque, N.M. 87108

**"CONVERT" for
Language Conversions**

PROBLEM Because of the way FORTRAN handles I/O, your programs are too slow in execution.

SOLUTION Convert your program from FORTRAN to PL/I, which handles I/O more effectively. **HOW** "CONVERT" is a ready-made proven FORTRAN to PL/I converter with a record of 98% conversion.

WHERE "CONVERT" is a general purpose compiler for translating any source language to any target language. If you have a conversion problem (FORTRAN to PL/I or otherwise), contact the experts: Peter X. Yates, VP, OLI SYSTEMS, INC., 527 Madison Ave., New York, N.Y. 10022.

ACCOUNTS PAYABLE

Many system features including:

- Auto. discount calculation
- Cost center reporting
- G/L interface tape
- Check reconciliation
- Written in COBOL
- Single data base
- Audit trail & file control
- 3 manuals & 3 yr. warranty
- Batch mini or main frame
- Low purchase price or rent.

Write or call for more information

LEGLER SYSTEMS COMPANY

23 Charles Hill Road
Orinda, CA 94563
(Est. 1972) (415) 254-1264

RPG II SYSTEMS

- A/R-OPEN ITEM OR 8/F
- ACCOUNTS PAYABLE
- GENERAL LEDGER
- PAYROLL AND LABOR DIST.
- INVENTORY
- CREDIT UNION MAILING, ETC

Extensive Documentation Provided

Bancroft Computer Systems

P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

**TIME
FOR
SALE****370/158 mod 3
Datacenter**

3.5 meg MVS
Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Kerlevsky
(212) 564-3030

Datamor

132 West 31 St.
New York, N.Y. 10001

**REMOTE
JOB ENTRY****PHOENIX-HECHT**

- IBM 370/158-3
- Nationwide Incoming Watslines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, HASP, INTERCOMM, noscot
- Complete data security including off-site storage

For information
call John MacDougall
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

TONE 3
is
TSO FOR VS1
but
without TCAM and the
overpowering overhead of VS2
(check these points).

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with remote support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- Interactive program execution
- Operations additional console support
- Dataset maintenance
- Catalog management
- ISP support
- Remote entry subsystem support
- Enhanced 3270 usability
- Full ASCII terminal support
- Interactive computing
- Data inquiry

TONE
Software Corp.

write
for
details

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

CONVERTING?

Try the experts. DASD Corporation encourages test evaluations of all of our language translators.

RPG/RPG II to COBOL (DOS or OS) will accept all types of RPG and produce ANS COBOL. Most translations are 100% error free. Our modular COBOL simplifies maintainability.

SYSTEM/3 COBOL to OS COBOL makes this tedious, redundant conversion completely automatic. We're 97% clean, which frees a lot of man hours for more important tasks.

DOS COBOL to OS COBOL is basically a difference of syntax, but may mean a lot of wasted man hours.

GE MAP to OS COBOL will allow immediate upgrade of your GE 400 series to full ANS COBOL.

360/20 BAL to 360/370 OS ALC is an extremely solid product eliminating a monotonous programming job.

DASD TRANSLATORS SAVE TIME AND MONEY.

Many service options are available: lease, conversion only, conversion and clean compile, full conversion responsibility including testing and JCL.

For a prompt solution to your conversion problems, write or call today.

DASD CORPORATION

National Marketing
1480 Renaissance Drive—Suite 315
Park Ridge, Illinois 60068
312/299-5005

**CLASSIFIED ADVERTISING ORDER FORM**

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Microcomputer Classified Exchange, Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are \$55.30 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs \$110.60 per insertion. Extra space is available in half-inch increments and costs \$27.65. Box numbers are \$3.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____ Title: _____

Address: _____

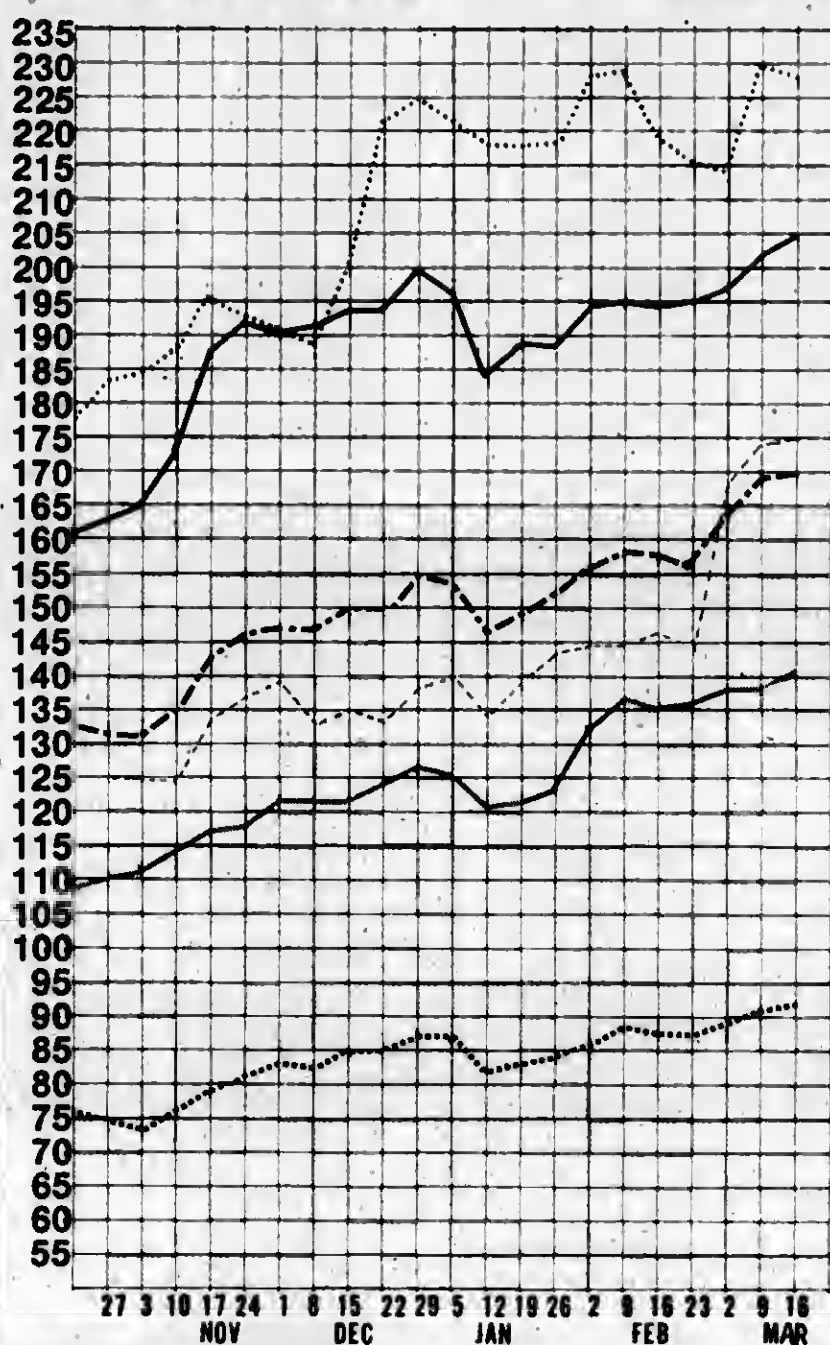
Telephone: _____

Send this form to:
CLASSIFIED ADVERTISING
COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

COMPUTERWORLD

Computer Stocks Trading Indexes

— Computer Systems - - - Software & EDP Services
 - - - - Peripherals & Subsystems - - - - Leasing Companies
 - - - - Supplies & Accessories - - - - CW Composite Index



Earnings Reports

PLANNING RESEARCH
Three Months Ended Dec. 31

Three Months Ended Dec. 31

	1977	1976
Shr Ernd	\$.15	\$.13
Revenue	\$2,125,000	45,836,000
Earnings	1,918,000	8,792,000
6 Mo Shr	.33	.30
Revenue	100,615,000	66,466,000
Earnings	2,295,000	8,185,000

s-Includes after-tax loss of \$17,000 in the quarter on sale of subsidiary. Results for six months include after-tax gain of \$157,000 on similar transaction.

QUOTRON

Year Ended Dec. 31

	1877	e1976
Shr Ernd	\$1.29	\$.65
Revenue	33,353,384	24,642,972
Tax Cred	2,269,154	1,463,533
Earnings	4,850,374	2,791,729
3 Mo Shr	.28	.28
Revenue	6,699,034	7,149,082
Tax Cred	372,181	517,271
Earnings	1,196,185	1,049,406

e-Registered.

g. Restated.

RAPIDATA

* Year Ended Dec. 31

	1877	1878
Shr Ernd	\$ 50	\$ 29
Revenue	17,912,681	15,623,938
Earnings	889,441	510,977
3 Mo Shr	.14	.16
Revenue	4,473,556	4,140,501
Earnings	240,295	181,322

e-Includee \$181,912 net gain on sale of certain assets.

UNITED TELECOMMUNICATIONS**Year Ended Dec. 31**

	1877 (000)	1878 (000)
Shr Ernd	\$2.31	\$2.01
Revenue	1,191,164	1,005,125
Disc Op Loes	3,153	534
Earnings	134,290	112,974
3 Mo Shr	.57	.56
Revenue	313,827	262,529
Disc Op.	(684)	284
Earnings	33,977	30,965

a-Resated.

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreinhofer
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Frank Collins
Account Managers
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezellan
Account Coordinator
COMPUTERWORLD
353 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Judy Milford
Account Managers
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: 12424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

West Germany
Hans-Jürgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11.
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 15, 1978

**All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139**

<

NOT POPCORN POPPERS, FRAN. PAYROLL.



FRAN TARKENTON, MINNESOTA VIKINGS' QUARTERBACK.

Fran Tarkenton's product isn't popcorn poppers, it's MSA's Payroll Accounting and Personnel Management & Reporting System. No matter how large or small your organization is, how it is structured or how many people are on the payroll, MSA's System will be the solution.

And, MSA's System offers complete flexibility in pay periods, tax withholding, deductions, special earnings, automatic bank deposits and reporting.

The MSA Payroll and Personnel Management & Reporting System are integrated to help you meet your government reporting requirements including: EEO/ERISA/OSHA/Affirmative Action.

For more information on our full line of financial software systems, call Carole McConnell at (404) 262-2376 or return this coupon.



THE FINANCIAL SOFTWARE COMPANY

Management Science America, Inc.
3445 Peachtree Road, N.E., Dept. C-1
Atlanta, Georgia 30326
(404) 262-2376

Chicago (312) 986-2450
Los Angeles (213) 822-9766
New York (201) 871-4700

International Agent:
MSA International, Inc.
Brussels, Belgium
Tel. (02) 673 99 63
Telex: 63020 Answerback MSA B

Name _____	
Company _____	Title _____
Address _____	
City _____	State _____ Zip _____
Phone _____	
I am interested in: ☐ Payroll Accounting ☐ Accounts Payable ☐ Personnel Management ☐ Accounts Receivable ☐ and Reporting ☐ Financial Information and Control ☐ General Ledger ☐ Supplies Inventory Control ☐ Canadian Payroll ☐ and Purchasing ☐ Accounting ☐ Fixed Asset/Property Accounting ☐ ALITAX™	



EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Assistant Editor	Frank Vaughan
Washington Bureau/Chief	Edith Holmes
Staff Writers	Catherine Arnst Jeffrey Beeler Timothy J. Scannell Brad Schultz Marguerite Zientara
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Barbara T. VanScoyoc Susan Gerrard Joe Hunn
Photography Editor	Ann Dooley
Editorial Assistant	Denise Petski
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger Frampton
Munich	Hans-Jurgen Ballnath
Asia	Hidetuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone

SALES

Vice President/Marketing	Roy Einreihofner
Advertising Administrator	Terry Williams
Display Advertising	Mary Anne Furlong
Classified Advertising	Donna Whalen
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen
CIRCULATION Vice-President/Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti
Customer Service Rep	Peggy Kelly
Assistant	Eleanor Smith
PRODUCTION Manager	Lee Vidmer
Supervisor	Henty Fling
Assistant Manager	Peter Holm
Typesetting Supervisor	Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone (617) 965-5800. Telex: USA-92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone (01) 995-3352. Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristenstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone (03) 445-6101. Telex: 12424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy. U.S. - \$18 a year. Canada and PUAS - \$28 a year. Europe and Middle East - \$50 a year, all other foreign - \$65 a year. Four weeks notice as required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed - write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreihofner
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld* Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

At Million Dollar Ceremony Software Winners' Ranks Swelling

By Don Leavitt
CW Staff

CHICAGO — By the end of last year, at least 302 individual software packages had each accounted for more than \$1 million in sales. Very nearly half that number have reached the \$2 million plateau and many are well beyond that, according to Larry Welke, president of International Computer Programs, Inc. (ICP).

Twenty-two of the packages have exceeded \$10 million; nine have gone over the \$20 million mark; and two have reached or exceeded \$50 million in sales, the publishers of the *ICP Software Directory* told the opening banquet at the annual Million Dollar Awards ceremony held here recently.

Those numbers are a far cry from the 29 packages that had reached the million-dollar level when ICP started these ceremonies seven years ago, he noted. So many companies were involved this year that Welke split the ceremony in two, saluting those packages just reaching the million-dollar level this year on one evening and fettering the multimillion-dollar winners the next night.

Top of the Pile

At the top of the pile, the Mark IV system from Informatics, Inc. joined the Total data base management system from Cincom Systems, Inc. at the \$50 million level. Various Mark IV special features have attained million-dollar stature on their own and the grand total for that product line is reaching toward \$100 million, Welke said.

The idea behind the Million Dollar Awards started not long after IBM unbundled its software and the independent software industry began to take shape. That industry is now so vigorous that ICP has dropped recognition of \$2 million sales because "the jump from one million to two million suddenly takes no longer than from one to five," the publisher explained.

The ceremonies have become well enough established so IBM — and presumably other mainframers that have unbundled software — have been invited to participate.

All have declined thus far, a Welke aide commented, adding, however, that IBM has apparently taken the idea to heart and internally presents awards to managers of its own products that have accounted for sales in the million dollar or higher range.

Other Success Indicators

While sales dollars are one indicator of a product's success, there are others perhaps equally valid, Welke reminded those attending the second evening's banquet. Number of installations is one such benchmark, he said.

Recognition was given to applications packages with 250 or more installations and to systems software

that had been placed in more than 1,000 sites. Previous categories at 100 installations (for application packages) and 500 (for systems programs) were dropped this year because "they are not as significant as they once were," Welke said.

The Librarian from Applied Data Research, Inc., Panvalet from Pansophic Systems, Inc. and the Westinghouse Disk Utility from Westinghouse Electric Corp. continue to top the "systems" list with more than 3,000 sites to each of their credits.

The application packages with more than 1,000 installations apiece include Autotab II from Capex Corp., Alltax from Management Science America, Inc., the Statistical Package for the Social Sciences from SPSS, Inc. and the general ledger and financial reporting package from Software International Corp.

Prestige Symbol No Longer, Russian CPU Gets the Boot

By Tim Scannell
CW Staff

MOSCOW — The Byelorussia Power Engineering Construction Department, complaining that computer technology is more trouble than it's worth, has placed an advertisement in the Minsk evening newspaper in an effort to sell its Soviet-made system.

The decision to sell the Minsk 32 computer was based on worker resentment of the system and management's distrust of the computer's output, according to *Pravda*, the Communist Party newspaper.

The system was purchased by the department in 1973 when having a computer was a symbol of prestige among the managers and leaders of Soviet industry, *Pravda* reported.

Problems with the system began when the Byelorussia department

asked the Novosibirsk Programming Center to supply instructions to program the computer to perform 31 functions. The center informed the department only 26 functions were possible and then produced a program for only eight, according to *Pravda*.

When the final program was delivered, the department found three of the functions "were good for nothing," the newspaper stated.

Meanwhile, the workers at the Byelorussia department decided to turn against the computer, which was programmed to check on their assigned production and rate of material usage. "Day by day the list of workers not carrying out their assignments grew longer and longer," *Pravda* said.

At the same time, management manually duplicated everything the computer did, *Pravda* noted.

On the Inside This Week

NEWS

CW Photo Feature: Computer Expo '78	4
Peripheral Firms Most Visible on Exhibit Floor	5
Motions Fly as End of U.S. Case Approaches	7
DPers at USGS Complain Systems Unreliable	9
House Gets Postal Bill Without EFT Funding	10
IBM Users Unite to Establish Backup DP Site	11
SSA Starts Patching DP Center Security Holes	12
St. John's Working on English Skills Program	13
Large University DP Center Opens in Scotland	14
Users Warned on Deals With Trade-In Credit	15
Service to Report on Transnational Data Issues	16
Micro-Based Ball Server Aimed at Tennis Buffs	17
Mini Helps Architects Study Renaissance Dome	18
In Depth: Tsunami	20-29

EDITORIAL

Editorial: Is Washington Listening?	32
Human Connection: Phone Calls Must Be Filled	33
Taylor Report: DP Too Specialized for Lawyers?	33

SOFTWARE & SERVICES

Capex 'Optimizer' Has Enhanced Cobol	43
'CPG' Uses Micro, Mini for Cobol Development	44
Accounting Packages Offered for System Ten	46
'Finman' Puts Finance, Administration On-Line	48

COMMUNICATIONS

Six Modem Vendors Earn Perfect Grades	51
System Helps Bureau Service 1,500 Doctors	52
Washington University Sets Software Course	54

TERMINAL TRANSACTIONS

Connecticut Net to Handle Multiple Agencies	58
---	----

SYSTEMS & PERIPHERALS

On-Line System Pulses Through Hospital	59
Records Service Aids Hospital's Accreditation	61
Nixdorf Introduces Entrex Data Entry Unit	62

MINIWORLD

User No Slouch: Evaluates 43 Systems	65
Minicomputer Net Keeps Milk Orders Fresh	66
Small System Tightens Builder's Cost Controls	67

MICROCOMPUTING

Medical Center Concocts Patient Monitor	69
'Micro Assembler' Available for Bipolar Units	70

COMPUTER INDUSTRY

FTC Chief Optimistic About Competition	75
Study Sees IBM Pushed to Diversity	75
County Denies Bid Request Biased Toward IBM	77
Survey Finds 'Seller's Market' in Retail Field	78

enCORE!

What does SyncSort DOS have in common with our OS sort?

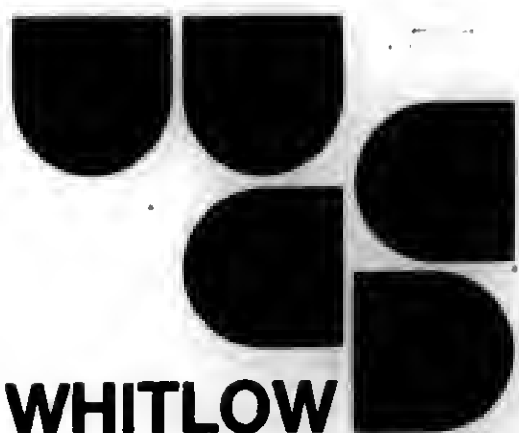
(Better performance than
anything IBM can offer!)

Call (201) 568-9700.

Ask for a
personal
introduction.

OVERSEAS REPRESENTATIVES —

Brussels: CAP/GEMINI Belgium
Dusseldorf: CAP/GEMINI GmbH
Geneva: CAP/GEMINI Switzerland
Hague: CAP-GEMINI/PANDATA
Johannesburg: Computing Benefits Ltd.
London: GEMINI Ltd.
Melbourne: Shell Oil Co. of Australia
Milan: SYNTTAX
Paris: CAP/SOGETI PRODUCTS
Stockholm: BRA
Tel Aviv: ADVANCED TECHNOLOGY, Ltd.
Vienna: CAP/GEMINI GmbH



WHITLOW

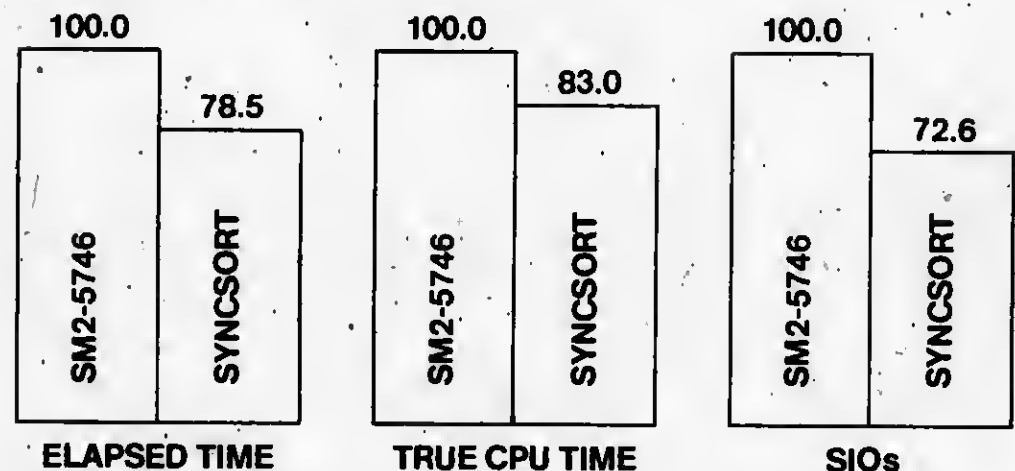
COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

How time flies! Just a few years ago, SyncSort for OS and OS/VS was an unknown young understudy to the then reigning *Diva* of the day, a slightly overweight IBM sort. Would our promising young protégé ever get the big break she needed?

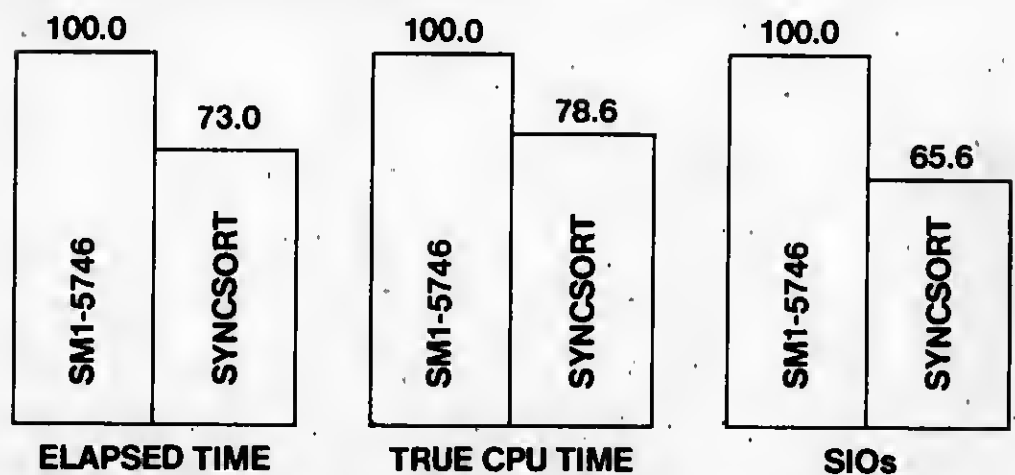
We decided to help make that happen. We set up a series of exhaustive "auditions" that matched SyncSort against the Lady from IBM in every role in the sorting repertory. The rest, of course, is history. When word began to spread around the circuit that SyncSort simply did more sorting work at less cost in machine and human resources, the sorting public began to queue up. Today, SyncSort plays the top role in over half of all OS and OS/VS installations.

But what about SyncSort DOS and DOS/VS? Would it have that kind of success against all that competition from IBM? We decided to bite the bullet and find out.

First we tested DOS/VS against the Computer Giant's leading lady, which happens to be SM2-5746 — the "top of the line" sort for DOS/VS. Well, it came as quite a shock to us, but the "top of the line" is apparently not that high. Because SyncSort did a lot more sorting, for a lot fewer resources, in every single category:



Okay, we thought, maybe we made a mistake. Maybe SM2 isn't the best the Giant has to offer. So we took a look at SM1-5746. Here are the results:



Yes, we did a full matrix of tests against all those other IBM sorts for DOS and DOS/VS — the whole thundering herd of them. (Think *quality*, IBM, not *quantity*!) But the results were just more of the same. Our test crew said it was like being trapped on a down escalator.

So we think we may have another winning sort on our hands, and we think you'll think so, too.

Particularly if you like talented performers, with trim lines and no horns on their heads.



An Expo '78 attendee gazes down line of Hewlett-Packard's graphic terminals and display stations.



Attendees browse around exhibit floor as Expo '78 kicks off its new year.

Computer Expo '78



John Shea, president of Comsol Corp., gives reason No. 4 for buying the 3200 Comsol.

A CW Photo Feature
By Ann Dooley



The IBM Series/1 is under discussion as it makes its first Computer Expo appearance.



Bruce Leibold swings into action to win the GE cup.



Mike Mezzacappa tries his luck with The Owl's on-line programming.



Attendees stopped, looked and listened at the Bell System exhibit.

But Few Products Introduced Peripherals Firms Most Visible on Exhibit Floor

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — The seventh annual Computer Caravan sported a new name but a familiar look as the combination technical seminar and product exhibit rolled into town last week for its first stop on a 10-week tour of nine major U.S. cities.

The event here marked the official debut of the traveling show's new name — Computer Expo '78. Except for that relatively minor change, however, veteran Caravan-goers noticed few major differences, at least in product mix, between last week's exposition and previous conferences in the six-year-old series.

Like the other shows preceding it, the first stop on this year's circuit was dominated primarily by peripherals manufacturers.

The group with the strongest representation was the software suppliers, followed by the small business systems vendors including IBM, which exhibited its newly introduced 5110.

Reflecting technological trends in the computer industry as a whole, the show was also attended by several vendors of distributed data processing (DDP) systems. Some of these DDP equipment suppliers included Texas Instruments, Inc., which displayed its 774 system, and Inforex, Inc., which demonstrated its System 7000.

Few Product Debuts

Most exhibitors at the conference agreed a Caravan-like show, with its mainly regional appeal, would prove a poor vehicle for launching a major product announcement.

In fact, some vendors even conceded they had deliberately scheduled important product introductions to coincide with subsequent shows like the National Computer Conference, which is larger in its appeal and thus maximizes the opportunities for product exposure.

Nevertheless, a few vendors did use Computer Expo '78 as an occasion for unveiling the latest additions to their lines. Consolidated Computer International, Inc., for example, introduced the Series 2 line of distributed data entry systems, including the Key-Edit 2000, 2022 and 2024.

Each system provides a 1,920-character CRT terminal, a memory of up to 256K bytes and 900M bytes of disk storage, the Waltham, Mass., firm said.

The 2000 package emulates IBM 2780, 3740 and 3780 terminals, while the 2022 combines data entry and remote job entry with communications capabilities, according to a spokesman. In addition to the standard data entry functions, the 2024 accommodates transaction-oriented data collection either locally or remotely, he added.

A typical system including a 192K-byte CPU, 800 bit/in. tape drive and 20M-byte disk drive costs \$125/mo per terminal on a five-year lease.

Qume Corp. also used the show to introduce a product — the keyboard send/receive (KSR) version of its Sprint 5 daisywheel printer terminal line, which previously included just a receive-only model.

Designed for letter-quality output, the microprocessor-based terminal operates at 45- or 55 char./sec and pro-

vides 43 control commands that allow users to specify variables like vertical and horizontal tabbing and carriage movement, Qume said.

Standard front-panel functions include automatic line feed, form length, 10- or 12-pitch spacing, parity and transmission rates of 110-, 150-, 300-, 600- or 1,200 bit/sec, the Hayward, Calif., company noted.

In quantities of 50, the KSR version of the Sprint 5 costs \$2,480.

A third exhibitor to formally introduce a product at Computer Expo '78 was Ann Arbor Terminals, Inc., which announced the \$1,575 Model 531E CRT terminal.

Based on an Intel Corp. 8080 micro-

processor, the unit displays 24 lines of 80 characters each on a 15-in. diagonal screen and transmits data at selectable

CW at Expo '78

rates ranging from 110- to 9,600 bit/sec, Ann Arbor said.

Contrary to most of the other exhibitors at the show, Control Data Corp. had no hardware displays at its booth. But the company did provide information about its IBM Series/1-compatible peripherals line, slated for introduc-

tion later this year.

Other companies, meanwhile, took advantage of Computer Expo '78 to provide the first public demonstrations of products they had already introduced. These firms included Versatec, Inc., which exhibited the Model 1640 hard-copy systems and off-line vector processor, and California Computer Products, Inc., which showed its 4350 disk storage facility.

By the end of the second day of the three-day event, conference organizers estimated about 2,000 attendees had trooped into the exhibit hall to glimpse what they hoped would prove the DP equivalent of nearby Disneyland's Frontierland and Adventureland.

OS CAPABILITIES DOS EFFICIENCY

At last, DOS/VS users can keep the low core, low overhead and high efficiency of DOS/VS while enjoying the powerful capabilities of OS file and space management.

SPACE/MANAGER installs in two minutes with no impact on existing operations — not even an IPL. SPACE/MANAGER will immediately start providing these significant benefits:

- **REDUCED OPERATIONS TIME** — full job stream management, partition independent JCL, and automatic job set-up will speed turnaround and reduce reruns.

- **IMPROVED EFFICIENCY** — fully automatic assignment of optimized file locations, volume balancing and volume priority concepts greatly reduce channel contention and arm movement, thereby speeding throughput.

- **REDUCED SPACE REQUIREMENTS** — By pooling every partition's space requirements, using only the minimum space, and reclaiming all unused space, SPACE/MANAGER users often save 30%-70% of disk space.

- **IMPROVED RELIABILITY AND SECURITY** — A comprehensive hierarchical security system, complete file retention management and cross-partition file protection vastly improve the users security and control.

- **REDUCED PROGRAMMING EFFORTS** — Elimination of EXTENT and ASSGN cards, plus powerful PROC and symbolic capabilities greatly simplify programming efforts.

- **EXPANDED CAPABILITY** — An automatically maintained total-system catalog, comprehensive activity reports, automatic secondary space allocations, are just some of the system improvements provided by SPACE/MANAGER.

It's all there and it's only there with SPACE/MANAGER. While alternative systems provide limited subsets of these capabilities, SPACE/MANAGER has it all: comprehensive capabilities, incredible efficiency, unparalleled simplicity, complete documentation and outstanding local support from offices throughout the United States and Canada.

Call or write ALTERGO, the industry leader, and let us prove our claims

ALTERGO SOFTWARE INC

**55 WILLIAM STREET
WELLESLEY OFFICE PARK
WELLESLEY, MASSACHUSETTS 02181**

TELEPHONE: (617) 237-6132

Please send me information on

SPACE/MANAGER

Name

Title

Organization

Address

Zip Phone

Disk Type Number

Our need is ☐ immediate

☐ 3-6 months

☐ over 6 months

Carter Expected to Approve NTIA This Week

(Continued from Page 1)

tions have revolved around splitting telecommunication procurement authority among OMB, GSA, DOD and the new agency and dividing the information policy-setting role between the State Department and NTIA. Also at issue has been NTIA's share of telecommunications planning in the event of a national emergency; the NSC and DOD have fought to secure their roles in this area, according to OMB, Commerce and congressional sources.

Between Sept. 23 and Oct. 17, NTIA went from following in OTP's steps as "the President's principal advisor on telecommunications" to being subordinate to the Secretary of Commerce as "the principal advisor on policy." By the Jan. 23 draft of the executive order, the word "principal" had disappeared, deleted to accommodate the views of such agencies as DOD and GSA which felt they had an equal right to offer advice to the President on federal system operational matters and on telecommunications policies.

The March 9 draft buried this advising function in the middle of the order and combined it with the function of advising the director of OMB on procurement and management policies.

The overall effect of these changes was to diminish the importance of NTIA and to confuse its role. Similar erosions of NTIA's authority occurred with respect to the new agency's tasks of reviewing federal agency system programs, developing and establishing telecommunications policies and coordinating telecommunications activities in the executive branch.

'Last Straw'

The March 9 version of the executive order "was the last straw as far as Commerce [was] concerned," according to a congressional source.

After the March 9 draft was issued, Commerce sources indicated they weren't sure the agency has sufficient responsibilities and powers to be worth the effort of setting it up.

Meanwhile, on Capitol Hill, Rep.

Jack Brooks (D-Texas), long involved in the government's use of computers and communications, believes all policy functions should rest in OMB. The congressman has no problem with NTIA's role in setting private-sector telecommunications and information policies, a spokesman for Brooks said recently.

"I really think the OTP and Commerce people are being overly emotional about this. They act as if anything is left to OMB, their efforts are no longer worthwhile," the spokesman stated.

Senators Ernest F. Hollings (D-S.C.) and Abraham Ribicoff (D-Conn.) disagree, however. They believe that if the final executive order is to be legal, it must transfer OTP's functions either to the President for redelegation within the executive office or to NTIA in Commerce. "No function can be deleted, no function can be transferred, in whole or in part, to any other agency," a congressional spokesman said.

"OMB must restore Commerce to its predominant role in the telecommunications and information policy areas with regard to other agencies. If the President wanted the State Department, for example, to be involved in setting information policy, that should have been written into the reorganization plan," the spokesman stated before the final draft came out of OMB.

In addition, OMB must ensure that every OTP function not given to President Carter is dealt with in the executive order defining NTIA, the spokesman said. A key issue "for the American public as well as for Congress" is the ability to hold one person — the assistant secretary of Commerce for telecommunications and information — accountable for policy developments in these areas.

Hollings and Ribicoff maintained the assistant secretary must be the principal advisor to the President on these matters if there is to be any power balance between the agencies.

U.S. Winding Down Case

(Continued from Page 1)

will also ask the judge to throw the case out of court before the defense even starts.

Government Bombshells

But the government may have some bombshells of its own when it finishes presenting evidence. A serious, high-level debate is going on in the Justice Department about whether to ask the court for interim relief against IBM when the government's side is concluded [CW, March 6].

If the Justice Department chooses to ask for that judgment, it would file a motion on the conclusion of its case asking Judge David N. Edelstein to find that there is "reasonable cause" to believe IBM did monopolize the computer field. If Edelstein accepts the government argument that IBM has been a monopolist, the government would then ask him to place certain restraints on IBM while the corporation presents its defense.

The rationale of such a move would be to prevent IBM from making alleged monopoly profits while the defense drags on. Edelstein would be asked to force the firm to reveal interface specifications and market data to competitors during this period.

An interim relief proposal would, also force IBM to present its defense quickly because it would no longer be to the firm's advantage to drag out the case, some government attorneys argue.

No Decision Yet

However, the government hasn't yet decided whether to file such a proposal. If the judge did grant the interim relief motion, IBM would be likely to appeal it all the way to the Supreme Court, which could delay the start of the defense by a year or so.

During the time of the appeal, the interim relief injunctions would probably be stayed, or held in abeyance, and therefore would have little if any effect on IBM during the appeals process.

Despite that prospect, several of the lawyers on the government trial staff here are thought to be pushing heavily for the motion and are now just waiting for the word from the higher-ups

in Washington on whether to proceed with it.

But even without that government motion, the verbal fireworks on the IBM motion to dismiss the case promise to enliven this courtroom like nothing else has since the opening motions three years ago.

Edelstein has offered both the government and IBM two days to argue the proposal before him.

In his two-day presentation, Barr is expected to point up every inconsistency or weakness in the case it has taken the government three years to present.

The government will then get its turn, and in two days it will summarize and place before the court all the evidence it feels supports its contentions that IBM monopolized the computer industry.

Probable Results

If Edelstein decides to grant the motion to dismiss the case, the government would surely appeal that decision through the appeals courts up to the Supreme Court. If the motion were upheld, the case would be over unless the government decided to begin another case against IBM, which is highly unlikely.

However, a more probable scenario, lawyers close to the case admit, is that the motion to dismiss will itself be dismissed. It is even likely, some sources believe, that the judge would also reject a government move for a summary judgment, although people close to the trial have had hot disputes over what the judge might do if the government does decide to file such a motion.

If both motions are dismissed, then IBM will begin calling the 110 people it presently lists as witnesses for the defense. Some have predicted IBM's defense could take as long as the government's case — and, if it does, the case will finally go to the judge for a decision some time in 1981 — 12 years after it was filed.

Edelstein has indicated he will probably take at least a year studying the evidence before making a ruling; then the long, drawn-out appeals process could start.

Now, here's help with your proposal

Now, here's everything you need to create a winning proposal—all in one place. "How to Create a Winning Proposal", a 250-page roadmap to proposal preparation.

- **Proposal outlines, contents checklists, sample forms, and step-by-step writing instructions.**
- **Covers solicited/unsolicited proposals, business plans, R&D, bank and grant proposals**
- **Easy to use—no theory, just practical "how to" methods that work**
- **Three basic formulas to estimate the time, materials and staff required to accomplish your proposed project**
- **Government procurement—contract opportunities, new policies, requirements and benefits**

Regardless of the size or scope of your proposal, **How to Create a Winning Proposal** is guaranteed to help you. In 19 valuable chapters, you get everything you need to plan, organize, write and submit a winner.

Order a copy now! \$65 prepaid includes UPS delivery inside USA. In Calif. add \$3.90 tax. For outside USA, \$76 (cashier's check only) includes air delivery. C.O.D. orders call 408/425-8444.

5th
Printing

Mercury Communications Corp.
730 Mission St., Suite 101
Santa Cruz, CA 95060

Please send me _____ copies of "How to Create a Winning Proposal" @ \$65.

Name _____

Address _____

City _____

State _____

Zip _____

☐ Check enclosed ☐ Master Charge ☐ VISA/BankAmericard

Card No. _____

Exp. Date _____

Signature _____

In IBM Antitrust Trial Motions Fly as End of U.S. Case Approaches

NEW YORK — A flurry of motions have been made recently in the U.S. vs. IBM antitrust trial as the parties prepare for the end of the government's presentation and the start of IBM's turn on center stage.

The four motions filed in the last few weeks — one by the government's trial team and three by IBM's — relate to reopening certain discovery procedures used to collect evidence in preparation for trial.

The government particularly wants to conduct depositions of 110 IBM witnesses. Last summer, Justice was granted the right to take 24 IBM witness depositions. The additional depositions were requested after IBM's January filing of a revised witness list containing 152 names. The government noted in its motion that only 15 of the original 24 witnesses are included in the new list, thus obsoleting the deposition power it obtained in June.

The government said it would not request a delay in the trial if the motion is granted and stated that the depositions could be taken while IBM's case is in progress.

IBM Response

IBM opposed the new depositions with a 32-page response, a 17-page affidavit by Thomas D. Barr, head of its trial staff, and three motions. In the response, it asked Judge David N. Edelstein to "put an end to [the government's] attempts to turn the clock back four years and to reopen — for itself only — discovery that should have been finished long ago."

The government has already had ample opportunity to depose the IBM witnesses because all 110 names were on the original IBM witness list filed in June 1974, Barr said.

Based on the length of time and the manpower used to conduct depositions of other IBM witnesses, Barr estimated: "We are talking about somewhere in the neighborhood of 2,000 to 2,500 lawyer-days or something around 10 lawyer-years of discovery" if the government's motion is granted.

Move to Reopen Discovery

Keeping pace with the government, IBM also filed its own motion to reopen discovery, although it added the qualification that the motion need not be considered by the court and will be withdrawn by IBM if the government's motion to reopen discovery is denied or withdrawn.

IBM's current motion asks that it be allowed to conduct additional discovery of government agencies, competitors and government witnesses to cover issues that were introduced by the government "subsequent to the time those witnesses testified but which relate to their testimony at trial."

The government responded that IBM's motion is "a tactical maneuver to leverage the denial of the plaintiff's motion on a pretense of inequality of treatment and on its fabrication that 'new issues' have been raised by the plaintiff."

If IBM's motion were granted, it would considerably lengthen the trial while the government's motion offers the opportunity to shorten it because it

would "facilitate economical cross-examination," the response said.

Along with the motion to reopen discovery, IBM also filed motions asking for a continuance, or delay, in the trial until discovery is completed and requiring a statement by the government of the issues claimed to be the subject of this litigation.

The motion included a qualification similar to the one in IBM's motion to reopen discovery: "It should be emphasized that the continuance sought here is in direct response to plaintiff's motion to reopen discovery and take the depositions of some 110 witnesses."

The statement-of-issues motion is a

little more complicated and loosely related to IBM's motion last December that asked for a mistrial on grounds that the government changed the issues on which the case is being tried [CW, Jan. 9].

IBM contends the case the government has spent the last two years presenting "is vastly different from the presentation and claims actually made by the [government]."

The statement quoted Edelstein in a remark made on June 5, 1975 when he denied a prior IBM motion for a statement of the issues. Edelstein then said, "the court will not forego further efforts to bring the issues into sharper focus. Thus, during the course of the

trial the court will remain alert to every opportunity afforded by the emergence of this case to further negotiate and define a refinement of the issues."

The government responded that both motions were "part of a series of recent motions concocted by IBM counsel to put off indefinitely the adjudication of the substantive charges."

"IBM's continuance motion, like IBM's sham motion for a mistrial... IBM's unfounded motion for reopening of discovery... and IBM's dilatory motion for a statement of the issues... should be denied," the government charged.

Edelstein has yet to rule on any of the motions.

CICS Users:

You've just written your last on-line data entry program.

KEY/MASTER is the CICS application development system you've been waiting for. With KEY/MASTER data entry applications are designed and tested right at the terminal. There's no coding, no compiling, and no delay.

Easy to use.

All you specify is the format of the data to be entered and the editing rules. KEY/MASTER does the rest. All the logic needed to accept data, edit it, and store it in KEY/MASTER's own on-line database is built in.

If you've wanted to bring your key-entry facilities on-line, now is the time. KEY/MASTER's features are superior to all known key-entry systems (whether keypunch, key-to-tape, or key-to-disk) and require no user programming.

Ready in minutes.

KEY/MASTER can be installed and ready for use in minutes. It works with both CICS and CICS/VS and runs under any operating system. All you need is 32K of virtual or real storage and one or more local or remote 3270 (or compatible) terminals.

No risk!

KEY/MASTER can be leased for \$295 per month or purchased for \$12,000. Each system comes with a 30-day no-risk guarantee. After 30 days, if you're not convinced that KEY/MASTER is the ideal system for developing on-line data entry applications, simply return the system for a full refund.

We'll be glad to tell you more, give you a demo, or sign you up for a 30-day trial. Just clip the coupon or call.



turnkey systems inc.
111 east avenue
norwalk, connecticut 06851
(203) 853-2884/telex 964351

tsi international, ltd.
19 bedford row
london WC1R 4EB, england
01-405-7304/telex 23302

839 mitten road
burlingame, california 94010
(415) 697-1833

additional
representation
worldwide



- ☐ We're interested. Send a brochure.
- ☐ We'd like a demo.
- ☐ Schedule us for a 30-day trial.

Name

Title

Company

Address

City State Zip

Phone

ADP Onsite Service Combines DDP, T/S, FM

(Continued from Page 1)

by an ADP Maintenance Operations and Diagnostic (MOD) center in Ann Arbor, Mich.

This remote operation reduces the need for the user to have a trained operator, ADP said. The MOD center automatically responds to problems such as a systems crash and brings the local Onsite processor back up.

Furthermore, the center automatically runs error and diagnostic programs in parallel with user programs to monitor the functioning of the system.

An Onsite technician at the MOD center can manually take over system operations remotely if that is required, ADP added. In fact, while the user can operate the system himself, the MOD center is capable of operating the system remotely except for the mounting

of tapes or disk packs and changing line printer paper, ADP said.

The local Onsite processor can run all the software developed by ADP for its time-sharing network, which is based on 25 Decsystem-10s. The main processor has a 150 nsec bus cycle time and a 300 nsec microstore cycle time. It has a 512-word cache memory and a 2K-word by 96-bit microstore instruction set.

The unit also contains a custom communications processor and a maintenance processor that is based on an 8080 microprocessor with 8K of programmable read-only memory and a 1K random-access memory. This maintenance processor is linked to the MOD center.

Up to 32 users can be linked to each Onsite system and each system can have up to 2.5M bytes of main mem-

ory and up to 1.5G bytes of disk storage.

The local Onsite system provides 110- to 300 bit/sec terminal support for either hard-wired or dial-up ports. In addition, 1,200 and 2,400 bit/sec dedicated ports are available, as are 1,200 bit/sec dial-up transmissions via modem.

Each Onsite computer system is linked to the ADP teleprocessing network using the firm's proprietary packet-switching scheme.

The service allows a user to communicate with the central sites in the ADP network, as well as establish a distributed network of Onsite processors that can all communicate with each other, ADP said.

Onsite systems may cooperate with each other since files and programs may be moved either between Onsite systems or between one Onsite system and the central site with a single command, ADP said.

New Way to Deliver

The use of Onsite computers at the user site is basically a new way to deliver ADP's services, according to Ken Draeger, president of the firm's Network Services Division. By allowing the user to process ADP applications programs on an Onsite system at the user's facility, the user avoids high communications charges, he explained.

But while the Onsite processor located at the user site is in many ways the key to the service, Draeger emphasized that the firm "is definitely not going into the hardware business."

With the Onsite processor, the user receives an administrative package, a full range of utilities software and a plain English command language, Draeger said.

Fortran, Cobol and Basic are provided with the basic Onsite service, as are the following proprietary packages:

- Information Processing Language, a data management language for devel-

opment of transaction-oriented systems.

- Time Series Analysis and Modeling, a system for displaying and managing time series data, such as company sales data, for analyzing financial and economic data.

- Financial Modeling Language, an English-like language for financial modeling.

- ADP Project Evaluation and Control System, a package for scheduling projects such as product launchings, capital equipment installations, plant construction and the development and installation of DP systems.

In addition, a series of graphics packages is available on the ADP network and test-processing capabilities such as entry, editing and formatting are also available.

Onsite users can access the ADP series of data bases covering such fields as finance, securities analysis, foreign exchange rates, demographics and chemistry for use either with applications packages or on a stand-alone basis.

Entry-level Onsite service includes a processor that can service up to 16 local users, 90 million characters of disk and a 300 line/min printer at the user site in addition to all of the software. The service also provides the user with 20 hours of connect time to the central system each month, 100K characters of disk and approximately 20,000 computer resource units at the central site.

Such a service, available only on a 24- or 36-month contract, costs about \$10,000/mo, ADP said.

However, the firm noted users would then be billed for any additional resources used on the network or at the central site and indicated the typical entry-level user would probably end up spending between \$12,000- and \$20,000/mo.

ADP's Network Services Division is at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

1960 payroll?

It's not easy trying to run half-astute, tread 1960 payroll, personnel packages on a 370...

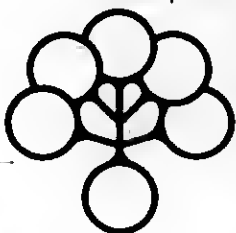
Wang users don't have the problem. Wang payroll/personnel/ERISA software is specifically designed for whatever 360/370 OS, DOS, VS, IMS environment you have...

For more, just call Joe Nestor (617) 851-4111, Wang Laboratories, Inc., Lowell, MA. 01851.

WANG

Announcing RTP The DOS/VS Resident Transient Program...

- ☒ Eliminates the Main DOS/VS Bottleneck
- ☒ Increases throughput 10 to 20%
- ☒ No changes to JCL
- ☒ No need to Re-IPL
- ☒ Not release dependent
- ☒ Runs without operator intervention
- ☒ Also runs under VM



Value Computing Inc.
The Computer Operations Company
Please send me more information about RTP
— The Resident Transient Program

NAME _____ COMPANY _____
TITLE _____ PHONE _____
ADDRESS _____ CITY _____ STATE _____
ZIP _____ CPU _____ OPERATING SYSTEM _____

Mail to: VALUE COMPUTING INC.
300 VCI Building, W. Marlin Pike
Cherry Hill, New Jersey 08002

Or Call toll-free
800-257-8242

2078

IBM Ships 30 Series CPUs

(Continued from Page 1)

again, I'll trust IBM with this one," Colonel Phillip J. Wendt, commander of the Air Force's Data Services Center in the Pentagon, said.

The Air Force's 4M-byte 3032 will replace a 2.5M-byte 360/75, although the data center has been using a 370/168 while waiting for delivery of its 30 series CPU. The 360/75 will be retained "for other tasks," Wendt noted. The 3032 will be used "almost exclusively" for modeling and simulation tasks, he said.

16-Channel 3033

Singer is leasing its 4M-byte, 16-channel 3033 to replace a 3M-byte, 7-channel 370/168, which it will sublease to another user. The CPU will provide the horsepower for a centralized communications system with 17 high-speed data lines. Singer is looking forward to "excellent cost/performance benefits" and considers itself "fortunate" to receive the first 3033, a spokesman said.

Singer chose the 3033 because of the processor's increased capability, the additional communications capacity

and the increased memory.

The Credit Life Insurance Co. ordered its 3031 to replace a 370/145. (The firm cancelled an order for a 370/148 when it bought the 3031.) The 3M-byte, 6-channel CPU will be used "to anchor a distributed processing system," according to David Halley, a senior vice-president with the firm.

"We are a very centralized company, but are developing a branch system that is designed around taking our computer services close to our customers," he said.

Both Singer and Credit Life placed orders for the 30 series CPUs on the day of the respective announcements. It is not clear when the Air Force placed its order, since The General Services Administration (GSA) handles computer procurements for the Air Force, and according to Wendt, the GSA asked the Air Force if it would accept the 3032 as a replacement for a 370/168 the data center previously had on order. "The new technology came out, and the GSA was interested in knowing if we would accept the 3032. Of course, we would!" Wendt said.

Internal — Not Vendor — Problem

DPers at USGS Complain Systems Unreliable

By Brad Schultz
CW Staff

RESTON, Va. — A number of U.S. Geological Survey (USGS) DP users are claiming that DP systems at three sites are inefficient and unreliable because they were acquired without appropriate understanding of user needs.

Chief Geologist Dallas Peck has formed a special committee to investigate the charges and consider alternative courses of action. Although the USGS' Geologic Division concluded last November that the systems were "not cost-effective and should probably be replaced in the near future," spokesmen now indicate USGS is stuck with ill-suited equipment and software it cannot afford to replace.

Blame for the dilemma has been laid mostly on the USGS' own procurement staff in the Computer Center Division, but some users also consider the systems and their documentation to be inherently ill-designed.

About a year ago, USGS installed three Honeywell Information Systems, Inc. Multics dual 68/80 systems under a \$15 million contract with HIS' Federal Systems Operation. One system went to the survey's headquarters here in Reston, and the other two went to Denver and Menlo Park, Calif.

Each dual 68/80 CPU has 512K words of memory, a Datanet 6632 front-end network processor, six to nine disk drives, tape and bulk storage subsystems, a printer, a card reader and card punch; each can support 60 to 80 terminals.

The systems are used by geophysicists and data analysts to assist federal decision making related to land use, urban planning and development, construction practices, environmental and health problems and earthquake, volcanic and other natural hazards.

According to Geologic Division sources, the systems were troublesome from the time they were installed. Responding to a branch chief's consensus that the Multics systems should probably be replaced soon, Peck formed an Ad Hoc Review Committee on Geologic Division Support and named Bruce Hanshaw, from a third USGS division, Water Resources, to chair its investigations.

Cause of Contention

When contacted, Hanshaw first denied any knowledge of Multics failures, but later conceded that "Multics is a bone" the Geologic Division is picking with the Computer Center Division. The Geologic Division has decided to stay with the systems despite the problems, largely because the HIS contract will not expire for years, he added.

Hanshaw and other USGS sources familiar with the Multics procurement process have not indicated that HIS has failed to respond to the user griefs. "As far as I know, there has been a complete and open conversation between both the [USGS] and [HIS] on all phases of the problem," a Denver geophysicist said. Rather, the situation tends to be seen as an internal "managerial" concern of the USGS.

Hanshaw said the position of Geologic Division DP coordinator has been created at USGS Denver. Another Denver geophysicist, Joe C. Cain,

noted that the post has been created as a direct result of the Multics failures there.

Users of the systems were willing to comment on the situation, but stipulated that their names be withheld. One source, a Denver site applications programmer, said "the turkey's been up and down like a yo-yo."

"They keep telling us that it's environmental . . . and wind problems and a few things like this . . . but — as many times as that thing's been up and down — it's my belief along with many others around here that they've had some severe hardware problems," the programmer contended.

"When we first got on this thing, the

Fortran compiler wasn't worth a hoot. It still isn't right now. [The HIS] idea of a file is completely screwed up, [being] what most people in the [real-time] data world feel is almost impossible to work with: multisegmented files," he continued.

Many Changes Needed

The systems are "completely tuned to terminal users. No batch input or output. Consequently, a lot of the things that you need to do batch — which are production jobs — cannot be done on the system without a whole lot of rigamarole and setting things up. [We're] slowly getting it done, but it's taking a whole heap of software changes to the

system," he added.

The Multics system was developed in conjunction with MIT to handle classified U.S. Air Force work; it has an elaborate repertoire of security features.

According to some users, the USGS applications do not need such a high level of protection, and the added complexity has severely dampened system performance.

"You've got your I/O equivalent of . . . an access control list . . . and nobody knows how to manipulate it. Consequently, most people have a hell of a time trying to work using other people's programs because the system

(Continued on Page 10)

The video terminal professionals
of Datamedia

working wonders



at thousands of user sites worldwide

Designing a video terminal family is only half the battle. What separates Datamedia from the others is our ability to deliver a reliable product — consistently. • And that's just what we've been doing since 1968. • Delivering a family of general-purpose alphanumeric display terminals. • Providing performance-proven products at a moderate price. • Establishing, with our family of Elite video terminals, a new standard in terminal reliability. • Helping users in industry, business services, government, education, medicine, and research around the world get what they want from their video terminals.

Datamedia Video Terminals.
Stand in front of them;
you'll see why we stand
behind them.

**Datamedia
Corporation**

7300 N. Crescent Boulevard
Pennsauken, NJ 08110
609-665-2382
TWX: 710-892-1693
Sold throughout North America and the world

I'd like to have more about Datamedia video terminals in front of me.

☐ Please have a salesman call me to discuss my specific needs.
☐ Please send me information on your complete product line.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

WALK AWAY LEASES

for IBM 3031 3032 3033

158 168 and most other
Processors and Peripherals

- Lowest Lease Rates
- Contract Flexibility
- Simple Documentation

alanthus leasing company

1500 E. 12th St., Suite 100, Columbus, Ohio 43215
414-461-5496

CBC COMPANIES

A new name in front of an old reputation for reliability. We have a **CONTINUOUS INVENTORY OF TERMINALS** and we **STOCK AND INSTALL OPTIONS**. Immediate delivery on most items.
The popular ones

DEC

- Writer II (LA-36 Printer Terminal) \$1,600 ea.
- Writer III (LS-120 Teleprinter) \$2,600 ea.
- Scope (Video Display Terminal) \$1,500 ea.
(Model VT-52)
- Printer I (LA-180 High Speed Printer) .. \$2,690 ea.

1. ... IAL (614) 461-5496.
2. ... DESCRIBE YOUR NEEDS.
3. ... DEPEND ON THOSE WHO USE
DIGITAL EQUIPMENT FOR YOUR BEST
ANSWERS, PRICE AND DELIVERY.

CBC COMPANIES
170 E. Town Street
Columbus, Ohio 43215
Call-614-461-5496

House Gets Post Office Bill With R&D Funding Deleted For Electronic Mail, EFT

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Postal Service Act of 1977 went to the floor of the U.S. House of Representatives last week without specific research and development funding for electronic mail or electronic funds transfer (EFT) system.

Representatives Lionel Van Deerlin (D-Calif.) and Charles W. Whalen Jr. (R-Ohio), the Justice Department and the Computer Communications Industry Association (CCIA) successfully combined forces here to encourage the bill's sponsor, Rep. Charles H. Wilson (D-Calif.) to delete all references to electronic mail and EFT.

Those opposed to H.R. 7700 feared the proposal — which would have required the U.S. Postal Service to spend at least 2% of its budget from the preceding year on R&D, including EFT and electronic mail, by 1980 — would have turned over these developing technologies to a regulated monopoly rather than allow them to be offered competitively [CW, Feb. 27].

In his report to persuade Wilson to omit references to electronic mail and EFT from H.R. 7700, Van Deerlin asked the House Rules Committee to refer at least the R&D portion of the bill to the House Subcommittee on Communications, which he chairs. The congressman was aided in his efforts by a mailgram sent to the 16 members of the Rules Committee by the CCIA.

Adverse Consequences

Because of the Postal Acts "extremely adverse consequences for the development of modern privately owned electronic information transfer systems within the U.S., the CCIA urged the Rules Committee to let Van Deerlin's Communications Subcommittee give it

a going over.

"Although this legislation can virtually eliminate the availability of capital to private-sector companies offering electronic message and information transfer services and stifle further technical development by the private sector, as well as seriously impact existing and potential providers, no testimony has been heard from the industry that is now and will be providing these services or from the customers they serve," the CCIA said in its mailgram to the Rules Committee members.

Potential Unemployment

The industry association decried the commitment of public funds — as much as \$300 million — for the development of the Postal Service's electronic systems on the basis that these monies would help the post office destroy competition and cause unemployment in these developing industries. The CCIA stated its belief that the Postal Service will extend its monopoly under the Private Express statutes to include EFT and electronic mail.

CCIA President A.G.W. (Jack) Biddle warned that H.R. 7700 would have a detrimental effect on the House Communications Subcommittee's effort to rewrite the Communications Act of 1934 and on the Federal Communications Commission's inquiry into competition in the telegraph and mailgram business.

In its present form, H.R. 7700 still contains a provision directing the Postal Service to study alternative means of handling the mails. The House Post Office and Civil Service Committee hopes to bring the bill up for a vote by the House following Congress' Easter recess.

Users Claim Unreliability

(Continued from Page 9)

is too secure," one user explained.

In addition, the remote job entry "takes too much power — it could break the system security," he continued. "So [USGS management was] kind of hesitant about hanging on to RJE... We've got about \$40,000 worth of tape drives over here in our RJE [facility], but because they're so damned scared of their system security, they won't allow our tape drives to do anything except act like card images," that user said.

"The documentation that Honeywell provides is very lousy. I think everybody would agree on that point," a Menlo Park user said.

A Denver user did agree, adding "there are absolutely no diagnostics or error messages that make any sense on this damned thing... The system is just [trying] to do too much. It tries to remember everything from one process to another... internal variables get all screwed up because they don't get cleared to zero on rerunning a program."

Another Denver user said HIS people, "when they originally analyzed these problems, said it'd be two to

three years before we'd even begin to fill up the CPU load, and we're already running quite consistently during the daytime at 100% CPU utilization... This problem coupled with... having too small a front-end [has overloaded] the system."

Still another Denver user said the Multics system there is continually swamped with tasks, and he is thus compelled to send his programs to the Reston facility for execution.

CDC System Faster

By its own tests, the Geologic Division has compared 68/80 performance with that of other vendors' CPUs. A Control Data Corp. Cyber 74 was found to execute a Fortran analysis program in 375 seconds, while the 68/80 took 2,860 seconds.

Computation costs for the Cyber were put at three to six times less than 68/80 costs.

An internal memo revealing these findings also noted the HIS CPU was possibly impaired by a faulty Fortran compiler and recommended HIS equipment not be used by personnel until some of the performance problems were solved.

In Greater Philadelphia Area IBM Users Unite to Establish Backup DP Site

By Tim Scannell
CW Staff

PHILADELPHIA — More than 40 large-scale IBM users have banded together to form an organization with the goal of establishing a backup computer center that can be used by member corporations in the event of a data center disaster.

The Large-Scale Computer Users Group, headquartered here and comprised of banks, insurance companies, chemical manufacturers and public utilities, hopes to create "a fully functioning, totally equipped data center of the magnitude of a 370/168 or a 3033," according to Morton B. Comer, DP vice-president of the Provident National Bank and group chairman.

Most major corporations are "spending multimillions of dollars a year to keep their networks and computer systems going," Comer noted. In the event those systems are unavailable "it can literally bring their companies to a grinding halt and, in some cases, they probably can never recover," he said. Membership in the users group includes such companies as Burlington Industries, the RCA Corp., Conrail, Dupont, and others who rely on the continuity of their DP centers for survival, Comer indicated.

The proposed data center will be located in the Valley Forge area of Pennsylvania, close to highways and motels. Besides having a CPU and related peripherals, the center will include telecommunications facilities, an uninterruptible power supply (UPS) and state-of-the-art physical control and detection apparatus, Comer said.

If a disaster should occur at one of the member sites, the member would assume control of that portion of the data center containing the backup CPU and have access to 10,000 square feet of air-conditioned floor space and 2,000 square feet of office space that includes desks, phones, file cabinets and tape racks.

According to Comer, a disaster is "any loss of member user's processing capability projected to be for a prescribed period of time due to: a) destruction of CPU or key peripheral equipment; b) extensive damage to the electrical switch gear, water supply equipment, air conditioning or other environmental or power equipment; or inaccessibility of the computer center."

The user's group reserves the right to determine whether a disaster has occurred, Comer said.

Solution, No Site

At this point, the alternate computer site is a "solution looking for a vendor," Comer pointed out. Members of the users group are reluctant to absorb the total cost of building and maintaining a dedicated center.

The group is currently negotiating with two vendors who have expressed interest in building the backup facility. Both vendors operate data centers in other sections of the U.S. and view the users group's idea as an opportunity to generate a guaranteed cash flow as they establish a large data center in the Philadelphia area.

Since both companies under consideration already have other sites they use on a full-time basis, the alternate site would be used primarily as a

backup for the users group. The vendor would be free to "sell off the excess capacity" of computer time when a user wasn't utilizing the site in times of disaster, Comer stated.

Under such a system, the users group would pay less than \$140,000 to \$160,000 per month, or approximately 55% of the total cost to operate a center of this size, Comer added.

Comer acknowledged that there are other companies and organizations that offer backup facilities to corporate members. Most of them, however, are based on an "empty shell concept" and "offer a 1950s' answer to a 1980s' problem," he said.

Although other organizations have

the available floor space and the proper environment, "it may take five, six or seven weeks to ship equipment in and set it up." In that time "a company could come to a halt," he claimed.

Viable Solution

The idea of establishing an emergency backup computer site is a viable solution to the problem, Comer stated. A group in New York, the Shared Contingency Computer Center (SCCC) [CW, Feb. 13], has also expressed interest in forming such a center and several of its members have consulted the users group along these lines.

"The old agreements of 'In case I'm

down I'll come to you, if you're down you come to me' don't work anymore. You can't move communications lines and you can't move data sets that easily," Comer said.

If and when the data center is erected, each member will pay a monthly fee to use the site should a disaster occur. The approximate costs will be \$4,000 for a user requiring 370/158 backup, \$6,000 for 370/168 or multiple 158 backup and \$8,000 for 3033 or multiple 168 backup, Comer commented.

Additionally, each member will pay a proportionate share of the telecommunications costs, plus some minor administrative expenses.

Good performance measurement takes more than luck

QCM/SPM VS. HARDWARE MONITORS

QCM's Systems Performance Module performs most hardware monitor functions, yet gives you the operating system software measurements that only an event-driven monitor can provide.

QCM/SPM VS. SAMPLING SYSTEMS

QCM's Systems Performance Module can monitor what today's sampling systems can not, such as disabled code, control unit activity and shared DASD interference.

QCM
"the others just
don't measure up"

QCM/SPI VS. ONLINE PERFORMANCE MONITORS

If you want to look at and resolve your real time problems, QCM's Systems Performance Interrogator contains event driven measurement functions, not just control block chasing.

QCM/JAB VS. SMF/RMF DATA REDUCERS

QCM's Job Analysis and Billing is the only system that supplements SMF and RMF data to provide a truly accurate job accounting and capacity management system.

I would like additional information on the most comprehensive and complete family of products in CPE.

Name

Title

Company

Address Telephone

City State ZIP

Operating System ☐ MVS ☐ VS ☐ OS



**DUQUESNE
SYSTEMS INC.**

1511 Park Building
355 Fifth Avenue
Pittsburgh, Pa. 15222
(412) 281-9055

SSA Starts Patching DP Center Security Holes

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Social Security Administration (SSA) is implementing security recommendations made by the General Accounting Office (GAO) after its auditors compromised the computer operation last month and after ignoring an in-house computer-crime vulnerability study for more than 10 months.

In the past two weeks, the agency has initiated efforts to comply with 10 of the 11 GAO suggestions intended to improve the security of the computer system governing the benefit program for blind and disabled Americans, an SSA spokesman said. The SSA was prompted to take security actions when Sen. Abraham Ribicoff (D-

Conn.) made public the fact that GAO auditors removed from the computer facility 38 reels of magnetic tape with the names and addresses of 1.14 million citizens receiving Supplemental Security Income (SSI) without raising the suspicions of security guards [CW, March 13].

Now, an in-house study of computer security in the SSI program has come to light. It indicates that many of the recommendations made by the GAO were also suggested by a team of 39 SSA employees last May.

Dated May 9, 1977 and entitled "A Study of Computer-Related Crime Vulnerability in the Supplemental Security Income System," the study pointed out the weaknesses in the SSA's storage and handling of tapes

and warned that the physical security of the telecommunications complex devoted to SSI needed attention.

The internal study also voiced the one GAO recommendation that the SSA is still considering: that security background investigations be conducted for all personnel in sensitive computer-related positions.

Scope of In-House Study

Prepared by SSA representatives from all parts of the agency at the request of the SSA systems security officer, the report went far beyond the GAO in its recommendations and advocated the creation of an internal audit group that would answer only to the agency's commissioner.

The GAO auditors who succeeded in

bypassing the SSA's new \$500,000 security system have never seen this internal report. Exactly what became of that intensive, three-week effort last spring is unclear.

The SSA was unable to locate this particular report last week. A spokesman for the agency said, however, that the SSA completed a risk analysis of its computer operation in November and is preparing its report and recommendations for its parent agency, the Department of Health, Education and Welfare (HEW).

Several security projects are under way, and many of the agency's security problems will be solved by the new facility now being built and scheduled to open in 1979, the spokesman stated.

The analysis by SSA employees covered both unauthorized access and modification of data and program as well as the physical security of the DP equipment used to process SSI claims, according to the study.

"Due to the atmosphere of extreme pressure from sources such as the courts, Congress and the public for more responsive processing, safeguards were often left out of the SSI system design," the 65-page report stated. "The time has arrived, however, for additional safeguards and strengthening of controls already in place."

"Management must decide what is to be secured, against what hazards, and must determine the trade-off between risk of loss and the cost of protection," the study said. "The overwhelming finding . . . is the absence of the ability to control and audit activity," it stated.

The study team found that terminal users and the initiators of SSI transactions in field offices were not required to use personal identifiers and so were not personally accountable for their actions.

Like the GAO auditors, the team also discovered that a lack of awareness and interest on the part of security guards resulted in lax enforcement of procedures established to prevent fraud and theft.

Threat of Sabotage

"The lack of sufficient physical access control over hardware, including terminals and the central computer facility which is the heart of the nationwide telecommunications system, may result in sabotage," the report warned.

The GAO auditors proved what the internal SSA team cautioned against: that the absence of strict administrative control over tape access could result in malicious and deliberate destruction or modification of program data tapes.

The SSA team further expressed the need for comprehensive documentation and review of which programmers and analysts were allowed to do what to applications programs and operating systems. Failure to control these people and tasks could result in fraudulent payments or denial of service to a qualified beneficiary, the study stated.

In addition, the lack of systematic program logic review at the coding level invites the fraudulent manipulation of computer programs, the report said.

The SSA team stressed the need for a permanent internal audit group to discover and correct security problems.

FEW THINGS IN LIFE ARE PERFECT

But one of our teleprocessing monitors is... We know our MINICOMM is the best teleprocessing monitor around for small 360/370 DOS and DOS/VS system users. We wouldn't have dared to claim it was perfect. But our users did!

They gave it a perfect 4.0 rating for "overall satisfaction" in the 1977 Datapro software survey. Of the 199 packages evaluated in the survey, only 2 others achieved this honor (neither has anything to do with teleprocessing).

MINICOMM also scored a perfect 4.0 in "ease of use" and a 3.9 in "throughput/efficiency"!

We won't try to recite all of MINICOMM's unique advantages here.

We'll just say that if you're going to be a first time user or are unhappy with your present monitor—and have at least 24K of core and a day or two for installation and training—we can have you on-line and loving every easy minute of it.

So ask yourself: when perfection is so close at hand, does it make sense to settle for less?

Our other two monitors also draw high praise from users. Get the facts on our entire MONITOR IV

family of teleprocessing monitors. Today... call or write! (calling is faster!) Brochures on products filling your precise requirements will be in the mail the same day.

BETACOMM: Designed for the medium to large size 360/370 DOS/VS user with multithread, multitask requirements.

INTERCOMM: The most advanced general purpose on-line TP monitor system for 360/370 OS and VS environments.

MONITOR IV
INTERCOMM

MONITOR IV
BETACOMM
DOS & DOS/VS

MONITOR IV

informatics inc

Software Products

World's Leading Independent Supplier of Software Products

Member SIA Software Industry Association

21050 Vanowen St., Canoga Park, Calif. 91304 (213) 887-9121

New York (212) 489-7200 Washington (703) 821-5900 Chicago (312) 298-9300 Los Angeles (213) 822-3552

For Grammar School Pupils

St. John's Working on English Skills Program

By Tim Scannell
CW Staff

JAMAICA, N.Y. — Educators here at St. John's University have developed the first volume in a series of experimental computer programs designed to help grammar school students learn English skills.

The first volume in the computer-assisted instruction (CAI) system is composed of 96 separate lessons, geared for the fifth-through eighth-grade levels, according to Dr. Robert Williams, assistant to the academic vice-president and system coordinator.

"It is basically a teaching set of programs... written 'for American students seated in American schools,'" Williams said, explaining that each lesson attempts to teach a very small tidbit of usage and/or grammar to a child at his own particular level and speed.

The system was structured to work in conjunction with a teacher's educational program, Williams said. After an instructor has lectured on a certain facet of the English language, "the child will sit down and go through an exercise on the computer. We are not presenting this as something to drive the teacher away but something the teacher can use as an auxiliary to the normal work schedule," he said.

Written in Basic

More than a year old, the first volume of the program more than a year old, was written in Basic language using the Dartmouth time-sharing system available at the university. The programs, however, were fashioned to operate on any microprocessor or mini-computer that uses Basic and can support terminals, Williams continued. "Our whole point was to build simple programs that would generate sentence exercises for practices and hopefully to have an item that anyone... could put up without too much trouble."

Each lesson in Volume One consists of a series of multiple-choice and "fill-in" questions, Williams explained. The lessons can be run in any order the child wishes because there is no specific "file structure" to the programming. "The principal thing we're working with is to avoid a 'systems' approach so that people who want to use this can put up whatever programs they want," he said.

The CAI system is designed to accommodate the slow learner as well as the student who advances quickly, Williams pointed out. "Our concept of handling lessons with children would be to let them on [the system] perhaps

twice or as much as three times a week, and we're talking about a 10- or 12-minute sitting per session. We don't see it as the type of subject matter that somebody would pursue for a half hour every day. Nobody should be overtaxed on something like that," Williams noted.

On the other hand, the system is being built "so that a youngster who wants to sit down and tear through it on his own could pretty well navigate the series just going from one program to another. It has a development sequential approach," Williams said.

The academic staff at St. John's is currently "working like crazy" to produce the second volume, Williams

said. "Many of the programs will actually churn out six or seven tightly related lessons and/or exercises, but again, they're all stand-alone programs."

Volume II Capacity

When Volume Two is completed, around May 15, "we'll have a load-up of about 200 lessons (including Volume One) which will be worthy of a year, a year and a half, perhaps two years of study for an elementary school kid depending on how a principal or a teacher might want to organize around it," Williams added.

Although the system is not designed at this point to teach English as a sec-

ond language, "we are contemplating a version of it for that," Williams observed, "but, the earliest we could have that type of program would be in about two years."

Williams has made tentative arrangements with school systems in New York and Michigan concerning implementation of the CAI system. The Archdiocese of New York Computer Center is even looking at Williams' material for possible use throughout its school system in New York, Williams stated. However, "our concern right now is to get the second volume written. We aren't under any pressure to push it in the marketplace at this point."

OPTIMIZER III Eliminates program problems before it's too late.

From Capex, a dramatic new approach to COBOL programming.

Programs that apparently have been thoroughly tested sometimes fail... unpredictably and unexpectedly. And for most programs, there is never a "good" time to fail.

That's where Capex can help, with an exciting new program product we call OPTIMIZER III. If you use COBOL and any of the IBM OS, VS1, SVS or MVS operating systems, OPTIMIZER III can help you produce more reliable, more efficient systems, on time, at lower cost.

Improves Program Reliability

OPTIMIZER III works directly with each COBOL programmer, providing direct feedback about what the program *actually* does. Concise, easy-to-use information is provided right on the source program listing to help spot otherwise hidden logic or performance problems and to highlight untested logic. Using OPTIMIZER III, problems are found and corrected *before* programs go into production so there are fewer failures, fewer missed production schedules, fewer reruns.

Speeds Problem Diagnosis

OPTIMIZER III helps minimize the impact of program failures. It "traps" program failures, analyzes them, and then provides the information needed to diagnose the problem. Whether programs are in development or in production, problems can be diagnosed quickly, directly by COBOL programmers, using OPTIMIZER III's COBOL-oriented diagnostic information instead of cryptic hexadecimal dumps. Problems are corrected faster, lost time is minimized, and reliance on special support groups is reduced.

Better Programs Faster

By providing key information in a highly usable form, new OPTIMIZER III works with each COBOL

programmer to produce more reliable, more efficient programs. It provides the information needed to speed program debugging and ensure adequate testing. Programs are developed faster, with fewer compiles, fewer test shots. Printed output for listings, dumps is reduced. And, thanks to proven automatic object program optimization, all programs produced with OPTIMIZER III are smaller and faster, *automatically*.

Results Available Immediately

With OPTIMIZER III, you get better program quality, more programming capacity, more system capacity. And you get them *immediately*. Without changing systems. Without costly retraining. Without increasing cost. You can have new OPTIMIZER III working for you literally in a matter of minutes. To find out how, write or call now: (602) 264-7241.

CAPEX CORPORATION
Atlanta (404) 261-3553 • Boston
(617) 323-6170 • Chicago (312)
596-6550 • Dallas (214) 238-7191
• Los Angeles (213) 923-9216
• New York (201) 262-8888 • Other
offices worldwide.



Capex Corporation
2613 N. 3rd St., Phoenix, AZ 85004
Gentlemen:
Please send me more information
on OPTIMIZER III.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone _____

Model _____

System ☐ MFT ☐ MVT ☐ VSI

☐ SYS ☐ MVS

CA



"I Suppose It's Efficient, But I Miss the Days When We Could Fire Employees Right and Left."

Large University DP Center Opens in Scotland

ABERDEEN, Scotland — Aberdeen University has opened its computing center, one of the largest university computing facilities in the UK.

Built around a Honeywell Information Systems, Inc. dual 66/80 large-scale computer system, the center will serve the needs of users in most departments of the university and, in addition, provide specialist facilities for a number of other universities.

University staff and post-graduate students make extensive use of the facilities for research work in their fields.

Much of the research at Aberdeen involves the use of large data bases. One of the reasons for choosing the HIS 66/80, which replaced an International Computers, Ltd. (ICL) System 4/70, was HIS's Integrated Data Store/II (IDS/II) data base software, according to Russell Henderson, vice-president and general manager of HIS's UK computer operations.

"Aberdeen University has the greatest concentration of data base activity of any university in the UK, beginning in 1971 with implementation of the 1971 Codasyl data base specification. The University Computing Center played a leading part in establishing the British Computer Society group working on the development of the Codasyl specification, and in 1975 the center became a member of the international committee directly responsible for the specification of the Codasyl data definition language (DDL)," Henderson said.

Initially, a network of 100 on-line CRTs connected to the central system by private lines, and located in departments throughout the university gave users access to the computer from their own departments.

The University Computing Center provides a special service for undergraduates based on two separate facilities enabling classes to make extensive use of the computer.

A "cafeteria system" operating through an RJE terminal in the chemistry building is designed to give large classes a fast turnaround of small programs.

A "multiaccess classroom"

equipped with 15 CRTs and two TV monitor screens provides for more advanced computing needs. The multiaccess classroom is intended primarily for honor students, although it can be booked by any department for undergraduate work.

Typical examples of the processing load on the computer by various departments include research on patients' data relating to diagnosis and

the use of drugs or into characteristics identifying women at risk for premature delivery.

The department of arts and social science analyzes wage rounds and union bargaining.

Fortran Interface

Earlier this year, HIS announced that it had entered into an agreement with the university to take over the marketing rights to a fully integrated Fortran interface to

the IDS/II system.

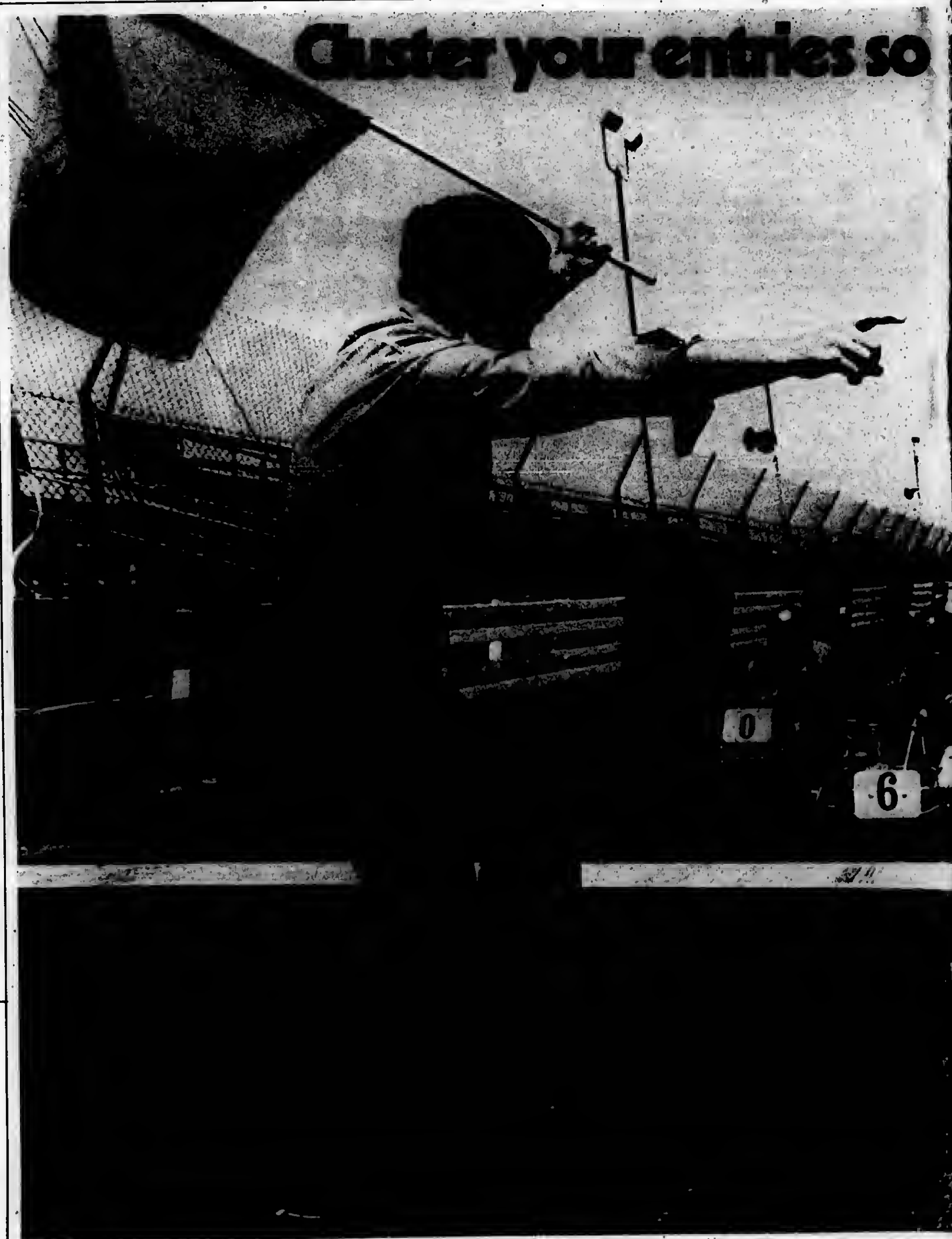
This Fortran interface, in operation at the university, is believed to be the first full implementation of the Codasyl 1975 proposal for Fortran data base work and also the first data manipulation language to be fully integrated into a Fortran compiler, Henderson said.

The configuration of the central system includes 14 200M-byte disk drives as well as the first two Datnet 6678

front-end network processors installed in Europe.

A network linking the computing centers of Dundee, Heriot-Watt, St. Andrew's and Aberdeen universities is now being established.

At present Heriot-Watt operates a Burroughs Corp. 5700, and St. Andrew's operates an IBM 360/40. Dundee University installed a Digital Equipment Corp. System 10 last year.



CATALR

DOS Compiler to
RELOCatable Library

\$750

Get it ON - Call

Marcus Powell Associates
1736 Franklin Street
Oakland, CA 94612
415-893-7598

Could Work as Lock-In Ploy Users Warned on Deals With Trade-In Credits

By Catherine Arnst
CW Staff

WINTER PARK, Fla. — Computer vendors or third-party lessors often promise trade-in credits on equipment in order to tie users into longer leases, but those credits often become nonexistent at the time of an actual trade-in, a recent *CNReport* warned.

The "trade-in credit ploy" is

dangerous because it locks the user into a particular vendor's equipment and because the "credit" is often not documented in writing, according to the International Computer Negotiations, Inc. newsletter.

The ploy is particularly effective because "it is based on reason and financial substance," the report said. It gives the user an "out" if there

is a need to upgrade or if some desirable state-of-the-art developments come along.

However, the credit is generally available only if the new equipment is manufactured or supplied by the same vendor as the original equipment. For example, a legitimate Honeywell Information Systems, Inc. credit may help a user upgrade to a new or larger HIS prod-

uct, but is not much good if the user desires to switch to an IBM product.

With a particularly naive user, a vendor may not even offer to place language guaranteeing trade-in credits into the contract, the report warned. And even when the basic credit provision is included in the agreement, "a vendor's first choice will be to

use extremely vague language that does little to pin down the amount of the 'guaranteed' credit," it added.

For example, a vendor may use a phrase such as "customer may... receive a trade-in credit to be used on any other equipment purchased or leased from the vendor, in accordance with vendor's then-existing trade-in policies." The catch, according to *CNReport*, is that only the vendor has any control over what the "then-existing trade-in policies" are.

A more sophisticated user may demand more specific language, in which case the vendor could offer a "guaranteed" trade-in option credit "formula." This complicated — and valid — formula could be hedged, however, by adding a phrase like "pursuant to vendor's policies."

Discount at Risk

A more likely occurrence would be to apply the credit formula against a purchase or lease price that is above the market rate, the report conjectured. "This is the critical danger" and no user should seriously value any trade-in credit without being aware of this risk," it said.

The result of such a "ploy" would be for the vendor to offer the trade-in credit on the list price of a piece of equipment, but not on the 10% discounted price it normally offers. Consequently, a user may be getting only the standard discount without trade-in credit or the trade-in credit without the discount routinely offered to others.

To avoid such risks, the report recommended that a user:

- Place only limited value on a vendor's offer of trade-in credits, particularly when comparing proposals from different brokers.
- Make every effort to see that the trade-in credit provision in the contract is as specific as possible.
- Ensure that the credit will be fully available despite of any other discount.
- When the time comes to apply the trade-in credits to a new acquisition, ignore them initially and negotiate the best possible discount without the credits.

everybody wins. Mainly you.

You run a wholesale business. Two locations, 3000 customers and growing. But rather than hire more order clerks, you put a computer in your main office. Trouble is, feeding it orders keeps your clerks queued up, your direct line tied up, and your computer idling while your slowest operator taps out 30 words a minute.

We have a solution: A system that features our newest Dataspeed® 40 terminals clustered on a common controller in each of your two locations. Information is entered on a simple keyboard, with your own display forms to guide the operator, then held until all corrections are made and your computer is ready to receive it. Saves time. Avoids billing and shipping errors. Helps reduce inventory. Improves your cash flow.

Solving problems in data communications is an all-out commitment of the Bell System. If you haven't talked systems with your local Bell Account Representative lately, you're missing something.

The system is the solution.



T-SHIRTS

Posters,
Memo Pads,
Sweatshirts, and
General Nonsense...

Free Brochure... 25
cents

THE INCREDIBLE
SYSTEMS & T-SHIRT
COMPANY
Box 2623
Menlo Park, CA 94025

Service to Report on Transnational Data Issues

WASHINGTON, D.C. — A publication and reference service aimed at helping executives of multinational companies evaluate the potential impact of events that affect communications across national boundaries, *The Transnational Data Report* (TDR) will be published here eight times a year by The Wayne Smith Co. The annual subscription price for the newsletter is \$140.

The publisher emphasized that articles will be written by a number of experts, including Russell Pipe, Director of the International Business Action Centre, V.S. in Amsterdam, the Netherlands, and a contributor to *Computerworld*.

Each issue will contain about 20 pages of news and a four-page supplement related to the main feature story.

Services Offered

Four different reference services are being offered, according to the publisher. The first provides new materials — such as reports, studies, monographs and feature articles on such subjects as privacy, Euronet, vulnerability, taxation and national data policies. The subscriber may elect to receive all the materials available each month or to limit the articles received to those dealing only with specific countries. This service is priced at \$350 annually, the firm said.

The second reference service focuses on laws and regulations. Documents such as draft laws, statutes, proceedings, debates, hearings and international treaties will be provided in their original language or translated into English, Spanish or German in some cases, the firm said. Subscribers can be specific about the countries and types of materials they wish to receive.

This service also costs \$350 annually.

Document Search

Two other types of customized services are also being offered and prices will vary. For an agreed-upon fee, The Wayne Smith Co. will prepare research reports and studies or do a document search, in accordance with the subscriber's specifications, the firm said.

TRD will "locate and secure the specific documents you need, providing they are available and within TDR's scope of reference," the company said.

For more information, contact The Wayne Smith Co. at Suite 810, 500 12th St., S.W., Washington, D.C. 20024.

'Bottom Line' Program Evaluates Large Buildings' Energy Usage

MINNEAPOLIS — Large building complexes such as industrial facilities, offices, colleges and hospitals could save 25% or more of their electrical and fuel oil costs annually by employing advanced energy conservation methods, according to a recent survey completed by Honeywell, Inc.

"While before the 1972 crisis, energy usage per square foot in large buildings was measured in pennies, now it is measured in dollars, and that upward inflationary trend hasn't stopped," according to

Erling Hallanger, user representative for Honeywell's Commercial Division.

Recognizing a keen interest among building owners and operators in reducing energy costs, Honeywell initiated the "Bottom Line" program in the fall of 1976. Through an advertising campaign in national magazines, building managers were invited to submit fuel consumption figures and operating data for a free conservation evaluation.

Responses were processed at Honeywell Inc.'s administrative processing center on a 512K H6080 system and returned. Energy records and operating histories were compared with optimum control techniques recommended by Honeywell. The analyses presented "shopping lists" of energy conservation measures to the building owners, together with annual cost-savings potential for each item.

In tabulating the results of survey respondents, Honeywell found that industrial facilities today spend an average of \$1,500 per 1,000 sq ft for energy each year. Churches and schools showed significantly lower energy costs because these buildings are not occupied for as many hours per week as commercial buildings.

Surprising Result

"One surprising result of the survey was that relatively few owners and operators of larger buildings have actually implemented advanced energy conservation measures," Hallanger reported. "If the 964 buildings represented in the survey were to alter their operating plans to observe the optimum, the total energy-saving potential for one year would be \$57 million," he reported.

The three most significant conservation measures suggested were using heat and air conditioning during full occupancy only, reducing ventilation when not needed and adjusting control systems so heating and cooling energy is not used at the same time.

Because of the round-the-clock schedules of hospitals,

Honeywell said the greatest energy savings potential in this group could be realized by allowing slightly warmer inside temperatures during summer months, thereby reducing the load on cooling equipment.

Another interesting result came in the analysis of savings by adjusting controls. "The practice of allowing simultaneous heating and cooling was common until 1973 because it allowed close control of each room and could quickly react to changes in the number of people present," Hallanger explained, "and energy was less expensive then."

"Since 95% or more of existing buildings were designed prior to 1973, upgrading of control systems to minimize concurrent cooling and heating is one of the best conservation techniques," he noted.

"The magnitude of energy-savings potential is huge, and the Bottom Line survey indicates that only a small fraction of it is currently being realized," Hallanger commented. "Roughly speaking, 34 cents per sq ft times the existing non-residential building stock (15 billion sq ft) would yield a \$5.1 billion savings. That's equivalent to 425 million barrels of crude oil per year that could be saved through better conservation practices."

"We hope these survey results inspire the building owners and operators who participated to implement broader energy-savings practices," Hallanger said, adding that the free Bottom Line analysis is still available to building owners who write Honeywell's Commercial Division in Minneapolis.

NAME and ADDRESS CAPTURE TYPE/SCAN

.025 Per Name

DATA-MIDWEST (A Division of DATA SYSTEMS INC.)

3050 Metro Drive, Minneapolis, Minn. 55420

612-854-1800

SOFTWARE YOU SHOULD KNOW ABOUT

DASD CORPORATION: I'm interested in:

TSO

☐ Increasing my capabilities with TSO with Video Programming Tools. VIP simplifies the creation and modification of data files and will automatically flow-chart JCL procedures.

CICS

☐ Saving 75% of my programming BMS coding time and automatically printing hard copy screen images with MAPGEN.

TAPE LIBRARY

☐ Effectively managing my tape library without hooking the operative system with LIBMAN. This intelligent tape library management system will always scratch least critical data first, and operates in an online environment for immediate inquiry and update.

RELATIVE BDAM

☐ SIMBA will save both disk space and access time by blocking my relative BDAM files.

IERCOMPR

☐ DASDCMP does it better!

TRANSLATING

☐ RPG to COBOL (DOS or OS)
☐ SYSTEM/3 COBOL to OS COBOL
☐ DOS COBOL to OS COBOL
☐ GE MAP to OS COBOL
☐ 360/20 BAL to 360/370 OS ALC



DASD CORPORATION
National Marketing
1480 Renaissance Drive,
Suite 315
Park Ridge, Illinois 60068
312/299-5005

PLEASE SEND DETAILED INFORMATION TO:

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

PHONE _____

REMOTE BATCH PROCESSING ON IBM'S FASTEST CPU 360/195

TIME FOR SALE

GUARANTEED
TURNAROUND
only
50¢ a second

OS/MVT, HASP/RJE, 2 Meg, 3330's and 2314's — United Airlines operates a Cost Efficient service featuring High Speed Processing and Quick Turnaround. Through Auto Answer WATS or leased lines (at speeds of 2000 to 9600 BAUD) you gain access to one of the most complete data centers in the United States.

Dial our number and execute your own programs or utilize a wide range of software — ICES, MARKIV, OSIRIS, BMD, PANVALET, GPSS, HEC1, HEC2, SWMM, all standard compilers and more.

If you are using an outside computer service, United can offer you a substantial savings and an unbeatable service.

COMPARE — call or write today to request a benchmark or additional information.



UNITED AIRLINES

Computer and Communications Services Division
Denver Technological Center
5350 South Valantia Way
Englewood, Colorado 80110
Call Collect (303) 779-2000 — Ask for Jon Burley

168

System available
for short
term sublease.

COMDISCO

312-698-3000

Programs Up to 99 Shots

Micro-Based Ball Server Aimed at Tennis Buffs

LANSDALE, Pa. — The DPer who enjoys hitting a few tennis balls after work now can test his ground strokes against a microprocessor-controlled tennis ball thrower from the United States Machine Works, Inc.

Dubbed "The System," the MOS Technology, Inc. 6504-based unit allows tennis players to program any sequence of up to 99 shots to different court locations, at different speeds and with different delays between shots.

The \$4,000 ball launcher even comes with a removable control panel that allows players the joy of bringing it home to preprogram for the next day's practice session. In addition, there is a six-function remote control unit that permits players to control the unit from anywhere on the court.

As an additional feature for the player too harried to preprogram a ses-

sion, The System will program itself for both singles and doubles.

And for the player who demands the privacy of his own home, United States Machine Works will design full- or half-length practice alleys to meet the player's individual requirements.

Information on installation and prices can be obtained from the firm at 21 Williams Place, Lansdale, Pa. 19446.



Tennis fans can preprogram The System at home.

California System Reunites Lost Pooches With Owners

By Marguerite Zientara
CW Staff

DOWNEY, Calif. — Dogs should love computers, at least in this community where a computerized system helped 4,000 lost dogs find their owners last year.

The Animal Control Authority, with representatives from Downey, Norwalk and Pico Rivera, controls a computerized system that keeps track of 40,000 dog licenses issued every year in those and four neighboring cities. When a license is issued, certain information is stored in the computer, such as a description of the dog, its age, whether it's been spayed or neutered, its dog tag number and the name, address and telephone number of the dog's owner.

If someone catches a loose dog, he can call the Animal Control Authority and tell them the dog tag number. Animal Control will then furnish the name and telephone number of the dog's owner, according to Phil Yantis, head programmer for the City of Downey.

The Animal Control Authority accesses the information from Downey's city offices via terminal. The system runs on a Honeywell Information Systems, Inc. 62/60, which also takes care of about a dozen other functions including accounting, land use, statistics and payroll, Yantis said.

A program has been written which

will allow information to be accessed by address of the dog's owner as well, but at present there is not enough on-line disk storage space to store that cross-reference file, Yantis said. It is hoped an upgrade of the machine and a redesign of the file structure will solve the problem, he said.

The system is in its second year of operation.

Mueller Elected AIAA President

SANTA MONICA, Calif. — Dr. George E. Mueller has been elected president of the American Institute of Aeronautics and Astronautics (AIAA), the largest and oldest technical society devoted to science and engineering in the fields of aeronautics, astronautics and hydronautics.

A write-in candidate, Mueller was elected by a vote of the AIAA's 23,000 professional members. He will serve on the board of directors during 1978 and be inaugurated in January 1979.

Mueller is chairman and president of System Development Corp. From 1963 to 1969, he directed the U.S. manned space program as the National Aeronautics and Space Administration's associate administrator for manned space programs.

RENDECK IS A SYSTEMS HOUSE WITH OFFICES IN AMSTERDAM, DUBLIN AND LONDON.

We specialise in Data base - data communications, mini computer systems and support IBM's Airlina Control Program, IPARS. We have our own Data General mini computer in our Amsterdam Office and we are the Banelux Agents for SHADOW II the most advanced T.P. Monitor, and several other sophisticated software packages.

FOR OUR PLANNED EXPANSION IN 1978, WE REQUIRE EXPERTISE IN THE FOLLOWING FIELDS:

AMSTERDAM OFFICE

Programmers and Analysts in the following areas:

IPARS

- Real Time — Control Software — Departure Control
- Reservations — Fare Quotations
- Schedule Change
- Batch — Airline Revenue Accounting Systems.

The selected staff will be working in Europe and the Middle and Far East. Generous expenses, whilst working outside Holland, will be paid; plus outstanding salaries.

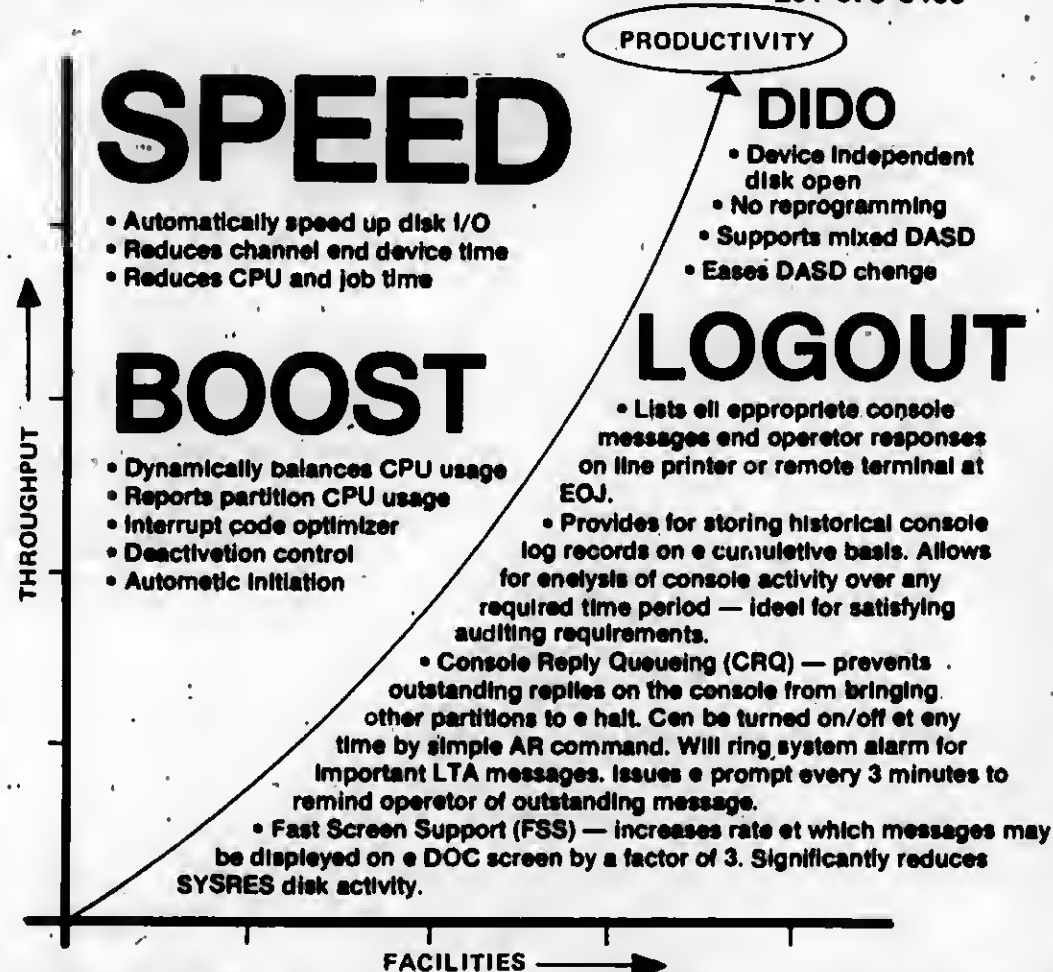
If you feel your experience fits one of these above positions, Please contact us immediately at either our Amsterdam or London Office.

Barry Mence
Rendek Nederlands BV
A.J. Ernststraat 157, Amsterdam
Tel: Amsterdam 461215



M SYSTEMS SOFTWARE
IBM 360/370
DOS, DOS/VS
PRODUCTS YOU SHOULD KNOW...

MACRO 4 INC.
Gothic Plaza
376 Hollywood Ave
Fairfield, 07006
New Jersey
201-575-6466



MACRO 4 INC.
Gothic Plaza
376 Hollywood Ave.
Fairfield, 07006
New Jersey
201-575-6466

TELL ME MORE:

SPEED ☐

LOGOUT ☐

DIDO ☐

BOOST ☐

NAME _____ TITLE _____

COMPANY _____ PHONE _____

ADDRESS _____

CITY/STATE/ZIP _____



'Capability' Upgraded to 'Capacity'

Harris Unit Survives College Misunderstanding

By Tim Scannell

CW Staff

CASTLETON, Vt. — The Vermont State College board of trustees here has decided to keep its Harris Corp. 120/4 computer despite two years of problems associated with the system and a great deal of misunderstanding surrounding its capabilities.

The decision to retain the computer, which services five state colleges, two high schools and a number of administrative areas, was based on its improved performance following a \$110,000 upgrade, according to Gerald Smith, director of computer services.

Prior to the upgrade, the system was plagued with extended downtimes lasting as long as two or three weeks. Under normal conditions, the machine should be operational a few minutes after a malfunction occurs, Smith said. Students using the system for academic purposes complained of their inability to complete assigned work because of the lengthy periods of failure, he stated.

Three Options

The original Harris system, consisting of 64K of main memory and one 80M-byte disk drive, was purchased after a selection committee approved by the board of trustees performed a three-year study on the subject. The selection committee was composed of 10 people from each of the five state colleges, guided by an outside consulting firm that specialized in "helping people select computers and facility management," Smith explained.

The committee had three options to explore, Smith said. It could upgrade the computers the colleges already had (an IBM 1130 and a Digital Equipment Corp. PDP-8 as well as use of the Dartmouth Time-Sharing System); offer more computer power and time to academic users; or purchase a new system.

During the study, primary consideration was given to the students who, according to the National Study of Higher Education, would each need from 12 to 17 hours of computer time per semester, Smith stated.

The committee examined each vendor's proposal until it narrowed them to a choice between Harris and another company. "Vendor A, one of the older, more established firms, offered us software and some kind of a 'track record' to go on," Smith noted. But Harris, even though it was new to the business, "offered us a better price."

After the system was installed, something happened, Smith said. There was a "confusion based on one word: capability."

"The selection committee was saying that we bought a computer with the capability of handling 25 concurrent terminals, and everybody else was reading that as being a computer with the 'capacity' to handle 25 terminals," Smith pointed out. "The colleges then went out and hung 25 terminals on the system, and it just couldn't handle it."

It was a "case of everybody underestimating the demand that was going to be placed on the computer and, as a result, the computer was not large enough to meet the needs of a five-college system," Smith commented.

All of the colleges were dependent on the Harris system because the IBM, PDP-8 and time-sharing systems were eliminated to pay for the new computer. During the confusion and resulting problems, a Wang Industries, Inc. microcomputer was leased to support the academic workload.

Two Alternatives

There were actually two schools of thought concerning the 120/4, Smith observed. "One group believed that no matter what we did to the Harris, it would never run at a satisfactory level. The other group, which included myself, could see" the only problem with the system was "that it was over-

worked," he said.

After reconsidering the proposals from other vendors, the second study group recommended upgrading the Harris system.

Although Harris was thoroughly caught up in academic and administrative politics, it supplied "substantial support and cooperation" throughout the whole affair, Smith said.

Harris officials issued a set of guidelines for upgrading the system and pledged that if the school went along with their suggested configuration, "they would give a 100% guarantee that the system would perform at the specified level," Smith said. "If we were not satisfied, they would take

back all of the equipment, charging us only the shipping costs."

The upgrade consisted of installing three additional 80M-byte disk drives and adding extra memory. The specified level of operation, after modification was defined as the ability to handle a normal week's workload at a consistent speed for an acceptable time, Smith stated.

Although the upgraded system failed an operational test in December, its performance improved on a "day-to-day basis," Smith remarked. To date, the computer has been "running like a top" and the response time with the present number of terminals "has been cut to less than five seconds."

DYNAM/T MEANS FILE SECURITY

A Complete Tape Management System for IBM 360/370 DOS and DOS/VS

If you knew of all its advanced features, you would demand the free 15-day trial of DYNAM/T. The file security alone makes DYNAM/T a gem for DP Managers. However, DYNAM/T doesn't stop there. Just look at this combination of features that are not available in any other system features that dramatically improve resource utilization. For example:

- DYNAM/T is DOS and DOS/VS release independent, requires no modifications to the supervisor, JCL or user programs.

- Automatic Volume Recognition and Early Device Release features eliminate

the need for reservation of tape drives for each partition.

- DYNAM/T logs exceptional occurrences for audit trail and it also accepts alphanumeric volume serial numbers.

- DYNAM/T provides comprehensive reporting of all tape activity.

- DYNAM/T allows for control of unlimited numbers of tape volumes and an unlimited number of tape file generations.

- Automatic re-run facility.

- Allows manual and automatic catalog of tape files.

- Does not allow duplicate tape reel numbers.

- Provides control of unlabeled tapes.

- Automatic release of tape sort work files.

- Allows use of alternate data sets for input.

Those are just a few of the features that make DYNAM/T a major advance in software systems.

**MAIL THE COUPON
OR CALL TOLL-FREE
800-221-4767**

[NY State Call: 212-355-3333]

Member: Software Industry Association

COMPUTER ASSOCIATES

655 MADISON AVENUE
NEW YORK, NY 10021

U.S. OFFICES:

New York, California, Connecticut,
Georgia, Illinois, Missouri, Ohio,
Texas, Virginia

WORLD WIDE DISTRIBUTION

Australia, Austria, Argentina, Benelux,
Brazil, Caribbean, Chile, Columbia,
France, Germany, Holland, Indonesia,
Israel, Italy, Japan, Mexico,
Philippines, Scandinavia, South
Africa, Spain, Southeast Asia,
Switzerland, United Kingdom,
Venezuela

☐ YES! Please rush the free DYNAM/T Information Kit!

cw 3/27/78

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone No. () _____

CPU _____

OP/SYS _____

TSUNAMI

By Charles P. Lecht

IN DEPTH

IN DEPTH

IN DEPTH

IN DEPTH

CHAPTER II Part 2

At the start of this chapter we reviewed the growth of the Japanese computer industry in broad terms and compared that growth with our own. We reached the conclusion that the state of Japanese technology today is more potent than either we or the Japanese computer industry seem wont to admit [CW, Feb. 13].

Nevertheless, we can only admire the high level of achievement that has characterized the Japanese computer industry over the past 10 years. If we fear that our internationally based computer industry is vulnerable to competition from Japan, I believe we ought to do something about it.

I further believe this would involve reducing our growing preoccupation with the continued success of the Japanese computer industry and redirecting attention to our own.

That the Japanese computer industry has contributed increased technological know-how to the world at large is a widely acknowledged fact. For example, the Fujitsu M-200 and the Hitachi 210 (enhanced Amdahl Corp. 470V/7 and Intel Corp. AS/7 systems respectively) provide us with improved versions of the best the U.S. may have to offer.

Not only do these systems provide more millions of instructions per second (Mips) per dollar, but they will undoubtedly include 64K-bit memory chips — one to two years before they are available from U.S. manufacturers.

In applications software, the Japanese have begun to demonstrate incredible superiority in certain areas. For example the scope and efficiency of the Japanese National Railway's reservation system rivals that of any other in the world. With one order, the passenger can book his railway tickets, airline connections and hotel accommodations and fulfill a variety of other needs. To my knowledge, no other country has such a comprehensive system — a phenomenon that suggests the underlying cause of Japanese applications development superiority.

If we accept the notion that organic harmony among all parties in the project enactment environment is a necessary (although not sufficient) requirement for a successful outcome, then we can also acknowledge that the Japanese can satisfy this need as well or better than anyone else in the world, if almost by virtue of their cultural envelope. Project teams, once committed by consensus to a goal, zealously pursue it with little bickering among staff

FUJITSU

Major Items	Co-operator	Activity	Comment
1. Magnetic Tape (6250 bpi)	Memorex Corp.	Export	OEM contract (20 units / month since this fall)
2. Capital participation	Consolidated Computer Inc. (Canada) Amdahl Corp.	Marketing, Service Production contract Technical tie-up and Capital participation in Feb. '72 (27.8%)	18% stockholder (in future 40%)
3. A foothold in Australia	. Nissho-Iwai Co. - - 11% . Partnership Ltd Pacific - - - - - 11% . Computer Manufacturers Australia - - - - - 5%	Foundation of FACOM Australia Ltd. in July '72	Fujitsu 73%
4. A foothold in Brazil	-	Foundation of FACOM Do Brasil LTDA in Dec. '72	
5. A foothold in Spain	-	Foundation of Fujitsu ESPANA, S.A. in June '73	
6. A foothold in Korea		Foundation of FACOM Korea Ltd.	
7. Capital participation	. Spanish Telephone and Telegram - - - - - 27% . Spanish Industrial Public Corp. - - - - 27% . Spanish City Bank - - - - - 16%	Foundation of SECISA* in Mar. '75	Fujitsu 30%
8. A foothold in Philippines	a local syndicate called MARTEL - - - - - 70%	Foundation of FACOM Computers Philippines Inc. in Apr. '75	Fujitsu 30%
9. A foothold in England	Amdahl International Ltd. - - - - - 50%	Foundation of Amdahl International Ltd. in Nov. '76	Fujitsu 50%

*Sociedad Espanola de Comunicaciones e Informatica S.A. (Spain)

Figure II-13A

NIPPON PERIPHERAL LTD.*

Major Items	Co-operator	Activity	Comment
1. Disk (70MB)	BASF (W-Germany)	Export	OEM contract (1000 units / 3 year)
2. Disk (70MB)	Memorex Corp.	Export	OEM contract 60 units / month since Apr. '77

* 50 - 50% joint venture between Hitachi and Fujitsu

Figure II-13B

IN DEPTH

IN DEPTH

IN DEPTH

IN DEPTH

HITACHI			
Major Items	Co-operator	Activity	Comment
1. M-Series (large-scale systems)	Intel Corp.	Export	Intel AS/6
2. Disk	NCR	Export	OEM contract (4000 units/4 year)
3. Process control computer	GE	Export	negotiating
4. Micro-processor technology	Motorola Semiconductor Products	Technical tie-up	
5. Assembling of semiconductors for export for south-east Asia		Hitachi Semiconductor founded in Malaysia in 1973	

Figure II-13C

NIPPON ELECTRIC (NEC)			
Major Items	Co-operator	Activity	Comment
1. Marketing of System 100 peripherals and terminals	-	Foundation of NEC Information Systems in Massachusetts in Apr. '77	
2. System 100	HIS Australia	Marketing tie-up	
3. Marketing of System 100	-	Foundation of NEC Computers in Singapore in Mar. '77	
4. Marketing of microcomputer /LSI	-	Organization of NEC Microcomputers in Massachusetts in May '76	
5. Disk (30/60 MB)	HIS Italy	Export	OEM contract (1000 units/3 year)
6. Marketing of semiconductors	-	NEC Electronics Europe in Dusseldorf Paris Branch in '75 London Branch in '76	founded in '73
7. Production of memory (4K chip)	-	Foundation of NEC Ireland in Oct. '76	

Figure II-13D

— something sure to spark envy in the breasts of Western programming managers.

In the on-line banking area, including electronic funds transfer, the Japanese lead the world. Unburdened by excessive regulation, the banks operate at home according to nationally accepted procedures that encourage operational standardization and mutual cooperation.

The data communications network

supporting Japan's national banking business started operation in 1973. It is an on-line system providing service to 89 banks, each with widely dispersed branches operating all over the country, and includes coverage for the Central Bank for Commerce and Industrial Cooperatives and the Bank of Japan.

This system is, I believe, the world's largest, with as many as 7,200 branch offices on-line. Allowing any member bank to perform exchange dealings

with any branch throughout the country, it processes over one million transactions per day.

Other examples of Japanese achievements in the applications software area include cash-dispensing systems, postal systems, educational networks, time-sharing and a host of others. I believe that the world is largely unaware of how far Japan has progressed toward achieving a truly automated society.

That the U.S. computer industry still leads in most technological areas is unquestionable. This position of leadership is waning, however, and it is the thesis of this book that a major cause for this may be traced to our own government's inability to formulate a national policy regarding its computer technology and industry.

Until very recently (1978), U.S. opinion seemed to equate the creation of such a policy with sliding one notch further toward socialism. It is now evident that a critical factor in the technology equation which determines who will ultimately lead whom is the role of our respective governments in guiding and nurturing their computer industries.

While it may be argued that the U.S. does at times support its computer industry indirectly through provision of large R&D contracts, its policy in doing so, if there is one, is at best uncoordinated.

At this point in time, the Japanese government is behaving with far less, shall we say, circumspection in its provision of grants, enactment of legislation, granting of long-term, low interest loans and formulation of trade tariffs. Indeed, the Japanese government has been able to coordinate its national policy of support for its computer industry so well that, by comparison, our government seems antagonistic to our own DP industry.

Parry and Thrust

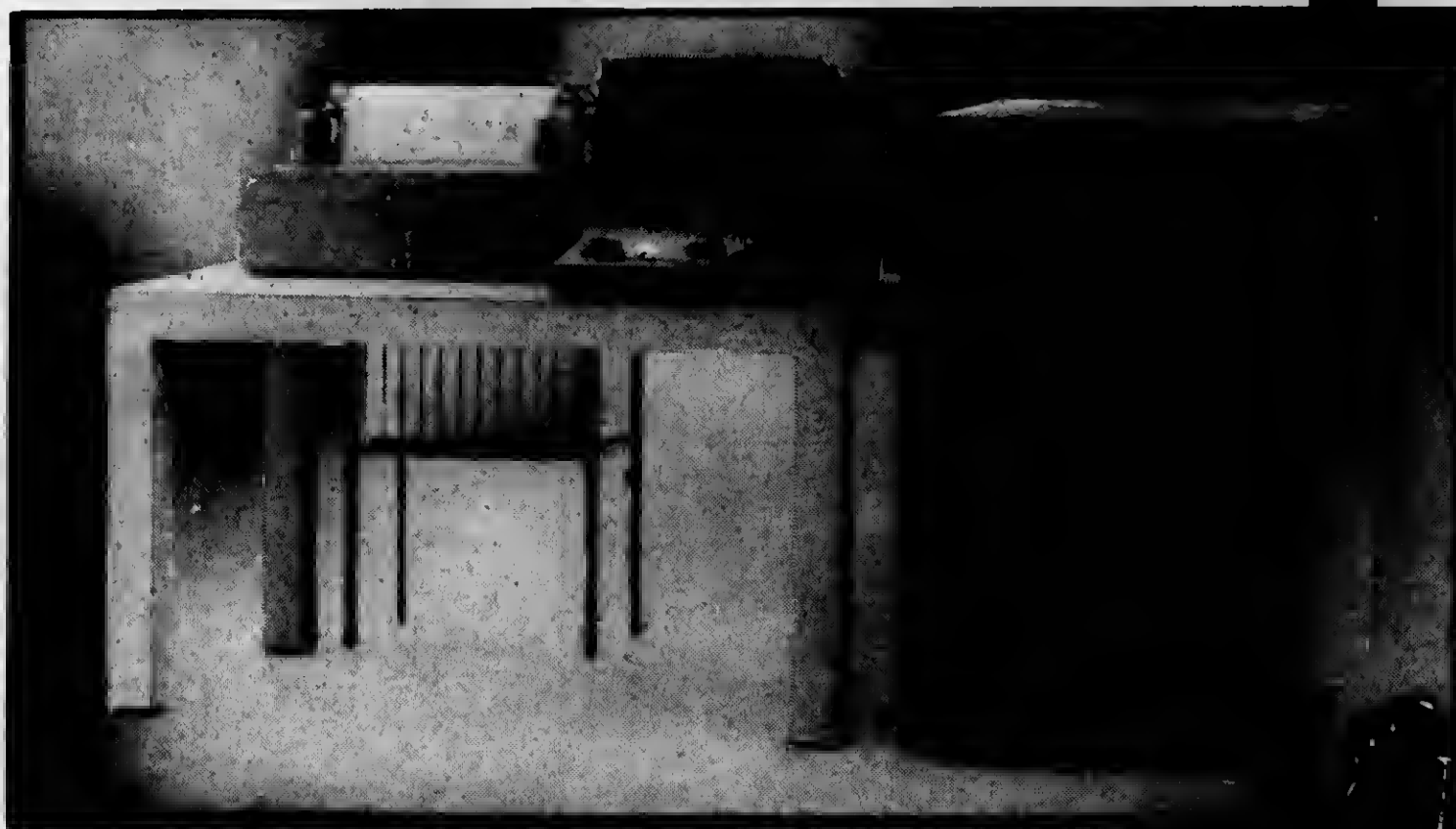
Asking the U.S. computer manufacturer to understand why import tariffs should be lower in the U.S. than in Japan for competing products is becoming increasingly difficult as the quality of Japanese products begins to exceed that of our own. And, as Japanese manufacturers master computer technology, they have also begun to learn the parry and thrust of product announcements needed to compete in the world marketplace.

When IBM announced its 30 series line, Japanese manufacturers did not let the occasion go unanswered. Unmoved by IBM hype, they lost little time in concluding the announcement was primarily a System 370 price reduction, and they responded accordingly.

Fujitsu's rejoinder was to reduce its M series CPU prices by approximately 38% (average); create a new four-year lease plan; and announce the Model M-200 and plans to improve M-180 II performance while introducing 16K memory chips for some models. Fujitsu also unbundled all software and

(Continued on Page 23)

All You Need To Buy This IBM Business Computer



Is This Business Computer...

At Span Management we compare our IBM Business Computer with your telephone because it's just that simple.

The first thing you need is the hardware. That's our IBM Series 1, that compares with a telephone set itself. Then you need an operating system and that's like a dial tone. The only thing left is to have numbers to call and those compare to the different software programs you need to do a particular job. Our software systems are the product of seven years of development under the scrutiny of businessmen like yourself.

It's simple and economical to buy too, because you choose only the system your business needs. You add the cost of the hardware, the operating system, and the software programs together and that's your cost.

For more
information, use that
phone to punch this program:
(401) 438-2200

BASIC IBM SERIES/1 COMPUTER.....		\$25,870.00
• Central Processor (64K) • On-line Terminal • 9,300,000 Character Disk Drive • 512,000 Character Diskette • 120 Character Per Second Printer		
TSS-2 MULTI USER OPERATING SYSTEM		\$5,000.00
APPLICATIONS SOFTWARE LIBRARY		
• Order Entry.....	600.00	
• Billing.....	600.00	
• Inventory Control.....	600.00	
• Accounts Receivable.....	600.00	
• Accounts Payable.....	600.00	
• General Ledger.....	600.00	
• Payroll.....	600.00	
• Sales Statistics.....	600.00	
• Product Definition.....	600.00	
TOTAL		

Plus Many Others!

ATLANTA SEMINAR

At the Northlake Hilton at I-285
and La Vista Road
March 30th, at 12 Noon, 2 PM, or
4 PM

NEWARK SEMINAR

Newark New Jersey,
Newark Airport Sheraton Inn
April 14th, at 12 Noon, 2 PM, or
4 PM

Westminster Industrial Park,
E. Providence, R.I 02914

SPAN

MANAGEMENT SYSTEMS

"BRIDGING THE GAP BETWEEN MAN AND MACHINE"

(Continued from Page 21)

services which previously were giveaways.

Hitachi announced its Model M-180L and improved M-170/M-180 performance and prices; it also introduced 16K chips. The performance of the Model M-180L (known in the U.S. as the Ite AS/6) is claimed to be about 1.2 times that of IBM's 3033 at nearly .75 times its price. Hitachi also will soon introduce the large-scale M-210 to compete against IBM 3033, multi-processor.

The Nippon Electric Co. (NEC/-Toshiba group) improved performance by about 30% for the Acos 600 line (equivalent to Honeywell Information Systems, Inc.'s 60 series) and lowered add-on memory prices by 50%.

'Overseas Beachheads'

The charts comprising Figure II-13 show the level of cooperation being achieved by four Japanese companies with others within the U.S. and abroad. This interesting (but incomplete) summary shows how Fujitsu, Hitachi, Nippon Peripherals Ltd. and

IBM JAPAN

Revenue is estimated to reach about \$1.23 billion in Fiscal Year 1978 (based on a revised conversion rate of 250 yen/dollar) with a nearly \$30 million profit after tax. Exports from Japan represented about 15% of IBM Japan's revenue, with rentals accounting for 42%, sales for 20% and maintenance (including software and services) for 15%.

NEC achieve this cooperation for the manufacture and distribution of certain major items.

A document entitled "Electronic Computer Industry/Market Outlook," dated July 1977 and prepared by the American Embassy in Tokyo states, "It is also clear that Japanese companies are moving rapidly to establish overseas beachheads, but in a very un-Japanese way. It is unusual that major Japanese corporations such as Hitachi, NEC and Fujitsu feel compelled to sell their products to foreign companies instead of going into foreign markets on their own."

"Japan's companies have a lot at stake in the computer game, and it is probably because of their own weakness in the computer field and doubts about their chances of success that they have turned to foreign computer companies for marketing assistance."

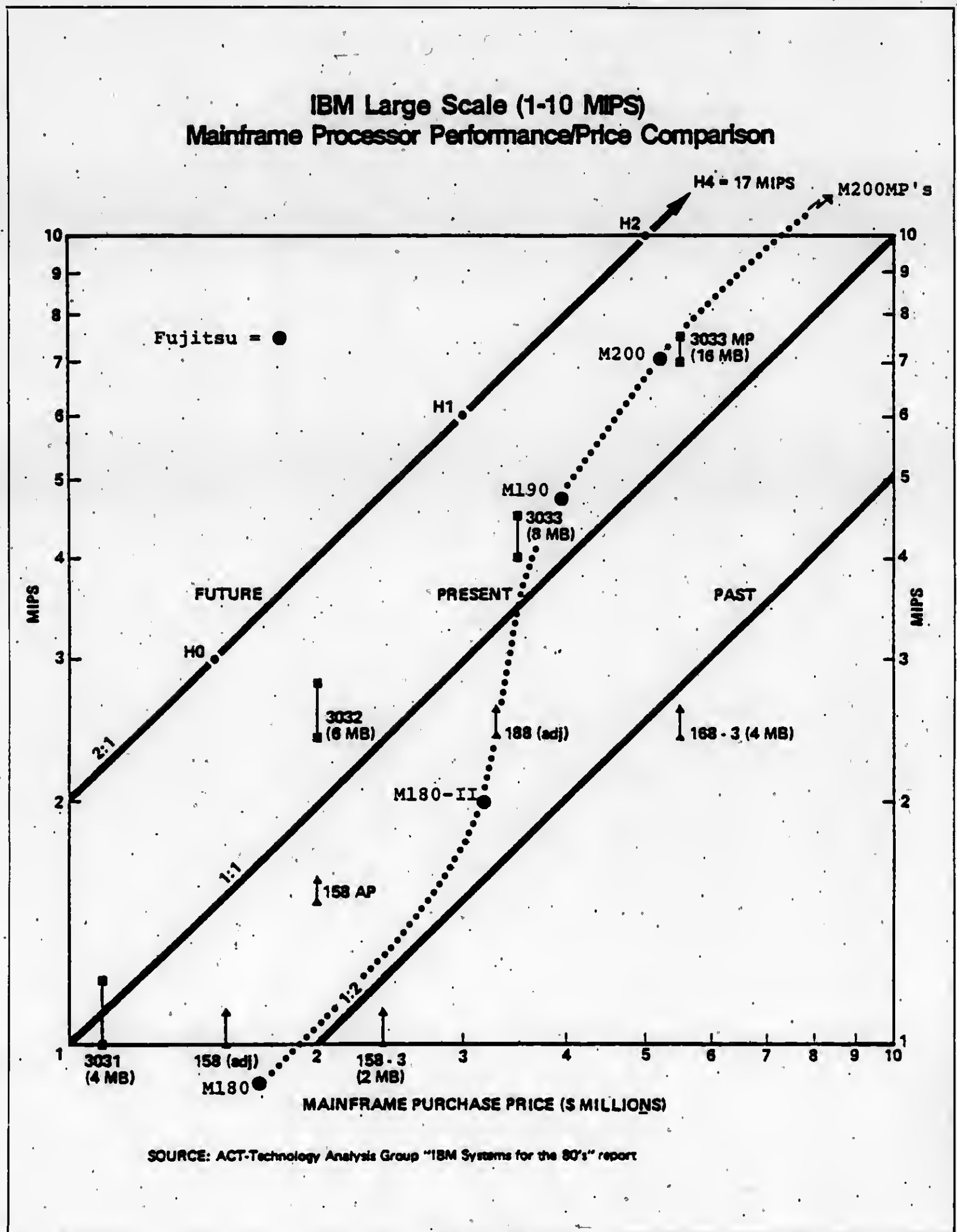


Figure II-14A

The corollary of this is that Japanese computer companies would not be doing as well as they are overseas if it were not for the assistance of several U.S. computer companies that are willing to sell Japanese-made products on an OEM basis."

This observation serves to underscore the fact that, however successful the Japanese computer industry has been, much of its success seems tied to U.S. industry. While I do not agree that the reason for using agencies abroad is primarily related to the

weakness of the Japanese industry, the overall thrust of the embassy's observations seems valid.

Figure II-14A and B show how Fujitsu's large- and small to medium-scale systems compare with those IBM products in the same ranges currently being produced, recently announced or as yet to be announced.

Figure II-14A shows the approximate processor performance in MIPS and purchase price for the mainframes (i.e., CPU, main storage, channel and standard features) of certain compet-

ing Fujitsu and IBM products. The "past" performance/price line represents two units of price for one unit of performance.

Note that IBM models 370/158-3 and 168-3 fit close to this line (i.e., prior to the March 21, 1977 price adjustments). The "present" performance/price line indicates one unit of performance per one unit of price (or \$1 million per MIPS). Models 3031, 3032, 3033 and our projected 3033MP fit on or above the 1:1 line.

(Continued on Page 24)

(Continued from Page 23)

Advanced Computer Techniques Corp.'s forecast of IBM's "next generation" of large-scale processors is shown on the "future line." Designated models H0, H1, H2 and H4, these are expected to be introduced in the 1979-80 timeframe.

The Fujitsu M series models M-190 and M-200s already "fit" between the 2:1 and 1:1 performance price spectrum (or about 1.2 to 1.4 Mips per \$1

million). We are fairly confident of the Fujitsu M series CPU performance estimates, but less confident about the prices, because of obvious factors including the yen per dollar conversion rates, marketing factors (Japan Electronic Computer Co. [Jecc]), memory size and features included or excluded, etc.

Thus, the Fujitsu performance/price curve is a "ball park" estimate. As indicated, the earlier M-180 and M-180

II are less competitive after recently announced IBM price cuts. However, the newer models, M-190 and M-200, are still very competitive.

Figure II-14B follows the same format as that of II-14A. It covers the 0.1 to 1.0 Mips and \$100,000 to \$1 million ranges. The Fujitsu M-130 is very competitive compared with IBM's 125-2. The M-140, a once-adequate competitor for IBM's 138, and the M-160, already inferior to IBM's 148, have

both been undercut by IBM's recent price reductions of 20% (in early March 1978). IBM's 138/148 main-frame price cuts are not shown on the chart.

No doubt, Fujitsu and Hitachi will follow suit. The future IBM E series "E" for ("entry-level"), which should be introduced by the second or third quarter of 1978, shows a doubling of Mips performance/price vs. the current models 125-2, 138 or 148.

I believe that this is the first time the comparisons shown in these charts

Has your system got the right rhythm?

SARA will help you keep the beat.

SARA (Systems Analysis and Resource Accounting) is the most efficient and cost-effective diagnostic tool you can use to keep your system at peak performance. It lets you take a critical look at your entire configuration... and pinpoint potential problem areas. Try SARA now, for 30 days, and find out just what shape your system is in. Mail the coupon today or, for immediate consultation, call (703) 821-6275 or (800) 335-0135 (toll free).

HITACHI

The next largest computer vendor after Fujitsu, Hitachi is Japan's largest electrical/electronic corporation ("the GE of Japan") with FY77 revenues of about \$5.18 billion and an after-tax profit of \$122 million.

Computer-related revenues were estimated at \$568 million and may grow to \$640 million in FY78. Hitachi has approximately 14% of Japan's computer market and its DP operations are profitable. However, DP only represents about 11% of Hitachi's total business.

Others include heavy electrical machinery, 27%; electric appliances, 24%; communications products, 10%; and industrial machinery, 15%. Exports in FY77 totaled over \$1.1 billion, primarily in heavy electrical machinery.

Hitachi exports large-scale computers (a version of the M-180) which are marketed and supported by Intel Corp. (Model AS/6). It also plans to introduce the Hitachi 210 as the Intel AS/7.

DEC

300 & 500 Systems

G/L A/R A/P P/R O/E

Medical Billing & Report Generator
Dibol® Applications Software

**BUSINESS INFORMATION
SYSTEMS, INC.**

One Davis Blvd. Suite 509
Tampa, Fla. 33606
(813) 253-2796

© Registered trademark of
Digital Equipment Corporation

have been presented in public news media. In view of the clear pattern of achievements shown by Fujitsu in comparison with IBM's 370 as well as 30 series processor line at the high ranges, we cannot help but conclude that without IBM's H-line in the offing, Fujitsu will have superseded IBM in large processor technology even before IBM begins to fill line orders for the 30 series.

Whether this could have been

FUJITSU

The largest domestic computer manufacturer in Japan, Fujitsu is second only to IBM Japan with an estimated 19% (and growing) market share.

Total corporate revenues in Fiscal Year 1978 should exceed \$1.5 billion, with DP products representing over 70% or \$1 billion. Profits before tax are estimated at \$100 million in FY77 and should maintain that level in FY78. Telephone, radio and other communications equipment represent about 23% of Fujitsu revenues; electronic components claim about a 4% share.

Since Amdahl has installed more than 80 large-scale systems to date, Fujitsu exports (subassemblies) are increasing rapidly for these big-ticket DP products. Total exports in FY77 are estimated at \$150 million (based on 250 yen per dollar).

Fujitsu plans to introduce computers smaller than the Amdahl 470V/6 through a U.S. marketing and support firm before 1980.

achieved with or without the amazing Mr. Amdahl's help seems a moot point to me.

R&D Funding

Returning to Japan, Figure II-15 shows where Japanese companies' current R&D investments go (estimates). It also shows that funding for these R&D activities is equally shared by the Japanese government and its computer industry and has been for some time.

Government supported R&D is not in the form of a direct subsidy, according to the Ministry of International Trade and Industry (MITI). It's a credit-

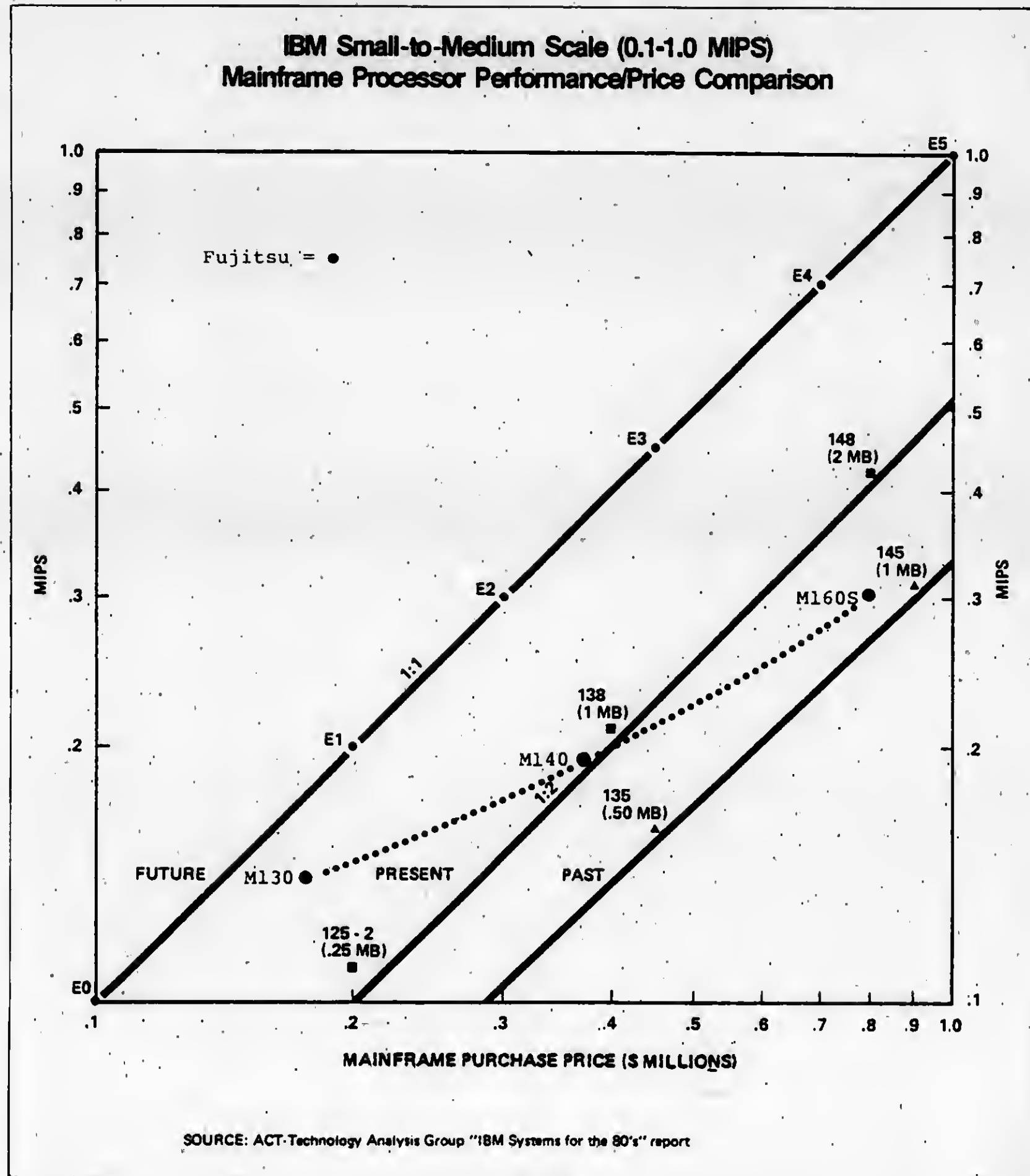


Figure II-14B

ing arrangement in which the manufacturers are obligated to refund the credits to the government (at some future unknown date) out of profits from the specific products which directly result from the R&D activity.

Without any major space or military technology developments comparable to those of the U.S., the Japanese government feels it must play a major role in promoting and supporting its high technology to "protect" its DP industry.

Some noteworthy figures which substantiate the Japanese Government's support of its computer industry follow:

- Government general hardware grants cover up to 50% of the cost for development of new computer types. For example:

1972-74 = 34.2 billion yen
1975 = 19.5 billion yen
1976 = 29.9 billion yen
Total 76.6 billion yen

In other words, this is approximately \$300 million (based on 300 yen/\$1 in 1972-75 and \$250 yen/\$1 after 1976)

- Governmental software industry support expenditures totaled:

1973-75 = 3.0 billion yen (module development)
1976 = 0.5 billion yen (information technology)
1976 = 1.2 billion yen (aid grants)
1976 = 13.0 billion yen (promotion loan)
Total 17.7 billion yen (about \$70 million)

- Recent major R&D support funding has been as follows:

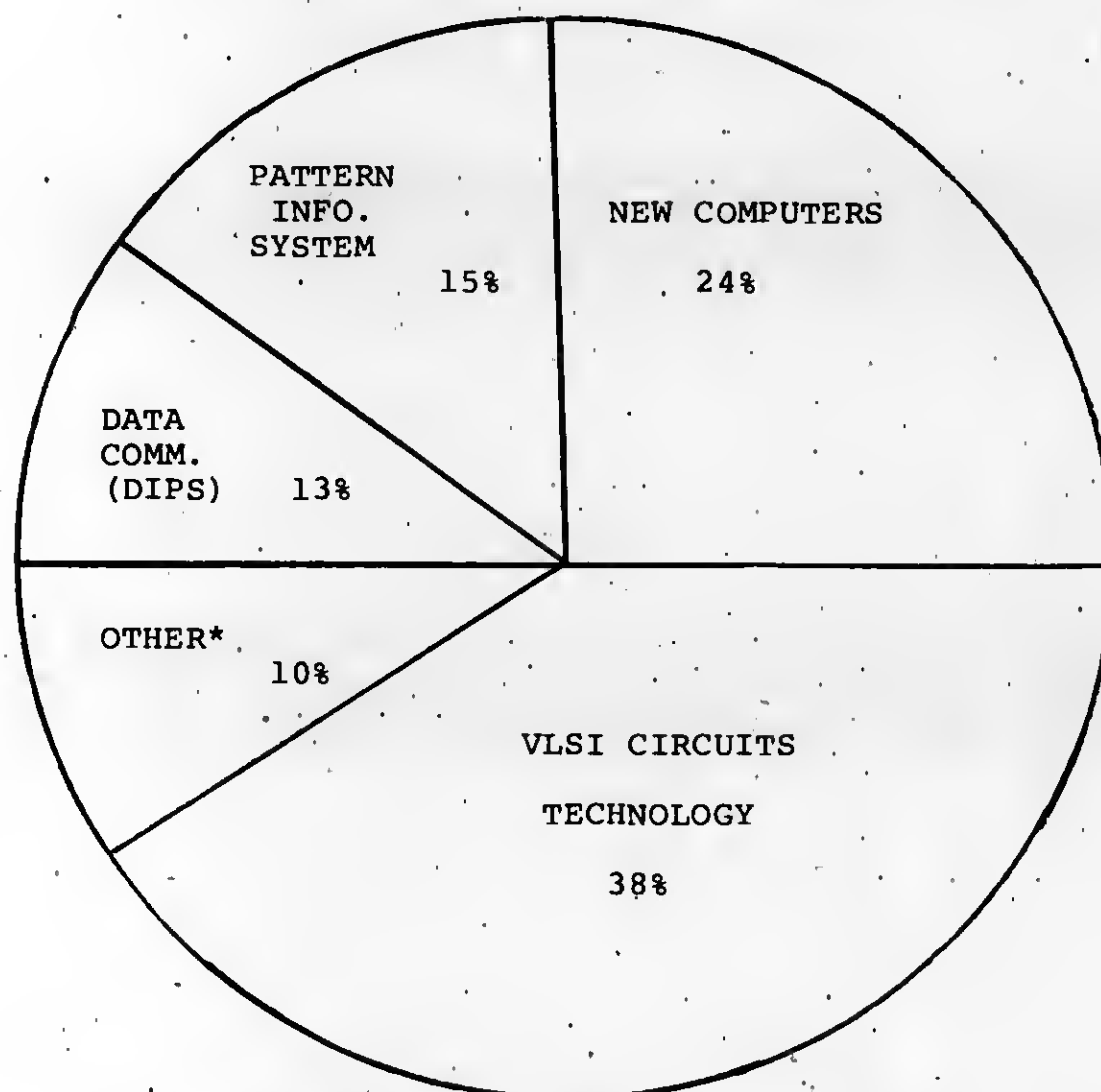
1971-78 = 35.0 billion yen (pattern information system)
1974-76 = 1.15 billion yen (medical information division center)
1973-78 = 5.0 billion yen (automobile traffic control)
1975-76 = 1.35 billion yen (community video information system)
Total 42.50 billion yen (about \$170 million)

What Price Liberalization?

Figure II-16 presents a chronology of events which leaves no doubt that the Japanese government is closely chart-

(Continued on Page 26)

JAPAN'S R & D INVESTMENT EMPHASIS



Government subsidy = \$0.8 to 1.0 billion

Manufacturer funds = \$0.8 to 1.0 billion

Estimated FY '72 to '80 total = \$1.6 to 2.0 billion

SOURCE: ACT/Technology-Analysis Group
estimates derived from various MITI reports.

*OTHER includes: I/O equipment, software, medical information systems, traffic control, etc.

NOTE: Excludes Government loans for: Industry restructure, info. processing promotion, training and loans to JECC for computer leasing.

Figure II-15

Japanese Government Computer Policy Chronology of Events

- 1971 — Law created: Temporary Measure for the Promotion of Electronics and Machine Industry.
- 7/71 — Fourth stage in liberalization of capital imports established.
- 11/71 — Improvement plan for computers sets direction and objectives for production and usage in Japan.
- 2/72 — Equipment liberalization: import tariffs reduced from 15% to 13% on mainframes and from 25% to 22% for I/O.
- 4/73 — Fifth stage in liberalization decided.
- 7/74 — Further imports of computer technology allowed.
- 8/74 — Up to 50% foreign capital investments in computer-related business allowed.
- 12/75 — Full capital investments allowed.
- 12/75 — Import restrictions removed for hardware.
- 4/76 — Software capital investments allowed.
- 5/76 — Final liberalization achieved, except for high import tariffs.
- 3/77 — Import tariffs reduced for foreign computer products.

Figure II-16

(Continued from Page 25)

ing its industry's growth and reacts with relative ease in enacting legislation to help ensure its viability. One may argue that this chart shows an increasing liberalization of policy regarding foreign investment in and foreign involvements with the Japanese computer industry. This liberalization should doubtless help assuage a mounting fear (in U.S. computer industry circles) of Japanese intransigence.

What we do not see is what agreements were made in the U.S. and within other capitals of the world to encourage such liberalization, nor do we see at what costs to all parties concerned (including the Japanese) those agreements were made. That govern-

NIPPON ELECTRIC CO.

Revenues are projected to be \$1.94 billion in Fiscal Year 1977 and \$2.27 billion in FY78. Computers represent nearly 24% of this total, or \$456 million in FY77.

NEC controls a 9.3% DP market share in Japan. Its principal business includes telephone equipment, 29%; electronic devices, 21%; and communications transmission equipment, 18%. Exports were about \$570 million in FY77.

NEC is expected to enter the U.S. market with a small business system competing with products from such vendors as Basic/Four, Datapoint, IBM (System/34), Univac (BC/7) in 1978. It already markets a unique low-speed printer called "Spinwriter" through a U.S. firm.

ments must make trade-offs seems as inevitable as the rising of the sun.

Reportage of events in the U.S. news media portrays our government and private industry as outraged with foreign import/export regulations in areas highly prejudicial to our future. In particular, Japan has been singled out as having particularly unfair regulations (where unfair is, of course, defined by our cultural envelope).

The same embassy report cited earlier contains several references to an officially sanctioned Japanese government policy in the public sector which sug-

gests that buying foreign products is unpatriotic. How do we reconcile the liberalization of tariffs with the "Buy Japan" policy?

Indeed, if Japan truly liberalized its import tariffs on foreign-made computer products, such a "self-inflicted wound" might sincerely have been intended to prove Japan's intention to honor Western opinion. The embassy report also says that import liberalization occurred only after Japan's domestic industry felt sufficiently strong to truly take on foreign competition.

No doubt, all of the above reasons contributed to the liberalization, with the last of most consequence, in my judgment. But to call the March 1978 (effective) reduction in tariffs a liberalization is in itself excessively liberal. I cannot blame the Japanese electronics industry for taking advantage of the vacuum created by our government's cavalier attitudes toward its own DP industry.

Concluding our review of the Japan-
(Continued on Page 28)

FIVE YEAR COMPUTER GROUP FORECAST (INSTALLED UNITS)

		3/76	3/77	3/80 "goal"
Fujitsu/Hitachi	M-Series	115	343	7,300
NEC/Toshiba	ACOS-Series	460	925	4,900
Mitsubishi/Oki	COSMO-Series	60	122	2,000
				14,200

SOURCE: JECC Survey 1976

Figure II-18

JAPAN'S COMPUTER INDUSTRY REVENUES

(Dollar Amounts in Millions)²

	Fiscal Year 1975 ¹			Fiscal Year 1976 ¹			Fiscal Year 1977 ¹			Fiscal Year 1978 ¹ (Est.)		
	Total Sales	Computer Sales	% Total Sales	Total Sales	Computer Sales	% Total Sales	Total Sales	Computer Sales	% Total Sales	Total Sales	Computer Sales	% Total Sales
Fujitsu	\$1,045	\$ 752	71.9%	\$1,888	\$ 868	73.1%	\$1,312	\$ 958	73%	\$1,504	\$1,080	67%
Hitachi	3,948	435	11.0	4,673	514	11.0	5,180	568	11.	6,200	640	12.
Nippon Electric	1,549	363	23.5	1,757	413	23.5	1,944	456	23.5	2,268	556	24.5
Toshiba	3,239	206	6.4	3,516	214	6.1	3,857	236	6.1	4,400	250	5.7
Mitsubishi Electric	2,144	98	4.6	2,520	116	4.6	2,785	128	4.6	2,960	160	5.4
Oki Electric	454	190	42.0	449	175	39.	501	193	38.	534	190	36.
	\$12,379	\$2,044	16.5%	\$14,103	\$2,300	16.3%	\$15,579	\$2,539	16.3%	\$17,866	\$2,876	16.1%
IBM (parent corp.) (CY) ³							\$18,000			\$21,600		
IBM-Japan (CY) ³							\$1,102			\$1,234		

¹ Fiscal years end March 31 of following year.

² On a ¥250 = \$1. basis

³ Revenue from all sources

Figure II-17

(Continued from Page 27)

nese computer industry, we can summarize as follows:

- The Japanese government actively supports its domestic computer industry.
- The U.S. government only passively supports its DP industry (in many cases U.S. government regulations and standards tend to inhibit or restrict progress in our industry).
- U.S. net exports of DP equipment currently represents about \$3 billion positive balance of trade volume.
- According to Miti, "Steel, automobiles and television have been the chief money-earners for Japan until now. The computer industry is the future money-earner in Japan."
- In 1977, Japan had a trade surplus of about \$10 billion while the U.S. had a total trade deficit of nearly \$28 billion.
- Japanese tariffs are far higher than U.S. tariffs for IC components, computers, I/O devices and terminals.
- Most U.S. companies have signed

cross-licensing agreements with Japanese companies — but the feedback to the U.S. is practically zero (it's a one-way street).

- The Japanese government-supported VLSI (very large scale integration) development program is budgeted at about \$500 million to \$1 billion over a four-year period.

- In the words of Takeo Shiina, president of IBM, Japan, "Japan is IBM's most competitive marketplace."

- By the mid-1980s the Japanese government expects DP exports to represent about 15% of total output (or three to five times current output).

- Government support and encouragement of interlocking corporate relationships in Japan would be considered in violation of antitrust laws in the U.S.

- Japan's total electronics output was approximately \$21 billion in 1977 compared with only \$4 billion in 1967

(a fivefold increase in 10 years). By 1985, Japan may become No. 1 in electronics production.

- Japan's computer market grew by more than 25% per year during the past 10 years — nearly twice as fast as the U.S. market.

- The U.S. government must establish an overall, long-range DP industry policy that includes increased support for its leadership role in world computer markets (a Miti-type agency

CRT PRICE BREAK!

HAZELTINE 1500

\$1095

HAZELTINE MODULAR 1

\$1195

OEM Distributors for

Data Printer Line Printers

ADL

Charge!

Get off the routing list and on to the subscriber list. Just take out your American Express, Master Charge or VISA card, find the subscription form bound into this issue, and CHARGE!

COMPUTERWORLD



Price/performance. Flexibility. Relia

Series/1 is a family of small, powerful, general-purpose computers that puts the emphasis on productivity.

Series/1 offers a choice of two processors in a variety of storage sizes, plus a full range of I/O units, high-speed disk storage, dual-sided diskette capability, both digital and analog sensor I/O, line and matrix printers and a choice of standard or customized display stations. And well-documented user attachment features make it possible to directly attach non-IBM equipment you may already have.

In addition, communications capabilities include asynch, bisynch and SDLC. IBM's new Programmable Communications Subsystem gives Series/1 the flexibility to simultaneously handle multiple line disciplines or protocols and an extremely broad range of communications I/O, from a variety of manufacturers. And because it is programmable, the user can meet changing communications requirements without having to add new hardware.

But that's not all. The real news of Series/1 is the extensive nature of the architecture.

Both processors—the 4953 and the more powerful 4955—feature realtime 16-bit design, proven bipolar LSI logic, MOS-FET N-channel storage, micro-processor device control and a comprehensive priority interrupt structure. In addition, you get hardware multiply and divide, power fail/auto restart, full double-word arithmetic, parity checking on all I/O data transfers and storage busses and a full-function instruction set including up to 207 microcoded instructions on the 4955 (with the Floating Point Processor feature) and

IN DEPTH

could be created).

One cannot help but conclude that Japanese DP exports (with government backing) may soon erode the profits of the largest U.S. firms in world markets and can seriously threaten the survival of smaller firms. Japanese government-inspired corporate "groups" are willing to sacrifice near-term profits (in DP operations) to establish substantial market shares in specific market segments, regardless of

the impact on financial statements. Of the six major firms, only Hitachi's computer division is believed to be profitable.

U.S. firms, in contrast, must maintain much higher profit margins and cleaner balance sheets if they are to continue to attract capital (see Figure II-20). (Most U.S. corporations cannot subsidize unprofitable computer divisions today.)

Moreover, as profit margins begin to

erode because of the greater pricing competition between the Japanese firms and IBM, Burroughs, HIS, Univac, NCR, DEC, etc., some smaller U.S. firms may be forced into mergers or be acquired in order to survive. In addition, many U.S. DP companies will be attracted to OEM Japanese computers, terminals, components, subassemblies, I/O devices, etc., thus precipitating greater U.S. dependence on Japanese-made DP products.

1977 Net Margins (Estimated)

IBM Japan	10%
NCR Japan	5.1
Burroughs Japan	6.9
Toshiba	1.4
Oki	0.5
Fujitsu*	2.8
Hitachi	2.4
NEC	1.5
Mitsubishi	1.2

* Includes extraordinary gain from sales of stock.

Figure II-19

Series/1.

Approximately \$29,000 as shown.

Includes a 4953 Model D (48K) Processor with Programmer's Console, 4962 Model 2 Disk/Diskette Unit, 4974 Matrix Printer, 4997 Model 1B Rack Enclosure and two 4979 Display Stations.



bility. Service. You can't beat Series/1.

168 on the 4953.

The Series/1 Realtime Programming System manages system resources for batch, real-time, communications and sensor-based applications in a multiprogramming environment. The Realtime Programming System also provides IBM Systems Network Architecture (SNA) support for Series/1, enabling it to function as a cluster controller communicating to host System/370 processors over SDLC lines.

In addition, Control Program Support provides task and data

management, I/O device support and operator interface services for users developing a tailored operating system.

For application development, PL/I provides the ability to write both commercial and scientific applications in one high-level language. Two other languages, FORTRAN IV and Assembler, are also offered.

Series/1 is supported by IBM's extensive service organization, backed by a sophisticated parts inventory system and a variety of portable diagnostic tools to supplement special diag-

nostic features built into the system.

On site installation by IBM Customer Engineers plus a three month parts and labor warranty are included in the Series/1 purchase price. Ongoing IBM maintenance is available under the IBM Maintenance Agreement at a fixed monthly charge.

To find out more about Series/1, contact your IBM Series/1 marketing representative or write the IBM General Systems Division, P.O. Box 2068, Atlanta, Georgia 30301.



Lecht is the author of five previous books on computer-related matters; The Programmer's Fortran II and IV, The Programmer's Algol, The Programmer's PL/I and The Management of Computer Programming Projects and most recently, The Waves of Change.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and Data Processing Management Association.

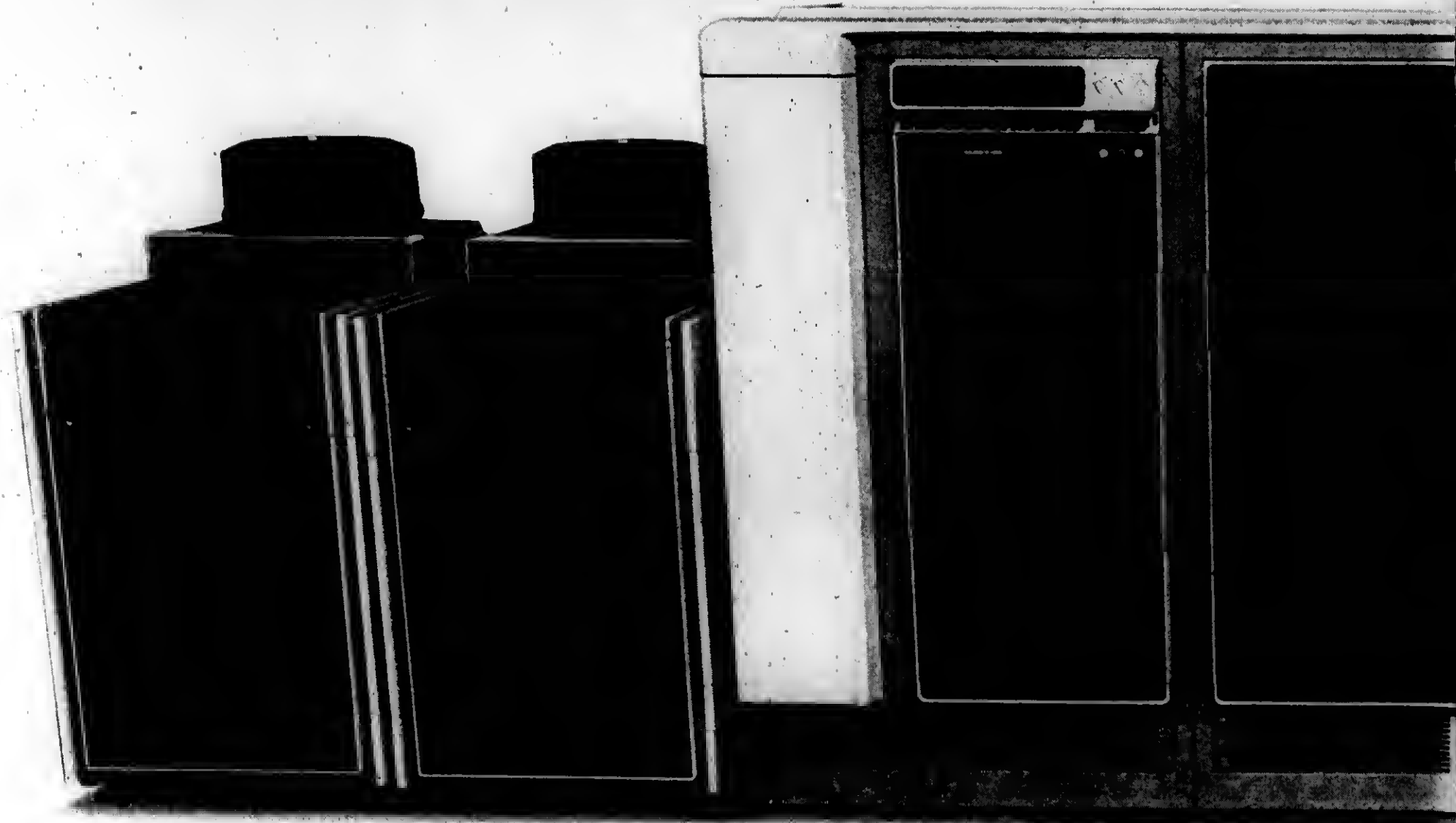
3830-2

Control Units
AVAILABLE
WITH
MADRIDS

COMDISCO

312-698-3000

INTRODUCING THE MINI- MAINFRAME. \$195,000.



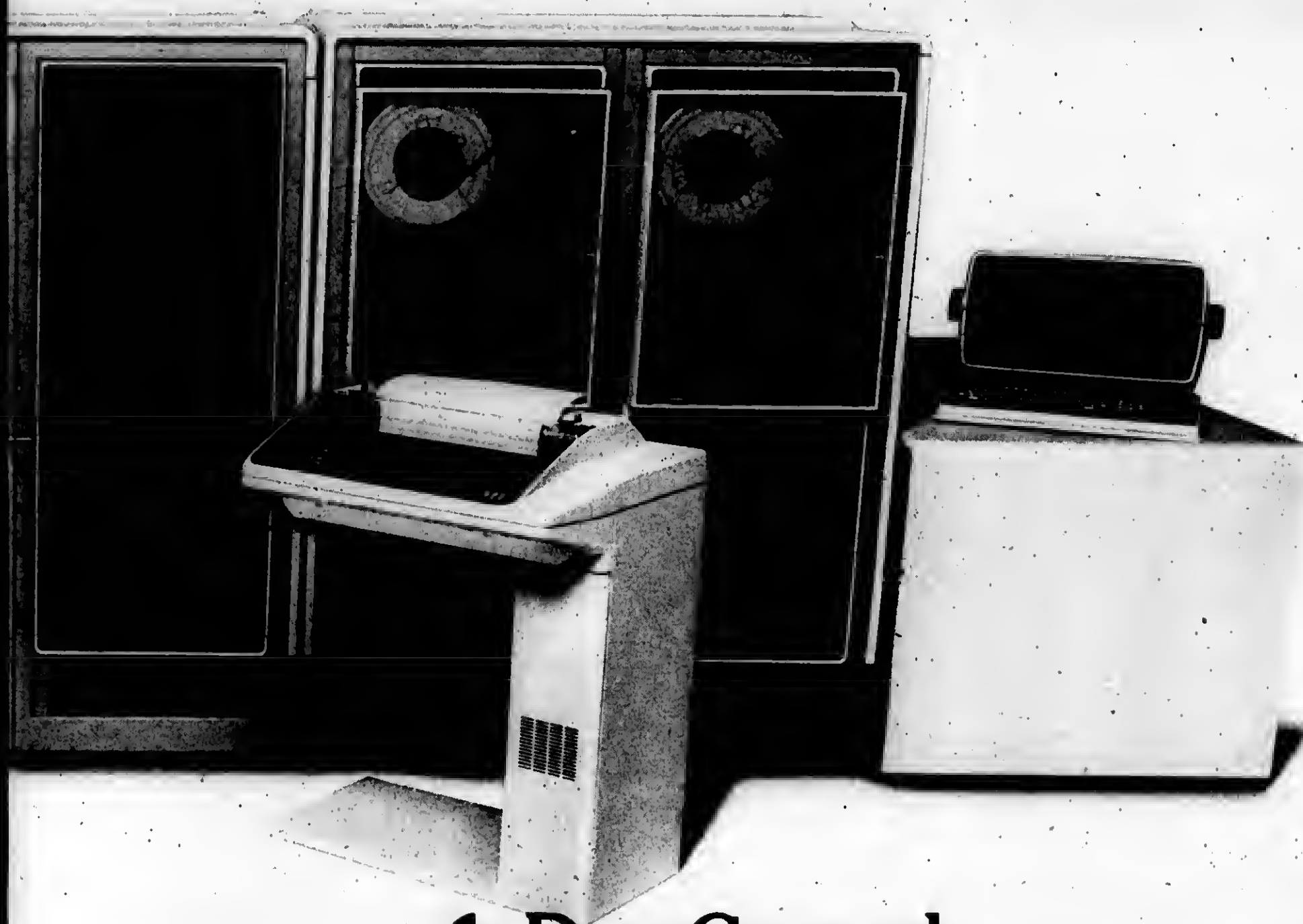
Data General Corporation, Westboro, MA 01581, (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61 rue de Courcelles, Paris, France, 766.51.78. Data

Until now, either you opted for the capability of a mainframe or you went with the flexibility and economy of a mini. Until now.

Introducing the Data General ECLIPSE M/600 computer system. It combines the workload capability of a mainframe with the traditional advantages of a mini, such as interactive computing, distributed processing and economy.

One thing that makes the ECLIPSE M/600 like no other existing computer is an incomparable three level I/O Management System, which prohibits I/O bottlenecks. Another is an incredibly efficient Demand-Paged Memory Management, which allows you to run more jobs faster. And its new Job Processor is unmatched for speed and flexibility. Then our supremely intelligent Advanced Operating System (AOS) keeps everything speeding along for a minimal terminal response time and a maximum concurrent batch stream throughput.

Once again Data General raises the world's expectations for computers, while lowering the cost. To find out more about what you can expect from the new ECLIPSE M/600, write for our brochure. Or call (617) 366-8911, Ext. 4735.



 **Data General**
We make computers that make sense.

Editorial

Is Washington Listening?

While the DP industry enjoys a prosperous year, the Federal Communications Commission (FCC) is trying to find a dividing line between computers and communications as part of its Second Computer Inquiry. And Congress wants to rewrite the Communications Act of 1934.

Ostensibly these proceedings will decide how much of DP will remain unregulated without encroaching on the regulated domain of communications. But a recent reader commentary by Jim Ryan ["Free Enterprise at Stake as Industry Grows," CW, March 20] put this into a different perspective.

Tracing events in the growth of the DP industry, Ryan said, "it became clear that the effect of government regulations on the telephone industry had a secondary effect on the computer industry." He cited as ironic the contrast between the freedom of equipment choice in minicomputers and microcomputers and the regulation on the communications side.

The real issue at stake is not the attempt to define an artificial boundary between two intertwined industries. If one examines the justification for regulation, one finds it is partly to make communications (and other) services available to whomever desires it in the most cost-effective way.

What is happening is that the technology is making feasible applications for which the regulators have not yet performed their rate-averaging mumbo jumbo. Former FCC Chairman Richard Wiley sees the solution in an eventual deregulation of the terminal equipment area. But this is only part of the answer.

As networks become more integrated with multiple applications, the communications facilities become an integral part of distributed

computing. DP sites are becoming less and less self-sustaining and more and more dependent on interaction — via communications — with multiple sites.

Until now, innovative vendors operating around the government-imposed constraints of archaic regulation have managed to provide users with cost-effective solutions despite the inflexibility of communications facilities. This is a credit to these suppliers. But it will become more difficult for them to identify such solutions as networks and equipment become inseparable.

At the end of his article, Ryan asked rhetorically whether the DP industry is a free enterprise only as long as computers operate as stand-alone devices, bringing to light a very important point.

If the Computer Inquiry and the supposed rewrite of the Communications Act further restrict the DP user, no matter how indirect the impact, the regulators and legislators could severely restrict the continued prosperity of the DP industry.

Only one industry would benefit from such restrictions — the telephone industry, which hides under the skirts of the regulators and supplies equipment and services only when it is ready. That industry reacts very little to competitive pressures, and it has a lot to gain.

The public, and especially the businessman, has a lot at stake in the drama as it unfolds in Washington. Unfortunately, those making the decisions are comfortably insulated from the real needs and problems of the DP user.

Ryan has identified an important consequence. It is to be hoped that Washington is listening. But — just in case — users should make their voices heard by any and all means at their disposal.

Data Past

Five Years Ago March 28, 1973

ARMONK, N.Y. — The maintenance arrangements involved when IBM and non-IBM equipment are mixed, and under which IBM continues to maintain its part of the equipment, were changed by IBM last week. The new arrangements, explained in a reissue of the IBM Multiple Supplier System Bulletin, added:

- Charges for costs of maintenance calls resulting from additions and alterations.
- A requirement that IBM local and laboratory personnel inspect altered and restored equipment.
- A provision for increased charges for maintenance contracts "to cover costs" where the costs of maintenance had been significantly

increased by alterations.

The bulletin also announced restrictions upon the additions and alterations that could be connected, over and above, the older restrictions laid down in the 1956 consent decree.

Eight Years Ago April 1, 1970

BETHESDA, Md. — General Electric Co.'s information service department extensively restructured its time-sharing prices. The charges, scheduled to be effective in May, included a reduction in the hourly terminal-connect rate and a data throughput charge based on a character input/output measurement concept for users of the GE Mark II time-sharing system.



Letters to the Editor

Analogy Comes to Mind

Being in the microcomputer business, we read with interest Portia Isacson's statement that "IBM is nervous" about competition from the microcomputer industry and that DP executives will lose prestige and salary as a result of an increase in the number of personal computers ["IBM Warned: Beware of Personal DP," CW, Feb. 27].

Following that line of reasoning, we would like to warn Kenworth and Peterbilt that their days in the truck business are numbered because of the increase in sales by Ford and Chevy of half-ton pickups.

Tom Weathered
Irv Wardlow

Applied Microsystems, Inc.
Dallas, Texas

And Now a Word on DDP

Regarding the March 6 special report:

Distributed intelligence is a scatterbrained idea.

Harold Bosworth Foonman
Chalfont, Pa.

Simple Answer for Yount

Had Robert Yount come to me at a computer store looking for a microcomputer system ["Small Systems Vendors Better Learn English," CW, March 13], I would have simply told him to buy a floppy drive and as much memory as the system will take.

I may have seemed like a slick salesperson at the time, but six months later I would have been a hero. His programmers would be spending time implementing useful software systems rather than compressing bytes out of programs and data files so they could fit on the system.

The day of the Neanderthal 8K/paper tape "computer system" is at last, thank God, fading into the dis-

tant past.

Paul C. Anagnostopoulos
Framingham, Mass

Clarifying ACM Vote

The March 6 editorial "ACM and Soviet Union" carried the statement "Turk's third point is also well-taken, although there seems no indication that ACM members did not take it into account as they voted to sever relations." Readers may infer from that statement that all 35,000 or so members of the Association for Computing Machinery voted on this issue. As a matter of fact, that action was an ACM Council action only.

Readers may be interested in the special report "Science, World Politics and Human Rights," by Richard J. Seltzer in the Feb. 20 issue of Chemical and Engineering News.

Peter Lykos
Chicago, Ill.

Out of Anonymity

The "Ode to an Ace Programmer" printed in the March 13 "Letters to the Editor" column was stated to be anonymous.

We have a copy of the poem in our office. Lou Ellen Davis of Stamford, Conn., is credited with writing it.

Steven Deckard
Eldorado, Ill.

Case of Computer Error?

With reference to the "Learner's Lexicon" in the March 13 issue: Two "definitions" are listed under multiprocessing. Definition 1 may be related to multiprocessing. Definition 2, however, describes multiprogramming, and it describes it quite well.

No definition is offered for multiprogramming.

Computer error?
David K. Totten
Virginia Beach, Va.

COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

☐ Please enter my subscription
(see alt. on back)

☐ I'm already a subscriber,
but I'd like you to
change my

address
title
industry
other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

Europe and Middle East — \$50 All Other Foreign — \$65

RATES: United States — \$18

Canada and PUAS — \$28

(MC Only List four digits above your name)

--	--	--	--

--	--	--	--

If charge we must have cardholder's signature: _____

Expiration Date: _____

First Initial	Middle Initial	Surname										
Your Title												
Company Name												
Mail To:												
City										State	Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from Computerworld.
☐ Check here if you're interested in receiving information on Computerworld's Index

- 10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other

THE OCCUPATION FUNCTION

- 11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg. Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other



Detach here, fold, and place in post-paid envelope attached through binding.

Legislation Would Help Invention Needed to Foil Robot Phone Calls

By Jack Stone
Special to CW

As I read how the electronic and computer industries are intensifying their efforts to develop products for the home market, I become increasingly concerned that they may be missing a real winner.

I'm not referring to minor extensions of the hobby kits or micro games, nor to more cost-effective home computers or instructional machines. I'm talking about a product for millions of potential buyers who already have the base terminal unit installed, a telephone handset.

The need to be addressed is the ability for private citizens to efficiently and effectively handle commercial telephone messages generated by robot telephone operators. In the trade, they are termed "junk calls."

And why do I assert that the need is significant? Easy! I learned long ago that success in the mass market is dependent on the degree to which the buyer becomes psychologically aware of a need. The intense antagonism created by junk messages is really building this awareness.

Maryland Situation

I recently reported on the problems the U.S. Congress has had with junk advertising via computer-generated lobbyists' mail [CW, March 6]. Now I've learned that

citizens of Maryland have been bombarded with continuing barrages of prerecorded telephone sales messages.

As a matter of fact, the oppression became so bad that both the Maryland State Senate and House of Delegates voted to prohibit the use of automated dialing machines within the state. (The measure should be enacted into law soon, after minor differences are reconciled by the two legislative units. Unfortunately, the proposed law has no effect on telephone calls originating from outside the state and has no penalties for those who violate the law.)

Felicity Barringer discussed the matter recently in the *Washington Post*. In describing the technology, she wrote, "The automated 'Megadial' system that would be abolished under this legislation can be programmed to run through, in numerical order, all the phone numbers on a given phone exchange (and deliver a commercial message) before it moves to the numbers on the next exchange."

The article described some of the happenings at the earlier committee hearings on the subject. Delegate Marilyn Goldwater expressed concern about the potential for being harassed by multiple purveyors of junk telephone advertising. She said, "It really boggles the mind, the number of junk telephone calls one machine can turn out. You could be

swamped with 10, 20 or even 30 recorded calls in a day. You could lose control of your own telephone in your home."

There were some who testified against the prohibition, claiming that economic advantages outweighed the personal inconveniences. For example, the lobbyist

her machine on while she was away, in part to avoid the possibility that Megadial would remember to call back an unanswered telephone number. (I wonder if she had dinner out each night to avoid the early evening calls).

Simple Design

The design for my proposed system, using top-down methodology, was a direct fallout from the title: System for Utilizing and Controlling Ridiculous Amounts of Junk Telephonic Messages, or Scram for short. Its stark simplicity may be its greatest virtue.

First, we need federal legislation that will require senders of high-volume commercial messages to add an electronic identification code to the front end of each message. Then we only need to extend the technology of the answering device to recognize the codes and reject the junk talk out-of-hand.

With my answering machine, the average citizen will be able to save the time formerly spent listening to robot telephone operators and use it to give his or her undivided attention to television commercials.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave., N.W., Washington, D.C. 20007.

Attorney Says 'No'

DP Too Specialized for Regular Lawyers?

Trial lawyer Matthew P. Mitchell recommends a different approach to users thinking of suing computer vendors than the one I suggested in "Lessons for Users: Do Your Legal Homework" [CW, Feb. 20]. He argues that the general-purpose lawyer is like a general-purpose computer and can be programmed to do almost anything!

This is a telling and neat analogy, worthy of Mitchell's background (he handled the Teamster Union case against Univac) but one with which I cannot agree.

Mitchell illustrated what he thinks should happen when a user gets into a problem. He proposed two series of recommendations — one series for hiring the lawyer and one for action after the lawyer is hired (See box).

Unfortunately, none of these recommendations (beyond the ones dealing with educating your lawyer once you have found him) deal with the DP user's need for immediate skilled guidance — something I find to be more lacking than anything else in computer problem situations.

Skilled guidance early on can sometimes help head off lawsuits or reduce the damages dramatically.

A lawyer who lacks DP background during the period when problems are first recognized may not understand the importance of being able to use property (machines, software, know-how) belonging to the other side, or the way DP people on both sides take their responsibilities very personally. These factors can be important in trial preparation.

The ill-prepared lawyer can end up creating a whole new fantasy land for the user who doesn't understand qualifications implied in the Mitchell approach to hiring a lawyer, nor the critical importance, both financial and legal, of the initial actions in a lawsuit.

In addition, nowhere in his list of actions does Mitchell provide for the user becoming aware of what he is getting into. For instance, an ability to handle a three-week trial tells nothing about the lawyer's ability to assess the quality of the opposition or gauge the amount of preparation the opposition has put into contract forms, instructing the salesmen and technicians and other aspects of the case. The user may unknowingly be faced with an unusually skilled and prepared opponent.

Frankly, ordinary skills — even in-

(Continued on Page 34)

Looking for Counsel

1. Has he had some long (i.e. three weeks or more) trials in commercial cases? (Short trials, divorces, criminal trials and personal injury cases are different breeds of cat.)
2. Does he have the kind of backup staff that can do a thorough job on discovery, trial preparation and assistance at trial? (Competent associate lawyers and paralegal assistants can magnify the trial lawyer's effectiveness manyfold.)
3. Has he adequate capacity to learn the business of the user and the "state of the art" in the computer application the user has in mind? (Prior understanding of the user's application, and/or of computers in general, is helpful and saves time, but commercial lawyers are professionals at "crash learning".)
4. Does the lawyer appear to have the time, interest, general intellectual background and capacity to learn what he doesn't already know?

Once the appropriate lawyer has been located and hired, the user's active participation in his case should not end. I would strongly encourage the user to follow up as follows:

5. Educate the lawyer. For openness, give him all the paper that has anything to do with the project. Give the lawyer any books or articles that may be helpful and point out the pithiest material in the pile.
6. If he isn't already reading it, get him a subscription to *Computerworld* and *Data-mation*.
7. Spend time with the lawyer; if your expertise is limited, hire an expert, if only for some private tutoring.
8. Be interested, and stay interested, in the information the lawyer is obtaining in discovery. Sometimes information that does not have obvious significance to a lawyer will become much more meaningful in the light of other facts.
9. Take the lawyer's advice; if you have picked a good one, his judgment as to the probable outcome of a lawsuit may be the solidest rock you will find amid the shifting sands of litigation.
10. Finally, if it appears the lawyer is not doing a job, discuss that frankly and forthrightly with him. Sometimes even competent, conscientious lawyers find themselves in over their heads. They are usually the first to realize the problem and are often willing, perhaps even eager, to put a case into the hands of lawyers better equipped to handle it.

Matthew P. Mitchell recommends that users follow these steps to find and "train" a lawyer.

**The
Taylor
Report**
By
Alan
Taylor
CDP

After Scolding by Edelstein 'Pilloried' IBM Trial Spectator Speaks Out

Recently during the U.S. vs. IBM antitrust trial, Judge David Edelstein lashed out at a spectator for "grimacing and smirking" in court. He told the spectator, Martin Simpson, an independent financial analyst, "I wish you would confine and contain your feelings and not display your emotions. I am not interested in your reaction. If you can't conduct yourself well, get out."

"If you behave in this fashion, you don't belong in any polite society, let alone a courtroom. You certainly don't bring credit to anybody whom you represent."

"This is a serious matter sir, and this court is doing everything in its

power to concentrate on the issues and testimony before it and the attempts and efforts of counsel to represent clients. Do you understand that? ... You are ill mannered and poorly behaved."

Simpson replied to Edelstein in a letter he has allowed Computerworld to publish. He has received no reply from the judge.

Following are excerpts from Simpson's letter.

On my own time and expense as a member of the public, I attended the IBM antitrust proceedings this morning. I was surprised and taken aback when you lashed out at me

for allegedly not behaving with proper decorum. Whether I nodded, yawned or otherwise excited your ire through a facial expression

Reader Commentary

is still unclear to me, but being the butt of your harangue was certainly as inadvertent as it was unexpected.

I am not used to being pilloried in public for my mien, and I also resented your remark that I was a dis-

credit to whomever I happened to represent.

In addition, I regret your inference that I do not regard the current proceedings of the Justice Department suit against IBM as being important. I have a stock ownership position in IBM and also in many competing computer companies.

I believe this litigation has profound implications for all companies competing in the free enterprise system, as well as specific potential impact on the U.S. balance of payments, employment and competitive posture in international commerce. It therefore would never occur to me to treat such proceedings with disrespect, especially as I am underwriting part of the court costs through my tax dollars.

On a number of occasions, through perusal of the trade publications to which we subscribe, I have gained the impression that you are both biased and irascible in matters relating to this litigation. My own observations have done nothing to discredit this view.

In my opinion, your handling of this litigation is not proving productive or conducive to a fair hearing for the parties involved. I realize the issues at stake are profound, complicated and challenging, but see no reason why you would discourage free access to the court hearings through abrasive and what appears to me to be unwarranted outbursts. If in fact I committed any breach of legal etiquette of which I should be aware, I would appreciate your drawing the nature of such lapse to my attention.

If it is your policy to discourage ready access by the public to these proceedings, please let me know. As a taxpayer, I can see no reason why I should be precluded. I also do not subscribe to the view that judges have been elevated to a position where they can capriciously ride roughshod on the public at their whim.

Too Specialized For Lawyers?

(Continued from Page 33)

created by all the capabilities of paralegals, trial experience and having subscriptions to *Dotomotion* and *Computerworld* — are not enough to rely on against well-prepared and well-heeled opponents. A user needs, and can get, better service.

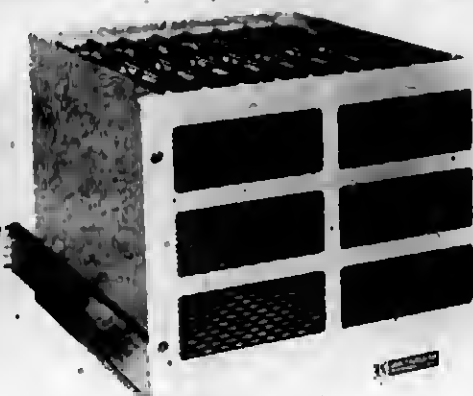
That is why I urge readers first and foremost to do their legal homework before bringing suit. Then, when a problem comes along, don't take time out to train your lawyer, but seek out a lawyer who can train you in improving your immediate and long-term position.

The matters are just too vital and the opportunities for settlement are too high at the start of litigation to take unnecessary chances.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

SAVE 80%

ON PDP 11/70 MAIN MEMORY



WITH DATARAM BULK CORE

1024K x 18 (one megaword) PRICE COMPARISON

DEC				DATARAM			
Qty	Item	Unit Price	Sub-Total	Qty	Item	Unit Price	Sub-Total
1	MJ11-BC 256K word (512KB) system	\$ 55,500	\$ 55,500	1	BC-417 chassis and accessories	\$ 3,400	\$ 3,400
3	MJ11-BG 256K word (512KB) additional	53,240	159,720	8	128K x 18 (256KB) additional	5,140	41,120
Source: Datapro, February 77			\$215,220				\$ 44,520

SAVINGS $\frac{215,220 - 44,520}{215,220} = \frac{170,700}{215,220} = 79.3\%$

You read right!

Dataram's BULK CORE provides a dramatic main memory alternative for PDP-11/70 users. BULK CORE system BC-417 interfaces to DEC's 11/70 Memory Bus, and is completely compatible with DEC's MJ11 series of core systems.

The BULK CORE BC-417 system is offered in a 15 1/4" chassis with a minimum configuration of 256K x 18. It can be expanded in increments of 256K x 18 to a maximum of 1024K x 18 (one megaword).

BULK CORE. An economical, exciting... and proven alternative.



PRINCETON-HIGHTSTOWN ROAD
CRANBURY, NEW JERSEY 08512
TEL: 609-799-0071 TWX: 510-685-2542

I'd like to learn more about BULK CORE for my PDP 11/70

- ☐ Please send information
☐ Please have a salesman contact me

I'd also like to learn more about BULK CORE for Fixed Head Emulation on my ☐ PDP-11 ☐ Nova

Name _____

Title _____ Phone _____

Company _____

Address _____

City _____ State _____ Zip _____

☐ Please send me information about Dataram's ADD-ON/ADD-IN memory for minicomputers.

PDP and DEC are registered trademarks of Digital Equipment Corporation

Canada: Tracac Electronics Corporation, Ontario/Quebec/British Columbia • Belgium/Luxembourg/Netherlands: Synelec Information Systems; (02) 647-87-12 • France: YREL, 950-2224 • Italy: Macronics, 3536041 • Sweden: M. Stenhardt AB, 08-739 0050 • Spain: Aupoca, (01) 457-53-12 • Switzerland: Stolz AG, 057 5 46 55 • United Kingdom: Sintrom Ellinor Ltd., (0734) 85464 • West Germany/Austria: O.E.M. Elektronik GmbH 0711-798047 • India: Industrial Electronic Instruments 79281 • Israel: K.O.M. Electronics Ltd. (03) 58232 • Japan: Matsushita Electric Trading Co. Ltd. (03) 435-4552 • Australia/New Zealand: Anderson Digital Electronics, (03) 543-2077

Hewlett-Packard Computer Advances

Vol. 3 No. 2 March 1978



IMAGE
reflects your
data base
management needs

Get to your data before it gets to you

Educated guesses don't work. Management decisions need to be based upon accurate information in all phases of an organization's affairs. Quick access to timely and complete data often makes the critical difference in operational efficiency. In response to this, Hewlett-Packard's general purpose computer system — the HP3000, and the HP1000 provide a full menu of data management software.

First, there is the HP3000's multi-programming executive operating system which accesses files sequentially (each record processed serially in physical order), or directly (each record is accessed by a relative record number calculated by a software algorithm). Similarly with the HP1000's Real-Time Executive (RTE).

KSAM

KSAM/3000 (Keyed Sequential Access Method) provides a more sophisticated file access. KSAM files can be accessed by key values within the data record. Each data record contains one primary key field and may include up to 15 alternative ones. Access of these records can be sequential or random by either primary or alternative key value. KSAM/3000 also supports key access by physical or logical record number, or by chronological order.

◀ Our cover captures one kaleidoscopic moment. Similarly, in a continually evolving company, a Hewlett-Packard IMAGE/QUERY data base management system can reflect current financial, manufacturing, order and shipping information.

KSAM/3000 users may also retrieve data by using part of a key rather than the entire key. Titled partial or generic key search, this approach is ideal for values that share a common beginning. Suppose you wish to find all customers in a certain geographic area. By specifying only the common first three characters of the zip code — like 950, it is possible to read quickly 95050, 95060, 95065, etc. Plus, generic key searches are perfect memory assistants. "I think the brand name begins with Ba. Let's see, is it Bates, or Battes...?"

For those users with existing indexed sequential files, KSAM/3000 facilitates their conversion to the HP3000. For example, RPG programs on an IBM SYSTEM/3 using indexed

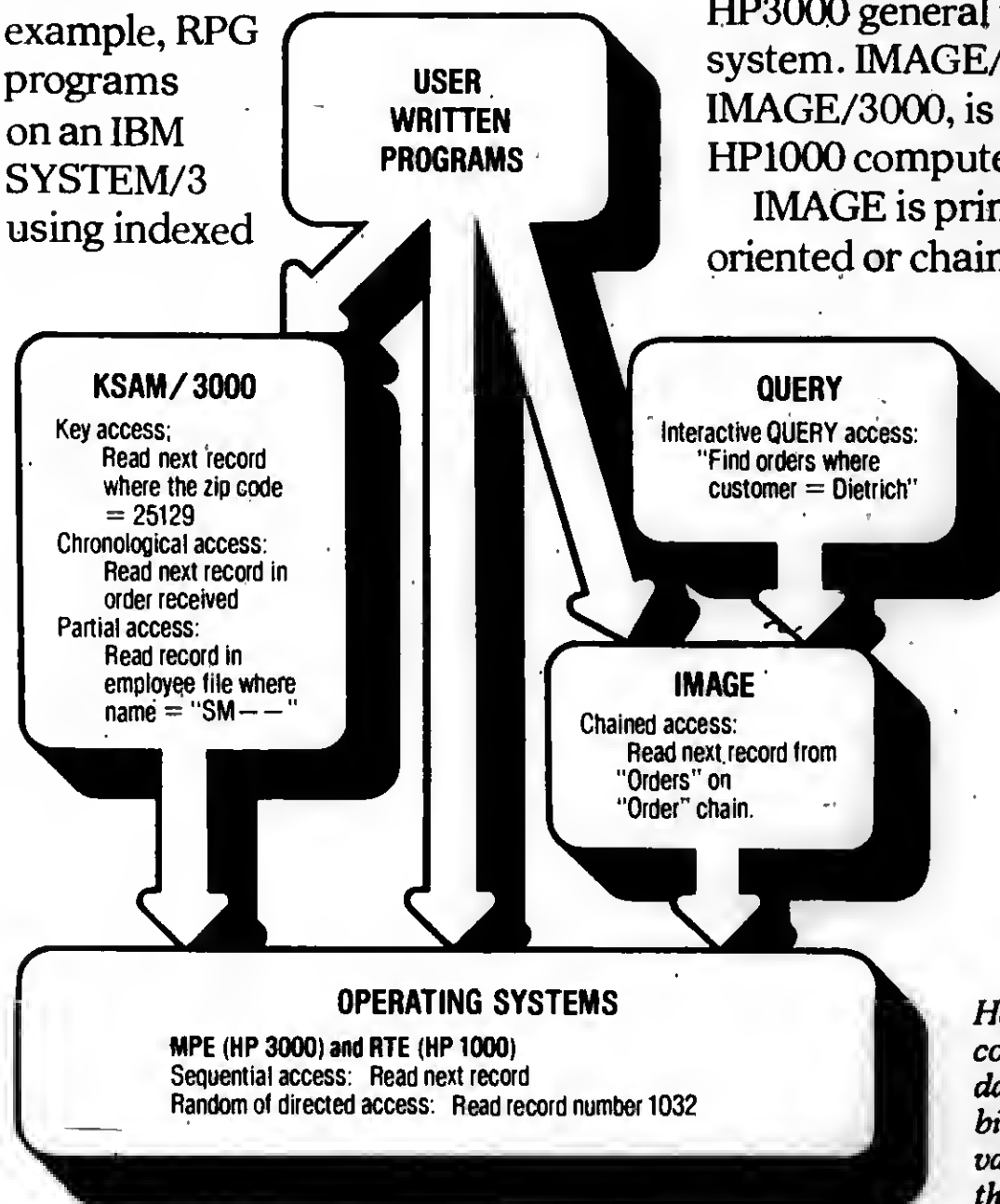
access method require virtually no change to run on the HP3000 Series II.

IMAGE

As data handling requirements become more complex in terms of the number of files needed and the inter-relationships of data within the files, it makes sense to consider a data base management system. IMAGE, for example, is Hewlett-Packard's powerful data base management system which handles multiple files and which helps users define and create a data base tailored to their special requirements.

There are two versions of IMAGE. IMAGE/3000 runs on the HP3000 general purpose computer system. IMAGE/1000, a subset of IMAGE/3000, is available on the HP1000 computer system.

IMAGE is primarily a path oriented or chained approach to



Hewlett-Packard computers have a range of data management capabilities which offer users a variety of ways to access their data.

data retrieval. Pointers are maintained which logically connect those records with common attributes into chained lists. This allows cross-referenced access to collections of data down to the smallest unit. This approach makes it possible to access related data very quickly.

Since IMAGE treats and maintains a data base as a unit, the user is freed from organizational concern and overhead. Plus, it has a coordinating facility SCHEMA which describes the structure, interconnections, and item level security of the data base.

Any HP3000 KSAM file or IMAGE data base is accessible from RPG, COBOL, BASIC, FORTRAN, OR SPL. IMAGE/1000 files are accessible by FORTRAN, ASSEMBLER, AND BASIC. Users can select the language most appropriate for each application.

IMAGE/3000, introduced in 1974, was the first data base management system available on a minicomputer. In the fall of 1976, it was elected to the "Software Honor Roll of Datapro Research Corp., Delran, NJ"

QUERY

IMAGE is used primarily by the computer system specialist and the programmer — those people concerned with data entry, organization and retrieval.

QUERY, a companion data base inquiry facility for IMAGE, is for the non-computer specialists whose needs are to retrieve, analyze and report information to support their job functions and decisions. QUERY

facilitates spontaneous and unanticipated inquiry into the data base by authorized users. And, it can be used as an aid in designing data bases.

By entering English-like QUERY commands, an authorized user can retrieve, update, or modify data in an IMAGE/3000 or IMAGE/1000 data base — without learning complicated programming languages. These commands can be entered either interactively or in batch mode. QUERY adheres to all those security provisions of MPE and IMAGE/3000 described on the following page.



Ask her any question about a customer. With FIND, Sherry has the answer in seconds.

A user can casually and easily search an image data base and retrieve information using a FIND command — not by writing a program. QUERY locates entries based upon logical criteria and relational operators i.e. =, ≠, <, >. Or, the user can specify selection criteria as easy-to-understand mnemonics. Here's a sampling.

ISNOT — is not equal to

GT — greater than

LT — less than

IB — is between

Selections can range from simple requests —

FIND ZIP # IS 94508

to more complex ones based upon

logical comparisons —

FIND PRODUCT IS 324L6A AND
SALES-REGION IS 24 AND CUST-
AMT-DUE IB 1000, 10000 AND
DAYS-OVERDUE IGT 60

The number of logical relationships that can be specified in a single FIND command is practically unlimited!



With QUERY, Sam enters orders easily, even though it's his first day on the job.

To facilitate use of IMAGE by computer novices, a user can input one single command and QUERY will automatically execute an entire QUERY job consisting of many different QUERY commands. Similarly, a set of FIND or REPORT commands can be stored in a separate command file. This is a convenient time-saver for frequently used, or lengthy commands, such as the previous FIND example.



Ken is designing a data base. QUERY tells him if it's working.

For users writing programs which will access IMAGE data base files through IMAGE procedures,

Continued on page 6

Everyone needs security

Especially when building a data base

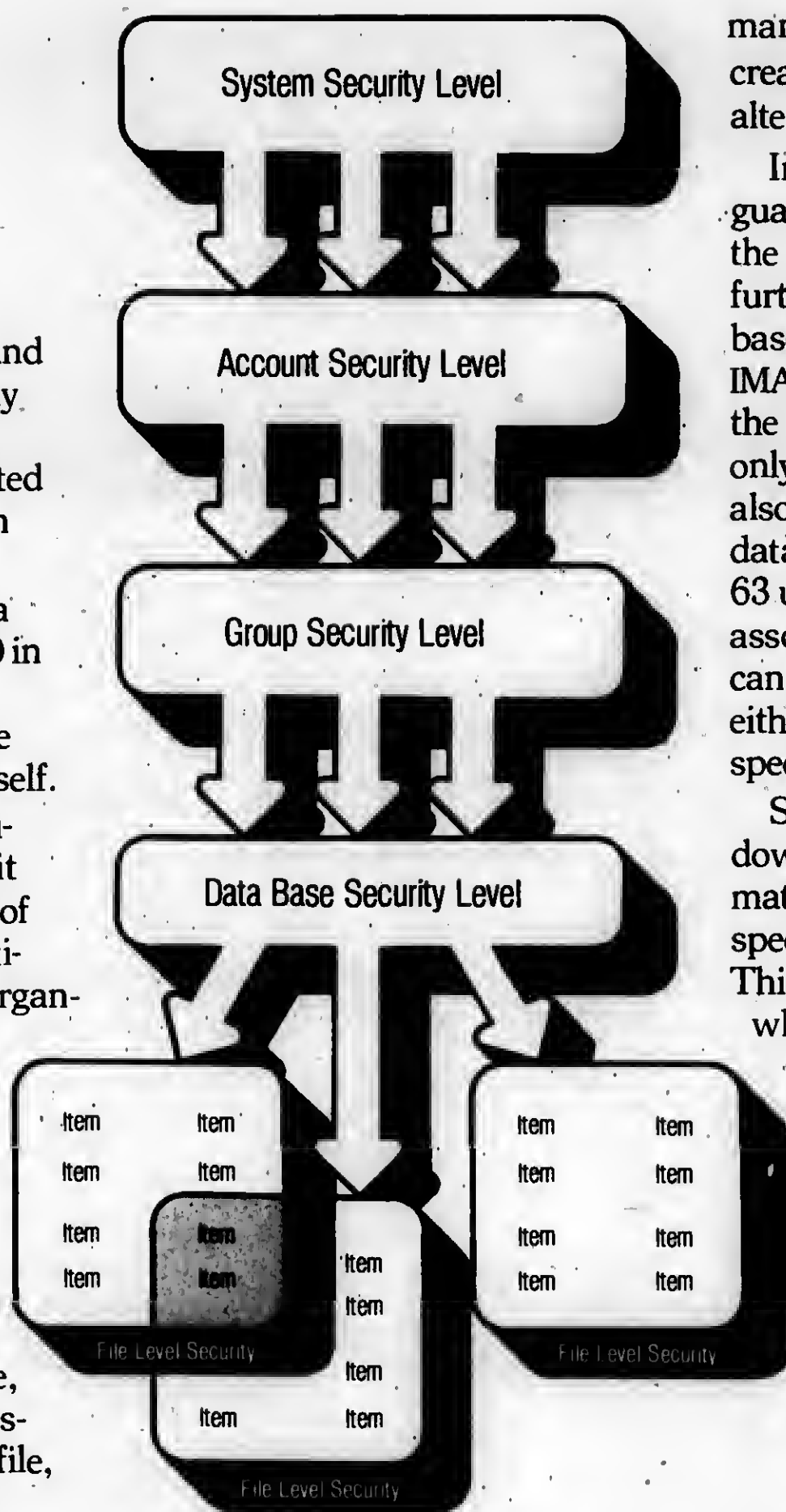
There is definite concern today about maintaining the security and integrity of data bases. Justifiably so. It is essential that any data base be designed and implemented so that only authorized users can access or modify the data.

Hewlett-Packard ensures data base protection for IMAGE/3000 in two ways. One is through the operating system—MPE, and the other by the IMAGE software itself.

The HP 3000 supports a multi-user environment. By necessity it must have an encompassing set of security procedures. MPE's multi-level security is based upon an organizational structure of accounts, groups, and files. An account consists of a group of files, and any of these files can be accessed by one or more users.

System access is granted only to those users with a valid log-on identification consisting of account, group and user name, each of which may require a password. Then, before accessing a file, this same log-on is used to pass MPE security checks at each of three levels—account, group and file level. By passing these security checks, the user is then allowed an appropriate file access, e.g. read, write, etc., as determined by his user class.

These access restrictions are set by the system and account



Your data is secure in an IMAGE/3000 data base for you can control specific read and/or write access for each user right down to individual items in the data base. Prior to even getting to the data base however, the user must pass several security levels provided by the operating system (MPE) and IMAGE.

managers when the account is created and, of course, can be altered as necessary.

In addition to the security safeguards of MPE, IMAGE provides the data base administrator with further protection for the data base. The key to the strength of IMAGE/3000 and 1000's security is the ability to control access not only to specific data sets (files), but also to each data item (field). The data base designer can define up to 63 user classes, each with an associated password. Then he/she can associate each class with either read or write access to specific data sets and items.

So, the data base is protected down to the smallest unit of information, for example, a data item specifying an employee's pay rate. This ensures that the only users who access and/or change specific items are those whose job function require it.

Because multiple users can be simultaneously accessing and up-dating an IMAGE data base, data integrity must be assured.

Upon entering the data base, users may specify the type of access they wish—e.g. read, modify, update, etc. Or this may be handled via a user program. IMAGE will allow that access only if it is compatible with the functions already being performed by the other concurrent users. This approach results in compatible sharing of the data base and ensures data integrity.

Especially when keeping track of court dates...

To the advantage of both prisoners and the institution, the Cook County Department of Corrections is using an HP computer system to deal with problems such as how to separately house experienced criminals from neophytes.

Their system, which includes 40 on-line HP2640 CRT terminals accessing an HP3000 with IMAGE/QUERY software, places current inmate records at the fingertips of cell assignment officers.

"A better informed correctional force means fewer problems," says J. David Coldren, Director of Criminal Justice Information Systems for the State of Illinois. Guards are more accountable now, security has improved, and prison tensions have been reduced to some extent."

"The new information system provides for other essential functions as well. One is to make certain that prisoners keep their court dates. This is no small task considering that, on an average day, 400 of the 4000 inmates are due in geographically scattered courtrooms, and that transportation and security must be arranged.

"IMAGE/QUERY provides for easy and convenient entering and retrieving of data, an important aspect for keeping track of inmate court dates. We have the flexibility to retrieve by judge, date, courtroom, etc.," explains Coldren.



"A good data base system saves development time. If we hadn't had IMAGE, we might still be writing our first application program," says J. David Coldren, of the Illinois Law Enforcement Commission.



A dynamic production environment requires a responsive data base management system. Farah Manufacturing Co., chose Hewlett-Packard's multi-terminal IMAGE/QUERY system.

...or delivery dates

"Even a small cutting order here can involve 60,000 production steps. Our IMAGE/QUERY system gives us control of each step of every order," says Randy Bohannon, Director of Information Services for Farah Manufacturing Company, the El Paso, Texas, men's and boy's apparel maker.

"Before we installed the central Hewlett-Packard 3000 system and three HP1000's, we used a production control system. It gave us data on only five or six major steps per order — barely enough to estimate delivery dates.

"Now with the IMAGE/QUERY system, we can not only predict deliveries accurately, but can immediately pinpoint problems. We can

compute variances from our standard costs. This gives us an indication of what went wrong in the production cycle and enables us to adjust accordingly.

"Tracking begins with the cutting order. The system matches order assignments to fabric inventory in our three plants, sending a bill-of-materials along with the assignment. This on-line production data entry keeps the data base and our reports current.

"The system updates the data base from a single user transaction without duplicating the data in multiple files. QUERY allows us to generate non-routine reports on-line from any data we collect. In a dynamic production environment, that is sophisticated control," Bohannon concludes.

New & Noteworthy

More talk

Now, there's a lot more talking that can be done between

the HP3000 general purpose computer system and certain IBM systems—specifically OS, MFT, OSMVT, OS/VS2, SVS, and MVS.

With MRJE/3000 (Multi-leaving Remote Job Entry emulator), the HP3000 can serve as a HASPII or JES2 work station for an entire distributed network. Jobs are transmitted easily over leased or switched lines. This new software package is a full job management system. Any HP3000 network terminal can submit jobs to the host, and become a HASP console to monitor job status, and to interrogate the IBM system. Commands to accomplish this are easy, and straightforward. For example: SUBMIT, DISPLAY JOB, CANCEL JOB.

MRJE/3000 simultaneously supports up to seven input, seven print, and seven punch streams—all the while with full operation of MPE—the multi-programming operating system of the HP3000.

A handy feature of MRJE/3000 is its ability to accept jobs for later entry to the IBM host. Jobs submitted off-line are spooled to be automatically transmitted once a

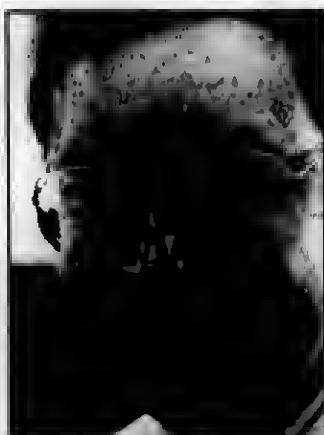
communication connection is made—perhaps at night when telephone rates are lower. Output is returned—conveniently and automatically—to the designated peripheral device or file.

The January Computer Advances described RJE/1000, for the HP1000 which provides emulation of an IBM 2780 remote batch terminal to certain IBM 360 and 370 systems.

For more information on HP's Distributed Systems Network, check C on the reply card.

QUERY/continued from page 3

QUERY is an excellent design and debug aid that helps you determine if your program is working properly. For example, have your program update a field, and then let QUERY immediately examine that data to see if it was, in fact, entered correctly. With QUERY, a designer can implement a small data base quickly, play with it, and get ideas on how to improve it. Plus, a handy FORM command provides current information on the layout of the schema—the data base structure.



Marco needs a financial report for a board meeting in half an hour. He gets it in 4 minutes.

QUERY provides two types of reporting capabilities. One, LIST, is ideal for quickie reports. It pulls

out specified bits of information and automatically formats them. For example, the command LIST ALL INVENTORY FOR CURRENT-COUNT LT 125 would yield the specified inventory data in readable, columnar format.

Another more sophisticated REPORT enables the user to specify the report format with respect to header and column labels, page numbers and group labels. In addition, the user can sort entries through multiple fields, as well as total, average, or count columns of numeric data values. Arithmetic calculations can be performed using the ten query registers and the results can be printed in the report. As mentioned, frequently used formats can be stored conveniently in a procedural file.

If you would like more information on any of Hewlett-Packard's data management software, check the appropriate letter on the reply card.

Computer Advances is written to inform professionals of the latest technical contributions from Hewlett-Packard. You are invited to receive issues at your place of residence or business. Write Carol Scheifele, Computer Advances, Editor, Hewlett-Packard, 11000 Wolfe Rd., Cupertino, CA 95014.

HEWLETT  PACKARD

Hewlett-Packard Computer Advances

Direct Response Card

HP is pleased to provide you with literature or answer specific questions regarding any computer advances which intrigue you.

Please Send more
contact information

☐
☐
☐☐
☐
☐

- A. IMAGE/QUERY 1000
B. IMAGE/QUERY 3000
C. HP Distributed Systems Network

Computerworld

Name

Title

Company

Address

City

State or Province

Zip or Postal Code

Country

Telephone

CW 3/78

Hewlett-Packard Computer Advances

Direct Response Card

HP is pleased to provide you with literature or answer specific questions regarding any computer advances which intrigue you.

Please Send more
contact information

☐
☐
☐☐
☐
☐

- A. IMAGE/QUERY 1000
B. IMAGE/QUERY 3000
C. HP Distributed Systems Network

Computerworld

Name

Title

Company

Address

City

State or Province

Zip or Postal Code

Country

Telephone

CW 3/78

First Class
Permit No. 141
Cupertino,
California

Business Reply Mail

No Postage necessary if mailed in the United States

Postage will be paid by

Hewlett-Packard
11000 Wolfe Road
Cupertino, CA 95014

Attn: Computer Advances

First Class
Permit No. 141
Cupertino,
California

Business Reply Mail

No Postage necessary if mailed in the United States

Postage will be paid by

Hewlett-Packard
11000 Wolfe Road
Cupertino, CA 95014

Attn: Computer Advances

Hewlett-Packard Computer Advances/March 1978

Testing Support Also Boosted

Capex 'Optimizer' Has Enhanced Cobol

PHOENIX — Capex Corp. has added an enhanced Cobol compiler listing and considerable testing support to the already well-established object code tuning of its Optimizer II package and called the result Optimizer III.

The earlier Optimizer reduced CPU time and memory requirements for ANS Cobol programs on IBM 360 and 370 gear by analyzing the entire program flow. It regenerated the object module with much of the code — especially the instructions generated

by the compiler without regard to the programmer's application logic — eliminated or improved.

Those capabilities, enhanced, are the heart of Optimizer III, according to a spokesman. But the package also simplifies the programmer's use of the compiler listing by merging the Data Division with the Data Map and the Procedure Division with the Clist, he said.

The Procedure Division-Clist printout also identified logical exits for each PERFORM range, flags unexecutable code and pin-

points unconditional IF statements, the spokesman noted.

New to the Optimizer is the Detector subsystem, which simplifies debugging by producing a formatted report of each Abend. This shows which program "bombed," which instruction caused the problem and what was in the data items at the time.

Contents of the registers, status of files and the makeup of Working Storage are also reported. So is program flow, in a way similar to a facility available under IBM's VS Compilers, but with

such low overhead it can be left embedded in programs even after they move to production status, Capex claimed.

Optimizer III enhances testing by bypassing but reporting minor interrupts so a single test session can identify multiple errors.

The Analyzer subsystem of Optimizer III ensures adequate testing by showing, after a session, how much of the program has been tested and, specifically which verbs — by page and line number — were not executed, even in the section of the program that was exercised.

Histograms of time spent in each module and on paragraphs within the modules may help the programmer see where the program or the test can be improved, the spokesman added.

Optimizer III can be leased for \$325-\$1,140/mo or licensed for \$9,750 to \$28,500/mo depending on lease duration and/or size of the configuration. There is an annual maintenance fee of 12% after the first year's use, Capex said from 2613 N. Third St., Phoenix, Ariz. 85004.

Interdatas Get Multitasking

LOS ANGELES — Fast from Cybertek Computer Products is an advanced multitasking operating system for Interdata's 16- and 32-bit processors. It was designed with the same concepts found in such large machine systems as IBM's OS/MVT, Cybertek said.

The system supports dynamic memory allocation with no fixed partitions. This allows programs to load immediately wherever there is adequate space in memory, a spokesman noted.

The link editor in Fast minimizes object module load time, he added.

The software also supports rapid program execution, the spokesman said. Five different disk access methods are available, each designed for optimum speed in specific applications, he reported.

Overlapped I/O

I/O operations are overlapped so the processor executes new tasks while awaiting the completion of I/O on earlier ones. And spooling of printer output to disk avoids keying the system to the relatively slow speed of the line printer, the spokesman said.

Fast's multiterminal support

provides a particularly effective program development environment, the vendor claimed. This is further enhanced by a fast, two-pass "IBM-like" Assembler, which provides easy conversion to IBM BAL code for programs intended for the bigger machines, according to the spokesman.

Fast also has an expanded instruction set including storage-

to-storage commands, he said.

Fast itself is compact, requiring as little as 20K of memory for resident code. The system is available in two versions. Fast/16 for Interdata's earlier CPUs costs \$7,500; Fast/32 for the 32-bit units costs \$10,000.

Both are available now, Cybertek added from 3255 Wilshire Blvd., Los Angeles, Calif. 90010.

Despite Limited Budget

Package Spices Up Program Effort

By Gordon Cochrane

Special to CW

ROCHESTER, N.Y. — It is possible, with a fixed budget for hardware and staff, to increase the scope and sophistication of data processing. We have done just that at the R.T. French Co. by reducing system maintenance requirements and by making system development easier.

Most recently, we replaced our program development system with Complete, the teleprocessing (TP) system from Software AG. This has dramatically improved our on-line program development facilities and given us the ability to support on-line

transaction-processing applications planned for the near future.

R.T. French is best known for mustard, but our food products range from pet treats to wines. In addition, we are expanding into leisure time fields such as ceramics and art supplies.

As a food producer, R.T. French is a multiplant manufacturer with locations from Maine to California. French and its affiliates employ more than 3,000 people.

The main corporate offices and DP facilities are located here in Rochester. A DP staff of 35 includes one programmer/analyst manager, three documentation

analysts, nine programmers, two analysts and one data base administrator.

It is essential to use systems that are reliable, easy to install and easy to use because no system programmers are employed. With a 1M-byte IBM 370/155 operating under MVT, we support the full range of business applications: accounts receivable and payable, payroll, purchasing, bill of materials, order entry, inventory control and sales reporting.

About four years ago, we realized that we would soon be unable to keep pace with our increas-

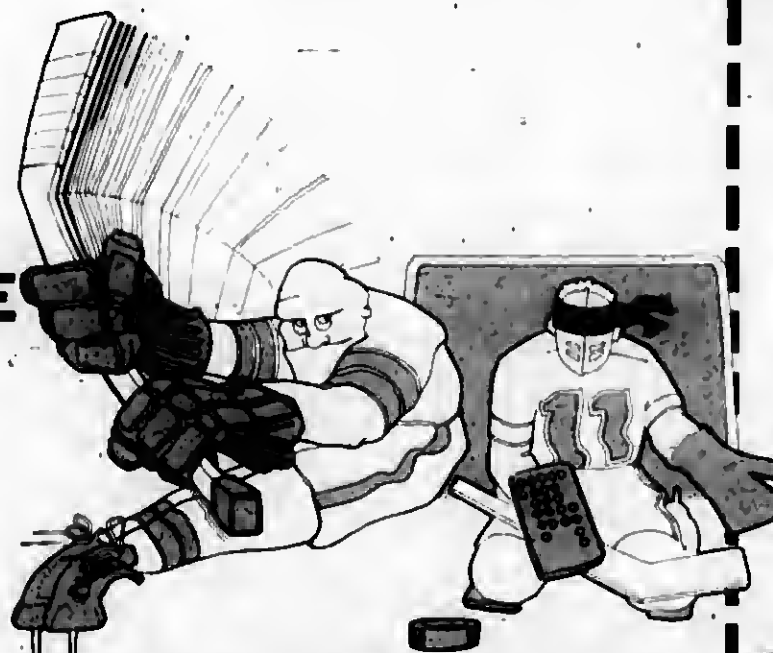
(Continued on Page 44)

SAVE your financial decision-makers with our GENERAL LEDGER, ACCOUNTS RECEIVABLE AND ACCOUNTS PAYABLE Systems.

Don't let your company management face-off against tough decisions wearing information blind-folds. Give them a great assist with proven, reliable systems from the No. 1 company — Software International.

Our hard-hitting first line includes the famous GENERAL LEDGER and FINANCIAL REPORTING SYSTEM, powerful ACCOUNTS RECEIVABLE and agile ACCOUNTS PAYABLE Systems.

They know their way around the league, operating in DOS, O/S, IMS, IDMS, DL/1, TOTAL, as well as on-line under CICS.



Give your financial management the most effective power-play you can, the three-way combination of GENERAL LEDGER, ACCOUNTS RECEIVABLE and ACCOUNTS PAYABLE, only from Software International. SCORE!

We've been in the penalty box for too long, Software International. Shoot your latest information to me about:

Large Computer Systems

- ☐ General Ledger and Financial Reporting System
- ☐ Accounts Payable
- ☐ Accounts Receivable
- ☐ Manufacturing
- ☐ Master Production Scheduling
- ☐ Material Requirements Planning
- ☐ Capacity Planning
- ☐ Shop Floor Control
- ☐ Comprehensive Report Generator
- ☐ FILETAB

Small Computer Systems

- ☐ System/3
- ☐ General Ledger and Financial Reporting System
- ☐ Accounts Receivable
- ☐ Accounts Payable
- ☐ Burroughs B-1700/1800
- ☐ General Ledger and Financial Reporting System
- ☐ Accounts Receivable

Other small computer system application products available soon. Please specify computer and need.

Name _____ Title _____ State _____
Company _____ Zip _____
Address _____ Phone _____
City _____ Computer _____

SOFTWARE INTERNATIONAL

Elm Square, Andover, Mass. 01810 (617) 475-5040

Atlanta • New York • Washington, D.C. • Philadelphia • Chicago
San Diego • Toronto • Houston • Columbus, OH • San Francisco

*Registered trademark of Software International CW32778

Look Into Johnson Systems'

CICS/VS UTILIZATION MONITOR AND CHARGEBACK SYSTEM



"Now, a powerful data collection system that lets you accurately account for . . . and equitably bill for . . . all resources used by each user."

"The first feasible alternative to Performance Analyzer."

Send me your brochure about the new CICS/VS UTILIZATION MONITOR and CHARGEBACK SYSTEM.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone (____) _____

Computer _____

Operating System _____

Johnson
Systems, Inc.8400 Westpark Drive
McLean, Virginia 22101

(703) 893-8700

C327

CSR TELLS IBM USERS

THE WHOLE STORY ON JES3/MVS

But that's nothing new. CSR has provided comprehensive live lecture and self-study training on the current releases of JES3/MVS at major companies including American Airlines, International Harvester, Manufacturers Hanover Trust, Montgomery Ward, Nationwide Mutual Life Insurance, Pacific Northwest Bell, Phillips Petroleum and SwissAir.

By providing in-house self-study/live lecture training, CSR saves you training expenses by eliminating student traveling costs and course development time for your staff. All live lecture and self-study courses are customized to reflect your installation's operating standards. As a result of this customized training, the students' study time is reduced, since the student only learns what is required to support your particular JES3/MVS configuration.

CSR's self-study machine exercises simulate actual operating conditions for your configuration and provide practical on-the-job learning experiences. The courses satisfy the training requirements for twelve job functions including management, operations, systems and application programmers. For more information on the self-study and live lecture courses contact Mike Daversa.

CSR

COMPUTER SYSTEMS
RESEARCH, INC.
195 West Main Street
Avon, Connecticut 06001
phone (203) 678-1212

'CPG' Uses Micro or Mini As Cobol Development Bed

SEWICKLEY, Pa. — The Cobol Program Generator (CPG) system from David R. Black & Associates Inc. utilizes a Zilog Z80 microcomputer or a General Automation, Inc. minicomputer as the environment in which users can reportedly build Cobol programs interactively, even if they are destined for production use on IBM 360s or 370s.

The basic Cobol generating system has been developed and operational for a number of years, a spokesman claimed. By providing users with better interaction than they could have with the IBM CPU, it allows each programmer to be far more productive, he added.

"Far more productive" may be an understatement if Black's figures are accurate. The spokesman claimed the system has the capability to produce "in excess of 2,000 lines of debugged Cobol code per day," although he failed to indicate how many programmers were at work to produce that total.

The major enhancement to CPG now is the postprocessor that converts the

Zilog- or GA-oriented Cobol to Cobol that can be compiled and run on an IBM mainframe, he continued.

But the postprocessor isn't set up to be self-sufficient, the spokesman said. When it reaches a point in the generation of the IBM-oriented Cobol that has no base in the mini or micro Cobol — ASSIGN statements, for example — the system pauses while the programmer enters appropriate instructions at the CRT.

The initial CPG is made up of three programs. One provides the ability to describe newly desired files through creation of a data dictionary; the second program creates a skeleton of the user's logic utilizing Isam files. The third combines the results of the first two to produce the final program.

The vendor charges a monthly fee depending on the type of system installed. A single-user Z80-based hardware/software package costs \$750/mo; an eight-station GA 440 with CPG costs \$375/mo per station.

David R. Black & Associates is at 441 Beaver St., Sewickley, Pa. 15143.

Package Spices Up Effort

(Continued from Page 43)

ing needs for new systems because of the cost of maintaining existing systems. We knew tools such as data base management systems, teleprocessing monitors and on-line programming facilities could be used to reduce maintenance costs and make our staff more productive in implementing new systems . . . but we could not fruitfully introduce all of these at once.

So we planned a progression of acquisition, training, conversion and development that would bring change in manageable and beneficial increments.

The first step was the installation of Adabas, the Software AG data base management package, in January 1975. In converting existing systems to the use of Adabas, we developed a data dictionary facility we considered essential for data base control. In addition to providing the standard documentation functions, our dictionary system is used to strictly validate all entries into the data base.

With our data base methodology, we have been able to greatly simplify the maintenance of application systems. Also, the Adabas inquiry facility has eliminated the need for special programming for most retrieval requests from users.

To improve the productivity of our staff, we decided we needed an on-line program development facility. So, in June of 1976, we installed a program product for on-line program development.

However, we soon discovered it was an extremely unreliable system that required system programming support — which we did not have. Further, when the system was up, response times were much too slow.

At about this time, Software AG demonstrated its then-new TP monitor to us. We were impressed with its facilities for on-line programming support and transaction processing and especially with its ease of installation and use in view of our need to minimize

system support requirements.

Since we knew we wanted to acquire a transaction-processing facility in the near future, we carefully evaluated Complete's capabilities in this area compared to those of such packages as CICS and IMS from IBM, TaskMaster from Turnkey Systems, Inc. and Environ/1 from Cincom Systems, Inc.

Complete was installed in April 1977 with no problems at all. Within one week, all programmers were proficient in its use for program development, especially appreciating the full-screen editing feature that helps them get more done with less effort.

Compared with our previous program development system, core requirements are less, response times are much better and system throughput is much higher. The vendor's claim that the system can not be mistakenly brought down are true. It is possible to run test systems and production systems with a single copy of the monitor, and the test systems do not interfere in any way with the operation of either the production systems or the monitor.

With 500 jobs per day run on the system, Complete has simplified our operating procedures because of its resource management facilities and because it provides intelligible status information about the entire system to the computer operator. With as many as 18 terminals active for program development, there is virtually no burden on operations.

We are running the Adabas inquiry facility, Adascript+, under Complete. This enables end users to make queries and obtain reports from their data base files without any program development by our DP staff.

We are now beginning to develop our on-line systems. So far, we have brought up a simple inquiry application for a customer information file.

Cochrane is manager of the information Services Department at the R.T. French Co. in Rochester.

INFORMATIQUE
INFORMATIK
INFORMATICS

Wherever it's said, however it's spelled, Informatics[®] fulfills the promise of the computer...universally!

Informatics...throughout the world, the word is synonymous with the ultimate in modern data processing. In the United States and many other countries, it means the people, products and services of Informatics Inc. Many people know us for our software products, such as MARK IV[®], or our information processing services. But we also provide a full range of professional services. Over 2,000 trained specialists available for information systems design, systems development, applications programming, management consulting, technical and managerial training, or full-scale facilities management. Informatics Inc., one of the world's leading independent sup-

pliers of software products and services. Drop us a line on your letterhead and we'll send you a colorful brochure that tells how we can help you fulfill the promise of *your* computer.

SOFTWARE PRODUCTS
PROFESSIONAL SERVICES
INFORMATION PROCESSING SERVICES

informatics inc



Corporate Offices/21031 Ventura Boulevard/Woodland Hills, California 91364/(213) 887-9040/Telex 69-8473

Member SIA



Software Industry Association

®U.S. registered service marks and trademarks of Informatics Inc.

Accounting Packages Offered for System Ten

FAIRFIELD, N.J. — A quartet of packages designed to provide accounting support to Singer System Ten and ICL System Ten 220 users is now available from Rapidata, Inc.

Although best known as the vendor of a remote-computing service network, Rapidata organized a Minicomputer Services Division to develop these (and possibly other packages) after signing an agreement with Forum International, an organization representing Singer System Ten Users, a spokesman explained.

With growing interest in distributed processing, it is possible some of the division's products will reside on the user's mini but include facilities to access Rapidata's network to reach other locations or capabilities on Rapidata's

mainframes, he added.

Currently, the packages include a Client Accounting System (CAS), which embraces general ledger accounting and all the work leading up to it, including preparation of charts of accounts, and a Customer Utility System (CUS), which is a programming language supporting ad hoc report generation from CAS files.

More specialized, but still useful to many organizations, is a Professional Time Reporting package that is so flexible, according to Rapidata, it provides "3,700 different ways" of accumulating and reporting time spent at any desired level of detail.

The fourth package is a Federal Tax (FTX) reporting subsystem that supports preparation of IRS Form 1040

schedules.

Each of the applications runs in one of the System Ten's 10K partitions plus Common storage. Disk availability is the limiting factor, the spokesman added, noting that one Singer (now ICL) Model 42 disk drive can handle one application.

The software runs under the operating system Release 1 and upward.

Users might have trouble with earlier releases, so Rapidata urged sites acquiring the applications to get a current operating system as well.

The entire quartet of packages is available for \$20,500, but the individual subsystems are also available separately for less, the spokesman said from 20 New Dutch Lane, Fairfield, N.J. 07006.

'CMU' Gives PDP-8 User Full-Duplex Transmissions

PALO ALTO, Calif. — CMU from Menlo Computer Associates, Inc. is said to provide users of Digital Equip-

ment Corp. PDP-8s and PDP-8-based systems with full-duplex terminal communications and support for file swapping with a time-sharing mainframe or another minicomputer.

Designed to run in OS/8 environments on PDP-8s as well as the PDP-12 and the Decstation-78 CMU allows the using mini to perform like a remote intelligent terminal with local storage and editing capabilities. CMU provides the file transfer facilities not available with OS/8 and enables a user to avoid an upgrade to DEC's RTS/8 software, according to the vendor.

The ability to store files locally "obviously" overcomes the cost of transferring records between the remote mainframe and the mini, and — if the mini is communicating with a remote-computing service — the cost of storing files on the network's system.

CMU can also provide download capabilities — presumably so a central point can maintain control over which programs are being used in the minis — and is able to transfer Ascii data as well as unformatted binary information.

The single system license for CMU costs \$350 for binary code only, \$700 for both binary and source code.

Quantity discounts on CMU and an optional Bell 202 supervisory channel protocol capability are also available from the vendor at 801 E. Charleston, Palo Alto, Calif. 94303.

BUYING HARDWARE

Pros



Photo courtesy of ComputerLand of San Francisco

Cons



ComputerLand, the DP Department Store. Hazeltine & Diablo on Display.

Time was, buying hardware meant dealing factory direct. Then came the distributor, or factory indirect. The phone/mail order ad reads, "15% off." 15% off what? Delivery schedule maybe. After sales service perhaps. The only real savings just might be the Toll Free number in the ad.

Now there's an alternative. Introducing ComputerLand, a national network of DP equipment stores, with outlets across the nation. This means you, and the DP director, programmer, general manager or purchasing agent can take a quick ride across town, try out working equipment in a user environment, make product comparisons, then drive off with the hardware of your choice. And, still be back in time for the afternoon coffee break.

Below is a sampling of the quality business information products, from more than 60 manufacturers of micro and mini-computer systems and peripherals, available for you to try out, buy or lease and take home today from ComputerLand.

ComputerLand™

14400 Catalina St., San Leandro, CA 94577 (415) 895-9363

Franchise opportunities available.



HAZELTINE 1500

- ☐ 24 X 80 Display (upper/lower case)
- ☐ High legibility 7 X 10 dot matrix
- ☐ Teletypewriter format for alphanumerics plus numeric pad
- ☐ Switch-selectable upper/lower case
- ☐ RS-232/C 20 ma. current loop interface
- ☐ Switch-reversible video.



DIABLO 1620-3

- ☐ HyType daisy wheel character printer
- ☐ Full keyboard with numeric pad
- ☐ Microprocessor controlled RS-232/C interface
- ☐ 45 CPS
- ☐ Tractor feed
- ☐ Internal power supply.

See our ad on page 54.

© Copyright ComputerLand 1978

ALABAMA

3020 University Dr., N.W.
Huntsville 205 539 1200

CALIFORNIA

6743 Dublin Blvd.
Dublin 415 822 8090

11074 San Pablo Ave.
El Cerrito 415 233 5010

22634 Foothill Blvd.
Hayward 415 538 8080

6840 La Cienega Blvd.
Inglewood 213 776 8080

16720 So. Hawthorne Blvd.
Lawndale 213 371 7144

24001 Via Fabricante, #904
Mission Viejo 714 770 0131

4233 Conroy St.
San Diego 714 560 9912

117 Fremont St.
San Francisco 415 546 1592

42 42nd Ave.
San Mateo 415 572 8080

1077 Saratoga Sunnyside Rd.
San Jose (Call directory assistant)

El Cid Plaza, Suite 105
Thousand Oaks 805 495 3554

104 W. First St.
Lustin 714 544 0542

1815 Ygnacio Valley Rd.
Walnut Creek 415 935 6502

COLORADO

2422 So. Colorado Blvd.
Denver 303 759 4685

CONNECTICUT

2475 Black Rock Turnpike
Fairfield 203 374 2227

DELAWARE

Astro Shopping Center
Newark 302 738 9656

GEORGIA

Cumberland Square North
Atlanta 404 953 0406

ILLINOIS

50 East Rand Road
Arlington Hts. 312 255 6488

9511 N. Milwaukee Ave.
Niles 312 967 1714

10935 S. Cicero Ave.
Oak Lawn 312 422 8080

KENTUCKY

813 B Lyndon Lane
Louisville 502 425 8308

MARYLAND

16065 Frederick Rd. (Rt. 355)
Rockville 301 948 7676

MICHIGAN

2927 28th St., S.E.
Kentwood 616 942 2931

29673 Northwestern Hwy.
Southfield 313 356 8111

NEW HAMPSHIRE

419 Amherst
Nashua 603 889 5238

NEW JERSEY

Pine Tree Plaza (Rt. 70)
Cherry Hill, N.J. (directory assistant)

NEW YORK

2 De Hart St.
Morristown 201 539 4077

OHIO

1612 Niagara Falls Blvd.
Buffalo 716 836 6511

225 Elmira Road
Ithaca 607 277 4888

OREGON

12048 S.W. Main St.
Tigard (503) 620 6170

TEXAS

Shoal Creek Plaza
Austin 512 452 5701

WASHINGTON

6439 Westheimer
Houston 713 977 0909/0910

WASHINGTON

14340 N.E. 20th
Bellevue 206 746 2070

Parkway Center, Suite 12
Federal Way 206 838 9363

8791 So. Tacoma Way
Tacoma (Call directory assistant)

Calldata Adds Enhanced Basic

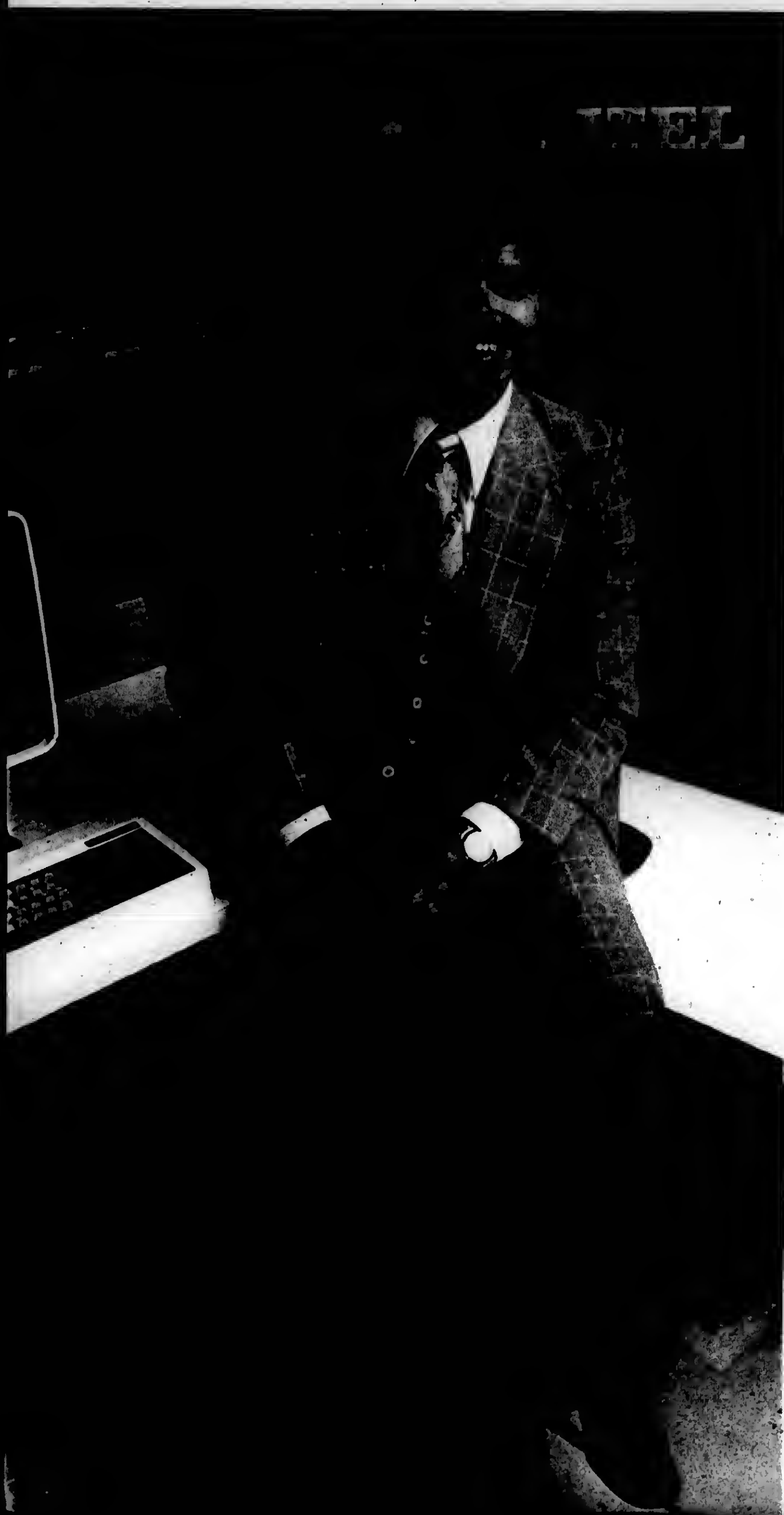
WOODBURY, N.Y. — The Bascom Basic compiler now on the Calldata Systems, Inc. remote-computing network is more powerful than any the service has previously offered users of its Digital Equipment Corp. Decsystem-10s, but most programs developed under older compilers can be used without change according to a spokesman.

Developed by Datability Software Systems, Inc., Bascom is said to be "10 times faster" than standard DEC Basic. It also allows variable names up to six characters, and strings and literals up to 256K characters, the spokesman said.

There are no limits to the dimensions of arrays the compiler can handle, he claimed, and Fortran-like and I/O accessing methods "that are not available on any other Basic implementation" are also supported by Bascom.

Calldata services are available nationwide. The company is based at 20 Crossways Park North, Woodbury, N.Y. 11797.

"Itel's technical staff is one of the best I've ever encountered."



*Tony Thompson
Vice President/General Manager
Computer Service Division
PRC Computer Center, Inc.
A Planning Research Company,
McLean, Virginia*

"From the very first pre-installation meeting until our AS/5 went on-line, Itel kept everyone informed on a day-to-day basis, of exactly what was going on. Not just the management in our data center, but also our operations staff — the same people who would eventually be using the equipment.

"Unlike a lot of other hardware manufacturers we've seen, Itel followed through completely on their original installation plan. In fact, I've never seen a computer installed so fast. Within two hours, they were ready to start running diagnostic tests.

"We're thoroughly pleased with the cost-efficient performance and total reliability that our AS/5 provides. And we continue to be impressed with the benefits of its compact internal design. For example, a reduction in power consumption — up to 50% less than our previous computer — requires less air conditioning and gives us more breathing room for additional peripherals.

"With a product as advanced as the AS/5 is, backed up with the quality personnel that we've seen, we know that Itel was the right choice."

The Advanced System™ is the most significant product Itel has brought to the world of data processing in the tradition that has always made Itel the financial and systems alternative.

ITEL
CORPORATION
Data Products Group

One Embarcadero Center
San Francisco, California 94111
Telephone: (415) 955-0000

'Finman' Puts Finance, Administration On-Line

LOS ALTOS, Calif. — Useful as stand-alone operations, the modules of the Financial Management (Finman) software from ASK Computer Services, Inc. can work together as an integrated system on a Hewlett-Packard Co. HP 1000 minicomputer, according to an ASK spokeswoman.

Finman supports an interactive, on-line, "menu-oriented" approach to order entry, accounts receivable, sales analy-

sis and accounts payable, she said. These modules may also be interfaced with those of the company's Manufacturing Management (Manman) software, she added.

Finman's order entry module accommodates split commission orders, differing line-item commission percentages, multiple requested and scheduled shipment dates - line by line item, if required, and general ledger distribution. Customer

acknowledgements, shipping papers and invoices are all by-products of this module.

The accounts receivable module is said to handle invoicing as well as debit and credit memo posting. Aging is available in detail and summary form; cash in advance, customer history, writeoffs and distribution of sales into general ledger accounts are also available, she said.

Reports generated by the sales analysis subsystem include sales and gross margin by product, product line, market segment and sales agent.

The "payables" module is said to handle purchase payments, discounts and check-writing.

Finman, integrated with Manman, is currently operational on a 64K HP 1000. With that combination, ASK recommends a 50M-byte disk. A

spokeswoman ventured that a 15M-byte disk might be enough for Finman by itself.

A one-time license fee for the entire Finman system is \$17,000; licensed separately, the modules cost \$9,000 for order entry; \$3,000 for sales analysis and \$5,000 each for accounts receivable and accounts payable.

ASK Computer Services, Inc. is at 73 Distel Drive, Los Altos, Calif. 94022.

Enhanced Cobol, Isam Available For 32-Bit Minis

OCEANPORT, N.J. — Beefed-up versions of Ansi X3.23-1974 Cobol compiler and the Indexed Sequential Access Method (Isam) file handler have been announced here by Interdata for use on its 32-bit systems.

The Cobol is said to allow interprogram communication with Fortran, assembly and other Cobol routines; and to enable creation of structured programming modules in conjunction with Interdata's Dynamic OS/32 MNT linkage editor.

The Cobol also features a Sort verb conforming to the 1974 ANS Level 1 Sort module; a run-time Return Code to expedite batch processing; qualification of data and paragraph names; data interchange with mainframes; and Trace capabilities through its Debug module, according to a spokesman.

The new Isam is said to support more than 8,000 files on up to 32 disks and feature dynamic access optimization based on most recent activity, allocating most recently used indexes and data to as many as 16 memory buffers. Cobol is used as the data description and manipulation language.

With the new support, a data base may be recovered by rolling back to a checkpoint or forward to an earlier image of the files; and the user may design, load and restore optimally arranged file systems.

Distributed in object code on magnetic tape or disk, the updated Cobol with Isam costs \$7,000. Interdata, a division of Perkin-Elmer Corp., is at 2 Crescent place, Oceanport, N.J. 07757.

KEY DISK OR SCANNER USERS

Your programs written or modified by our qualified experienced programmers.
Large or small jobs delivered when you need them anywhere in the country.
Charges per job based on hourly rate or negotiated flat fee quoted in advance at no charge or obligation to you.
Specific inquiries invited or write for list of equipment we can currently program.
SAMSON SOFTWARE SERVICE
14737 Sherman Way, Suite 114
Van Nuys, Calif. 91405
(213) 987-1552



You'll see big savings
in time and paper
with this 132 column display
from Datagraphix.

It's a whole new way of looking at things. An interactive terminal that actually lets you display computer output in a full 132 columns on a single line.

So now there's no need to waste reams of paper to check programs or to retrieve specific data. No need to waste time waiting for printouts. Or to waste computer time in reformatting data.

With the new Model 132A Display from Datagraphix, on-line programming gives you instant

feedback. And you'll get helpful features like scrolling, character and line editing and tabbing.

The exclusive Datagraphix Charactertron® tube gives you high resolution characters, upper and lower case, on an 8-1/2" x 11" screen. Bright and readable. And easy on the eyes.

If time costs and paper costs are important to you, remember that to waste not is to want not. So return the coupon to get full details on the new Model 132A Display from Datagraphix.

Datagraphix

A General Dynamics Subsidiary

Datagraphix® and Charactertron® are registered trademarks of Datagraphix, Inc.

Mail to:
Datagraphix, Inc., Display Department
P.O. Box 82449, Dept. C3D
San Diego, CA 92138, (714) 291-9960

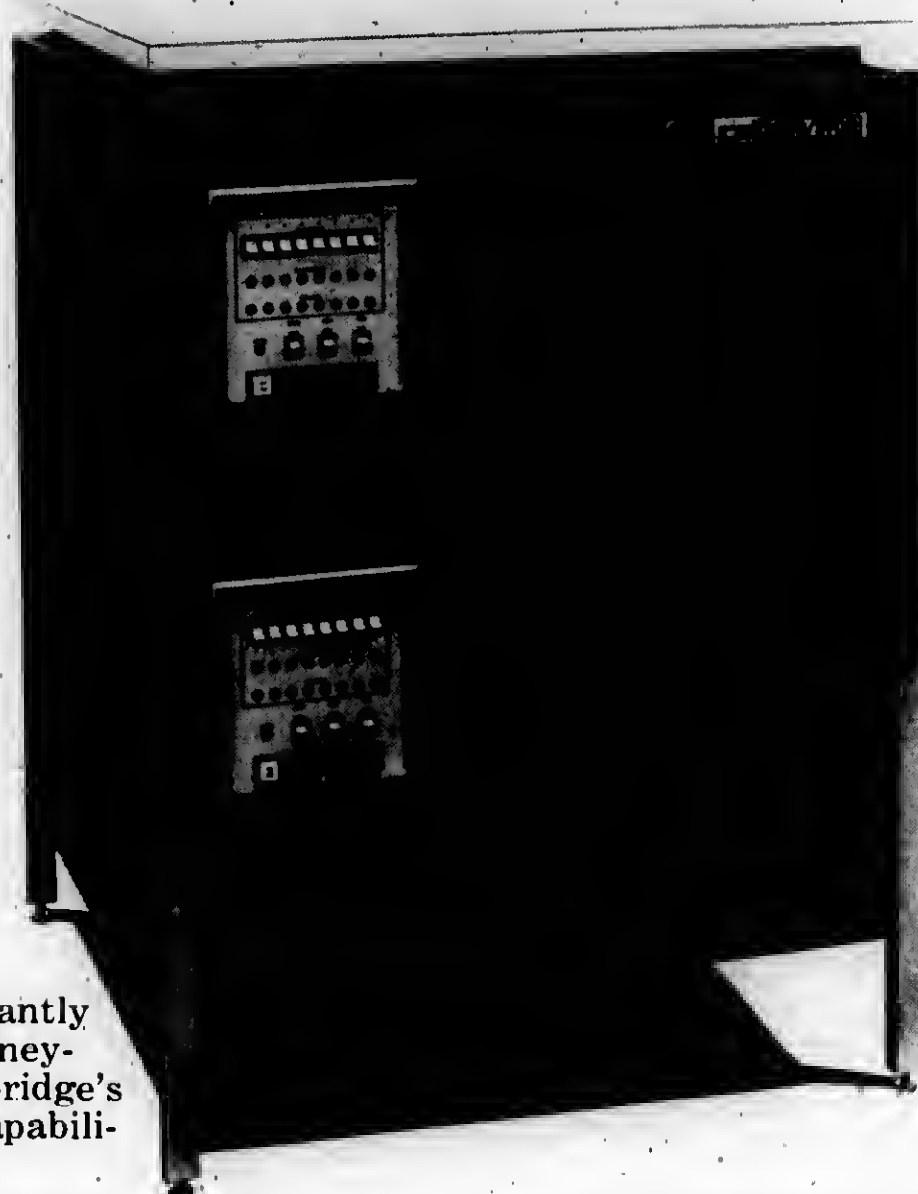
Please send me information on the Model 132A Display from Datagraphix.

Name _____
Title _____ Phone _____
Company _____
Address _____
City _____ State _____ Zip _____

Honeywell Users:

**NOW YOU CAN GET THE SAME
KIND OF LOW-COST MEMORY
FOR YOUR 200 OR 2000
THAT IBM USERS GET.**

FROM CAMBRIDGE, OF COURSE.



Cambridge Memories announces 2000/STOR—the new add-on memory for Honeywell Series 200 and 2000 Central Processing Units.

2000/STOR costs significantly less than memory from Honeywell. Plus it has all of Cambridge's usual high-performance capabilities, including:

- ✓ Highly reliable core memory—more than 2 billion bytes in use already.
- ✓ Field proven installations—2000/STOR systems are installed and operating at user sites.
- ✓ Easy expandability—2000/STOR can be expanded to more than twice Honeywell's maximum capacity limits in some models.
- ✓ Advanced fail-safe features—including built-in maintenance panel, memory exerciser, self-testing diagnostics, and standby memory capability.
- ✓ And a deferred maintenance capability to give you even greater system availability.

Cambridge does it again—superior memory at superior pricing to a brand new sector of the add-on memory market. You, the Honeywell user.

Call our Cambridge 2000/STOR Hot-Line—(617) 271-6400—or your local Cambridge representative. Or just send us the coupon and we'll be in touch with you within a week.

Tell me more about 2000/STOR add-on memory. I have a Honeywell _____ Model _____ with _____ K words, and wish to expand to _____ K words.

Name: _____

Title: _____

Company: _____

Street: _____

City: _____

State: _____ Zip: _____ Phone: _____

CAMBRIDGE.

A good place to put your information.



Cambridge Memories, Inc., 12 Crosby Drive, Bedford, Mass. 01730 (617) 271-6300

SALES OFFICES: Boston, Mass. (617) 271-6400; Atlanta, Ga. (404) 955-4416; Chicago, Ill. (312) 671-5260; Dallas, Tex. (214) 661-1750; Detroit, Mich. (313) 557-4080; Los Angeles, CA (213) 885-0253; Rochelle Park, N.J. (201) 368-0163; San Francisco, Ca. (415) 692-4806; St. Louis, Mo. (314) 878-4800; Washington, D.C. (703) 683-5323; Cambridge Memories (Canada) Ltd., 282 Belfield Road, Rexdale, Ont., Canada M9W 1H5, (416) 675-5667; Cambridge Memories GmbH, 6078 Neu Isenburg, West Germany, 06102-36092.



You've got a Computer Terminal on your desk.

With your push-button dial telephones and our P1-5 Data Concentrator, you've got a comprehensive interactive system to front-end your computer. The P1-5 will answer up to 16 simultaneous callers and record their key entries on to dual floppy diskettes, which eliminates the key punching process.

The P1-5 Data Concentrator offers:

- User designated field duplication
- Modulo 10 checks on user designated fields
- Audio response to callers
- Blank fill to the next field with the "..." key
- 3740 diskette compatibility along with automatic Time and Date recording
- Battery backup power supply
- Low monthly cost averaging \$300
- Optional 360/370 multiplexor channel Interface for P1-5
- Optional CRT/Keyboard terminals for \$17/month

The P1-5 has almost unlimited applications including General Ledger, Payroll, Time and Attendance Reporting, Production Reporting, Receivables Control, Inquiries and many other uses.

Call us today and we'll tell you how the P1-5 Data Concentrator can help you get in 'touch' with your employees and customers.



PHONE 1
1330 East State St.
Rockford, Illinois 61108
Phone 815/962-8927



Head Crash Protection You Just Can't Ignore.

Shockwatch* turns bright red if subjected to a shock that could damage a disk pack or cartridge. So it instantly tells even your newest operator not to insert the damaged media in a drive. And that eliminates the major cause of head crash.

Shockwatch is so dramatic, so simple, and so visible, nobody can miss it. And it's so cost-effective, you can't afford to ignore it. Ask your disk supplier about Shockwatch, or call us—Media Recovery, Inc., 2550 Electronic Lane, Dallas, Texas 75220, (214) 350-5725.

Internationally, call your field engineering sales manager at the local Burroughs subsidiary head office.

SHOCKWATCH®

Protection. Pure and Simple

*U.S. Pat. No. 4,068,613

Five-Part Documentation Shows How Less Is More

By Brian Case
Special to CW

When a programmer complains there is not enough documentation, the problem may be that what he has is not clear, that he cannot decide which of the available documents is more current, or that he cannot locate the relevant materials.

Concepts and Techniques

More documents may coincidentally alleviate his plight as side effect, but generally contribute only to a mass of documents.

In addition, there appears to be one type of documentation that defies alternatives: the current source listing and its associated job control. This is of little consolation, however, when the listing contains four pages of Cobol instructions dealing solely with data names I, J, and K and paragraph names Start, try-this and Give-up.

Even when supportive documentation is available in quantity, it is often lumped in more or less chronological order, forcing a guess at what is currently intended. Further, there is little assurance that all important changes are reflected in this bulk or that the notes scribbled on the Christmas napkin really do supersede the half-sheet with doodles of witches and pumpkins.

Ideally, documentation consists of information that is sufficient, accurate, current and easily located. Of these, quantity of documents enhances only sufficiency, and then indirectly.

Five-Part Proposal

A better approach to documentation creation and organization is one that concentrates on answers to the following questions:

- Who will use the document?
- Under what conditions will the document be used?
- What are the alternatives if the document is unavailable when needed?
- What are the chances that the document will remain or be kept current?

The physical form such an approach would take depends largely on the configuration, languages, standards, software technology, accountability and politics of a shop. The following is but one possibility satisfying the purpose and form of good documentation.

I propose a system that consists of five conceptually separate components. The first component, a user manual, is normally well established in most shops and will not be considered in detail. The main concern is that the manual contain nothing but information needed to use the system under production conditions.

The maintenance training manual, the second component, introduces the system on a technical level. This should concentrate on what the system does instead of how it does it, even granting that one person's "what" is another's "how."

Nevertheless, a statement of purpose belongs in the training manual, whereas the correspondence and the minutes of the meetings leading to the statement of purpose does not. A statement that a program updates the master file from a transaction file is appropriate; the physical paragraph

names involved are not. A system flowchart belongs here; detail program specifications, in whatever form, do not.

In short, if routine, ongoing debugging is going to materially affect the accuracy of the document, it does not belong in the maintenance training manual.

'Panic Book'

Conflicting concerns complicate the development of the third component—the "panic book." This consists of documents indicating how the system does its job while it maintains the accuracy of and facility of locating the relevant documents. It must be small and well organized to be used effectively, but complete enough to suggest proper procedures under crisis conditions.

The "panic book" must contain rerun and restart procedures. A list of all the error messages in the system, their probable cause and possible corrective actions should be here along with file sequences, accesses, points of creation and use.

Of course, the current program listing, associated job control and operations instructions fit here, too. Again, any other information should be screened to be sure it contributes to producing proper output under crisis conditions. Only an enhancement or major modification should affect the accuracy of the manually produced documents.

Commonly, a very small portion of a system causes the majority of its problems. Although rewrites of a system or program seldom is a viable alternative, modification or rearrangement of sections of code may be justified if they can be identified as troublemakers. The fourth component provides this identification.

Brevity Indicated

Since the purpose is statistical identification, not explanation, brevity is indicated. Further, entries that require 20 seconds are more likely to be made than those requiring 20 minutes.

Two similar logs make up this component. The first is maintained by operations and consists of the program number, the date and time the problem occurred and the date and time the problem was corrected for each instance assistance was required.

The second, maintained by the programmer, contains either identification of the routine causing the problem or a cryptic problem identification. Other programmer entries consist of user contracts. Review of both logs periodically should pinpoint areas where modification provides the greatest benefit potential.

The final component consists of those documents that do not fit anywhere else but seem too important to discard. This component will seldom, if ever, be used.

Such a system, though not a panacea, recognizes that documentation is usually not maintained. As such, documentation limited to specific endeavors whose accuracy is minimally affected by normal maintenance activity is superior to most existing documentation, no matter how complete or currently accurate.

As Users Score Performance Six Modem Vendors Earn Perfect Grades

By Marguerite Zientara
CW Staff

DELRAN, N.J. — Prospective users of data communications modems can expect very good overall performance from major vendors' modems, but will probably be disappointed by the same equipment's diagnostic facilities, according to a survey recently published by Datapro Research Corp.

In its report, "All About Modems," Datapro analyzed responses from 320 users with multiple models of modems, adding up to 732 individual responses on a total of 11,152 modems, for the most part from 24 vendors. Users rated the units on a four-point scale, with "4" representing "excellent" and "1" representing "poor."

Six vendors received perfect marks for overall performance. Codex Corp. for its models 4800 and 8200; Gandalf Data, Inc. for unspecified models; Livermore Data Systems, Inc. for all of its models rated; Paradyne Corp. for the M-4800; Racal-Milgo Corp. for the Modem 96; and Universal Data Systems, Inc. for all of its rated models.

Codex, besides capturing two perfect scores in the overall performance category, also came up with a 3.9 rating for its Model 9600 in the same category. Another vendor with a perfect score, Racal-Milgo, also got two 3.9 ratings in that category, one for the MPS 48 and the other for the Comlinks II.

Only two modems models were rated below 3.0 — the Rixon Sangamo Model T208 at 2.7 and all Timeplex, Inc. models at 2.6. The average overall performance rating was 3.5.

Diagnostics Scores Low

Besides overall performance, users were asked to rate their modems on diagnostic facilities, hardware reliability and maintenance service.

In the unfortunate category of diagnostic facilities, which got an average rating of 2.7, Codex was the overwhelming leader with the following scores: Model 4800, 3.8; Model 7200, 3.3; Model 8200, 3.5; and Model 9600, another 3.3.

Barely below that level was Paradyne's M-4800 with 3.4 and its M-9600 with a rating of 3.5.

Other high scorers were the IBM Model 3872, rated at 3.4, and all with 3.3; Bell Systems Model 202S, General Datacomm, Inc.'s 103 series, all rated models from Universal Data Systems, Inc., the Vadic Corp. 3400 series and the Racal-Milgo MPS 48 and Modem 96.

A number of models in the diagnostic facilities category were rated poor to fair, with the lowest score (1.2) going to Omnitec Corp.'s 700 series. All rated modems from

Timeplex, Inc. were scored at the next lowest grade of 1.4; Omnitec's unspecified models got a 1.5 rating.

Other models which were rated particularly low in this category, according to the survey, were Racal-Milgo's 2200/24 with 1.6; the Bell System 201B and 202C, 1.7; all rated models of GTE Lenkurt, Inc., 1.7; the IBM 4872, 1.7; and unspecified Series 103 models from the Bell System, 1.8.

Considering these low diagnostic facilities scores, Datapro noted that "on the surface, this can be taken to mean that diagnostic capabilities did not represent major factors in the users' buying decisions."

High Reliability Scores

In the category of hardware reliability, there were a number of perfect scores, two of which were again claimed by Codex for its models 4800 and 8200.

Also rated at 4.0 were Anderson Jacobson, Inc.'s Model 342; unspecified models from Gandalf Data; General Datacomm's Model 202; all Livermore Data Systems models; and the Racal-Milgo Model 20 LSI.

With an average rating of 3.5, the lowest scores in the reliability category were 2.3 for all models from Astrocom and 2.4 for all models of Prentice Corp.'s offerings.

In the area of maintenance service, Gandalf and General Datacomm again made good showings. Rated perfect were unspecified models from Gandalf and General Datacomm's Model 202.

Close behind was the Codex Model 8200, with a rating of 3.8. All models of Comdata

Corp. and the M-9600 from Paradyne were rated third by their users, with scores of 3.7. Two offerings from Racal-Milgo — the Model 4600/48 and the Modem 96 — followed with a rating of 3.6.

The survey indicated that the modem features most widely used were full-duplex (49.7%), diagnostics (45.5%) and automatic equalization (38.2%).

Regarding modem operating speeds, 28.6% of users said they operate at 4,800 bit/sec; 23.4% at 2,000- or 2,400 bit/sec; and 21.3% at 0- to 300 bit/sec, according to the survey.

The survey showed 37.7% of responding users used Data Access Arrangements to connect with the telephone network. Somewhat more than one-third (36.1%) used unconditioned, leased voice-grade lines; while the only other substantial percentage (21.8%) used C2 conditioning, according to the report.

The Bell System was used by 89.7% of responding users as their facility source, the report showed.

"It will come as no surprise to most users that line quality was the greatest source of operating difficulties (43.7%) and was followed by problem diagnosis (25.5%) and line outages (24.0%)," Datapro said.

Of the 11,152 modems reported on in this survey, 71% were leased and 29% were purchased, Datapro noted. By a ratio of 7:1, users had their modems serviced by the vendors rather than by a third party.

The 52-page report is available for \$12 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Termiflex Enhances HT/3, HT/4

NASHUA, N.H. — Termiflex Corp. has announced battery and storage options for its HT/3 and HT/4 handheld control display terminals.

The battery option uses batteries that have an expected life of 1,000 charge/discharge cycles. In most circumstances, they will not require replacement more often than once every five years, Termiflex claimed.

Batteries may be recharged by connecting the charger receptacle for 14 hours. Normal operation of the terminal with power supplied through the cable is possible while charging is in progress, but battery operation is not allowed, at that time, according to the firm.

With the HT/3, a minimum of 2-1/2 hours operating time is assured if the batteries are fully charged, a spokesman stated. For the HT/4, a minimum of 1-1/2 hours is assured.

Longer operation is possible between recharges if short displays are used or if the unit is switched to "normal" between pe-

riods of activity, the spokesman noted.

The "normal" switch position allows the terminal to operate like a standard model with power supplied through the DA-15P connector on the signal/power cable.

In the "battery" switch position, the power comes from the internal batteries. In either case, the transmit and receive signals are available through the signal cable and the DA-15P connector.

With the storage option, a message up to 191 characters long can be composed, edited and reviewed using keyboard controls, Termiflex said. The message may then be transmitted as many times as desired.

The HT/3 or HT/4 with the storage option installed operates the same as the standard models except for seven special keyboard controls.

Price of the battery option is \$200; the storage option costs \$300. The options are factory installed, Termiflex said from 17 Airport Road, Nashua, N.H. 03060.

COMMUNICATIONS

BUDGET

DOWN?

DECWRITER II & III
3 MONTH LEASE

THEN ONLY MONTH TO MONTH TO MONTH TO
WE SHIP FROM OUR NEW STOCK IN 1 DAY

FROM THE DECWRITER SPECIALISTS
AMERICAN TERMINAL LEASING • 617-261-1100

P.O. BOX 58, KENMORE STATION, BOSTON, MASS 02215

Remote Batch Network System Helps Bureau Service 1,500 Doctors

MINNEAPOLIS — A system at Health Care Systems (HCS), a service bureau here, handles all data capture of patient information charges and payments for more than 1,500 medical practitioners throughout the U.S.

The ICL, Inc. 1500 series system includes 33 Model 1501 terminals and 13 Model 1535 communications adapters in a remote batch network linked into IBM 2780 and 3780 emulators. HCS has been using the equipment, originally manufactured by Cogar, since 1973.

HCS updates and maintains the 1500 software for each client and formats each program to meet the client's specific requirements. Of HCS' total vol-

ume, 70% is entered via the ICL 1500 terminal equipment.

HCS serves over 200 clinic groups which either enter data directly into a

Terminal Transactions

1501 or submit their data to the HCS central bureau. HCS is dedicated solely to the health care management field.

The bureau handles patient billing and insurance claim preparation and provides patient-related accounting reports and practice analysis reports. It

also handles a number of specialized services such as clinical information systems, a unique method of recording, storing and reporting patient service and diagnostic information; patient recall, a system of alerting patient and doctor of needed care on a regular automatic basis; and equity analysis, a cash allocation system.

The 1500 system helps make more efficient use of personnel by allowing them more time for patient follow-up, as well as improving collections and cash flow, according to Colin Weesner, HCS operations vice-president.

"We have found the 1501 terminal easy to program, install and use," Weesner said. "We can train medical

office receptionists in three days on the use of the terminal. Within a month, an office receptionist can become an accurate and efficient data entry operator.

"We are very pleased with the ICL 1500 line," he added. "Our equipment downtime is minimal. When we have experienced downtime, service is available almost immediately."

The 1500 system has brought about a number of significant benefits for HCS as well as for its end users, Weesner said. HCS can provide a better, more reliable service because data control is in the hands of those people who actually originate the data.

"HCS provides a far more cost-effective service with the 1500 and the price for the end user is cheaper than would be the case with conventional data preparation," he said.

"We can also provide a faster service to our clients because the system eliminates a number of extra tasks which would normally have to be carried out if we used another system of data input, he concluded.

Unit Features CCD Memory

RICHLAND, Wash. — Azurdata, Inc. has introduced a source data entry terminal that incorporates a charged-couple device (CCD) memory. More than 27,000 option configurations for formats; check digits and transmission codes can be selected through keyboard entry on Scorepad LC, the vendor said.

The unit is available with 4K to 8K characters of CCD memory, according to a spokesman.

The use of a single-chip microcomputer has made possible an extensive choice of keyboard selectable features, he added.

Besides allowing for a normal "product code" field of four- to 12 characters and a "quantity" field of up to eight characters, the Scorepad LC allows any line or field to be opened up to accommodate free form comment lines or all entries to be free of formatting restrictions, according to the firm.

The Scorepad LC includes battery power supply, modems, memory, keyboard and display in a single handheld unit.

With 4M characters of memory, the unit costs \$875. For a unit with 8M characters of memory, the price is \$1,025, with price reductions for larger quantities. Delivery is off-the-shelf from Azurdata through P.O. Box 926, Richland, Wash. 99352.

Burroughs users! Now you can eliminate your Achilles heel.

Would a large international bank and thousands of other commercial operations throughout the world use Burroughs computers unless they were very good? Obviously not.

But would the same large international bank, a large bank service company and many other commercial operations substitute IBM-1403's for their Burroughs printers, unless they felt they could improve their printing reliability?

Are quality and reliability of printing your Achilles heel?

If so, we have a simple solution. Adapt an IBM-1403 model-2, -3 or -N1 to your Burroughs system with our Grumman printer controller. The proven quality, speed and reliability of the IBM-1403's should dramatically improve the performance of your printing operations.

Your cost will be nominal. One Burroughs user says he can pay for our printer controller with the savings on ribbons alone. In any case, if you've been paying for extra printing capacity to solve reliability problems, you'll be more than happy with the IBM-1403.

Of course, printing quality and total output are not just Burroughs problems. We are delivering our printer controller to users of CDC, DEC, Univac, Xerox and other computers to solve similar problems. Commercial, educational, scientific, military and computer service bureaus are among our printer controller users.

For multi-vendor installations we can add a switch to your controller to allow you to connect the IBM-1403 to either of two different computers.

You can rent, lease or buy both the printer and controller. For full information, call or write Joe McDonough, Grumman Data Systems Corporation, 45 Crossways Park Drive, Woodbury, New York 11797. (516) 575-3034. Telex: 96-1430. TWX: 510 221-1842.



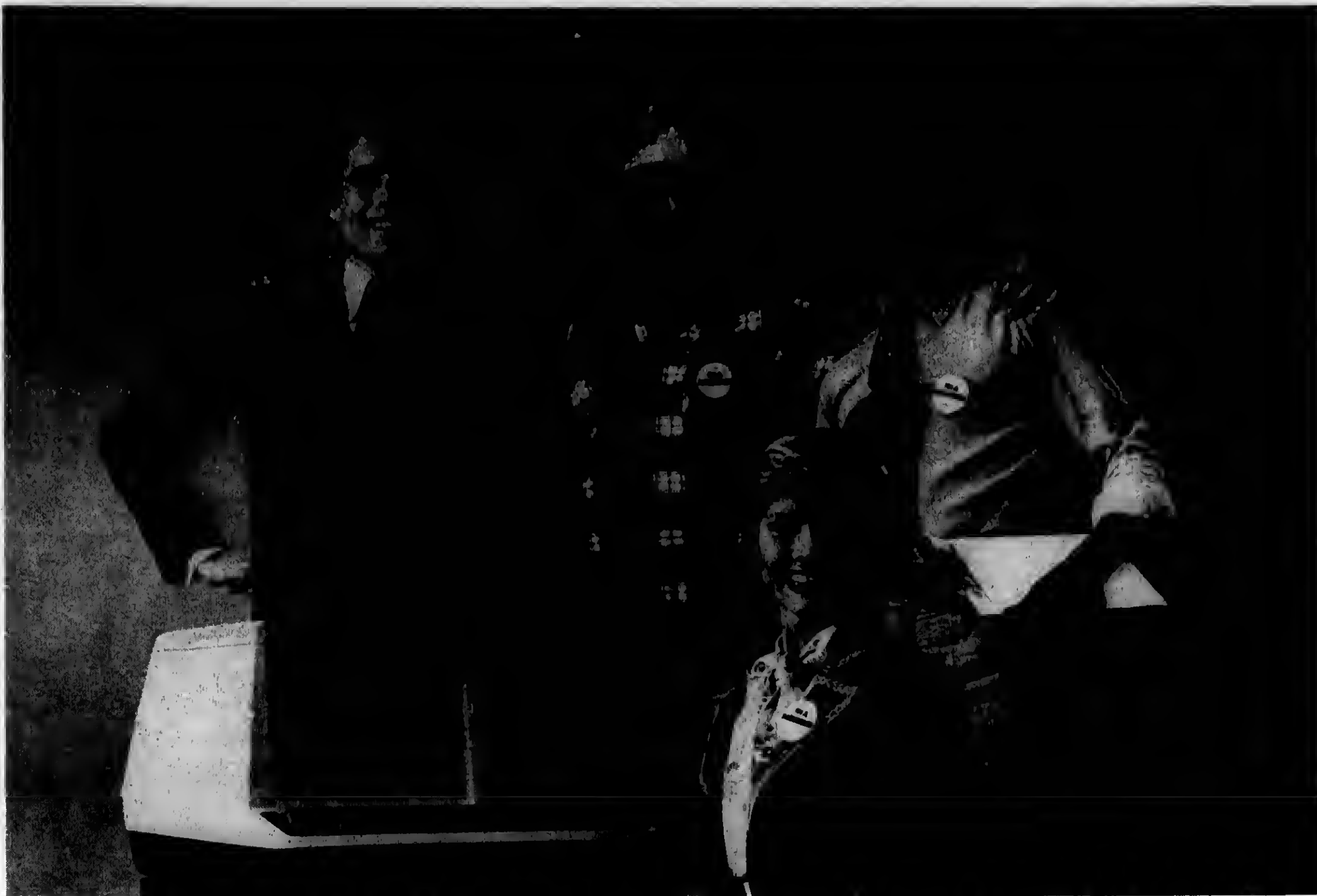
Grumman Printer Controller.

The image maker.

Canada: Digital Interface Ltd. Tel: (416) 231-3321
Nordic Countries: OY D. H. Wirkkala AB. Tel: 88 21 33
Great Britain & Ireland: Data Design Techniques Ltd. Tel: 01-903 6977
Spain: CERO. Tel: 416 87 60/ 416 61 88
Switzerland & Austria: Intersystems AG. Tel: 061/35 09 25
West Germany: PeriData GMBH. Tel: 06196/81952

FOR SALE Communication Terminals

- Teletypes - 28 32 33 35
 - TWX - TELEX
 - DECwriters LA36
 - Acoustic Couplers & modems
 - TI 700 series
- DATA COMMUNICATION
EQUIPMENT BROKERS, INC.**
4915 Fernlee
Royal Oak, Mich. 48073
(313) 549-3400



Digital introduces Datatrieve. Now anyone can get data from a PDP-11.

Anyone with a PDP-11 and an RMS-11K record management system can now achieve a new order of data accessibility. Digital's brand new query language and report generation software is here. It's called Datatrieve, and with it you could make just about anyone

time of your programmers.

It's designed for file clerks, plant workers, secretaries and even the company president. That's why Datatrieve-11 is a distributed processing tool of real importance. And its features, including interactive file update, security control and report format flexibility, make it ideal for a broad range of applications from the warehouse to the boardroom.

Available now. With a liberal supply of "I'm a Datatriever"

buttons for all those people in your company who will no longer be cut off from your computer by a language barrier. Write for full details.

Digital Equipment Corporation, Commercial Products Group, MK2N38, Merrimack, N.H. 03054.

European headquarters:

12, av. des Morgines, 1213 Petit-Lancy/Geneva.

In Canada: Digital Equipment of Canada, Ltd.

Datatrieve-11.

Everything about it is easy to work with.

- Handles sequential, relative and multi-key ISAM and (RMS) files in COBOL, BASIC PLUS-2, DIBOL, RPGII, and MACRO.
- Interfaces with RMS-11 on major Digital operating systems including CTS-500, RSTS/E, RSX-11M, and IAS and uses COBOL-compatible record definitions. Reduces programming time consumed by traditional ad hoc reporting.
- Offers built-in file update and file security features.
- Gives user extensive control of report formats.

in your company a "Datatriever" practically overnight.

The key to Datatrieve is an instruction set that's literally as simple as "Help, ready, find, sort, select, print, modify, store, erase, report." Using these basic Datatrieve commands, virtually anyone can access data and generate reports without using the valuable

**I'M A
DATATRIEVER**

digital

Digital Equipment Corporation, Commercial Products Group, MK2N38, Merrimack, N.H. 03054. CW3278

Yes, I'd like to help our people become Datatrievers. Please send me the facts about Datatrieve-11.

☐ Please ask your salesperson to call. ☐ Please send product information.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Washington University to Sponsor Course On Communications Software Designs

WASHINGTON, D.C. — A three-day course called "Software Design for Data Communications Systems" will be offered at George Washington University here May 31 through June 2.

The course is designed for systems analysts, designers, planners, project managers, programmers and others who are involved in the requirements analysis, design, implementation or support stages of a data communications system, according to the Continuing Engineering Education Department at the university.

The presentation will cover the major considerations of software design for remote-batch systems, message

switching, time-sharing, transaction processing; packet switching and distributed network systems. The course will include both applications and operating systems concepts and will consist of classroom as well as workshop sessions, a spokesman noted.

Detailed Understanding

He said the participant should acquire a detailed understanding of the concepts of resource management in a data communications system; the principal alternatives in network management today; and an understanding of the languages used, table structures required and the management and

control responsibilities necessary to successfully design a data communications software system.

The course fee is \$405. Further information is available from the director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Sigma Unwraps Data Translator

PALO ALTO, Calif. — Sigma Data Systems has announced the ST-1 serial data translator, whose purpose is to perform code translations on a serial data stream. The device is self-contained, including power supply, and communicates via two RS-232 ports at up to 19.2 kbit/sec. The data may be modified both in content and rate, according to a company spokesman.

Standard Translations

Standard translations include Ascii, Ebcidic and Baudot. In addition, translation of terminal control codes, such as cursor control, have been implemented. The device is intended to be user programmed in Intel Corp. MCS-48 compatible machine language, but custom application programs are available on request, the firm said.

The ST-1 translator contains an Intel 8035 microprocessor and up to 1K of erasable programmable read-only memory (Eprom), according to the firm.

Since the unit communicates via serial ports, it is compatible with any host computer, it added.

Price for the unit is \$250, with delivery in 30 days from 715 Torrey Court, Palo Alto, Calif. 94303.

Software Does Screen Formats

ADDISON, Texas — Systems Unique has introduced a software system designed to simplify the creation of "action programs" used in conjunction with IMS/90 on the Univac 90/30 and 90/25 systems.

The Screen Development and Message Processing System is said to eliminate the use of Icam and CRT control characters and deliver fixed-format records, which reduces coding complexity to that of normal batch programming. According to the company, this will enable programmers to generate input and output screen formats in minutes.

The system costs \$1,500 from Systems Unique, which can be reached through P.O. Box 946, Addison, Texas 75001.

Recorder Edits, Searches Data

BALTIMORE — Columbia Data Products, Inc. enhanced its Model 300C data cartridge recorder to include search and edit routines.

The 300C is RS-232 or current-loop compatible and uses an 8080A-type processor. The unit can search Ansi-compatible tapes, written in character blocks up to 256, for files or records using any string of characters as an identifier. The data can then be edited with a context editor for performing a string of character replacement or deletion, the vendor said. Lines can also be added.

The 300C can be installed between a modem or CPU and a terminal with speeds selectable from 75- to 19,200 bit/sec. It costs \$1,995, with delivery in 30 days from the firm at 6655 Amberton Drive, Baltimore, Md. 21227.

RTS Emulator Makes Debut

NEW YORK — Higher speed switched network operation, up to 4,800 bit/sec, is reportedly possible with ComTech Systems, Inc.'s request-to-send (RTS) emulator, providing the required half-duplex interface protocol for passive terminals and passive computer ports.

Formerly restricted to operating with full-duplex modems, for example the Bell 103 and 212, passive inexpensive terminals can now operate with half-duplex modems such as 1,200 bit/sec acoustic couplers, the 201C, 208B or equivalents. The emulator raises and lowers the EIA RTS signal as required, which passive devices cannot do, according to the firm.

No secondary channel or modem slaving technique is needed. Normal operating procedures are maintained since there is no loss of data during the RTS-CTS clear-to-send delay.

Cost reduction or expansion of four-wire computer networks can be achieved as well. The emulator permits the computer front end, normally restricted to full-duplex interfacing, to use a single dial-up connection to less active terminals, the firm said.

A second RTS emulator, the Model S302, mates synchronous terminals to synchronous modems.

Prices range from \$300 to \$400 per unit. Delivery is 30 days from 44 Beaver St., New York, N.Y. 10004.

Digicom Coupler Has Choice of Speeds

SAN JOSE, Calif. — The Model AC-312 acoustic coupler from Digicom Data Products, Inc. offers interchangeable high-low speed capability, field-convertible from 300 bit/sec to 1,200 bit/sec representing state-of-the-art Cmos circuitry technology, the firm announced.

The unit accomplishes terminal-computer communication over direct distance dial (DDD) phone lines and features a diagnostic window. It is Bell 202 half-duplex-compatible when configured for 1,200 bit/sec operation or Bell 113-compatible at 300 bit/sec configuration, according to the firm.

The AC-312 single unit price is \$495 (1,200 bit/sec), and the Model AC-312 (300 bit/sec) costs \$245. The Bell-compatible 202-type circuit board for field upgrading to 1,200 bit/sec is priced at \$370 and the 103-series 300 bit/sec board replacement is \$150.

Digicom Data Products, Inc. is located at Suite 108, 1440 Koll Circle, San Jose, Calif. 95112.

Perhaps the most dynamic franchise opportunity since fast food burgers.

A National ComputerLand Retail Franchise

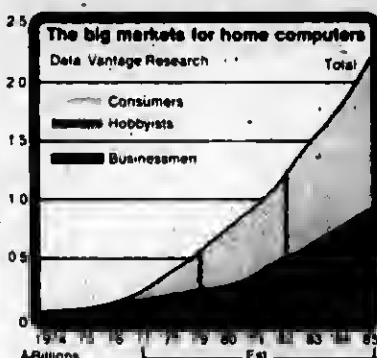
In 1987, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over \$100 million. By 1985, that total may top the \$2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising... And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about \$100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 35 stores now open. Key locations still available. Call (415) 895-9383 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand

Mail to E.E. Faber, President, ComputerLand Corp., 14400 Catalina Street, Dept. CW, San Leandro, CA 94677

Name _____ Occupation _____
Address _____ City _____
State _____ Zip _____ Phone _____

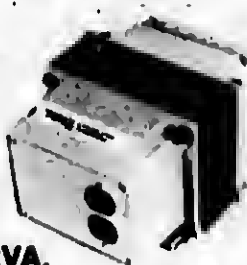
NOISE SENSITIVITY PROBLEMS GO AWAY—WE GUARANTEE IT!

Topaz Ultra-Isolation Transformers provide an inexpensive and reliable way to supply clean, noise-free AC power to sensitive equipment such as computers, instrumentation, communication and process control equipment.

Ultra-Isolation Transformers offer the industry's best noise attenuation:

- Common-mode noise rejection greater than 145 dB.
- Transverse-mode noise rejection greater than 125 dB at 1 kHz.
- Standard models 125 VA to 130 kVA.
- Priced from \$120.

Our guarantee: A Topaz Ultra-Isolation Transformer will solve your noise sensitivity problems to your complete satisfaction or we'll take it back—no questions asked.



TOPAZ
ELECTRONICS

SOLUTIONS TO
POWER PROBLEMS

3855 Ruffin Road, San Diego, California 92123—(714) 279-0831—TWX (910) 335-1526

With Integrated Functions

Transaction Data Unveils Net Control System

ORLANDO, Fla. — Transaction Data Systems, Inc. has announced a network control system that is said to integrate the functions of terminal control, data concentration, multiplexing, data encryption, packet switching and front-end processing.

The Netrol system utilizes statistical multiplexing, data-compaction and packet-switching techniques with automatic request for resend and a Synchronous Data Link Control (SDLC)-type protocol to maximize trunk circuit utilization. A single Netrol 110 remote unit can provide service to hundreds of interactive terminals as well as combine both batch and interactive traffic on a single trunk, the firm said.

A Netrol system consists of Netrol 110 remote units and at least one Netrol 4400 network control center.

The Netrol 110 remote units perform all terminal interfacing and control functions. A Netrol 110 can simultaneously interface asynchronous, synchronous and SDLC-type terminals, a company spokesman said.

The Netrol 4400 network control center terminates the network trunks. It unpacks and demultiplexes received

packets, updates network performance data and queues completed message frames for transmission to the user's DP system, a spokesman said. The 4400 establishes routing, down-line loads the remote units, maintains network performance data and provides for establishing the network configuration, according to the firm.

System Attachment

The 4400 attaches to a DP host via one or more serial ports or attaches directly to the host's block multiplexer channel.

Terminals up to 9,600 bit/sec and trunks up to 56 bit/sec can be accommodated. The Netrol 4400 provides

for dial-up trunk circuit backup in case a primary trunk circuit becomes unusable, the firm said.

Network System Configurator (NSC) software provides the user with the means to define the terminal and circuit characteristics to the Netrol system, the firm said. Responses to the NSC define the protocol packages and table parameters for each Netrol 110 load module.

The operator can define terminal type, access details, encryption option, diagnostic options, host unavailable spooling, user access controls and other parameters, according to the company.

IBM, Burroughs Corp. and NCR

Corp. protocols are supported. Others are available on a quote basis, a company spokesman said.

A Netrol 110 remote unit with 6 ports capable of supporting 120 terminals costs about \$17,500. A maximum Netrol 110 will support 300 terminals for less than \$36,000. Primary and backup trunk ports are included.

A Netrol 4400 network control center starts at \$54,000 for an eight-trunk system with four host interface serial ports, 10M-byte disk, 300 line/min printer, operator console and standard network software.

Transaction Data Systems, Inc. is located at 5750 Major Blvd., Orlando, Fla. 32805.

Micom Concentrator Now Has HP Option

CHATSWORTH, Calif. — Micom Systems, Inc.'s Micro 800 data concentrator now includes an option for users of Hewlett-Packard Co. systems.

The "HP" option eliminates the risk of buffer overflow by sending the DC1/DC2 control characters to control transmission from the attached computer port or terminals, the firm said. DC1 causes transmissions to be suspended; DC2 causes transmission to resume. The buffer storage allows data to be backed up when poor line conditions necessitate retransmissions, according to the firm.

The Micro 800 allows up to eight asynchronous terminals to share a single telephone line, with channel capacity at least double that provided by a conventional time-division multiplexer, and it provides automatic retransmission on error for all terminals using the system, a company spokesman said.

The "HP" option is available with the four-channel Micro 800 for \$1,900 and with the eight-channel unit for \$2,700. Delivery is 45 days from 9551 Irondale Ave., Chatsworth, Calif. 91311.

Attention VIDEO 370 Users!

KEY MASTER gives you more than just data entry.

- Interactive format design
- On line access to your database
- Less storage
- Failsafe operation

See page 7 for more details.

Another data security first from Motorola

A single plug-in board secures PDP-11* data

The latest in the line of Info-guard™ data security modules adds hardware encryption/decryption to the PDP-11 family of minicomputers. The single plug-in board, using the National Bureau of Standards' algorithm, allows quick retrofit for transmission security... even for multiple lines.

The microprocessor-based module includes Direct Memory Access (DMA) control and minimizes software impact on the PDP-11 C.P.U.

The DMA logic includes address selection, bus master control, word counting, input and output buffering, and interrupt control. Encryption control includes key transfer, initial fill of RAM buffer; encryption, and parity error checks.

After encrypting data blocks of up to 1K x 16 bits, the data is DMA-transferred back to the PDP-11 memory.



Other Info-guard data security modules are compatible with Motorola's M6800 EXORciser and other popular microprocessor systems. These modules are available off-the-shelf and make

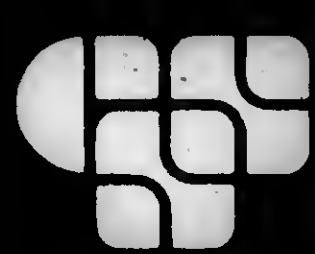
it easy for users to add encryption.

For more information, contact James Booth at 602/949-4735 or write to him at Motorola's Government Electronics Division, Dept. L-1, P.O. Box 2606, Scottsdale, AZ 85252.



MOTOROLA
OUR FIFTIETH YEAR

*TM Digital Equipment Corporation



National CSS

MEET
THE
CHALLENGE
OF OUR
EVOLUTION

design, develop, and market advanced data processing systems for vast, new total information service markets

Since our founding in 1967, National CSS has proven to be one of the few companies in the world capable of exploiting the full potential of today's most sophisticated computer hardware and software. We have also repeatedly demonstrated our leadership in the disciplines required for effective high performance communications and information processing. We are uniquely qualified to extend our leadership well into the future.

Our national network of 27 offices is capable of moving and controlling the information requirements of our more than 9,500 users through 70,000 miles of common carrier lines and satellite relays serving every major city in North America and parts of Europe. As a result, our sales and communications network have not only grown... they've multiplied.

Another fact you'll be interested in knowing about National CSS: We're Number 1 among all U.S. computer companies in R&D dollars spent per employee... and 8th among all publicly held companies in the U.S.

Now National CSS has taken another important step in our evolution toward

developing total state-of-the-art service capabilities and maintaining our position as the most innovative and dynamic organization in the information processing and communications field.

As a natural outgrowth of our knowledge, experience, and success in computer systems technology and information handling, we are introducing our own line of advanced minicomputer systems. Our new line of mega-minicomputers represent the latest technology in microprocessor design, programability, and software. They are mega-mini systems that computer professionals like yourself will be proud to market, program, and service.

National CSS can not only provide systems solutions for business, commercial, and financial applications...but also fully service the manufacturing, engineering, scientific, and medical applications markets.

Here are outstanding career-growth opportunities to use your knowledge and experience to full advantage with a company whose progressive evolution has equipped us to meet the exciting challenges of the 1980's...and beyond.

IMMEDIATE CAREER OPENINGS INCLUDE:

- **PRODUCT MARKETING PEOPLE**
- **SALES REPRESENTATIVES**
- **SALES SUPPORT PEOPLE**
- **FIELD MAINTENANCE ENGINEERS**
- **TROUBLESHOOTERS**
- **ASSEMBLERS**

An Equal Opportunity Employer M/F

If you are seeking an excellent salary and benefits package, coupled with high visibility and advancement opportunities with a firmly established and stable company...you belong at National CSS.

For immediate consideration for positions in all 27 offices, send your resume in confidence to:

**Nancy Potenza
Employment Manager
National CSS, Inc.
Dept. C-327
542 Westport Avenue
Norwalk, Conn. 06851**

 **National CSS**
*come on along...
the best is yet to come*

Connecticut Net to Handle Multiple Agencies

Special to CW

HARTFORD, Conn. — A distributed processing network comprised of more than 350 stand-alone and clustered intelligent terminal systems is being installed within multiple State of Connecticut agencies.

According to Raymond L. Howard, deputy commissioner of DP and information systems for the state, the distributed network project involves a simultaneous conversion of both terminals and modems. This project will re-

sult in a potential doubling of throughput capacity on the state's data

Terminal Transactions

communication network with a reduction in both individual terminal systems hardware costs and unit transaction costs, he said.

Over the past few months, the state has replaced a major portion of its existing terminal systems with PTS-100 programmable terminal systems from Raytheon Data Systems, Co. Planning is under way to convert other state networks over the next few months.

The PTS-100 is a minicomputer-based, stand-alone or clustered CRT terminal. Upgrades to the PTS-100 are available to support remote processing under the direction of user-created application programs.

The systems used by the State of Connecticut run in emulation of IBM 3271, 3272, 3275 and 3277 protocols as well as Honeywell Information Systems, Inc. 7700 and Univac Uniscope U-100 protocols.

Master Plan

The short-term objectives were primarily directed at replacing currently installed terminals with equipment that would provide improved technical and operational capabilities, reduce terminal hardware costs and meet the state's strict reliability and serviceability requirements. A longer term objective was to establish a base network of terminals that could be easily upgraded on an individual basis to distributed processing systems. "We selected Raytheon over 17 other vendors which submitted proposals," Howard said. "The PTS-100 system will help us do more at the user terminal site, use less host mainframe time and improve response time."

"In addition to meeting future requirements, any PTS-100 system can be upgraded on a modular basis to a PTS-1000 distributed processing system, which will provide remote site data entry and edit functions, remote batch terminal application processing and report generation and file manipulation at the remote site," Howard explained.

The PTS-100's local format storage and control capability allows the individual user to develop CRT screen formats that are used frequently at the local level. Screen formatting capabilities of the PTS-100 system include formatted or unformatted screen presentations; normal, highlighted and blanked data fields; and improved operator editing controls. Configuring the PTS-100 system stand-alone control unit with 24K allows seven different state formats to be generated on the screen using either a 64- or a 96-character display set.

"Double-buffering provides the capability for the Law Enforcement Network remote terminal operator to key a message to be sent to the host computer, while concurrently receiving a transmission from the host computer, a capability that was not available on the previously installed stand-alone equipment," Howard noted.

Installation Sites

The PTS-100 systems are currently being installed within the state's law enforcement network, tax, education and children and youth services departments, as well as the offices of Secretary of State and Teachers' Retirement Board.

The 114 state and local police sites are typically configured with one stand-alone PTS-100 system, which includes one or two terminals, control-

ler and printer. The law enforcement network, which operates around the clock, provides a high-speed and reliable means for the state and local police to communicate with the host computer, an IBM 370/168, to perform a number of functions:

- Obtaining information on stolen vehicles, boats, securities and other serially registered items.
- Sending all points bulletins and messages directed to one or more state or local police subsystems.
- Checking for warrants and wants on suspected criminals.
- Performing validation checks of motor vehicle operator licenses and registrations, as well as checking for operator license suspensions.
- Performing identification checks against the name index file of convicted criminals.

- Accessing the wanted persons and stolen properties files of the FBI's National Crime Information Center.

The Department of Education uses two terminals and a printer to maintain an on-line personnel file which responds to management requests and allocates costs of split-funding positions.

The terminals also provide access to automated accounting functions; giving the department a reporting mechanism for management inquiries.

The Teachers' Retirement Board uses three terminals and a printer to maintain a file of 48,000 teachers and administrators in the state's public school system. It automatically tracks retirement program salary deductions and facilitates the annual validation of retirement fund balances.

The system serving the Office of the Secretary of State is comprised of an eight-terminal system. It is being used in support of the corporation division's Financial Document System (FIND). More than 60,000 corporate entities filed with the State of Connecticut are recorded in the Find files.

The state tax department utilizes a clustered, 26-terminal system with nine printers. This equipment is used by various functional units to make inquiries on a master data base file.

The Department of Children and Youth Services, unlike the other agencies previously mentioned, is not on-line to the IBM 370/168, but is on-line to another manufacturer's computer. This agency is using 26 PTS-100 systems, with 30 terminals and 30 printers, to support the Human Services Management Information System used in rendering social services and related activities to children who are wards of the state.

The planned transfer of this application to the host 370/168 will be facilitated by the ability to use the same terminal hardware through changing the software emulator from that of the second manufacturer to IBM mode.

In financial terms, the joint terminal \$750,000 and \$1 million of anticipated duce operating costs by over \$500,000 during the first five years the replacement equipment is in operation, Howard said. In addition, between \$750,000 and \$1 million of anticipated capacity expansion costs will be avoided during the same five-year period, because of the inherent capacity increase resulting from the project, he added.

Proposal Book Rocks Industry!

A California publishing firm has literally taken the computer industry by storm with a recently-published "how-to" proposal book. The book, a 4½ pound loose-leaf volume entitled *How to Create a Winning Proposal*, covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top West Coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in commercial, government and OEM proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

Using a step-by-step instructional technique, the authors provide a virtual roadmap to the entire proposal process... including section-by-section checklists to ensure the proposal team of covering all the important bases. Excellent guidelines are given on the contents, structure and methods of preparation for both solicited and unsolicited proposals. A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team, and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's, and IFB's are included.

Copies are available from Mercury Communications Corp., 730-CW Mission Street, Santa Cruz, CA 95060. \$65 (pre-paid) includes 3-5 day delivery inside USA. In Calif. add \$3.90. For outside USA, U.S. \$76 (Int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

THE TERMINAL TABLE

A New Standard in Terminal Support Systems

CRT or Keyboard-Printer Stations:

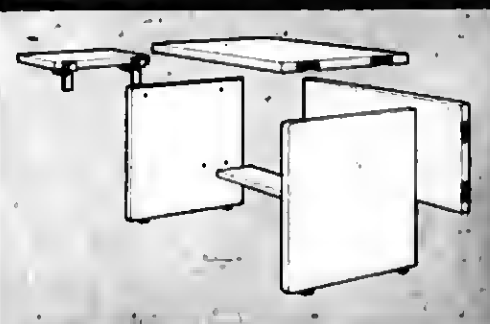
- Totally Enclosed
- Cords pass thru table-top slots.
- Modems rest on modem shelf.
- Correct Height
- Proper 26" Keyboard Height or Standing Height - 40"

Printer Stands:

- Slotted Top
- Forms Stacker
- Forms Shelf
- For under-fed printers
- Detachable for storage
- Front loading

- Non-Static
- Modular
- Shipping
- Colors
- Heavy gauge plastic laminate
- Widths - 24" to 60"; Depths - 24" to 30"
- Shipped unassembled. No tools required for On-Site assembly. Low storage cost.
- Available in colors and wood grains

Custom Designs Upon Request



For more information, complete and return the attached coupon. Or contact:

COMPUTER ROOMERS, INC.
2732 Seelco
Dallas, Texas 75235
Call Collect: (214) 357-4671

Please send more information on your terminal tables and stands to:

Name _____ Company _____
Address _____ Telephone _____
City _____ State _____ Zip _____

Computerworld Special Report

DATA COMMUNICATIONS TERMINALS

BUDGET BUSTIN...

TERMINAL BARGAINS

VERY CLEAN, LOW MILEAGE TELEPRINTER

Used very seldom by little
old lady doing remote batch
with velvet gloves! Will take
TTY in Trade.

76 DOORBUSTER

CRT WITH COUPLER
thrown in free. Call
up your favorite data
record anyplace there
is a phone. Only
\$150/mo for 30 year
lease. No Extras.



PORTABLE SUITCASE SPECIAL

Take your terminal
on vacation. Works
in the air, on the
beach, at the mov-
ies. Stay in touch
with data bases
that matter, 24
hours per day.



BUDGET BUSTER CLEAN DISPLAY

Official DP colors with
accent stripes. No wires, I/O
special keys, etc. Just plain
old fashioned clear screen. Uses
only third grade English words.



DATA DAN'S DYNAMITE HONEST DEALS DEVICES

March 27, 1978 Edited by Ron Frank

'Best' Terminal Depends on Specific Application

What requirements must be considered when selecting a terminal for a specific application?

Hermon L. Pope Jr. recently answered this question at a three-day data communications forum sponsored by the Institute for Professional Education in Washington, D.C. Pope is the manager of applications engineering, terminals and peripherals for the Digital Systems Division of Texas Instruments, Inc.

By Hermon Pope
Special to CW

The criteria for selecting a terminal are similar to those used for selecting any piece of office equipment. Overhead charges, "hidden" and obvious costs must be weighted against the total benefits derived from the terminal's use after its original purchase.

First, identify the requirements:

- Who is the intended operator and what variables must be dealt with? How much training is required?
- Is the purchase of an "intelligent" terminal indicated? What are the advantages and disadvantages?
- What method of communication is

Each variable must be carefully explored, since any or all of them many determine added success for a company's growth and profitability.

required in light of available resources?

- What environmental factors of the application restrict the selection of terminals?

Second, evaluate the true cost:

- Calculate all direct nonrecurring costs including the original purchase price.
- Evaluate all direct recurring costs such as service and communication costs.
- Define and evaluate all indirect recurring costs — for instance, cost of downtime.

Finally, consider the value derived from the use of the terminals as it reduces labor, inventory and money "float" time. Note that a terminal can improve on overall public image through timely reports and the minimizing of repetitious tasks that take away from valuable public interaction and company response to orders and services (if either apply).

Weigh the ideal requirements against the true cost and value of the terminal. The resulting restrictions that arise will determine the best terminal suited for the application. Sounds easy? It is, but each variable must be carefully explored, since any or all of them may determine added success for a company's growth and profitability.

Intended Operator

The operator interface is critical, since ultimately it will determine the effectiveness of the terminal. Is it a secretary, a clerk or an engineer? What is the expected skill level? Individuals with a data processing background may have the skills required to handle software. On the other hand, there are terminals for secretaries with typing

TERMINAL TYPE	ADVANTAGES	DISADVANTAGES
Nonprogrammable	• Low cost. • Simple to operate. • Interactive or batch. • More reliable (less downtime).	• Relies on host to detect errors. • No preprocessing of data.
Programmable	• Validates data on entry. • Fewer keystrokes • Preprocessing of data. • Lower burden on host. • Very flexible.	• Higher equipment cost. • Requires programming resources. • Requires more training.

Figure 1

CHARACTERISTICS TO BE SELECTED			
Line Type	DDD, Wats, Value-Added Network, Leased/Private Line		
Line Protocol	• No Error Checking • Parity Checking • Error Checking & Correction	• Line Control • Device Control	
Transmission Type	Speed (Bit/Sec)	Mode of Operation	Bell Modem
Asynchronous	300	Half-/Full-Duplex	103/113/211
	1,200	Half-Duplex	202
	1,200	Full-Duplex	212
Synchronous	1,200	Full-Duplex	212
	2,400	Half-Duplex	201
	4,800	Full-Duplex	208

Figure 2

ability that offer typewriter keyboards and powerful editing features for more effective data input.

In all cases — secretary, clerk or engineer — a certain amount of training

will be required on equipment operation, and application. Employee attrition or turnover may lead to further training and may be considered an ongoing function and cost. The total

amount of training will largely be determined by the selection of the terminal, the requirements of the application and the background of the operator. (Continued on Page 5/6)

The DELTA 4050 Display Terminal with proven Burroughs, Honeywell & Univac emulation



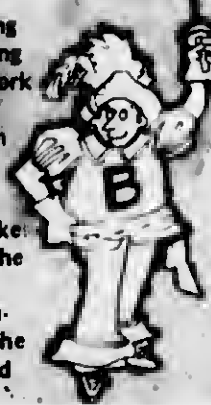
Performance proven around the world



USE THE DELTA 4050 FOR EXISTING AND NEW APPLICATIONS

When you need an emulating terminal, consider the DELTA 4050—the terminal that offers true emulation for your existing software. Most so-called "emulating" terminals provide nothing more than communications capability. That limitation will work for some new applications, but what of current jobs? That's where the DELTA 4050 outshines them all: it gets right down to business without modifications. Think of the time you'll save, and the problems you'll avoid.

While you're at it, think about the operating features you'd like to have in your display terminal system. You'll find them in the DELTA 4050 which offers more features and advantages, is more economical and is easier to use than the computer manufacturers' or other companies' emulating terminals. Compare the DELTA 4050 with the others; we think you'll be quite pleased at what you see. Call us now for full details.



Delta
Data Systems
Corporation
DELTA DATA SYSTEMS
Corporation
Woodhaven Industrial Park
Cornwells Heights, PA 19020
Phone: (215) 639-9400
U.K. Subsidiary:
DELTA DATA SYSTEMS LTD.
Welwyn Garden 33833

Users' Needs Supply Answer

Is Response Time a Terminal's True Measure?

By Don Leavitt
CW Staff

While designers and technicians configuring a network consider such things as the number of concurrent terminals that can be served or the transmission speed of the system, the user has a much simpler concern: "How quickly can I get an answer?"

Although the question is simple, the answer isn't. Even if it is restated to call for an apparently more precise measure, such as "average response time," there is no easy answer, according to Thomas Wyrick of the Federal Computer Performance, Evaluation and Simulation Center (Fedism).

An operations research analyst, Wyrick explained that even the sense of what is a good response time differs with the type of work being attempted, perhaps even more than with the equipment being used or the type and condition of the user's transmission facilities.

Some terminal users — the classic problem-solving time-sharers for example — are in a symbiotic relationship with the computer behind the terminal. They are thinking and looking for reactions to their thoughts as quickly as they are available: for them, "immediate" response is virtually a necessity.

Other users, however, are working with essentially clerical operations (order entry or file maintenance, for instance) and they have no pressing need for instantaneous response — as long as the response is quick enough so the users don't feel delayed by the system.

Speed May Intimidate

Some studies done a few years ago indicated too rapid responses were in fact disconcerting — even threatening to the clerical-type terminal operators, Wyrick said, although he couldn't recall details on any of this research.

To illustrate the intimidation that can be created by a too rapid response the analyst reached outside the clerical

world. "Imagine how threatened a chess player must feel if the system he's playing reacts within X seconds to a move that took him minutes to plan, evaluate and execute," he said.

"In any case," Wyrick continued, "cost is one of the limiting factors in

involve a number of separate interactions with the terminal; it is the sum of those actions and the user's time between the actions that combine to make up throughout.

A user's satisfaction with a system generally matches the user's view of

"In the long haul, consistency of response time appears to be a far more important psychological factor than 'average' response time."

determining how much management can commit to improving response times, even when they seem slow. Tuning a system adds exponentially to the cost of the system.

Although procurement documents often specify response time requirements, Wyrick said he wasn't sure how any organization could reasonably do anything more than cite a maximum response time that would be acceptable when the proposed network was being utilized by a typical number of users.

Response time is a particularly poor measure of a system's performance since throughput per unit of work may

the complexity of the request being made. If the inner workings of the system are understood in some detail, the user is often willing to wait for an answer longer than the naive user who assumes "the computer" can do anything at the snap of a finger, Wyrick noted.

Consistency Most Acceptable

In the long haul, consistency of response time appears to be a far more important psychological factor than "average" response time, both Wyrick and independent consultant Barry Stevens pointed out. Users can cope

with any situation as long as it doesn't vary too wildly, they agreed.

"The standard deviation in the mass of response times actually encountered over time is the critical thing," Stevens said. "It's hard to work comfortably with a system that provides responses in three seconds one time and 30 seconds or more another time on the same type of user request."

Even packages that monitor response times have to be adaptable to changes in the system or in the user's expectations. The Terminal On-Line Availability Reporting package recently introduced by Trusco Data Systems [CW, March 6], for example, compares "system time" of IBM CICS transactions with an internal, user-defined table of acceptable times and reports those transactions that fall outside the acceptable limits.

Trusco spokesman James R. Stephens acknowledged, first, that internal system time is only a portion of response time — "but it is the portion we can monitor for the user" — and, second, that the base against which actual experience is measured has to be adjustable — "because what the user is willing to accept varies over time."

Net 'Collects' Scientists

RBT Joins CPUs to Cut Research Costs

By Wesley W. Hilton
Special to CW

LA JOLLA, Calif.— The ability of a single remote batch terminal (RBT) to communicate concurrently with three large host computers in cutting costs for research scientists and graduate students at the University of California at San Diego (UCSD).

About 85 UCSD researchers — typically oceanographers, meteorologists, geophysicists, space physicists and chemists — use the terminal every day to transmit programs and data to two

Control Data Corp. 7600s and a Burroughs Corp. B6700. One CDC 7600 is at Lawrence Berkeley Laboratory in Berkeley, Calif., the other is at the National Center for Atmospheric Research in Boulder, Colo., and the B6700 is in UCSD's own computer center on the main campus here.

The CDC 7600s are large scientific systems, with dozens of peripherals and a number of remote job entry and intelligent terminals networks running across the country. The Berkeley system has a pair of CDC 6000 series sys-

tems "front ending" it. The Boulder CDC 7600, a large system too, will soon become a front end for a Cray Research, Inc. Cray-1.

UCSD has a great amount of computing power at its disposal, and the RBT helps researchers use it rapidly and economically. The terminal, a Harris Corp. 1620, is at the Scripps Institution of Oceanography, a UCSD research center. The system was installed in April 1977 as a replacement for a Harris 1200 that had been used for four years.

Interesting Input

Most applications running through the RBT are scientifically oriented, calling for a great amount of number crunching on the CDC 7600s and the Burroughs 6700. A dozen or more central processor hours are used every month on both the Berkeley and main campus hosts, plus an hour or two a month at Boulder.

Input from the Harris 1620 to the hosts is generally light, averaging 50 cards per deck. Few decks are larger than 200 cards. Printouts normally run no more than 10 to 20 minutes, or about 12,000 lines maximum. Anything longer usually is printed at the host and trucked or flown back to the users.

A number of X-Y plotter applications also are run regularly through the day, producing contour maps for meteorological, oceanographic and other studies.

Unusual Users

The line printer is attracting some unusual users, because it has a 96-character chain with upper and lower case and many special characters. One user, for example, is using the Burroughs mainframe and the

(Continued on Page S/20)

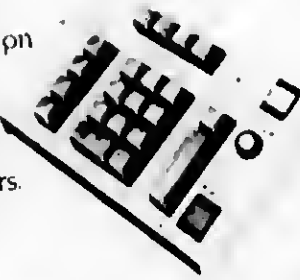
Puzzled About Your Data Entry Needs? CUSTOMIZE!

with Custom Terminals Corp.
We design & manufacture products to solve specific needs. Operational flexibility, simplicity, ruggedness & low cost are built-in! Let us design a terminal/peripheral system just for you. Point-of-sale; back room (inventory); factory floors; or any special application.

CT CUSTOM TERMINALS CORP.
225 OSER AVENUE, HAUPPAUGE, N.Y. 11787 • (516) 231-3111

KB-8

Numeric Pad add-on for all peripherals and terminals... around \$300. Interfaces with all CRT's and printers. (Customizable keyboards)



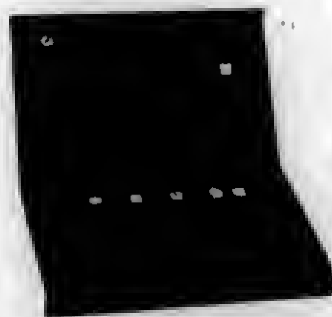
TR-10

Low cost, reliable, factory floor type data entry terminal... around \$900. Available with badge readers, journal printers, customizable keyboards, and displays, etc.



TR/B

Special purpose multi display data entry terminal... around \$2000. Used with mini computerized-conveyor systems, etc.



*Typical, small quantity, end user prices.

It already looks like a success.

Not only does the new 1200 baud interactive DECwriter III hardcopy terminal look like the successful DECwriter II on the outside, it also looks a lot like it on the inside.

Because the DECwriter III uses many of the same components and sub-assemblies that have proved so reliable in our DECwriters, it's, in a very real sense, already a mature, field-tested product.

But what you'll get that's different is speed. 1200 baud, 180 cps speed. Along with 1K buffer capacity.

That means you receive data four

times faster than conventional printers. And phone line charges can be reduced by as much as 75%. The 1200 baud speed of the DECwriter III also means you can combine the functions of a line printer and a CRT. Which saves you money and available office space without losing a bit of efficiency.

But the DECwriter III is more than fast and efficient, it's also very flexible.

For example, you can set operating modes — including four baud rates — at the touch of a finger. Plus, optional forms handling capabilities, including margins and tabs which can be set with

typewriter-like ease. And because you probably handle different size forms, it can handle different size forms — up to six parts and 132 columns.

The DECwriter III.

A new 1200 baud interactive terminal with a very successful look about it.

For more info, call 800-225-9220. Or write, Components Group, Digital Equipment Corporation, One Iron Way, Marlborough, MA 01752. Canada: Digital Equipment of Canada, Ltd. Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva, Switzerland. tel. (022) 93 33 11.

digital
COMPONENTS
GROUP



Right Terminal Depends on User's Application

(Continued from Page S/3)

tor.

Consider also the data volumes to be input by the operator and the quantities the operator will receive. Is more than one terminal required to handle these volumes? Must the terminal have both input and output capabilities operating simultaneously? Does the operator have the sophistication to han-

dle such a situation? What is the frequency of use of the terminal?

Finally, give thought to the required output form. Is printed copy required? If not, is soft copy adequate? Perhaps printed copy is the only required on occasion. Some terminals lead the operator through data entry routines by creating forms to fill out. These terminals are preprogrammed to generate

operator lead-through (prompting) to help guide the unsophisticated operator.

Note that operator lead-through and error validation are not synonymous. The latter requirement is unique to programmable terminals.

Intelligent vs. Nonprogrammable

Programmable and nonprogrammable units make up the current terminal types. Sometimes referred to as "intelligent" the programmable terminal is capable of preprocessing data, thus lowering the data manipulation burden on the host computer.

More important, the intelligent terminal validates the data upon entry, where error correction cost is at its lowest — at the source. Figure 1 depicts the advantages and disadvantages of both programmable and nonprogrammable terminals.

The selection of a programmable terminal depends largely on the cost of operator errors and in the source document. In either case, the intelligent terminal minimizes errors by "cleaning" or validating inputs. In cases where the host computer cannot assume a high load, or when on-line costs to the host are critical, the programmable terminal can preprocess the data, saving the user time and money.

Any additional functions outside of the immediate application may further justify the added expense of an intelligent terminal, as in the cases of inventory control, audit function and employee scheduling. These recurring tasks are prime targets for programmable applications and offer the user added time for customer service. But before jumping to the benefits a programmable terminal offers, be sure the programming resources are available to write and maintain the terminal's software.

The timeliness requirements set on data restrict the selection of the communications interface. A realtor may

need immediate data on locations, sizes, costs and special features of a home, whereas a ball-bearing manufacturer may require only daily or weekly reports. The sheer volume of data to be manipulated may overstep the preprocessing capabilities of an intelligent terminal and require manipulation by a computer host.

These considerations help determine the communication interface, but are not subordinate to so-called "hidden" opportunities and restrictions:

For instance, if error-free transmission is critical, then error-checking protocol should be incorporated for transmission.

An existing terminal network requires that the selected terminal be compatible with the configurations. Existing Wats line(s) that are unused at night can offer substantial transmission economy.

A further restriction on the selection of a communications interface is the geographic location of the terminal. The size and weight of a data terminal are of importance here, as are hookup capabilities. Some growing companies opt for portable terminals in order to have flexibility of moving them without hookup costs or confusion. Figure 2 depicts the wide range of basic communications characteristics available to the user.

Environmental Factors

In addition to determining the size and weight required for an application (fixed location versus portable), noise from the printer may be a deciding element. A factory environment may "swallow" the noise level associated with impact-type printers that would normally upset an office-type environment.

In cases where only soft copy is necessary, a CRT is sufficient and silent.

Sometimes factors such as the heat reproduced by the terminal or its ability

(Continued on Page S/32)

NEW RESPONSE TIME MONITOR.



MONITORS RESPONSE TIME on asynchronous and bisynchronous multidrop terminal networks.
DISPLAYS minimum, maximum, last transaction, number of transactions and maintains running average on 4-digit LED display.
DATA RATES from 75 to 9600 baud.
TERMINAL CONNECTION via optical coupler or RS-232C bridge.
RESOLUTION is 0.1 sec. with 9,999 sec. possible.

All packed into one self-contained, self-powered monitor, the

MODEL 300

\$1500 F.O.B. Salt Lake City, Utah

Manufactured and serviced by:

QUESTRONICS, INC.

3565 South West Temple, #5
Salt Lake City, Utah 84115
(801) 262-9923

"Towns you've probably never heard of" are now key locations in major data communication networks. And they're big in using terminals in many local applications.

That's why Trendata expanded its nation wide service facilities to cover places such as Victoria, Texas. Any data communications terminal manufacturer could have shipped a system there. We backed up a recent Victoria installation with a full training and service program.

We like towns like Dublin, Georgia because we offer everything from a system for wide flexibility and high production to a single reliable machine for limited applications. We handle the purchase, lease or rental program to keep it simple. And we

provide peripherals and supplies to avoid further complications.

Trendata communication terminals are designed to be as reliable and trouble-free as possible, but when you do need service, our factory trained serviceman will be there in a matter of hours... because we realize that downtime on a system in Las Vegas, New Mexico can be just as costly as one in New York City.



**Applied Magnetics
Trendata**

610 Palomar Avenue, P.O. Box 5080
Sunnyvale, CA 94086
(408) 732-1790

Our service reaches towns you've probably never heard of



EVALUATING TRUE TERMINAL COST

- I. Direct — Nonrecurring Costs.
 - Equipment (if purchased).
 - Installation (equipment and communications).
 - Initial operator training and training material preparation.
 - Initial programming cost (if appropriate).
- II. Direct — Recurring Costs.
 - Equipment lease (if not purchased).
 - Operating costs (paper, cassettes, etc.).
 - Service cost.
 - Communication cost.
 - Operator training (due to attrition).
 - Software maintenance (if appropriate).
- III. Indirect — Recurring Costs.
 - Cost of downtime.
 - Cost of correcting operator errors, source document errors, terminal errors, and communications errors.

Figure 3

EVALUATING VALUE DERIVED

- Reduction in Error Rate.
- Reduction in Labor.
- Reduction in Inventory.
- Reduction in Money "Floet" Time.
- Better Business Control Through Timely and Accurate Management Reports.
- Minimal Loss of Revenue Attributable to Response Time.
- Fewer Recurring Tasks, Allowing Concentration on High-Return Tasks.
- Public Image Improvement.

Figure 4

Tours Packaged by CRT

Amex Able to Offer More With Terminal Net

Special to CW

NEW YORK—The Travel Division of American Express (Amex) is responsible for preparing and promoting group and individual package tours sold by 13,000 travel agencies, 300 American Express travel offices worldwide and nearly 400 company representative agencies.

The processing of orders from travel agencies for Amex tour products had been handled by a combination of batch computing and manual processing methods. A year ago, the Travel Division replaced that combination with an interactive system involving twin medium-scale Digital Equipment Corp. PDP-11/70 minicomputers and Raytheon Data Systems Co. PTS-100 programmable terminals systems. Software for the Travel Inventory Management Systems (Tims) was developed by Cytrol, Inc. of Edina, Minn.

"Tims has lowered total personnel requirements for the Travel Division's wholesale business by approximately two-thirds and reduced 'back office' staffing requirements by more than 80%," according to David Dix, vice-president. Order processing costs have been reduced by one-half. The Travel Division has the capacity for tenfold growth without major system modifications.

"We've improved our service to our customers and the travel agencies because Tims has given us a steady flow of information triggered by the keying of a single document representing each order. The result is that our people spend their time negotiating with other people rather than stacking paper and editing and reediting paper documents," he added.

Old System Cumbersome

Orders for Amex were once processed at regional reservations centers in Los Angeles, Chicago, New York and Atlanta. Orders were taken over the phone and written on the outside of file folders which held documentation relating to each order.

Data from the file folders was keyed at each reservations center. At the end of the day, data from each reservations center was transmitted over dial-up lines to the Amex center here. Processed data travelled the reverse route back to each regional center.

"We needed a system which would allow us to store information, explode that information, relate and cross-reference it among the functions which required it—including management—and communicate information among those functions," Dix recalled.

"Until the implementation of Tims, we could not effectively handle individual travel plans such as package tours and more costly custom services. That is how Tims changed the nature of our business.

"To handle those individual package and custom business lines, we needed a modular, on-line system which could begin small and controllable, then expand along with our requirements. We saw the number of travel 'products' we needed to offer proliferating.

"The ability to computerize and to concentrate communications was the only way we could remain in business profitably," Dix explained.

To meet those requirements, Amex installed at its reservations center in Atlanta the two PDP-11/70s. Three Raytheon PS-100 control units provide an operator interface to Tims. There are 58 CRT display and keyboard terminals and three 165-char./sec printers attached to those control units.

Russell Gloor, director of system management, said that after evaluating a number of suppliers Amex found several reasons for selecting Raytheon terminal hardware for Tims.

"Two of the reasons relate to reliability," he said. "First, we found that Raytheon has thousands of terminals already in place. Second, Raytheon

came out better than most when we evaluated its ability to provide service on a worldwide basis. We need service in Atlanta, New York and Minnesota now, but would like the option of placing terminals in our retail offices someday. And those offices are located in every major city in the world.

"A third reason for selecting Raytheon was cost. We found its equipment to be as much as 40% lower in price than comparable equipment at the time of selection," Gloor continued.

"We were interested in the program-mability and flexibility of the PTS-100 terminals. Although we did not have specific plans for using those capabili-

ties at the time of our decision, it helped us to know we could upgrade from the PTS-100 to PTS-1200 level if we chose.

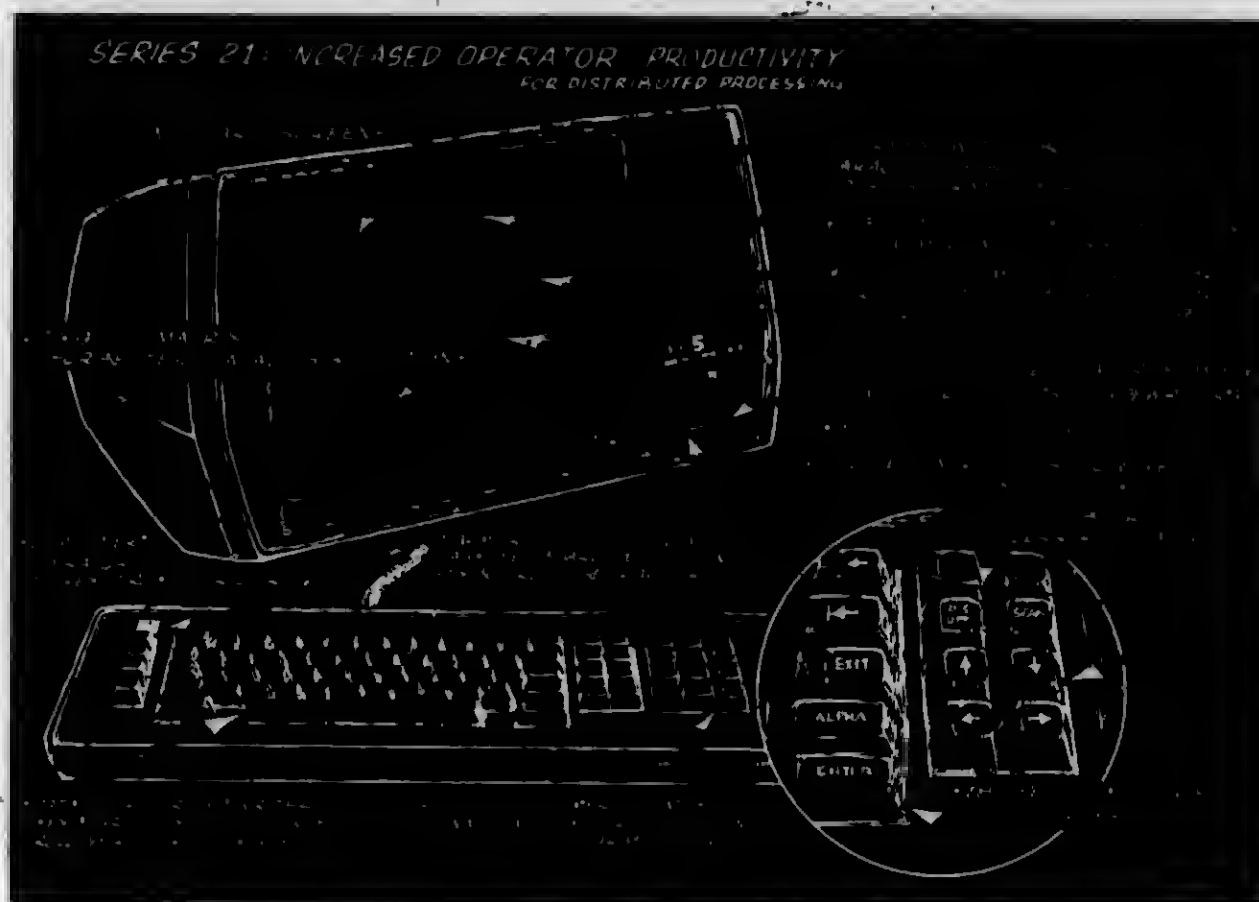
"And finally," Gloor added, "Raytheon offered the kinds human factors that helped its terminals gain the acceptance of our operators. The terminals have a pleasing appearance, are easy to learn and to operate, and no one has complained of eyestrain after using them."

Extensive Data Set

Amex telephone reservations personnel, inventory control specialists, accountants, mailroom workers or man-

(Continued on Page S/36)

MDS Series 21. Engineered to make your operators more productive in 25 different ways.



Mohawk Data Sciences learned a lot about data entry productivity over the past 13 years while meeting the high-volume needs of more than 6,500 customers worldwide. In the engineering of Series 21™ we put those lessons to work. We learned, for example, that a large display screen makes an operator station easy to use. A 15-inch, non-glare CRT is standard on all Series 21 systems.



Or consider the Series 21 keyboard. We offer a choice of data entry or typewriter style layouts with features like programmable function keys, full keyboard cursor movement, and moveable keyboard.

These are only some of the 25 different features engineered into Series 21 to make your operators and your system more productive. Also consider its two-level software, its peripherals flexibility, its modem

communications capabilities and its low system prices.

MDS™ is now conducting seminars on distributed data processing in major cities throughout the country. For an invitation to a seminar and a demonstration of Series 21, call our headquarters, 1599 Littleton Road, Parsippany, N.J. 07054, (201) 540-9080 and ask for James J. Byrne, V.P., U.S. Sales.

™Trademarks of Mohawk Data Sciences Corp

Mohawk Data Sciences
1599 Littleton Road
Parsippany, New Jersey 07054
(201) 540-9080

My application is _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip Code _____

Phone _____

☐ Please send further information on Series 21.

☐ Have a salesperson call.

☐ Send a schedule for the next free DDP seminar in my locale.

CW 03278



Mohawk Data Sciences

3270/3790 Users: Why wait for 3274s or 3276s? Raytheon's PTS/1200, the highly intelligent does much more. And you can get it

Waiting for the next new product advance can often make a lot of sense. Unless there is an immediately available alternative that has far more capabilities and can produce far greater cost savings and productivity benefits.

Raytheon's PTS/1200 system is such a product. It is a fully-programmable distributed processing system that uses an easy-to-use English-language compiler, has a main memory capacity of up to 128K bytes, handles up to 32 operator displays—plus dozens of additional downline displays in a multipoint network control mode—and can have a large peripheral equipment complement and local data base as well.

And the PTS/1200 operates in a fully compatible mode with IBM 3270 operator display devices. It not only emulates every 3270 function, but it performs total batch processing and spooling functions as well—simultaneously—and with no degradation in response times in either interactive or batch mode.

If you are waiting for the next 3270-type product to come on the market, wait no longer. For the PTS/1200 is far more powerful, cost efficient and adaptable—in a 3270 environment—than any product you can find today. And you can take delivery in just 30 days.

Look at what else the PTS/1200 can do for you:

- ✓ Operate in full 3270-compatible mode
- ✓ Control up to 32 operator displays
- ✓ Perform local batch processing concurrently with 3270 interactive processing
- ✓ Attach up to 24 peripheral devices
- ✓ Attach a large local data base
- ✓ Perform all 3270-type data entry tasks
- ✓ Perform all 3270-type inquiry/response tasks
- ✓ Operate as a HASP/JES workstation at the same time it is performing 3270 emulation
- ✓ Perform multiprogramming functions
- ✓ Control, in addition, a multipoint network of up to 24 terminals in 3270 mode.

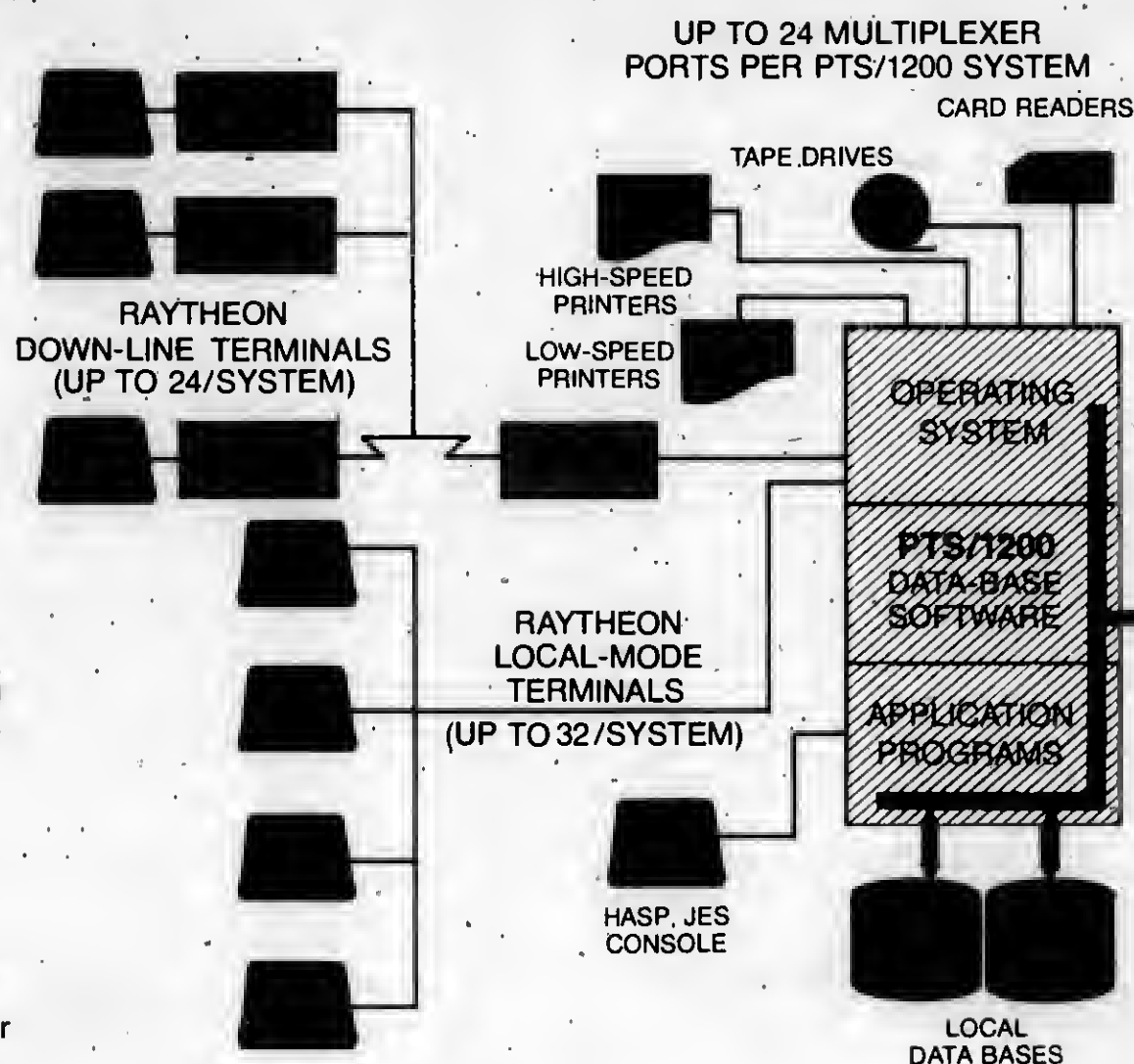
Consider these five benefits, and you'll look a lot harder at the PTS/1200:

1. No Change To Host Processor

The PTS/1200 installs immediately within your existing network with no change required in your host CPU, in the 370X front-end, in your existing applications software, or in your Emulation Program. It goes to work under 3270 bisynch protocol the day you install it.

2. Cut Mainframe Overhead

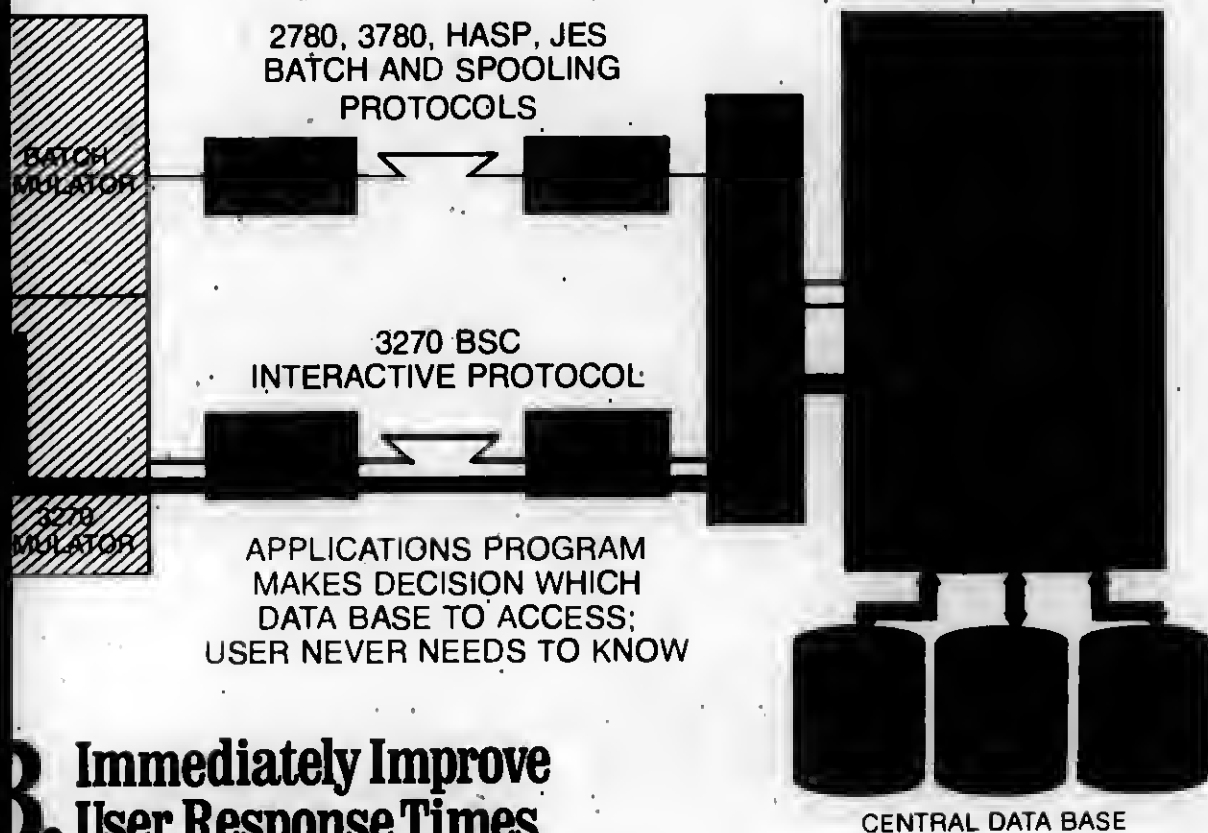
The enormous power of the PTS/1200 permits you to develop and store local formats and perform advanced data editing prior to transmission to the host CPU. This one feature alone can reduce your mainframe overhead by 30 per cent or more. The PTS/1200, in addition, runs its own multipoint network of up to 24 Raytheon terminals in 3270 mode—saving even more CPU time.



Intelligent terminal system, in just 30 days.

4. Reduce Communications Line Loading

With the PTS/1200, you perform a high percentage of the data entry and inquiry functions of a 3270 locally. In many cases, that can eliminate up to 90 per cent of the wasted communications overheads involved in polling, ACKing and NACKing, and in retransmitting. Your system becomes much more efficient in its use of communications lines.



3. Immediately Improve User Response Times

The busy times that often degrade each operator's response time from the host CPU disappear when you install a PTS/1200. Instead of operator waits of 20 or even 30 seconds when the network is busy, with the PTS/1200 the response is instantaneous for every operator, with every transaction. Multiply the number of operator stations by the number of messages by the average degradation delay and you get some feel for the productivity advantages that the PTS/1200's local format and data base storage features offer you.

- ☐ Tell me more about the PTS/1200. I am currently planning to develop _____ 3270-type links, with about _____ terminals, using Model _____ mainframe equipment.
- ☐ I need immediate delivery of _____ 3270 emulation terminals. Tell me how fast I can get them. We'll talk about PTS/1200 features later.

Name: _____

Title: _____

Company: _____

Street: _____

City: _____

State: _____ ZIP: _____

- ☐ I'm also interested in:
- _____ PTS-100 intelligent terminals
 - _____ Raytheon's packet network systems
 - _____ Your New OEM/Dealer Support program

Why wait? Get PTS/1200 today to solve the capacity problems you have today. Order now, and Raytheon will ship you a basic PTS/1200 system — or just basic Raytheon terminals in 3270 mode — within 30 days. And when Raytheon delivers, you get more than just a product. You get the experience of having installed more than 50,000 2260/3270-type terminals worldwide. You get a field service organization that spans the globe. You get a commitment to customer support that is second-to-none. You get the sense of security that comes from dealing with one of the world's largest corporations. You get the back-up of an aggressive technological pioneer in data communications network development. And you get Raytheon's pricing leadership — which means savings of about 20 per cent or more over major competitive products. Raytheon: our job is to anticipate your network needs and fill them before anyone else can.

Intelligent Terminals, Minicomputers, and Distributed Processing Systems

RAYTHEON DATA SYSTEMS

1415 BOSTON-PROVIDENCE TURNPIKE • NORWOOD, MASSACHUSETTS 02062

Call Director, Field Marketing, at (800) 225-9874 (toll free)

Inside Massachusetts call (617) 762-6700 • TWX: 710 336-0646 • TELEX: 92-4408

ATLANTA (404) 321-3064 • BOSTON (617) 237-4190 • CHICAGO (312) 694-4420 • DALLAS (214) 661-9722 • DENVER (303) 371-0990 • DETROIT (313) 358-3990 • GREENSBORO (919) 294-5811 • HARTFORD (203) 289-8281 • HOUSTON (713) 771-5851 • LOS ANGELES (213) 770-4240 • MIAMI (305) 592-3884 • NEW YORK CITY (212) 661-2790 and (212) 895-2567 • PHILADELPHIA (609) 665-8466 • PITTSBURGH (412) 281-2117 • SAN FRANCISCO (415) 692-4640 • SEATTLE (206) 453-0650 • TULSA (918) 663-7852 • WASHINGTON, D.C. (703) 979-6100

RAYTHEON

Bureau Automates Indexing of Land Transfers

By Richard J. Le Page

Special to CW

SYRACUSE, N.Y. — "Any automated land-transfer indexing system sold to state and county governments must be versatile enough to accommodate a broad variety of requirements.

Procedures used to record land title transfers have been developing over the past century or so, and this evolution is further compounded by

state legislative regulations — many of them quite antiquated.

These regulations mandate that hard-copy records of land transactions pertaining to documents such as deeds and title transfers be readily available for use by surveyors, public works departments, county officials and the general public.

The need for retention, retrieval and updating of hun-

dreds of tons of records around the country gave rise to a demand for some sort of

"The need for retention, retrieval and updating of hundreds of tons of records around the country gave rise to a demand for some sort of automated indexing service."

automated indexing service. One of the suppliers of such a service is the century-old Hall

& McChesney, Inc. (H&M) of Syracuse, N.Y., a subsidiary of the Chicago Title and Trust

Co. H&M called its automated land and title transfer system

Machine Posted Indexing (MPI) and was doing business in over 400 countries. But then Friden, the manufacturer of one of the system's key components, stopped producing the device an electromechanical unit called the Flexowriter, which provided printed and paper tape output.

These problems were taken to Continental Data Systems (CDS) of Hackensack, N.J., an OEM experienced in the application of microprocessors to data acquisition markets.

Because of the widespread geographical areas H&M services, the problems of reliability and serviceability of data collection hardware are as important as ease and simplicity of operation.

H&M asked SDS to design the system to be reliable, easy to use and versatile enough to apply in new situations with minimum effort.

To the Rescue

CDS solved the problems with an easily adaptable system using a Perkin-Elmer Data Systems Model 310 Carousel printing terminal and a CDS Microprocessor Memory Controller (MPMC).

Key to the system's flexibility is the variety of options available on the terminal and the processing power of the 16-bit Texas Instrument, Inc. 9980 microprocessor used in the controller. The MPMC is tied directly to the Carousel's RS-232C port and uses the full-duplex mode for communications — making an integrated data collection unit. H&M calls the new combination the "New Machine."

Dual Function Performed

As county land offices enter data into the "New Machine" a dual function is performed. A machine-readable optical character recognition (OCR) form and a pressure-sensitive strip are printed on a single, specially designed H&M indexing sheet. The self-adhering labels are separated and placed in the appropriate sections of a temporary index book in the county offices.

The OCR copy is sent to H&M to be read by a Scan-Data Corp. 2250 optical character reader. These index lines are then processed by an IBM 370/115 and merged with other current entries to print a final index covering a designated period of time. Complete, new indexed listings are supplied to the counties by H&M at quarterly, semiannual or annual intervals.

System Workhorse

The printer is really the workhorse of the data entry system. Because of frequent repetition from line to line in

(Continued on Page S/17)

SHORT-TIMERS!

I/O Terminal Rentals: From a day to a decade.

Renting gives you a real choice

Now you can rent the latest CRT terminals, teleprinters and protocol monitors by the day, week, month or longer. Choose the datacomm equipment you need from the world's largest rental inventory of telecommunications equipment.

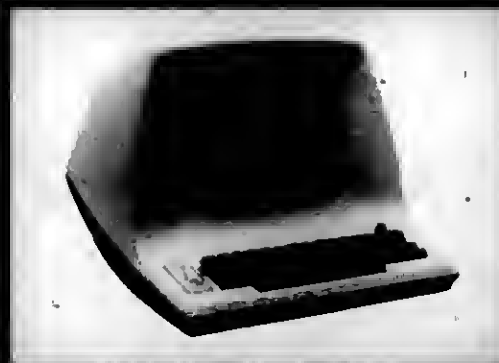
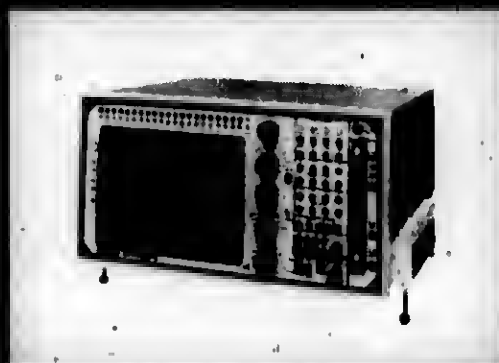
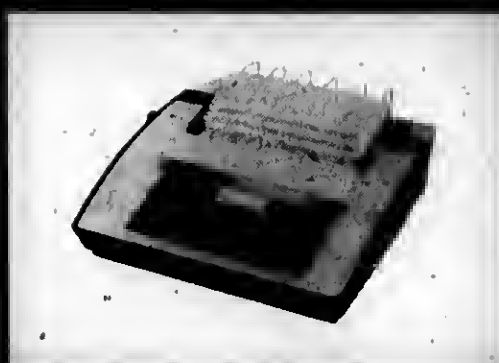
Top manufacturers like Teletype, Texas Instruments, Lear Siegler, DEC and Hewlett-Packard—we've got them all!

Immediate availability makes renting an obvious answer to most emergency equipment problems. Renting offers you both the operating and financial flexibility you can't get when you buy or lease. Renting is non-obsolete.

Renting is leveling out demand peaks and valleys. Renting is low-cost. You get what you need—when you need it—for as long as you need it!

Only one monthly charge

When you rent from



Leasametric. We pay just one low monthly rate. There's no extra installation, take-out fee, no add-ons, no monthly maintenance or repair costs. We take care of everything.

Service is our business

All equipment is inventoried and serviced by experienced professionals at Leasametric's 10 Regional Inventory Centers across the U.S. and Canada.

In the event of a failure, we'll replace or a functioning equipment with a fully operational unit within 24 hours. You deal directly with Leasametric's application specialists and technicians who are geared to respond to your emergency problems quickly and efficiently.

Call your nearest Leasametric Inventory Center today for immediate delivery of the latest CRT terminals, teleprinters and protocol monitors. Ask for your FREE EDP Equipment Rentals Brochure listing our many services.

Leasametric

Division of Metric Resources Corporation

INVENTORY CENTERS: San Francisco, CA; Los Angeles, CA; Anaheim, CA; San Diego, CA; Houston, TX; Chicago, IL; Boston, MA; Midland Park, NJ; Long Island, NY; Washington, D.C.; Orlando, FL; Dayton, OH; Philadelphia, PA; Seattle, WA; Denver, CO; Minneapolis, MN; Dallas, TX; Atlanta, GA; Baltimore, MD; Toronto, Ontario; TOLL FREE NUMBERS: Outside California; Outside New Jersey; Outside Maryland; Outside Illinois.

Replaces Minicomputer

Microprocessor Control Expands Terminal Uses

MONTEREY, Calif. — A persistent trend in terminal usage is getting simpler components to do more and bigger things. A system installed for KMart of Canada Ltd. is evidence of the trend.

For about half of the cost of low-end standard systems, the data gathering system for the Canadian retailer's point-of-sale (POS) equipment uses a microprocessor-controlled terminal instead of a minicomputer to handle cash register polling and data logging.

The back-office data gathering system, designated the System CD 100, was supplied by Cyberdata (CD) of Monterey, Calif. The System CD 100 consists of a modified Hewlett-Packard Co. HP 2649A terminal, a 10M-byte disk drive and a 60 char./sec printer.

The terminal functions on a level that would be equal to a minicomputer, or even a mainframe, in some other systems.

KMart uses Singer Business Machines terminals. The company's POS equipment originally used data concentrators that transmitted POS data over telephone lines to the mainframe. The communications line charges alone were expensive.

When Singer went out of the computer business, the retailer began looking around for a lower cost method of handling POS data collection. It selected the Cyberdata system.

To date the company has installed 36 of the CD 100 systems and as many as 70 are planned.

The center of the data collection system is the microprocessor-controlled HP 2649A. The combination terminal/controller has a modular design that allows Cyberdata to optimize hardware and firmware configuration to match specific applications.

"We chose the HP 2649A for several compelling reasons. We looked at building our own controller and decided against it. Building our own controller would have wasted limited resources, especially with so adaptable a piece of equipment as the HP 2649A available," according to Joe Greenwood, vice-president and general manager of Cy-

berdata.

"The flexibility of the 2649A CRT display would not have been available to us except in very expensive machines. The 2649A's communications system was another factor.

"We use binary synchronous communications to communicate with IBM and Singer equipment. Bisynchronous capability is a standard option

on the HP terminal," Greenwood added.

Five Micros

The Cyberdata system contains a total of five microprocessors. One is the central processor for the terminal; the other four are on POS scanner boards in the terminal's additional card slots.

The scanner boards are pro-

grammable to interface with various types of POS units. Each scanner has on-board diagnostics for self-checking. The status of the scanner microprocessors is fed to the central processor and indicated by lights on the keyboard.

Cyberdata added five printed circuit cards to the 15-slot backplane of the HP 2649A terminal. Additional slots pro-

vide space for increased I/O or enhanced displays, as user needs require them.

The terminal can be supplied with a number of memory, interface and keyboard options to customize individual systems to the user's specifications. The CD 100 has 20K bytes of random-access memory, expandable to 64K bytes. (Continued on Page S/42)

Rare bird.

An editing CRT that's ideal for transaction processing.

Lower software costs. Easier programming.

System builders say our Model 1200 Editing Terminal is ideal for transaction processing. We agree.

The Model 1200 makes programming easier because it tells the programmer (and the host computer) the status at the terminal. Communications strap setting, printer errors, operator mode key setting, and more.

The Model 1200 also cuts down on host computer loading by automatically setting modified data "tags," whenever a field is updated, so the host computer can request only modified fields, and skip thousands of needless compare operations.

To further lighten the load on the host computer, the Model 1200 has programmable send keys that let the program regulate the amount of data returned to the computer as terminal loading varies.

More productive operators.

Thanks to a 9 x 12 character matrix, the Model 1200 has crisp, clear, strikingly sharp characters. So operators see their work better and make fewer mistakes.

Data entry is incredibly accurate due to field attributes like low intensity, numeric only, blink, and inverse video.

Editing is fast and easy, too. Single keystrokes insert and delete characters and lines.

All our standard goodies. Only \$1383.*

A big, 12-inch screen, 128-character ASCII set, upper and lower case, 15 cps Typamatic repeat on all keys, and a 24-line display are standard. So is our exclusive No Hassle toll-free 800 number for service. One call gets you service. Where you need it. When you need it. World-wide.

So go ahead. Get a CRT terminal that's specifically designed for transaction processing. Perkin-Elmer's Model 1200 Editing Terminal.

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free 1-800-631-2154.



Quantity 75

PERKIN ELMER

DECwriter II & III

FOR SALE

• LA36 • LS120

DELIVERY

800-323-2288

CALL 312-229-1960

ICE INC
N. J. 07033
EMERSON 1-801-22

In Health Control Division

Key-to-Disk Units Let State Untangle Records

Special to CW
COLUMBIA, S.C. — Bureaucratic paperwork is being successfully untangled at the South Carolina Department of Health and Environmental Control here through the use of key-to-disk data entry and communications systems.

The implementation of the key-to-disk concept has significantly increased the depart-

ment's ability to maintain accurate recordkeeping, processing and document control in areas ranging from vital records to all of the project areas responsible for the delivery of better health care services. "Breaking the umbilical cord to the 80-column card format was traumatic and entered into with some misgivings," according to Lindsay Robin-

son, director of data systems management (DSM). "However, we have been greatly rewarded in the ability to use formats of 11 positions to 500 positions."

Three years ago, the department installed the first of three Mohawk Data Sciences Corp. (MDS) System 2400s.

The initial system, with 12 terminals, was used for con-

current key-to-disk data entry and remote-job-entry (RJE) communication with a host IBM 370/145. The 2400 replaced a Data 100 Corp. RJE system and 10 IBM 029 key-punch machines.

"The new key-to-disk equipment performed both data entry and RJE communications functions for approximately the same cost as the RJE

equipment alone and saved \$850 per month in lease costs for the keypunch equipment," Robinson said. "The net effect was that we got our key-to-disk free. In addition, data entry operator productivity rose at least 25%."

System Expansion

As the department's workload increased, the primary system was expanded to its present configuration of three 2400s. Two are used exclusively for data entry, verification and editing. Those two have been modified to allow the data entry supervisor to control both processors from a single keystation, thereby eliminating the need for a second control console.

The third system is dedicated to RJE via a communications link with the host IBM 370/145 located in the Department of Mental Health. Compatibility among the three systems exists to the extent that any two processors can be configured to support the RJE function and 80% of the key entry function with a minimum of recabling and core transfer.

If necessary, the remaining key entry terminals can be supported with a software change and additional support. Fortunately, no hardware downtime so far has been extensive enough to warrant the implementation of these standby features.

The hardware backup is supplemented by an extensive data backup procedure. Backup tapes are run from disk at the end of each half-day's work, minimizing data loss to a maximum four-hour period. The tape backup security cycle has been increased to a full year.

Security is also extended, in a physical sense, by having the keystations dispersed in the administration building. Keystations in the finance area permit both the operators and the documents to be under the supervision and control of the finance area. The MDS batch-balancing feature enables checking of totals for accuracy after verifying.

The ability to exercise control by limiting the movement of financial documents is a viable security measure. The user exercises greater diligence over input when the input is totally his responsibility, Robinson asserted.

The birth data base is an on-line file of all birth records between 1915 and 1976, some three million total records. That on-line file has been so successful that it was a subject of a conference sponsored by the National Center for Health Statistics in August at the De-

(Continued on Page 5/16)

Now-Remote Printing and Plotting: \$8180!

You could pay more for a printer alone. But now you can have remote print stations with plotting capability . . . for no extra cost. A new opportunity that should interest you . . . more than remotely.

The Printronix 300 lpm impact matrix line printer is the one that offers you several advantages. Like print quality on six-part forms other printers can't match. Or a 160 character capacity that gives you a standard 96 character set plus another 64 characters, such as OCR-A, large block characters, Farsi and many others. And the capability to plot bar codes, charts, graphs, and anything else that can be displayed on a CRT . . . at the price of a printer alone.

Our new Model P-300DC printer/plotter has an integral microprocessor data communication interface for direct communication with your host computer over switched or private telephone lines, emulating any one of the following line protocols: IBM BISYNC (2780) (3780) (3270); Burroughs; Honeywell (VIP-7700); or UNIVAC (DCT-1000). Remote printing. Remote plotting. Anywhere. Anytime. For \$8180.

If you order one today, we'll ship it tomorrow.

*\$8180 is the domestic U.S. price, which includes installation and 90 days of on-site service. No "extra" costs. Just extra performance.

Printronix, Inc., 17421 Derlan, Irvine, California 92714.
Call us at (714) 549-8272.



PRINTRONIX...
**More than a
remote possibility!**



Independent Equipment Keeping Tax Down for County Residents

RIVERSIDE, Calif. — Data processing for nearly every department of county government in Riverside County, Calif., is dependent on a teleprocessing network. Because taxpayers' money is being spent, price/performance considerations take on immense importance.

"We found we obtain better value with independent equipment," according to Morton S. ("Doc") Saultz, DP director for Riverside County. "For example, we use terminals, add-on memory and disk storage from Memorex Corp.

Combined data bases for 22 computer job partitions total almost five billion bytes. IBM systems, a 370/158 and a 370/145, process data so efficiently that, Saultz said, "in addition to performing on-line processing, we try to process a day's batch work the day it's received."

Twelve partitions are run on the Model 158, including nearly all of the on-line programs. The Model 145 handles 10 partitions, most of them batch processing.

The county uses 48 Memorex 1377 CRT stations in its network of 217 terminals. The 1377s, from Saultz's point of view, are reliable, flexible and cost-effective.

The Memorex disk drives, storage control units and disk controllers used by Riverside County are functionally compatible replacements for IBM equipment, he noted.

DP needs are so extensive that the county was among the first users of teleprocessing, employing its own microwave voice and data communications system. Since residents are as far as 170 miles from the county seat, teleprocessing is an important part of government in the county.

The Riverside County terminals operate in both local and remote modes. Locally, users are cable-connected to the central processing site here. Users in the rest of the county are linked to the center through a county-owned microwave communications system.

Most data communications are handled at 2,400 bit/sec, with a few microwave transmissions at 4,800 bit/sec. The

facilities of General Telephone and Telegraph and Pacific Telephone and Telegraph are used where the county facilities do not reach.

Multiple Data Bases

Getting building permits, researching zoning requirements, paying taxes, receiving public assistance or searching through court records are all

possible through the use of the teleprocessing network in Riverside County. Saultz's staff has even programmed the computer for a delinquent property tax payment schedule.

The two largest data bases record every parcel of property and the entire justice system of the county. Processing

(Continued on Page 5/17)



Operator uses Memorex display station to call up information from the county's property data base.

"Nixdorf showed us complete distributed processing capability and growth flexibility with its ENTREX systems—and saved us money, too!"

General Telephone Directory Company

Bob Alred, Director
of Data Processing

ENTREX Series 600. A Nixdorf Product.

"Tight schedules, last-minute changes and absolute accuracy are ways of life in directory publishing," asserts Wills. "Now we can finalize data at seven coast-to-coast offices, and transmit much faster... to give our customers more lead time, while meeting publication deadlines!"

"With Entrex Series 600 systems from Nixdorf," states Alred, "we don't compromise cost or capability. They perform multiple functions simultaneously. They're extremely easy to program and operate. And these flexible, clustered systems allow us to simply add terminals at about \$80 per month, vs. spending \$250-\$300 with our previous system!"

See what The Nixdorf Challenge can do for you.

Take *The Nixdorf Challenge*: Let us demonstrate our system capabilities—then compare! In data entry, distributed processing and data communications, Nixdorf is a worldwide mini computer leader... with over 100 sales and service centers coast-to-coast—dedicated to excellence and customer satisfaction.

Small business systems, too, with applications software.

That same dedication pays off if you need a stand-alone system and applications aid. Challenge us to show how NIDAS/8870 systems can provide more manageable management data than you thought possible.

Call Toll Free or write: Nixdorf Computer Corporation, 168 Middlesex Turnpike, Burlington, MA 01803.

More than 60,000 systems installed.
All over the world.

NIXDORF
COMPUTER

Texas Instruments
Portable Data Terminals
FOR SALE

• 743 • 745

BEST PRICE • FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-279-1960



Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, IL 60126

MAIL THIS COUPON OR CALL
TOLL FREE 800/225-1484 EXT. 365

Please send information on:
☐ Entrex Series 600 Systems
☐ NIDAS/8870 Systems
☐ Have a sales person call.

To:
Nixdorf Computer Corporation
Dept. CW-38
168 Middlesex Turnpike
Burlington, MA 01803

Name _____ Title _____
Firm _____ Phone _____
Address _____
City _____ State _____ Zip _____
Type of Business/Industry _____

"Speaking from fifteen years of experience in the business, BEEHIVE INTERNATIONAL is one of the most responsive terminal and computer systems suppliers with which I've ever dealt."

**Mr. Jim Bishop
Vice President of
Inforex manufacturing**



"In October of 1976 Inforex and Beehive International signed an agreement to supply Inforex with specially designed Beehive terminals for incorporation into our System 7000. This intelligent terminal is being built using Beehive technology tailored to meet Inforex's special requirements."

"Inforex's experience in its own field locations as well as at our customers' sites indicate that Beehive's overall product performance

and delivery is extremely reliable. With initial worldwide installations now behind us on this multi-million dollar program, these systems have generally met or exceeded our planned installation and start up time. We are very pleased with Beehive's total production effort . . . and especially in their responsiveness in solving design and production problems on a team basis."

Let us tailor our technology to meet your special requirements and ex-

perience product performance that will exceed your expectations.

Call, write or wire today!

BEEHIVE INTERNATIONAL

USA: 4910 Amelia Earhart Drive, Box 25668, Salt Lake City, Utah. Phone (801) 355-6000, TWX 910-925-5271

EUROPE: Schiphol Airport, Building 70 East, Amsterdam, The Netherlands, Phone 020-451522, Telex 15284

SALES OFFICES: CALIFORNIA/Costa Mesa (714) 540-8404, FLORIDA/Altamonte Springs (305) 830-4666, ILLINOIS/Elk Grove Village (312) 593-1566, MASSACHUSETTS/Burlington (617) 272-7136, NEW YORK/New York (212) 682-2760, PENNSYLVANIA/Plymouth Meeting (215) 825-0243, TEXAS/Dallas (214) 387-1856, UTAH/Salt Lake City (801) 355-6000

Mini-Based Terminal Net Updates Steel Inventories

By Ken Tatsuuma
Special to CW

NEW YORK — Kanematsu-Gosho (KG), Inc., a trading company, handles a variety of textiles, foodstuffs, metals, machinery and other materials through its New York office.

KG management has given all divisions and subsidiaries the latitude of finding an automated solution to information handling problems independently, and of acquiring the systems that are cost-justified and best suited to divisional needs.

Obviously, there are ground rules. The system chosen must be faster and less expensive than the centralized corporate system and it must have the capability of transmitting data to corporate headquarters.

At KG, a divisional, terminal-oriented, turnkey minicomputer system has reduced a three-day turnaround, using the corporate mainframe, to a few hours and permitted inventory reductions worth \$5 million.

The decision to install an in-house

accounting department's CPU.

Turnaround took a minimum of three days. Reports were out-of-date before management received them. Errors were difficult to find and correct because of the time lag. Because of the time lag on inventory status reports an extra margin of inventory was necessary to minimize out-of-stock conditions. Accompanying these problems were the remedial requirements — managerial involvement and a drain on executive time.

An on-line system seemed to be the ideal solution. But the accounting department CPU was already under a full load. So, it was determined that the di-

(Continued on Page 5/40)



CRT operators finish entering data into steel department's mini-based system.

A divisional, terminal-oriented, turnkey minicomputer system has reduced a three-day turnaround using the corporate mainframe to a few hours and permitted inventory reductions worth \$5 million.

minicomputer system was based on hard logic and the need to be most efficient.

The Specialty Steel Division of KG (U.S.A.), Inc. was started in 1959. Originally, it was limited to selling and shipping directly from Japanese inventory. But it became apparent that American distributors of steel products could not or would not accept delayed shipments.

Now Specialty Steel has warehouses in Chicago; Artesia, Calif.; Charlotte, N.C.; Arlington, Texas; Brookfield, Ohio; and Toronto in addition to its Brunswick, N.J., facility. Each of these facilities has sales personnel and more than 50 million lbs. of steel inventories. Of these products, 70% are manufactured in Japan and 30% in Europe.

Specialty Steel Sales, manned by 56 people, racked up about \$30 million in sales in fiscal 1977.

To clarify the complexity of stocking specialty steel products, a definition of this product classification is in order.

In this category are bars, plates, sheets, pipe, tool-steel (heat forged, hot rolled, annealed and standards) and carbon. Twenty-six different types of steel in all, in various dimensions, are stocked and sold. At KG's insistence, these products are sold only to distributors, not to the end user.

At peak periods, the division stocks 25,000 different items in 2,000 categories. This kind of volume requires controls that are too ponderous for manual accounting. So, for a time, Specialty Sales made use of the CPU operated by the accounting department.

Information under this system, was sent to and received from warehouses by mail and teletypewriter. It had to be keypunched, checked and sent to the

Powerful new way to write interactive data entry programs:



ITEMS.™

ITEMS — the INCOTERM Transaction Entry Management System — is a virtual storage operating system for distributed data processing. A powerful software development tool that can dramatically reduce the time required to create and implement versatile application programs.

ITEMS gives the system designer such operating advantages as extensive local editing, local screen format and data storage, local data entry control, interactive and stand-alone processing options, as well as security procedures. Implementation is greatly simplified. Mainframe application programs continue without workflow interruption.

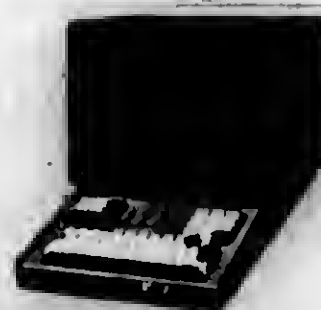
User experience shows that 20% to 30% of all interactively entered data results in error. ITEMS offers an efficient solution to this costly problem while enhancing data entry throughput and reducing mainframe overhead.

ITEMS operates on standard INCOTERM Series 30 or Series 40 Intelligent Termi-

nals with diskette or rigid disk storage. Up to eight display stations and eight printers can be operated independently under sixteen concurrent programs. Operators are guided by editing attributes for each input field; 25th line messages prompt accurate keying.

Why not discover how you can use the full power of ITEMS on your existing network without extensive conversion procedures. Call or write for complete details.

More power
to your
terminal.



INCOTERM®
CORPORATION

A Subsidiary of Honeywell Inc.
65 Walnut Street, Wellesley Hills, Massachusetts 02181
Telephone: (617) 237-2100

Key-to-Disk Units Help State Battle Paperwork

(Continued from Page S/12)
partment of Health and Environmental Control in Columbia.

It is necessary to have such records, complete and verified, for a number of purposes affecting everything from qualifying individuals for Social Security to preventing fraudulent identification acquisition. Birth certificates are automatically printed out on bank-note-type paper in a process requiring approximately 30 seconds for each search and print utilizing the Intercom teleprocessing monitor from Informatics, Inc. on an IBM 360/65.

"The on-line systems have meant a reduction in manpower requirements in the Vital Records Birth Searching Section of 50%," Robinson said. "That means the Vital Records Division has the resources to provide better service in other areas. And it is keeping up with the increasing volume of work with the same staff," he added.

Unique System

"To our knowledge, ours is the only such complete system in the country," Robinson claimed. The records had previously been keyed in, unverified, on an IBM Magnetic Tape Selectric Typewriter system (MTST). For verification, Robinson's staff split the files into 1,100 record batches, loaded them directly onto an MDS 1200 CRT system — without media modification — and then dumped the records to build the present on-line retrieval system on disk. Microfilm of original documents and computer output microfiche round out the total system.

Robinson noted that MDS's multimedia transfer capability has also proved important in a number of other systems. The state family planning program, which serves around 75,000 clients annually, produces optical character recognition (OCR) coded documents, which can be read and written onto tape on an MDS 6400 data recorder. The tapes are then loaded onto the dedicated MDS 2400 for RJE transmission to the host.

When the workload on the 370/145 is heaviest, communications from the 2400 is at

9,600 bit/sec. However, during off-hours, the line speed is doubled (with the use of a switchable modem) to 19.2 kbit/sec.

John Gore, director of planning and evaluation for DMS, said, "We really make our equipment work for us. With the volume we have, being able to deliver twice as much information in a given period of time and running all printers at top speed elimina-

ted the need for a third shift."

Over 50 distinct document-processing systems were developed or adapted for use with the key-to-disk system. Gore explained, "Our function is to provide support for all program areas within the Department of Health and Environmental Control. Raw data gathered from 14 health districts statewide, 46 county health departments and clinics and other sources comes to us

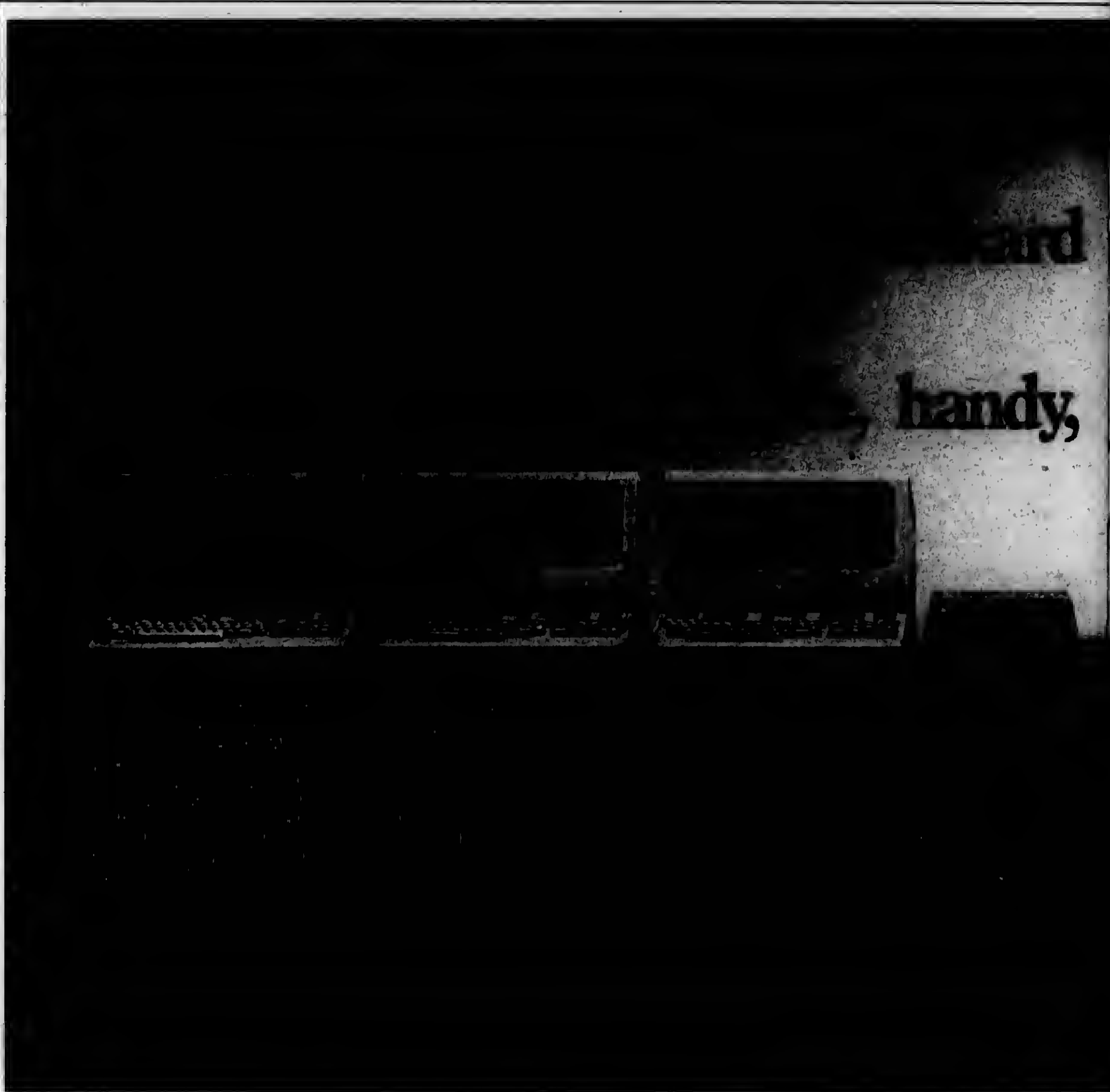
for data entry, editing, verification and submission to the mainframe for processing and report generation.

"Most of our work involves very high-volume document handling. The annual total for the Women, Infants & Children Program (WIC) alone exceeds 900,000 forms."

The key-to-disk systems are also used to enter and transmit test and billing data for the Bureau of Laboratories, which

performs 600,000 to 650,000 tests per year related to public health, environmental quality, food supply and other areas.

A separate MDS 2300 document processing and RJE system is used to communicate environmental control data to an IBM 370/168 at the U.S. Environmental Protection Agency in Washington. That data becomes part of a data base for use in mathematical modeling systems.



Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3
BEST PRICE
FAST DELIVERY
800-323-2288
CALL TOLL FREE
IN ILL. CALL 312-279-1960
Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60120

Yes, I'm interested in your terminals.
Send me more information on the

- ☐ HP 2645A CRT Terminal
- ☐ HP 2648A Graphics Terminal
- ☐ HP 2649A Terminal/Controller
- ☐ HP 3071A/3070A Data Terminals
- ☐ HP 7260A Optical Mark Reader
- ☐ HP 2631A Printer
- ☐ HP 2635A Printing Terminal
- ☐ Other Peripherals
- ☐ Send details of your OEM discounts and agreements.

Name _____ Title _____
Company _____
Address _____
City _____
State/Zip _____

Mail to: Hewlett-Packard, Attn: Larry Turner,
11000 Wolfe Road, Dept. 319, Cupertino CA 95014

System Keeps Tax Bills Down

(Continued from Page S/13) ranges from performing on-line wanted persons checks for the police in Blyth, Calif., near the Nevada border to supplying zoning records for the City of Corona (within 20 miles of Los Angeles).

The property data base, almost two billion bytes, supplies data for the widest range of services. Tax collection, recording, building and safety, zoning, assessment, auditing, city clerks and even fee-

paying private title companies use the property data base.

Every parcel of land in the county is entered according to situs, lot and block, owner name, parcel number and assessment number. Information on a parcel can be retrieved using any one of the descriptions. On-line CRT access to the data base enables the Tax Collector to bill and collect taxes on property at a clerk's counter. An on-line terminal will produce a new tax

bill for a lost one while the taxpayer waits. At 2 p.m. each day, the system balances the accounts and prints a report for depositing money collected during the last 24 hours.

The next largest data base serves the district, county and municipal courts, sheriff's control office, district attorney, police departments and sheriff's substations. Municipal courts are capable of generating their own warrants on-line through the system.

Index System Copes With Land Transfers

(Continued from Page S/10) the data entry work performed at the county offices, and since lines of the forms often require double entries in the same space, H&M required a printer terminal that could be completely and easily controlled by the microprocessor or its programs.

Through the CDS MPMC and the Carousel teleprinter,

the new indexing machine will duplicate selected fields of information from the previously typed line, duplicate the previous line in full or duplicate any single character from the previous line. To enter two names in one line of indexing, for example, the operator merely depresses a command key, which automatically moves the print head to the proper position for entering the second name.

The system offers error-coding capabilities, allowing the operator to cancel any line of indexing by pressing a command key. As a protection against error, the system will refuse to duplicate data from any field in the previous line if that field contains an operator-indicated error.

Tab and Backtab

There is a demand for frequent, automatic tabbing and backtabbing to speed the editing and input of land transaction information. This, too, must be easily controlled. The Carousel's multi-codes allow the programmer to simply advance or reverse the print head to any desired location.

This multi-code feature provides a special character that precedes other control sequences. These sequences direct the terminal to position the print head horizontally and the platen vertically, select either the left or right platen (on some split-platen Carousel models) and to set form length and margin positions.

Acquisition Easier

Features like these make the data acquisition task easier for recording clerks. As a result, the probability for errors is greatly reduced.

One advantage of this new system is its versatility. It can be programmed to meet the different indexing requirements of the over 400 counties served. So when H&M installs a new system, it has been programmed specifically for that customer. It offers a time-saving data acquisition method that allows H&M to process the information with a minimum of problems.

Richard J. Le Page is vice-president at Hall & McChesney, Inc., Syracuse, N.Y.

These Hewlett-Packard terminals are compatible with all the major interface standards and work with computers from a range of manufacturers. They come with full HP support, service, training, and documentation.

To find out more about these (and others) in our growing line of terminals, call the HP office listed in the White Pages. Or send us the coupon. If you don't see exactly what you're looking for here, let us know. There are plenty more where these came from.

HEWLETT  PACKARD

BLIS/COBOL
MULTIUSER OPERATING SYSTEM

HARDWARE
FLEXIBILITY

For information call today...

 Phone (305) 647-2200 USA
TWX/Telex 810-853-5033
1850 Lee Rd., Winter Park
(Orlando), Florida 32789

TRANSMISSION

INTERFACE

EDITING
FUNCTIONS:

OPTIONS:

"OFFHAND, WHAT MORE
COULD YOU WANT?"

VIDEO:

Next-Frame
Backward
Forward

KEYBOARD:

Full-Size
Full-Size
Full-Size



When it comes to flexibility, the Infoton 400 Data Display terminal can hand you all you need.

Designed around the Z-80 microprocessor, it offers complete control of all Blocking and Editing functions through software settable modes. One thing that's especially easy to handle about the I-400 is its cost; at \$1,095 in quantities of 100 or more, it's the most versatile terminal for the price you can get your hands on.

More information on the I-400 is quickly within your grasp. Call Infoton toll-free at (800) 225-3337 or 225-3338. Ask for Barbara Worth. Or write Barbara Worth at Infoton, Second Avenue, Burlington, MA 01803.

Prepared by Chickering/Howell, Los Angeles.



 **Infoton 400**

Plus Intelligent Growth Path

RJE Offers Centralized, Distributed Benefits

By Bernabe Monsalvo
Special to CW

Whether it's key-to-tape, key-to-disk or full Hasp multileaving, the right remote job entry (RJE) terminal can bring the distributed processing virtues of speed and flexibility to centralized DP — and it can bring the centralized system virtues of reliability and data control to distributed networks.

RJE can also provide a highly intelligent growth path for the majority of users, located between the two extremes who need some form of decentralized data entry.

As new terminal users know, the system design question is not as simple as choosing either a stand-alone mainframe (centralized) or distributed system. Functional definitions of distributed processing vary greatly and are complicated by wide gaps between theory and reality.

A distributed system may work perfectly on paper. Before processing begins, however, millions of characters of code and electrical connections must be created, tested, debugged, refined, documented, manufactured, shipped and installed. The larger and more complex a distributed system is, the greater are the chances of something going wrong.

And centralized computing is no more out of date than its primary virtue — inherent system control. In a centralized system, important data remains at home, used and guarded by a trained central staff.

This can be desirable not only for a company with high security needs, but for the company whose management philosophy is based on tight central control of responsibilities. The more "distributed" a system's intelligence/data-handling responsibilities, the more people — local, remote, trained and untrained — who must handle and affect important data and the greater the emphasis that must be placed on security and control measures, both in programming code and sheer dollars.

Steps to Success

Companies which are succeeding with distributed systems are typically those that go about implementation gradually and with careful planning, identifying where their own unique needs exist for distributed processing and where they don't.

Since all data begins at a source, the most likely place to start a distributed system is at the beginning of the cycle. The more purification — data editing, verification — performed here, the "cleaner" the data that will pass through the system.

And it is here, at data entry, that strong controls can be put into place — screen formatting, error correction, audit logs — that will pay system dividends for the life of the data. In a distributed environment, about 80% of all processing time is spent on data entry, data validation and data flow control and accountability.

Somewhere along the distance between centralized computing and a full-blown distributed network lies the system and terminal answer for the majority of DP users. Typically that "somewhere" involves the data entry or RJE functions.

Because of the importance of RJE to

data processing, much development has already gone into RJE systems, and this has produced increasingly sophisticated turnkey and user-programmable terminal-based systems that can add distributed processing power to both centralized and semi-distributed system schemes.

Whether used to off-load the mainframe in a stand-alone host system or as the first building block of a true distributed network, RJE terminals can give a wide variety of users the opportunity to put some level of distributed processing to work in their systems in a controlled, highly effective and reliable way. Depending on the application, the existing company computing

needs and future wants, chances are excellent that a suitable, workable terminal system can be purchased off-the-shelf and installed in a short time.

RJE Options

RJE terminal systems made today have multiple protocol and message block transmission features that allow point-to-point and multipoint communications within systems hosted by most common mainframes. Simple RJE terminals provide key-to-floppy disk or magnetic tape data entry, with validation and editing features, in stand-alone mode. Once keyed, the data is transported to the central processor manually.

More sophisticated RJE terminals offer point-to-point and multipoint communications with the host processor. They can remotely handle multiple peripherals and local data processing.

An RJE terminal system or network can be used for different things by different people. A small company can automate its data processing without purchasing a mainframe by tying RJE terminals to a service bureau, using dedicated or dial-up lines. A company with centralized computing can off-load its mainframe by installing powerful RJE capabilities in remote locations, at the sites of data origination.

And high-performance, multifunctional (Continued on Page 5/34)

Do You Have A Language Barrier?



If communicating in Arabic, Farsi, German, Hebrew, Russian, or any other language presents an obstacle to your data processing, MEGADATA's 700/DL Dual Language Terminal will help to overcome this problem. This intelligent programmable terminal can display two completely different character sets simultaneously or separately, using the same bilingual keyboard, and it provides complete text writing capability for two different languages.

The software for the 700/DL is no problem either, because it is tailored specifically for your application. Furthermore, the entire software package can be adapted easily to your requirements, minimizing any change in the existing program. Hardware obsolescence is eliminated by simply updating the software capability. Interactive Data Entry, Complex Interrupt Capability, Forms Control, Format Storage, Validation — they are all available with the 700/DL.

For further information about the 700/DL or the many other application-oriented MEGADATA terminals, call or write TODAY.



MEGADATA
CORPORATION

35 Orville Drive • Bohemia, New York 11716
Tel. 516-589-6800 • Telex: 14-4659



Central Regional Office: 2200 E. Devon Avenue • Suite 217 • Des Plaines, Illinois 60018 • Tel. 312-296-1900
Western Regional Office: 15910 Ventura Boulevard • Suite 800 • Encino, California 91316 • Tel. 213-990-9777

RBT Cuts Costs for University Researchers

(Continued from Page S/4)

Harris 1620 chain printer to produce galley proofs of 12th Century Canon Law Concordances in Latin, Old French and Old English.

Self-Service Computermat

Users bring in their own card decks, lining up as many as six to 10 at a time and waiting their turn at the card reader. All do their own programming and keypunching. It's quite a strain on any system, but the hardware is holding up fine — downtime has averaged less than a day a month and has rarely involved at the entire system.

The printer or card reader might be lost for a while, as an example, but the system keeps going with what is still available until the malfunction is fixed.

The RBT is scheduled to operate 24 hours a day, which is difficult with an unattended, open-shop operation. An engineering aide comes in at 7 a.m. to make sure the machine is on, that the operating system and emulators are up and that enough paper supplies are in. After that, the aide is on call during the day if there's a problem.

Both CDC 7600s are up around the clock, too, but the Burroughs B6700 is shut down for a few hours after 1 or 2 a.m. and is brought back up at 6 a.m.

Center's Configuration

The Harris 1620 has 65K bytes of main memory, a 600 line/min chain printer, a 600 card/min reader, a 2,000 step/sec, 30-in. X-Y plotter and a Teletype operator console. The lack of a

CRT terminal for a console and any magnetic tape drives is deliberate: The teletype provides users with the hard copy they must have to track down what they've done. The printer generally can keep up with the line speeds, so jobs might as well be printed while they're being received.

UCSD also has 150 interactive terminals scattered around the campus to access the Burroughs B6700. These terminals are of many different types. All but 20 are owned or leased by the UCSD departments or individuals who use them.

Despite the "network's" diversity, it all runs smoothly because the Burroughs mainframe was designed for data communications applications.

Data communications lines are

mixed. There is a 9,600 bit/sec leased line to Berkeley, a 2,000 bit/sec dial-up line to Boulder and a 4,800 bit/sec hard-wired line to the on-campus Burroughs system. Modems are a Paradyne Corp. LSI-9600 to Berkeley, a dial-up Bell 201 for Boulder and a short-haul Gandalf Data, Inc. LDM-404 for the local Burroughs CPU.

Operating System

The 1620's operating system is a Harris Communications Operating System (COS) plus three Harris concurrent remote terminal emulators: two for dual UT-200 emulation into the CDC 7600s and one for DC-1100 emulations into the Burroughs B6700. All three emulators operate simultaneously under COS control.

Situations develop, for example, where the Harris 1620 is printing out from the Burroughs CPU, plotting from the Berkeley CDC 7600 and sending cards to the Boulder CDC 7600 simultaneously. As far as is known, Harris 1600s are the only systems with this capability.

The only serious software problem that has occurred was during the initial stages of using the plotter package in an open-shop, RBT environment. It seems to have been licked, though, and the plotter package is running smoothly.

At this point, the plotter software appears to be transparent, working within the rules of most protocols including UT-200, DC-1100 and IBM Hasp multileaving.

Lower Cost

With nine months of operation, volumes are rising steadily and costs are lower. About 225 to 250 jobs run on a typical day — most of them to Berkeley, about 20 to 30 at the main campus and a dozen or so at Boulder.

Costs are lower than they were with the Harris 1200 that was replaced. The reason for this is that the Harris 1620 does more work with less equipment. Its ability to handle all three host CPUs concurrently helps spread costs out over more users.

Features of the 1620 of most interest to UCSD's computer center are the Harris concurrent multiple protocol support, plus the ability to cross-connect the protocols. With these capabilities, a number of users can talk with a number of hosts without interference.

Next on the agenda is the possibility of upgrading the system further, using the Harris 1620 as a protocol translator to "retail" Berkeley CDC 7600 service through the on-campus Burroughs network. Users could then submit a job through their own terminals to the Burroughs B6700; the Burroughs B6700 automatically would set up a file which then would flow through the Harris 1620 to the CDC 7600, and vice versa.

UCSD is doing this already through another connection to an IBM mainframe. UCSD also plans to do 1620 input/output (I/O) accounting to allow the B6700 to collect charges for CDC 7600 I/O.

Hilton is programming manager of the computer center, University of California at San Diego in La Jolla, Calif.



MODEL 70 CRT VISUAL DISPLAY TERMINAL

- DETECT CALLS OVER DISTANCE
- STATE OF THE ART PROCESSING
- ATTACHED TO THE
- USES BATHING
- FIVE EYE
- USES THE
- WITH THE
- TWO BE
- NO OTHER



TO THE SUPPLIER OF SYSTEMS THAT ARE THE MOST ADVANCED IN THE WORLD



TEC, Incorporated
2727 N. Fairview Avenue
Tucson, Arizona USA 85705

I'm interested in the Model 70.

☐ Please send literature ☐ Call me ☐

Name _____

Title _____

Company _____

Address _____

City _____

...FROM THE PEOPLE WHO HAVE DESIGNED, BUILT, AND SOLD CRT'S SINCE 1966 AND CAN'T THINK OF ANYTHING MORE

TEC, Incorporated 2727 N. FAIRVIEW AVENUE, TUCSON, ARIZONA USA 85705 ■ (602) 792-2230 ■ TWX 910-952-1377

AN EQUAL OPPORTUNITY EMPLOYER M/F. COMMITTED TO AFFIRMATIVE ACTION - A TEC, INCORPORATED CORPORATE POLICY

Digital announces
the world's lowest priced
mainframe.





DECSYSTEM 2020

An entry-level system that revolutionizes the concept of mainframe computing.

Digital's advanced packaging technology and extensive mainframe experience bring you a full, general purpose system at a dramatically low price.

For over twenty years, Digital has believed you shouldn't have to spend a lot of money to get a lot of computer.

Now, with the DECSYSTEM-2020, Digital brings you a brand-new, full capability mainframe computer at a price which just a few years ago would have been considered impossible.

It is the result of a combination of factors only Digital could deliver. Advanced packaging technology. State-of-the-art MOS memory. A full range of existing mainframe software. Proven cost-effective peripherals. And high-volume manufacturing economies.

For a basic system price of \$150,000, DECSYSTEM-2020 gives you a combination of capabilities that simply cannot be equaled in the industry.

- 36-bit word length for high programming efficiency and convenience.
- Multi-stream batch plus interactive timesharing and transaction-oriented processing

for unmatched flexibility.

- Multi-user, multi-function operation, allowing different users to run different programs simultaneously.
- A proven, state-of-the-art TOPS-20 virtual memory operating system that can support large programs — over a million bytes — in all available languages. It features the easiest to learn user interface in the industry, plus flexible programming controls with abbreviated commands for sophisticated users.
- Proven, powerful program development tools that boost programming efficiency even further, drastically reducing the time needed to bring applications on line. These include on-line interactive debuggers and automatic dynamic resource allocation.

In software, DECSYSTEM-2020 offers a complete array of fully-developed high-level languages — for true mainframe versatility.

This impressively broad capability encompasses: ANSI-standard COBOL, CODASYL-standard DBMS, IQL Interactive Query Language, APL, FORTRAN IV, BASIC-PLUS-2, ALGOL, MACRO, and CPL (PL/I subset).

This software is extensively developed, with over 15 years of field-proven experience behind it. It is completely compatible with the entire DECSYSTEM-20 family of mainframes.

In addition, the DECSYSTEM-2020 will also run Digital's TOPS-10 operating system to give you even more alternatives for growth and expansion.

The world's lowest cost to install, operate and upgrade.

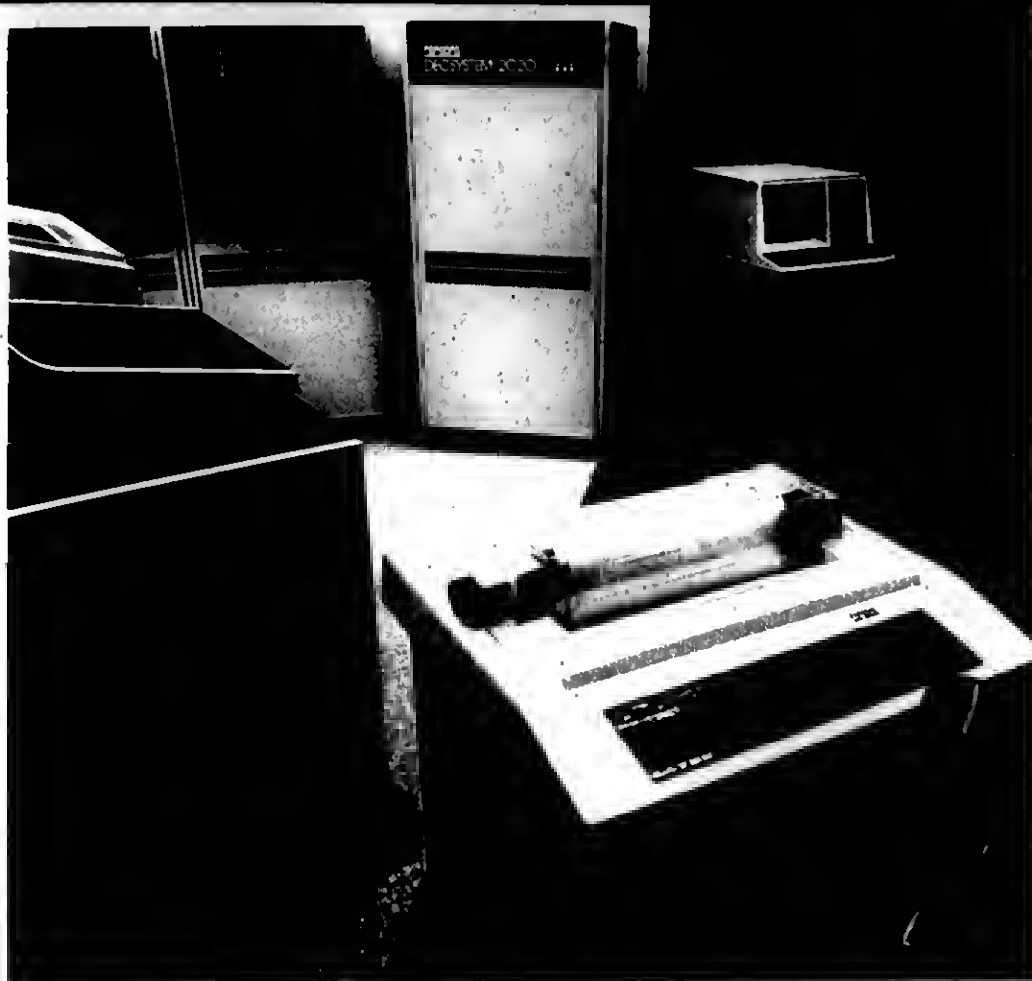
The DECSYSTEM-2020 is a mainframe that can reside outside the conventional computer room environment. Its incredibly compact size, 1,400 watt CPU power consumption, and simplified interfacing reduce installation problems and costs to an absolute minimum.

In addition, the DECSYSTEM-2020 was designed to be an extremely reliable, available, and maintainable computer system. The objective is to maximize system uptime and substantially reduce maintenance costs.

And, finally, the DECSYSTEM-2020 allows you to upgrade and expand more easily than any other mainframe you can buy. The DECSYSTEM-20 family is the first and only mainframe family that requires absolutely no software conversion from the smallest system to the largest.

With the new high-end DECSYSTEM-2060, Digital can take your mainframe installation all the way up to an ultimate configuration that includes 1,280K 36-bit words — over 5 million bytes — of main memory, 56 disks on 6 channels, 16 tape drives, 128 asynchronous lines, 2 front ends supporting 12 synchronous lines, and 80 simultaneous users.





Now you can use a mainframe like never before.

With the advent of the DEC SYSTEM-20, the whole concept of mainframe computing is dramatically changed.

People who have been settling for something less than a mainframe, no longer have to.

People who have been looking for a way to extend their mainframe capability through low-cost independent or distributed systems now can.

The DEC SYSTEM-20 meets all these needs.

It makes "distributed host" computing a cost-effective answer to the need for remote mainframe processing. For a minimum investment, you can have full mainframe capability at every user's site, networked together to share data or programs. Each mainframe can operate independently, or in conjunction with the central host, performing several tasks at once or dedicated to a single function as a local host.



Its low cost also makes it ideal for off-loading larger mainframes, to add capability you've never before been able to afford. Capability like interactive timesharing. Uninterrupted on-line program development. Other forms of transaction-oriented processing. A high-security system to protect sensitive files.

DEC SYSTEM-20. Mainframe versatility for more applications than ever before.

Major Features of the DEC SYSTEM-20.

Hardware. CPU: microprogrammed; 2K-byte cache memory; 8 blocks of 16 registers; parity checks in microstore, data paths, and on backplane bus; complete DEC SYSTEM-20 family instruction set.

Memory: MOS; 1,050 nanosecond cycle time; single bit error correction and double bit error detection; 512K 36-bit word capacity (2 megabytes).

Console: microprocessor based; console and remote diagnosis links.

Peripherals: • 176 megabyte disk — 36.3 millisecond average access time, 28 millisecond seek time, 640K bytes per second transfer rate. • 67 megabyte disk — 38.3 millisecond access time, 30 millisecond seek time, 1 million byte per second transfer rate.

• Tape subsystem — 75 ips, 800/1600 bpi, nine track on industry standard 1/2-inch magnetic tape, 120K bytes per second transfer rate. • Synchronous communications interface — 2K to 19.2K bits per second line speeds. • Asynchronous Communications Interface-Line units in 8-line groups with 8, 16, 24, or 32 lines per system.

Software: TOPS-10/TOPS-20 virtual memory systems; multi-stream batch, interactive timesharing, and transaction-oriented processing; large program size (over a million bytes). • COBOL — allows quick, efficient program development; enables responsive user interaction with applications; operates in both batch and on-line environments; provides programming staff with powerful, familiar data editing, sorting, updating and reporting features; meets standardized usage requirements. • IQL — meets on-line inquiry and report needs; simplifies information access, computation, and summary; reduces user request time and programming loads. • BASIC-PLUS-2 — easy-to-learn, easy-to-use programming language; provides the mix of computational, data formatting, and data manipulation requirements of most academic and technical applications; well suited to both development and production usage modes. • FORTRAN IV — powerful features for meeting a wide range of scientific, engineering, statistical and other technically-oriented needs; computational features matched by full scale data handling and data management facilities. • ALGOL-60 — a full implementation; the ALGOL debugger makes it easy to code and debug programs. • CPL — an interpretive subset of the ANSI-1976 PL/I language; true source-level debugging provided for PL/I. • APL — one of the most complete and powerful implementations in the industry.

Start with a DECSYSTEM-2020 and look how far you can go.

Among computers at its price level, the DECSYSTEM-2020's growth potential is unmatched in the industry. It is the smallest member of a full family of four DECSYSTEM-20 mainframes that cover a price, performance and capacity range of 10 to 1.

Among mainframes, the DECSYSTEM-20 family is the widest range of completely software compatible systems ever available. They have the identical operating system and high-level language processors. Growth within the family requires absolutely no expensive and time-consuming software conversion. Your software investment is always protected.

No other computer mainframe manufacturer can offer you this capability.

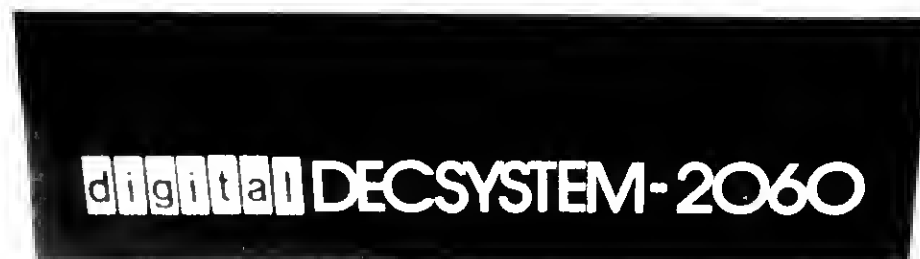
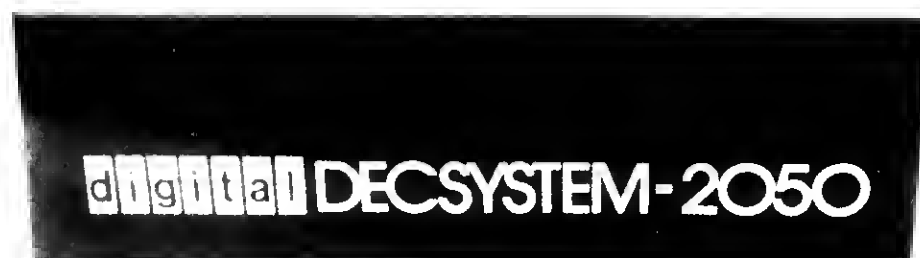
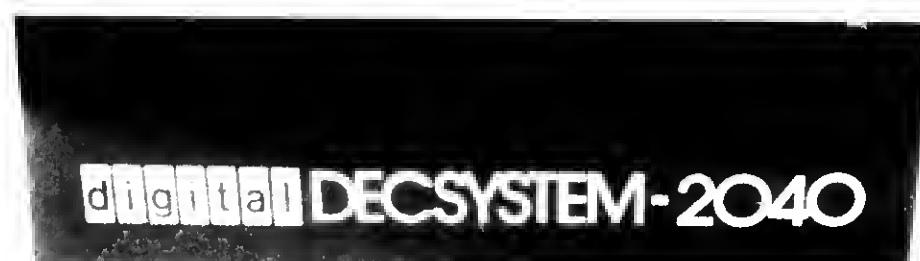
DECSYSTEM-2020 — the least expensive way to get into mainframe computing — for 8 to 24 simultaneous users.

DECSYSTEM-2040 — substantially enhances performance — for 16 to 32 users.

DECSYSTEM-2050 — offering cache memory and other advanced features — for 24 to 64 users.

And the new DECSYSTEM-2060 — the new high-end member of the family, offering over twice the capacity of the 2050, versatile memory options, and more storage capacity — for 32 to 80 typical users.

For the complete brochure on the new DECSYSTEM-2020, simply circle the reader service number, or call or write: Digital Equipment Corporation, MR1/M-49, 200 Forest Street, Marlboro, MA 01752. Telephone 617-481-9511, ext. 6885. In Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva, Telephone 93 33 11; Reading, England, Telephone 583555; Munich, Germany, Telephone 35031. In Canada: Digital Equipment of Canada, Ltd.



digital
LARGE COMPUTER GROUP

Custom System Suits Papers' Unique Needs

PHILADELPHIA — Philadelphia Newspapers, Inc. has two dailies, the *Philadelphia Inquirer* and the *Daily News*. When the firm began to look for a terminal-based text-editing system in 1975, it chose as its objectives increased throughput, reduced production costs and continued standards of editorial quality.

A typical *Philadelphia Inquirer* story is edited as many as four times after it leaves the writer's desk, and many different wire service stories may be merged before the final text appears. This called for an automated terminal system that was cost-effective, could handle a heavy text-processing load, could meet response time demands and could be operated by newspaper reporters and editors who were not computer experts.

After talking with many vendors, the newspaper decided System Development Corp.'s (SDC) Text II system employing Computek, Inc. intelligent editing terminals would meet the *Inquirer's* throughput and response requirements.

Both SDC and Computek were prepared to meet the newspaper's needs for special CRT/keyboard editing stations. Among those needs was a special keyboard, with keys oriented toward particular editorial functions.

Two of the *Inquirer's* managing editors, Andrew Khinoy and Dale Allen, worked with the two vendors to design the keyboard, whose keys produce unique editorial commands for the paper's environment.

Other concerns including CRT character presentation and color and screen size were also worked out. The first hardware modules were delivered in December 1975.

Redundant and Flexible

The Text II system installed at Philadelphia Newspapers includes six Hewlett-Packard Co. 21MX minicomputers with associated hard disks and hard-copy peripherals. The system is fully redundant to assure against any disruption in the newspaper's 24 hour-per-day, three-shift operation.

Three high-speed and six low-speed wire services are supported, and the central data base is split between the two newspapers with 15M bytes devoted to the *Daily News* and 30M bytes devoted to the *Inquirer*. Mirror data files are used.

As part of the total system, Computek supplied 140 Series 200 intelligent CRT/keyboard editing terminals with four terminals sharing a single intelligent terminal processor. Reporters use 12-in. displays while editors have 15-in. CRTs.

All stations are equipped with movable keyboards whose layouts were designed specifically for the newspapers. In certain positions, such as the copy desk and the telegraph editors' desk, both of which handle a large number of stories in a short period of time, two CRTs are shared by a single keyboard. This allows volumes of text to be called up, compared and reviewed by editors on one CRT while final copy is created on the second CRT.

"We have found the Computek terminals to be very flexible, and it is easy to configure them to meet the particular needs of our papers," according to Olaf Saugen, text-editing director for the papers.

In order to meet tight production deadlines and obtain maximum equipment utilization, the user has implemented its own maintenance program and employs Computek's Model 290 test set to maintain its text-editing systems.

"The Computek terminals are sophisticated pieces of equipment essential to the production of the paper," Saugen said. "The text on the terminal screens goes directly into print; since we are faced with eight deadlines each day, we cannot afford to have terminals out of commission."

"By doing our own maintenance with the Computek-supplied diagnostic programs and the hardware test sets, we can respond immediately to any problems and keep the presses roll-

ing," he added.

As a result of the Text II implementation, Philadelphia Newspapers expects to realize a considerable cost saving in the production of its two papers. The editors have better control of the product, and increased system throughput means that late-breaking stories can be rushed directly to print.

"We nearly completed Phase II of our three-phase program to automate our production, and we expect our conversion to cold type will be completed in early 1978," Saugen commented. "Like any high-volume production organization, the *Philadelphia Inquirer* and *Daily News* could not afford to be the alpha test sites or automation pioneers."

"We have successfully applied standard intelligent terminal and automa-

ted text processing technology to boost our production and reduce our costs. The system is an integral part of our business and has enabled us to keep the competitive edge in the Philadelphia newspaper market," he added.

With the implementation of the Text II system nearing completion, the Philadelphia Newspapers expects to enlarge its automation program in the future. Additional Computek terminals have been delivered to remote news bureau and reporter stations.

An electronic library system will be linked with the Text II editorial system. One possibility is to use the terminals for inquiry/retrieval from the library data base as well as for editing. New classified advertising software is also being considered.

How to avoid having the source of your data become the source of your problems.

A Special Report on Source Data Entry in our April 24th issue.

The trend in data collection is to get closer and closer to the data's source — with devices like OCR and Point-of-Sale systems. Which can be the source of lots of new problems for the user. What may be good for counting hamburger sales in a fast-food franchise, may be quite unsuited to a grocery store or egg wholesale business. And a system that's perfect for a big bank with many branches, may be useless at a medium-sized savings and loan.

In our April 24th supplement, edited by Frank Vaughan, we'll take a look at what it takes to get the data collection job done, accurately and efficiently, in a variety of different situations. Through a series of applications stories, we'll look at how others have solved their unique data collection problems, and give you an idea of some of the things you should do — as well as some of the things you shouldn't. The report will include:

- KEY-TO-DISK
- KEY-TO-TAPE
- KEYPUNCH
- OCR
- POINT-OF-SALE SYSTEMS
- AND A SPECIAL LOOK AT DISTRIBUTED DATA ENTRY SYSTEMS

If data entry is one of the things you have to cope with, then *Source Data Entry — Getting the Job Done* is data you should enter. It'll be in our April 24th issue.

If you'd like to advertise, the closing date is April 7th, and more information is available from your *Computerworld* sales representative. Or call Terry Williams at (617) 965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Mike Burman
Frank Collins
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 421-7330

Los Angeles
Judy Milford
Bill Healey
Jim Richardson
(213) 475-8486

THANKS, HAZELTINE!

As operating management, we appreciate how you've helped us control costs, stay competitive, and increase our profitability!

**A BUSINESS PROPOSITION
FROM HAZELTINE
CONCERNING POLLING NETWORKS
BUILT AROUND
BURROUGHS, HONEYWELL OR UNIVAC
COMPUTERS:**

SAVE AS MUCH AS 50% WITH



Net Smooths Operations For Auto Paint Franchiser

KING OF PRUSSIA, Pa. — Not long ago Maaco auto painting and bodyworks was inundated with paint orders from franchisees, with requests for site information from prospective franchisees and a host of other administrative details. Ivan D. Alcott, the company's DP manager, was asked to look into methods to speed the administrative processes, help reduce errors and lower costs.

Alcott's objectives were to upgrade the company's Honeywell Information Systems, Inc. Series 60 Level 62 system to achieve more control over domestic and international operations.

It had been just over a year since the company installed its IBM System/32 to augment a National CSS time-sharing package designed by Urban Decisions Systems. In this way Maaco was able to generate the data it needed into machine-readable form, catalog all

Siegler, Inc. terminals and found them to be unsatisfactory.

The company then went to 4050H display terminals from Delta Data Systems Corp. These terminals provide emulation for Maaco's HIS mainframe, in addition to programming capabilities and other features which Alcott considered important for his operation.

By switching to Delta terminals, the company was able to retain its standard HIS communications discipline and software which was an important advantage.

To handle live inserts and deletions, Maaco operators change the data on
(Continued on Page S/32)



Maaco uses Delta terminals with an HIS Series 60 mainframe to provide centralized purchasing for franchisees across the country.

"Maaco is switching to the CRT terminals to alleviate difficulties the company found in waiting to locate errors until the actual order came in for processing. Thus, the terminals will reportedly save a considerable amount of in-house paperwork."

information and store it for future processing.

Coming over from the System/32, Maaco was a cardless operation. But, Alcott learned, program changes and updates can be problematic in a cardless environment. When the company began writing more complex programs for batch processing, error rates began to increase.

Basic System

Maaco franchisees order supplies from a central facility, thus taking advantage of substantial reductions in the prices of paint and materials. The company's DP system also helps reduce the cost of materials and coordinates inventory with requirements.

In Maaco's international headquarters here, the firm now employs an HIS Series 60 Level 62 mainframe. This computer incorporates 245K bytes of memory and includes five 30M-byte disk drives and a 1,200 line/min printer.

The HIS Release 4 operating system was provided with an on-line program development system that enabled it to put its JCL out on the disk, maintain its programs with a remote text editor through CRT terminals and speed turnaround times for program development.

With a basic system now adequate for its requirements, the company set out to determine which CRT terminals would best suit its needs.

The HIS VIP 7700 and 7700R proved to be too slow for the operating procedures and heavy use in an edit mode. Also, the terminals did not offer paging features, which Alcott considered important because of the volume of information that must be displayed on the screen. Maaco also evaluated Lear

COME FACE TO FACE WITH ONE OF AMERICA'S HIGHEST PAID EMPLOYEES.

DATAPOINT'S FOUR INFOSWITCH SYSTEMS HELP YOU
CONTROL YOUR COMMUNICATIONS BUDGET.

are computer terminals configured to fit your needs. CENTREX and FAX are also available. And like all Datapoint products, INFOSWITCH is backed by our nationwide customer service force. Here's how INFOSWITCH can help you.

LDCS — For Long Distance Control
LDCS provides the most efficient long distance service available by insuring least-cost routing. For companies spending from \$5,000 to \$150,000 a month in long distance charges, LDCS may create a 15-40% reduction in costs by automatically placing and recording all long distance call information. LDCS simplifies use and enables management to account for long distance charges by every employee.

SMDR — For Local Call Management
With more metro areas going to local message unit billing, local exchange costs could soon rival long distance expenses. SMDR helps control these costs and gauge usage. SMDR automatically records and stores caller extension number, duration of call, and number dialed of each local or metro call.

SHARE — For Multi-location Telephone Management
SHARE cuts telephone costs and provides centralized control and cost efficiency for multi-location companies. SHARE places LDCS and SMDR sub-systems in each field location with

time, and agent is instantly available on video consoles. Find out more about how INFOSWITCH can help you face up to the rising costs of communications, send in this coupon, or call (512) 699-7280, in San Antonio, Texas.

Please send me more information about INFOSWITCH:
☐ LDCS ☐ SMDR ☐ SHARE ☐ ACD
☐ Please have a representative call. **Infoswitch**

Name _____
Title _____
Company _____
City _____ State _____
Zip _____

Mail to: Datapoint Corporation
7725 Datapoint Drive, San Antonio, Texas 78284 CW

DATAPOINT CORPORATION



in communications management™

Bank Net Uses Synchronous Adapters, Modems

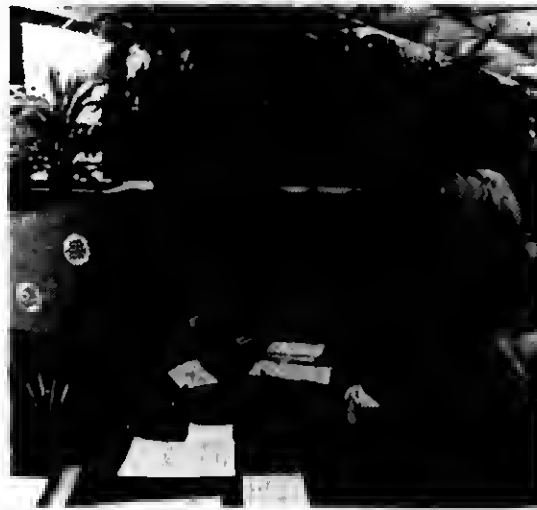
(Continued from Page S/2)

Racal-Milgo technical support personnel took a vital interest in the problem and helped solve it in the most inexpensive way possible.

In addition to the savings terminals, the multiplexer also polls a Digital Equipment Corp. PDP-11 front-end controller that drives four multidrop circuits supporting NCR 796 CRTs. The asynchronous CRTs handle new account information, mortgages and loan transactions.

Each of the four multidrop lines is equipped with a Racal-Milgo 24LSI synchronous high-speed modem and Model 129 asynchronous-to-synchronous adapter. This allows the asynchronous CRTs to operate over a 2,400 bit/sec synchronous data link.

The central-site communications rack is also equipped with a spare 24LSI modem and adapter that can be



Operator at main office inputs mortgage data.

patched in via the EIA panel in the event of a problem. Corresponding 24LSIs and adapters are in place at all First Federal offices equipped with CRTs. The CRTs at each of these drop points are linked together in series and do not require bridging.

High Speed Improves Operations

The addition of high-speed modems and asynchronous/synchronous adapters has significantly improved both the operation and cost effectiveness of the CRT portion of First Federal's terminal network. Operating speed of the CRTs, which originally utilized 1,800 bit/sec asynchronous modems, is now 2,400 bit/sec. Response time has been reduced from about 8 seconds to about four seconds.

Because the old asynchronous system was frequently busy, operator retries accounted for close to 40% of overall traffic. Today retries have dwindled to 1% to 2% of total inquiries.

Even though the number of offices with CRTs has doubled since the system's inception, two of six leased lines have been eliminated. The cost of circuit conditioning, previously required to keep error rates low has also been eliminated.

Easy Procedure

What's gratifying about these improvements is that they were accomplished without a system overhaul and without expensive changes in software. There wasn't even anything new to teach the terminal operators.

Transmitting synchronously at 2,400 bit/sec as opposed to 1,800 bit/sec asynchronous transmissions over our

Does "single source" make Centronics better than other printer companies?

NO. Although our 9 model 700 series of matrix printers, 4 model 6000 series of band printers, 760 series teleprinters and new non-impact electrostatic printer give us the most complete line in the industry, it still takes more than breadth of line to be the leader. Centronics has more. Competitive prices. The largest worldwide service organization of any printer company. Financial stability with a record of growth and strength unmatched in the business. And a track record of superior product reliability and customer support—whether OEM or end-user.

You know the advantages of a single source supply. You know the breadth of Centronics' line. And now you know why Centronics is the better printer company. Write or call today for the complete details of Centronics' full printer line. Centronics Data Computer Corp., Hudson, NH 03051, TeL (603) 883-0111.



CENTRONICS' PRINTERS
Simply Better



The author tests a remote modem from the central-site communications rack.

dedicated multidrop CRT lines lets us use the lines more efficiently. The Racal-Milgo adapters make this possible.

These devices, used in conjunction with the high-speed 24LSI modems, accept start/stop asynchronous transmission from our terminals, buffer the characters and convert or strobe these characters into synchronous format under control of the 24LSI modem transmit clocks.

Buffer Prevents Loss

The Model 129 adapters incorporate a 40-bit data buffer used to compensate for data losses and errors resulting from speed differences between the CRTs and asynchronous 24LSI modems. The adapters can accommodate up to 20,000 packed characters without data.

If any of the CRTs are operating more slowly than the modems, the adapters will insert extra stop bits to make up for the difference.

As an added protection against data loss, especially loss caused by premature switching as the CRTs are polled, the adapter automatically keeps the request-to-send (RTS) interface lead open until its buffers are fully empty.

The high-speed 24 LSI modems used in our system have built-in secondary 150 bit/sec FSK channels. This modem feature allows a central-site operator to address specific modems in the system, using a Racal-Milgo network diagnostic control device, and put the modems

(Continued on Page S/44)

IBM USERS:

GIVE YOUR NETWORK SIMULTANEOUS

PIX-II is the industry's only virtual data link. Virtual means PIX-II performs all of the functions of an SDLC network, but with none of the actual hardware and software required by IBM.

By removing the complexities between your host CPU's byte multiplexer channel and the remote devices it communicates with, PIX-II makes those devices appear to the CPU to be in local mode. And PIX-II works with every model in the IBM System/360, System/370 and the new 3031/32/33 family.

That's why you can perform functions with PIX-II that you could never obtain with other equipment. What functions? Take a look.
☐ *First*, you can set up an SDLC-based communications network virtually overnight (some users have done it in four hours) without BTAM, TCAM, or VTAM. Without NCP front-end software—you don't need a front-end. And with very minor planning or resource commitment. Just attach a small PIX-II local controller to your CPU byte MPX channel, and a PIX-II remote controller at each remote site. The result: a total data network that operates at up to 56KB on telephone, microwave or satellite links. ☐ *Second*, you can populate any remote site with any array of peripheral or terminal

3270s, MAG TAPE, PRINTERS, AND HASP OR JES WORK STATIONS UNDER SDLC WITHOUT VTAM OR NCP.

The Secret of PIX-II Is What It Can Do

PIX-II simplifies every data network by eliminating network complexity between the CPU's byte MPX channel and its remote devices. Thus, every device operates in a local mode. This flexibility lets PIX-II perform all of the following functions:

- Eliminate 270X or 370X front-end hardware
- Eliminate Remote VTAM and NCP software totally
- Eliminate Remote TCAM and BTAM in bisynch networks
- Convert 3270 systems to full local mode operation (interrupt driven)
- Duplicate 1052, 3215, 3210 console functions
- Replace 3780 functions with full-duplex SDLC
- Implement SDLC without VTAM/NCP
- Duplicate HASP work station without RTAM
- Duplicate JES work stations without RTAM
- Implement CPU-to-CPU link without ACF
- Eliminates remote site software needed with teleprocessing systems such as IMS, CICS, TSO, SWIFT, ENVIRON/I, WESTI, ROSCOE and others
- Operates under all IBM operating systems
- Operates under all IBM spooling systems
- Operates under most non-IBM OS/spoolers
- Implement remote tape drives as local systems tapes
- Implement various device types all operating full-duplex simultaneously

devices—up to 25 per remote PIX-II controller—and send and receive simultaneously to all devices over full-duplex lines. Without polling. Without interruption for ACKs and NACKs. As if every device were attached directly to the MPX channel. ☐ *Third*, when we say an array of devices, we mean just that. 3272, 3274, 3276, 3277 and 3278 data entry controllers and devices. Card readers/punches. Printers.

Magnetic tape drives. Console controllers, like 1052s. HASP, JES1, JES2 or JES3 work stations. Each at speeds ranging from slow to fast. All operating simultaneously on the same high-speed virtual data link. Without remote teleprocessing software. ☐ *Fourth*, you can use PIX-II regardless of the IBM processor model or software-system you use. It works flawlessly under

Tell me more about PIX-II. My immediate network requirement is:

- ☐ To consolidate _____ data centers currently using _____ hardware and software.
- ☐ To build quickly a 3277-type network of _____ devices linked to a _____ host CPU.
- ☐ To run remote peripherals in a clustered environment that includes _____ devices.
- ☐ To implement an error-free, low-cost satellite link between my _____ CPU and _____ devices.
- ☐ To create a CPU-to-CPU link without ACF right now.
- ☐ Other: _____

Name: _____

Title: _____

Company: _____

Street: _____

City: _____ State: _____ ZIP: _____

Telephone: _____

DOS, DOS/VS, OS/MFT, OS/MVT, OS/VSI, VS/2(SVS), VS/2(MVS) or other IBM-compatible operating systems. It also operates under all IBM spooling systems—POWER, HASP, JES and non-IBM spoolers. ☐ *Fifth*, you can save enormous sums of money in your data communications network in five ways. *One*: by eliminating front-end and remote site hardware (PIX-II local and remote controllers are almost always less than the hardware they replace). *Two*: by eliminating all NCP and device control software development (which can run into hundreds of thousands of dollars in staff resources over long periods of time). *Three*: by direct hardware cost reductions; PIX-II is so powerful you can consolidate many small data centers into one manageable remote batch network. *Four*: by reducing line charges by 50% or more; PIX-II's full-duplex, data compression and SDLC capabilities allow high-speed two-way data paths that are much more efficient than those you now use. And *Five*: by

minimizing future redesigns as new data links are needed; PIX-II lets you grow when and where you want, with the devices you want, within a single expandable virtual data link family.

Nearly 200 IBM users have already discovered PIX. Shouldn't you? Find out more. Send us the attached coupon, or call your nearest Paradync sales office. PIX-II lets you do it right now.

PIX-II LETS YOU DO IT RIGHT NOW.

paradyne

Paradyne Corporation, 8550 Ulmerton Road,
Largo, Florida 33541 (813) 536-4771

Sales Offices: Atlanta (404) 588-0875 • Boston (617) 965-4850 • Chicago (312) 692-5950 • Cincinnati (513) 793-2853 • Cleveland (216) 656-2629 • Dallas (214) 661-0242 • Detroit (313) 559-5360 • Hartford (203) 563-8105 • Houston (713) 977-7102 • Los Angeles (213) 437-0613 • New York (201) 461-3700 • Philadelphia (609) 662-3049 • Pittsburgh (412) 343-9133 • San Francisco (415) 574-0902 • St. Louis (314) 739-2322 • Tallahassee, Fla. (904) 877-3896 • Washington, D.C. (703) 548-4453.

**TERMINAL
RENTALS**

MODEL

43

TTY

\$67⁵⁰
MONTH**33** ASR-FF**\$54⁰⁰**
MO.

TWX-DDD

79⁵⁰
MO.

TELEX

76⁵⁰
MO.**33**
KSR-FF**\$49⁰⁰**
MONTH**ADM-3A**
\$49⁵⁰
MONTH
ADM-1A — \$73.00 mo.**COUPLERS/MODEMS**TC 3002
D/A Acoustic **12⁰⁰**
mo.TC 5001
202T **18⁰⁰**
mo.TC 4001
113B
Auto-Ans. **18⁰⁰**
mo.MODEL
40
TTY
LINE PRINTER
300 LPM**\$325⁰⁰**
MONTH

All equipment includes national service

Get complete details with a direct call:

800/527-7700or 214/252-7502 • Service 800/527-5608
TWX 910/806-5761 • TELEX 73-0022**vardon**

& associates, inc.

930 N. Beltline Road • Irving, Texas 75061
A Subsidiary of Pioneer Texas Corp.**SERVICE PROBLEMS?**NATIONWIDE SERVICE
356 CITIES
CALL**800/527-5608**IN TEXAS CALL
800/492-9602 or 214/258-2620

Selection Criteria Weighed

Terminal Must Suit Application

(Continued from Page S/6)

ity to withstand a "dirty" environment must be considered. In the latter case, how does dust, dirt or machine by-products such as grease or airborne chemical agents affect the terminal's operation? What safeguards are built into the terminal to protect it? Insufficient protection of the terminal's component parts may result in shortened life of the terminal.

True Terminal Cost

Figure 3 is a check list for determining the true cost of a terminal. Of special consideration are installation, training, programming and service costs that can only be determined by the vending company. The cost of cor-

recting errors should be thoroughly researched since this is an on-going expense that, though seemingly minor and often neglected, can become unexpected and substantial.

Terminals in today's marketplace vary in design, function, and portability. Their proven usefulness as tools to accomplish recurring as well as non-recurring tasks and to collect and process large amounts of data, often decides success and failure in business. Figure 4 depicts some of the typical values derived from terminal use.

The last point, "Public Image Improvement," is a function of the total values derived. Depending on the application, this function will vary according to the success with which you

select your terminal. Weigh all requirements according to the needs of the application. In order of importance, these will usually include:

- Operator Interface.
- Communications Interface.
- Data Manipulation Functions.
- Environmental Factors.

Select candidate terminals with the above list in mind and evaluate all true cost and value factors derived for each terminal. Imagination may be as important here as logic, since no terminal can determine its own applications. A thorough investigation is required to select logical candidates, but keen judgement will select the application's best terminal.

Net Smooths Franchiser's Operations

(Continued from Page S/29)

the screen of the Delta terminal and transmit it into the HIS computer. This is an important operating feature because of the requirements from the field; it would not have been available with the HIS asynchronous terminals, Alcott said.

Terminal Expansion

Maaco plans to install two Delta terminals in its central ordering department. The orders from 250 automobile paint and bodywork franchises across the country and Canada will be keyed into the terminals, fed into the computer and automatically checked for credit reference on an on-line basis. Collected data will then be edited and processed immediately.

Maaco is switching to the CRT terminals to alleviate difficulties the company found in locating errors until the actual order came in for processing. Thus, the terminals will reportedly save a considerable amount of in-house paperwork.

Presently, Maaco uses its system for its profit-and-loss balance sheets, general ledger and journals. The company also handles bookkeeping for company-owned bodywork, collision and auto painting shops scattered around the country, as well as in-house receivables/payables, corporate payroll, marketing research and new site selection for prospective franchisees.

By the end of 1977, Maaco headquarters had four 80M-byte disk drives and one floppy disk system.

At the present time, Alcott said, Maaco is concerned with centralizing many current field operations into headquarters through its DP system. In the future, however, there are plans to install CRT terminals at some shops in the field.

"A certain amount of computer power at the shop level would help in the collection of data the franchise owner needs for the company to analyze how that particular shop is doing," Alcott commented. "This kind of information will help determine the performance of a particular shop in

terms of its ratio of sales leads generated to actual cars painted and/or otherwise repaired.

"It would be nice to collect this data automatically, as a by-product of something the shop did in its everyday business operation," Alcott added.

For now, Maaco is watching to see if the price of equipment gets into the range that can be economically justified by an individual shop. As for headquarters, Alcott's intentions are to continually upgrade Maaco's present system with an eye toward continued efficiencies and economies.

Still
squeezing
data through
the
old-fashioned
way?

Concentrate.
It's cheaper!

If you would like to put several asynchronous terminals on one telephone line, read on.

MICOM's Micro800 Data Concentrator has obsoleted the good, old-fashioned TDM or time-division multiplexor. If you prefer to call it a statistical multiplexor or intelligent TDM, feel free. Either way, the Micro800 provides retransmission on error and, typically, double the efficiency of TDM. It's not a penny more than a TDM, and it's not a paper tiger.

Curious?

MICOM MicroComputers for DataCommunications

MICOM SYSTEMS, INC. • 9551 Irondale Ave. • Chatsworth, CA 91311 • Tel. 213/882-6890 • TWX 910/494-4910



'I Don't Know Who He Is, But Since He's Been on the Account Down Time Has Been Nil'

Terminal Net Eases Bookings for Tour Operator

SOUTHFIELD, Mich. — Elkin Tours, Inc., is one of the largest tour operators in the U.S.

To cope with its continuous growth, the company has recently placed a real-time reservations system into operation based on a Univac 90/30 and a network of 75 terminals.

"The computer has made a tremendous impact on our efficiency," Elliot D. Samson, Elkin's president, said.

"The agents, in particular, have noticed a significant change. They are being dealt with much more efficiently on the telephone and the ease of booking with us has been appreciated.

"To be sure, we had our labor pains when [the system] came in, but by this spring, our staff realized its efficiency and their mood changed from frustration to joy."

Volume Out of Hand

In earlier years Elkin handled its reservations business manually. But by 1975, it was clear it could not continue this way. In addition to the continued substantial growth each year, Elkin

Elkin; Jerry Cash, Univac project manager; and Larry Durocher, a systems analyst from Univac's Southfield office.

Terminals Phased In

The Univac 90/30 was delivered in August 1976, and the first 16 Univac Uniscope 200 terminals became operational early in November. Gradually, additional terminals were phased into the network.

"We spent about three months preparing for the equipment's arrival and it paid off. Within 30 days, we had the batch system working. For the real-time system, we had the Las Vegas trips up first, after which we phased in all the others by Dec. 1," Smela said.

(Continued on Page S/38)



DP manager Gerald Smela and operations manager Michael Dalton discuss management information received from Elkin's Univac 90/30.



Operator enters reservation information received over the phone from a travel agent.

had a new hurdle — the U.S. Civil Aeronautics Board required far more documentation for charters. In particular, a complete manifest of all passengers embarking on charters had to be filed with the agency.

"This was a horrendous typing job and the company was running into severe bottlenecks at the clerical end," Arthur D. Berlin, director of DP, recalled.

Berlin, who at that time headed up Berlin Associates, a DP consulting firm, was approached by Elkin and asked to come up with a solution.

Univac Chosen

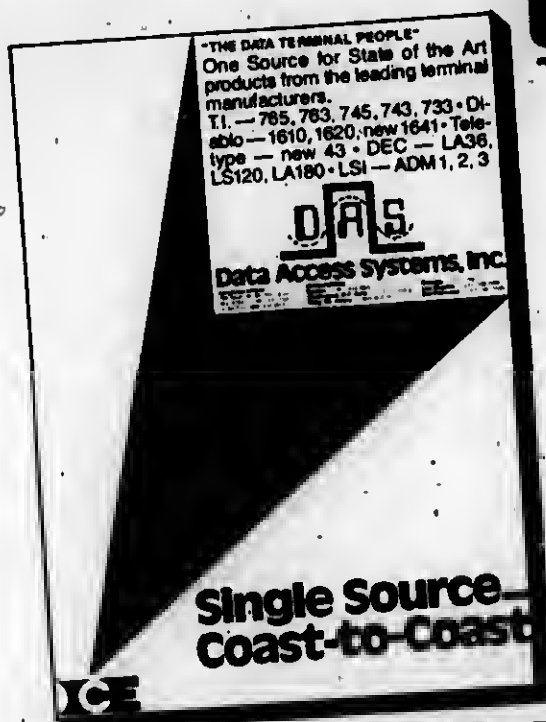
An invitation to bid on a computer system capable of supporting an interactive network of 16 terminals was sent to vendors. From a dozen responses, the choice was narrowed to two major suppliers and eventually Univac was chosen in May 1977.

"One of the key reasons for going to Univac beside price/performance considerations was its interactive applications software, which we felt was ideally suited to our needs."

Berlin noted that it took a real team effort and about 1,000 man-hours of work over a four-month period to prepare for the 90/30's arrival.

In addition to Berlin, the team included Gerald Smela, DP manager; Michael Dalton, operations manager; Eric Hutchins, reservations manager; Joe H. Martin, formerly controller for

A new combination... To better serve your terminal needs

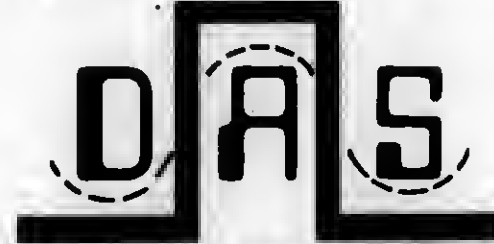


Data Access Systems, Inc. and International Computer Equipment, Inc. have merged to create a new nationwide network to serve your every terminal need. Our combined efforts now provide the only national company with facilities and capabilities to assure you of unparalleled equipment economies along with unmatched service. For your convenience new toll free numbers have been set up:

East 800 - 631 - 9604

West 800 - 227 - 4406

Or call your local district office.



"THE DATA TERMINAL PEOPLE"

Data Access Systems, Inc.

Corporate offices:

100 Route 46, Mountain Lakes,
N.J. 07047 • (201) 335-3322
or Toll Free (800) 631-9604

District offices:

Boston — (617) 933-8822
Washington, D.C. Area — (703) 525-2923
Phila. So. Jersey — (609) 854-0070

Chicago — (312) 298-0777
Los Angeles — (213) 538-4100
San Francisco — (415) 391-5535

RJE Brings Centralized, Distributed Virtues

(Continued from Page 5/19)

tion RJE systems may be used by a full distributed DP network to produce and transmit records, access central files in real-time and provide on-line processing to their own subnetworks.

Which RJE terminal system to use depends on application and system needs, financial constraints and overall company operating philosophy. To oversimplify, some level of automated remote job entry is needed by any user who wants greater remote "processing" power, whether to off-load mainframe processing, as in a central system, or as a means of expanding system processing capabilities, as in a distributed system.

More specific application needs include the complexity — and the impor-

ance of timeliness and validity — of new data as well as remote processing and communications requirements for current and future operations.

Application constraints involve the visible costs of appropriate hardware and software and the not-so-visible costs of personnel expertise — the more sophisticated the RJE system, the greater its operators' sophistication must be to exploit its best performance.

Size Ranges

A minimal-cost RJE system is used to input data only; whether to a service bureau or a company-owned host CPU and does not receive any CPU "output" other than the general user report of information entered. Depending on

the necessity for timeliness (whether the CPU demands daily, weekly or monthly input), data can be keyed to flexible diskette, disk or magnetic tape, then transported manually to the CPU site.

Alternately, the communications modems can carry input data over dial-up or dedicated phone lines to the host.

Such a system might further serve as a "host" terminal to other, stand-alone input terminals such as the IBM Model 3741, concentrating their input data, along with its own, onto a single medium — disk or tape — for final input to the host.

Minimal peripherals would be required, since an input-only system has no need for high-speed printing or other output functions.

A more sophisticated RJE system can perform data input along with remote inquiry — or "demand entry" — of the host files. This requires additional high-speed printing and data communications hardware and software; it also demands greater remote operator interaction and training.

In a manufacturing plant, for example, where bill-of-materials updates constitute the majority of RJE work, demand entry output may consist of a punched numerical control tape created at the host computer and "issued" at the remote manufacturing site by a high-speed paper tape punch.

Communications Needs

Data communications requirements for input-only and input/output RJE systems include interface compatibility with mainframe line protocols and associated peripheral gear, including multiple CRTs and high-speed output peripherals. Also required are mechanisms for point-to-point and multipoint communications, including the terminal's ability to act as "host" in a multipoint subnetwork.

If data communications traffic will be high, the system should provide for high-speed transmission of variable record lengths, multiple-record blocks and queued multiple-batch transfers to make most efficient use of the lines. Terminal features that allow unattended operations and queuing of multiple jobs for later transmission are useful for sending lower priority jobs to the host computer at night, saving the daytime for top-priority, high-speed communications.

Other features, such as strong data editing, validation, error-detection and communications error-logging techniques, are also found to varying degrees on RJE terminals. Terminal system vendors design systems that "emulate" the normal large computer terminals, such as IBM's 2780 and 3780. They add value to them by adding other features like cursor control and display screens for higher operator productivity and processing concurrency — allowing the remote system to perform multiple tasks concurrently, such as foreground data entry and background communications, and to shift system resources to the highest priority system needs.

Top of the Hierarchy

At the top of the RJE terminal hierarchy are those systems that perform transaction processing and remote application development, using their own, local data base files (copies of which exist in the mainframe) to actually process data remotely, providing "results" to the host CPU for updating central system files.

In the insurance industry, where policy writing accounts for most RJE activity, a company field office might use a transaction-processing data base system to maintain, access and update policy information for all its regional customers. In this way, daily customer inquiries can be handled by the system's local data base, and updates can be batch-transmitted to the host system nightly.

In a manufacturing environment, the local data base would list bill-of-materials data — complete parts "explosions" for all products assembled —

(Continued on Page 5/36)

Who?
What?
When?
Where?
Why?

That's what data collection is all about.

EPIC DATA offers you a simple, practical, flexible family of data collection products which can economically provide you with the information you need to answer these questions. Information which allows you to create reports on inventory status, job costing, production control, payroll, maintenance scheduling, access control, equipment circulation, time and attendance, goods consignment and circulation control so that management can make better decisions to reduce costs. And thereby increase profit.

WHO All data collected by the system can be pre-prepared. Or, where required, you may input variable data. By simply inserting his identification badge, punched or magnetic stripe, or reading the card's bar code, your employee tells the computer who he is.

WHAT Job cards, bar codes or key depression — all assigned by management — tell the computer exactly what he's doing.

WHEN An internal clock records when he started and when he finished.

WHERE The location of the terminal or variable key input tells the computer where he's working while travelling cards, bar codes or key depressions on the terminal input the amount of inventory being worked on or used.

WHY This collected data may then be prepared into reports telling you who worked on what, when, where, how many, and, often why or why not this operation was profitable.

CALL US TODAY. An Epic Data representative is ready to discuss how our simple, practical, flexible data collection systems can improve your profits.



epic data

In U.S.A.: 6350 LBJ Freeway/Dallas, TX 75240
Phone (214) 387-3121/TWX 910-860-5676

International: 7280 River Road, Richmond, B.C. Canada
Phone (604) 273-9146/Telex 04-355701

U.S. Sales Offices: 6350 LBJ Freeway, Suite 282, Dallas, TX 75240, (214) 387-3121 • 17 Amler Court, Bayshore, NY 11706, (516) 666-0797 • 3415 Hickory Trail, Downers Grove, IL 60515, (312) 968-8620 • 1724 South Heather Hill Rd., Hacienda Heights, CA 91745, (213) 965-2888
Representatives: ARIZONA BFA Corporation (602) 994-5400 • CALIFORNIA Moxon Electronics (714) 635-7600 • FLORIDA COL-INS-CO (305) 423-7615 • ILLINOIS Systems Marketing Corp. (312) 593-6220 • KANSAS/MISSOURI Digital Systems Sales (816) 765-3337 • MASSACHUSETTS J & J Associates (617) 729-5770 • MICHIGAN/OHIO WKM Associates, Inc. (313) 588-2300, (216) 287-0445 • NEW YORK Cane Technical Sales (914) 698-4411 • NEW YORK Ossmann Instruments (315) 437-6666 • PENNSYLVANIA WKM Associates (412) 892-2953 • TEXAS OMA (713) 780-2511 • WASHINGTON DPM Associates (206) 453-9082 • UNITED KINGDOM Sinterom Elinor Ltd. Reading (0734) 85464

TO BUILD A BETTER CHARACTER PRINTER, YOU NEED A BETTER PRINT ELEMENT.

WE HAVE ONE.

THE NEC SPINWRITER "THIMBLE"

NEC built the Spinwriter family of bidirectional character printers to be better than today's best. That required a high quality print element able to outperform "daisy wheels," and we have one.

Our unique "thimble" print element lasts up to three times longer, prints faster, offers greater applications flexibility, and costs less than daisy wheel elements.

Spinwriter thimbles are made from plastic specially reinforced with fiberglass — and specially molded — to provide normal element life of more than 30 million impressions. Thimbles are smaller in diameter and lighter in weight than daisy wheels. They have less mass, which means they can reach the next character faster and, therefore, print at a faster effective rate.

Spinwriter thimble elements can print up to 128 characters compared with 94 printable on daisy wheels. One thimble can hold two type fonts, and output those fonts with OCR quality. That means a Spinwriter can be used even in those applications normally requiring metal wheels or other modifications which slow printers down.

Spinwriter thimbles are available in a wide variety of type fonts, and are priced approximately 30 percent less than daisy wheel elements. Like Spinwriter ribbons, thimble elements are easily accessible, and can be replaced in seconds by operators using one hand.

Spinwriter thimbles are noticeably quieter than either plastic or metal daisy wheels, which means that Spinwriter printers fit well in office environments. A Diablo-compatible interface is available for Spinwriters, making direct replacement easy for original equipment manufacturers (OEMs) and end users.

The thimble is only part of what makes Spinwriters

better than today's best character printers. Consider our much longer lasting print hammer assembly: it has fewer moving parts than those on competing printers, and the voice coil actuated print hammer is strengthened with special alloys.

And consider the way highly reliable Spinwriters meet your printer needs: the Spinwriter family includes microprocessor-controlled receive-only and keyboard send/receive models, and basic mechanisms for those wishing to add their own power supply and housings.

Spinwriters feature Mean-Time-Between-Failure rates of better than 2,000 hours, and are serviced by one of the largest, most competent organizations serving the computer industry. Spinwriters are priced approximately 10 percent below competition, and we can deliver in OEM quantities in 60 days or less.

Tell me more about the Spinwriter family.

- ☐ Please have a sales representative call.
- ☐ Please send literature.

Name: _____

Title: _____

Company: _____

Street: _____

City: _____ State: _____ Zip: _____

Telephone: _____

CW 327



To find out more about how a better print element helps make a better printer, fill out the coupon, or call NEC Information Systems, Five Militia Drive, Lexington, Mass. 02173 (617) 862-3120.

NEC INFORMATION SYSTEMS, INC.

Eastern Office: NEC Information Systems, Inc., Mr. Richard G. Gilbert, 5 Militia Drive, Lexington, Massachusetts 02173
Central Office: NEC Information Systems, Inc., Mr. Stephen A. Kadash, 3400 South Dixie Drive, Suite 105, Dayton, Ohio 45459
West Coast Office: NEC Information Systems, Inc., Mr. Marty Rubin, 8939 S. Sepulveda Blvd., Suite 330, Los Angeles, California 90045

Two-Pronged Benefits Available Through RJE

(Continued from Page S/34)

and would be used by multiple terminals operators throughout the day for purchasing, inventory control, accounting and other purposes. At day's end, a "log-in" report would be transmitted to the host to show results of the data base activity.

Appropriate hardware, software and personnel skills are required in a transaction-processing environment. The terminal processor should be capable of driving multiple I/O terminals simultaneously, including high-speed printers, and maintaining large, moving-head disk memory files.

Software Requirements

Operating system software should have strong resource allocation and

data base access abilities, and the system should "speak" industry-compatible interactive languages, such as Cobol and RPG.

Terminal security features such as password sign-on, software lockouts and physical terminal locks should go hand-in-hand with strong operator aids — screen prompts, error messages, programmable function keys, upper/lower case and video highlighting features — to give operator flexibility while maintaining tight access and error control.

For application program generation, remote RJE operator skills should include some degree of high-level programming expertise, along with a sound knowledge of the application to be programmed for the remote termi-

nal system. Some RJE systems in this class provide application "packages" that guide the programmer through source creation and debugging by the mainframe, while others offer full user programming.

Programming Potential

User programming gives the remote programmer greater program creation latitude, but this can be misused by a wasteful programmer, and even top-level application programmers may be hard-pressed to match the effectiveness of the error-logging and error-correcting software written by the turnkey system vendors.

Data communications needs for top-end transaction-processing RJE systems may not be as great as for I/O

systems because remote transaction-processing serves to off load the mainframe. At the same time, however, larger RJE systems tend to act as host processors to their own subnetworks and so may therefore require the same kind of data communications support, from low and high-speed modems to Hesp workstations, demanded by larger data communications systems.

Before the specific processing benefits outlined here, RJE processing pays greater, long-term dividends to users who want to progress from a centralized to a distributed environment through carefully planned modular growth. Evolving from simple to more comprehensive RJE systems is the logical route for most users to follow; RJE system vendors provide compatible product hierarchies to facilitate trouble-free application growth, and the user's own DP staff can also grow, learning the necessary new operating skills, along with the system.

This allows a smooth, orderly transition from centralized to distributed processing for both the computer system and its operators/programmers. It also avoids the risk of corporate trauma of a too-fast leap, with unprepared personnel, into a full distributed system.

Monsalvo is on the data communications product marketing staff at Inforex, Inc.

ATTN: 3270 USERS

Here's a *tailor-made* system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. Systems Programmers, in particular, find the following features very valuable.

Both Local and Remote 3270 are available, of course,

PLUS

Local Job Entry. Line printers up to 1200 LPM with 1403 addresses and card readers with 2501 addresses can be placed next to any BRAEGEN CRT. These "hot" printers and readers are located in the users' areas up to 7,500 feet outside the computer room. Most popular uses are for programmer listings and accounting work. Users get the benefits of increased productivity because turn-around time is reduced to minutes.

PLUS

Address Switching. Any BRAEGEN CRT terminal provides as many addresses as required for Console, TSO, Applications, etc. Any CRT can have both Local and Remote addresses. This feature can reduce the number of CRT's required and will eliminate NCP,

VTAM type software overhead requirements.

PLUS

Multiple Controller Interfaces. The BRAEGEN controller allows multiple channel and remote interfaces. Any CRT can access multiple local IBM CPU's or remote CPU's. Just 2-3 seconds to switch a CRT between CPU's or addresses.

PLUS

Fast Cursor, Programmable Keyboard, 7500' Coax,

Multiple Drops per Coax, Wide range of speeds in 3286/3288 compatible printers; from 45 cps to 1200 LPM, Offline Data Entry, and our Offline TSO Editor.

PLUS

Features others have promised for 1978-1979 are **AVAILABLE NOW . . .** Local Copy, 128 character set CRT, Typamatic keys, Home key, etc.

PLUS

Low Prices — 1, 2, 3 year leases available.



Customers throughout the U.S. are benefiting from these features now. For more information please write or call; The BRAEGEN Corporation, 20740 Valley Green Drive, Cupertino, California 95014. (408) 255-4200.



BRAEGEN

Amex Net Aids Travel Planners

(Continued from Page S/7)

agement staff can use the Raytheon terminals to access whichever of three subsets of the Tims data base they are authorized to access.

"Tims includes a product data set containing information on the travel products we offer and a client data base with specific details on every booking we've made related to that product line. There are multiple keys for access to either portion of that data set," Gloor said.

"A second information data set contains the equivalent of the flipchart desk library formerly available to each reservations clerk. That file is updated in New York.

"The third data set contains a record of every travel agency we serve," Dix added. "The third Tims data set is key in providing marketing reports, by region, down to the level of individual Zip Codes and to the individual agent level in Amex offices."

"Those are the kinds of reports not possible before Tims," Dix said. "Now, more than 40 reports are available, allowing us to analyze our product line sales down to the level of each individual tour. We know what is selling, where it is selling and who is doing the selling. We also have up-to-the-moment inventory control."

"The Tims system has eliminated the cost and inconvenience of using the corporate center's batch system mainframes, has eliminated most paperwork within the Travel Agent Service Center, made more information available to management on a timely basis, lowered operating costs, improved service to customers and resulted in a smoother operation overall," Dix concluded.

Where do leading users of successful DB/DC systems go each year?

Where
leading user
Successful DB/
Systems go each year

CINCOM KNOCK-ABOUT '78 AGENDA

April 23-26th

At-a-Glance

GENERAL SESSION

ENVIRON/1 COBOL-XL Environment	Distributed Processing In The Navy	On-line Documentation Systems	Management Attitudes	New User Orientation	Industry Report On Data Base Users	A Look Inside The DBA Toolbox	EDP Auditing Of A Data Base Environment	New Customer Orientation Session			
ENVIRON/1 COBOL-XL Environment	10 Basic Techniques To Enhance DB-Orientation Documentation	When Does Data Become A DBA Responsibility	An On-line Accounting Package Using ENVIRON/1 And TOTAL	TOTAL Software Exchange	From No DB Department To On-line In One Year	On-line System Design	Teamwork: A Cliche Or Management Tool				
Educational Opportunities From Cincom	Training Users For On-line Systems	Performance Criteria For On-line Systems	The Keys To Success In Data Processing Are Planning & Involvement	Backup/ Recovery In An ENVIRON/1, TOTAL Environment	Evaluating Mini-Computer Alternatives With TOTAL	Control Of A Large, Centralized Data Base	System/3 TOTAL In An On-line Environment				
TOTAL 8.0	Management Awareness	Guidelines For A Successful First Year	Interactive Distributed Processing	TOTAL In A Manufacturing Environment	Accounts Payable System: Product Overview	Manufacturing Planning System Application Software	User Experience With TOTAL 8.0				

Cincom Systems' Knock-About . . . first formed in 1970 by Cincom and its user group . . . has truly become the premier forum for the exchange of information between successful implementors of data base data communications discussions on subjects of common interest. Presentations on the trends and directions in the software industry will be included in the 3 day seminar. Cincom will present a major new version of ENVIRON/1 along with a new on-line query facility. Enhancements to other products, and detailed information on innovative new product developments to real world problems, contributed by experienced professionals from our resource of installers worldwide.

Knock-About '78. If your organization has not contacted Cincom Systems, please contact us in time for pre-

Cincom Systems' Knock-About . . . first formed in 1970 by Cincom and its client user group . . . has truly become the premier forum for the exchange of information between successful implementors of data base data communications systems.

Over 600 Cincom customers will gather at Knock-About '78, April 23-26, to attend and participate in 75 sessions presented in 8 concurrent tracks. The comprehensive agenda (sample above) will enable each person to tailor a meaningful program to his or her professional responsibility . . . manager, system designer, programmer, data base administrator, on-line specialist, etc.

The majority of topics will be conducted by the users themselves. Special interest groups will provide industry-oriented interaction and in-depth discussions on subjects of common interest. Presentations on the trends and directions in the software industry will be included in the 3-day seminar.

Cincom will present a major new version of TOTAL, along with a new on-line query facility. Enhancements to other products, and detailed information on innovative new product developments, real world problems, contributed by experienced professionals from our resource of installations worldwide.

If you are a Cincom customer, we hope to see you at Knock-About '78. If your organization is considering data base or data communication software, we hope you will contact Cincom Systems immediately. We can help you prepare your organization's DB/DC success story in time for presentation at the next Knock-About (October, 1978).

Cincom Systems, Inc.
 11000 E. 1st Ave., Suite 800, Denver, CO 80231
 (303) 733-2400



Tour Operator's Net Aids Charter Bookings

(Continued from Page S/33)

Special formats for handling reservations over the CRTs were designed by Hutchins, the reservations manager, so that the operators would need a minimum number of keystrokes to complete a reservation.

World's Largest

The present configuration of the Elkin system makes it what is believed to be one of the largest Univac 90/30 computer-communications systems in the world. The main memory with a 524,000-byte capacity is supplemented by mass storage capacity of 600M bytes from seven disk systems (Univac 8418 and 8430 drives), two printers, a card reader and a communications subsystem handling 13 lines. Cur-

rently 65 Univac UTS 400 intelligent terminals with an average response time of five to 10 seconds are linked to the 90/30.

The reservations department is the primary terminal user with 48 UTS 400 units in the Southfield facility and five in the Toronto office.

The balance of the CRTs are used in Southfield by manifest audit (four), the cash transactions department (four), the group section (three), the VIP section, or retail arm of Elkin Tours (two), the hotel desk operations section (two), operations (one), accounting (two) and DP department (two.) Two units are in reserve.

Elkin Tours moved into a new building on Memorial Day this year and at that time changed over to the Univac

UTS 400 terminals. The terminals were preinstalled in the new facility and became operational immediately, resulting in no lost business for Elkin.

Reservation Transactions

When a travel agent calls in on special Wats lines to transact a booking, the call is automatically switched to the first available operator. The operator first brings up a format on the screen of the UTS 400 to determine whether space is available on the particular charter flight sought by the agent for his customer.

If the particular charter is booked, the CPU searches its data storage for other flights before or after the desired date. This information is shown on the screen, allowing the operator to dis-

cuss alternative flights with the agent.

When this part of the transaction is completed, the operator brings up a format that lists a selection of hotels at the destination together with the number of rooms available, enabling the customer to make a choice.

The next step is to complete the booking transaction. The operator keys in the travel agent's telephone number and the computer responds with the agent's name and address, which the operator verifies over the telephone. Any special restrictions in dealing with a particular agent are indicated to the operator by blinking signals on the top line of the format.

The operator then fills in the blanks on the format listing the name, address and telephone number of the customer.

The final step in the reservations process is to verify with the agent the charter costs presented on another screen format. Using information shown in the format, the operator informs the agent of the total costs, any extra costs such as special insurance, the agent's commission, final date for receiving a deposit and final date for receiving full payment.

After a booking has been made, the computer assigns a reservation number. Separate bank accounts are kept for each tour and the agent is advised to which bank the checks should be made payable.

Confirmation notices of bookings made during the day are printed each night on the 90/30 and mailed to the agent. Similarly, confirmation notices of cancellation orders received by the telephone are also printed and sent to the agent.

All tour payments are entered into the CPU the same day as they are received via the terminals. On demand, the CPU makes a rapid search of its files to determine those customers delinquent in making payments.

More Information Available

The system produces a considerable amount of information on each of the average of 24 tours being worked on at any particular time. This includes passenger manifests, rooming lists for each hotel (usually sent to the hotel two weeks prior to the departure of that tour), progress reports on filling charters and cash detail information on individual passengers. Among other chores, the 90/30 prints labels for each tour group.

"Since the system was installed, we've been constantly adding more main memory, more disk drive storage and additional terminals to keep pace with our growth," operations manager Dalton noted.

"To date, downtime has been less than minimal and the OS/3 operating system is in my opinion one of the finest available."

Discussing the priorities involved in the DP applications, Berlin pointed out that the reservations system was "deliberately placed on the air first because of its importance to our business."

"In the near future we will be concentrating on developing a total accounting system. This will include computing the total amount of hotel bills owed, presently a manual function, so we can keep better track of our cash flow."

**THINKING ABOUT AN S/34? PDP-11/70? ECLIPSE?
PREFER A VIRTUAL MEMORY SYSTEM?**

CONSIDER WANG'S NEW 2200VS.

A virtual memory system at an entry level price under \$50,000.

Interactive. Responsive. 2.3 billion bytes of online storage. ANSI '74 COBOL, RPG II, BASIC and ASSEMBLER. IBM 360/370 instructions.

Multiprocessing; multi-programming. Software automatically adapts to sys-

tem size. High, immediate programmer productivity.

The first-time computer that protects your investment.

The replacement computer for the yield you never got.

The remote computer to which you distribute 90% of the application's processing.

Modular. Expandable without system conversion.



If you want to bite into something you can chew, mail this coupon to Wang Laboratories, Inc., Lowell, MA 01851. Or call (617) 851-4111.

I'm hungry. Send me information on Wang's 2200VS.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Phone _____

DP81/CW3278



4toGO!

TODAY, 31 OF THE 35 LARGEST DATA PROCESSING SERVICE COMPANIES BUY THEIR TERMINALS FROM DDI.

When you read about the extra value we offer,
you'll want to join them. Call us.

In a predictably short time, all 35 of the nation's 35 largest data processing service companies will be DDI's customers.

Why are they drawn to us? Whether your company is in the market for 10 data terminals or hundreds, their answers may be the answers you're looking for.

Simply put, these companies will tell you DDI makes it easier for them to do business. We can do it because we have built a user support program that fills the needs of DP service companies as no manufacturer or distributor does.

Certainly no other kind of user has more demanding needs.

With hundreds of clients to serve,

these firms need a variety of terminals to interface with many different computers and data communication networks. DDI provides the efficiency of a single, reliable source of supply — with a choice which includes DEC, TI, DIABLO and ADDS.

Smart buying is important. As America's leading terminal supplier, DDI has the financial strength and mass purchasing power to provide exceptionally favorable pricing . . . in-house financing . . . a choice of rent/lease/buy plans . . . volume discounts . . . and a unique Combination Savings Plan to increase the customer's buying power.

Our large warehouse stocks speed delivery, so the service company's

new clients can be put in the revenue stream quickly.

Our nationwide maintenance service provides close support — vital because the terminals can take such a beating from the many untrained users and punishing environments the data processing service companies deal with. And whatever the need, instant response is assured by our nationwide branch network staffed by trained professionals.

WANT A FREE TERMINAL SURVEY?

What we are doing for the DP service companies we can do for you. Simply call your nearest DDI branch. Or contact our home office: 51 Weaver St., Greenwich, Ct. 06830. Tel: (203) 661-1700.

 **Data
Dimensions, Inc.**

America's leading terminal supplier.

BRANCH OFFICES: New York City (212) 687-2030 • Morris Plains, N.J. (201) 267-2311 • Philadelphia (609) 662-2833 • Washington, D.C. (202) 686-5150 • Cincinnati (513) 769-0680 • Detroit (313) 358-2600 • Chicago (312) 868-3770 • Atlanta (404) 433-2023 • Dallas (214) 387-2222 • Houston (713) 961-4711 • Los Angeles (213) 990-9200 • San Francisco (415) 349-7262

Steel Trader Updates With Mini-Based Network

(Continued from Page S/15)

vision had to search for its own computing power.

Department management began a detailed study of available turnkey systems. A packaged system of hardware, software and communications was a prerequisite because management didn't want to increase staff or undergo reeducation of a staff that had expertise in distribution, not DP.

In November 1975, management selected a Microdata Corp. Reality system, after visiting several installations and seeing a demonstration of the English-interactive language. This language would permit KG's management staff to learn to communicate with the system after only a few hours training.

Turnkey Sales & Leasing, Inc., New

York, N.Y., configured a package to provide hardware, software and leasing according to KG specifications.

A team of analysts first studied KG's existing system, then drew up a detailed list of management's operational and reporting requirements. Using an inventory control system with accounts receivable, invoicing and statistical modules, the team made modifications and added modules to customize it to KG's business.

Hardware Components

Originally, the system consisted of a 32K-core minicomputer with 10M bytes of disk, three CRTs and one line printer. By October 1976, two CRTs and one line printer were installed in North Brunswick. In December 1976,

a Digital Equipment Corp. Decwriter teleprinter was installed at the Artesia, Charlotte, Dallas and Chicago offices.

Today, the system had been expanded to 48K core, 20M bytes of expandable direct-access memory and a 120 char./sec line printer for producing operating and management reports. Located at the World Trade Center, the system and its reports help pinpoint inventory, direct shipments, minimize the inventory of dead stock, enable salesmen to be responsive to customer inquiries and let management forecast inventory requirements six to 10 months in advance.

The system has two tape drives, one with 800 bit/in. density and the other with 1,600 bit/in. density. The later is compatible with the host system.

There are three CRTs with keyboards at the World Trade Center; teleprinters at Artesia, Charlotte, Dallas and Chicago; one CRT and one teleprinter without keyboard at Toronto, along with modems and dial-up facilities for lower volume warehouses and a dedicated Wats line from North Brunswick. Message-switching between CRTs and printers completes the system.

The CRT terminals act as data entry points and as management inquiry terminals for immediate information retrieval.

The North Brunswick warehouse was the first remote site to go on-line and has a configuration of two CRT terminals and a 120 char./sec line printer. Other warehouses will have similar setups, but those with less volume may have only a single CRT and use dial-up phone facilities.

System Operation

Currently, the system works two ways. The on-line warehouses have access to the system directly through their terminals. Those warehouses not yet phased in communicate with the central system through Telex. Data is keyed in for them and the results returned by Telex. This will be phased out as terminals are phased in.

An order keyed into a terminal — either at the warehouse or at the central location — is checked against the inventory files to ensure the stock is on hand and checked against the customer's credit rating. If both factors check out, the computer generates an order to release the steel products to the customer. It prints a bill-of-lading, and a packing slip.

When the warehouse has shipped the order, the system is notified via the terminal, and it responds by:

- Printing an invoice.
- Removing the order from the books.
- Reducing inventory.
- Updating accounts receivable.

When the customer's check arrives, data keyed into the terminal credits the account; and the order cycle is complete.

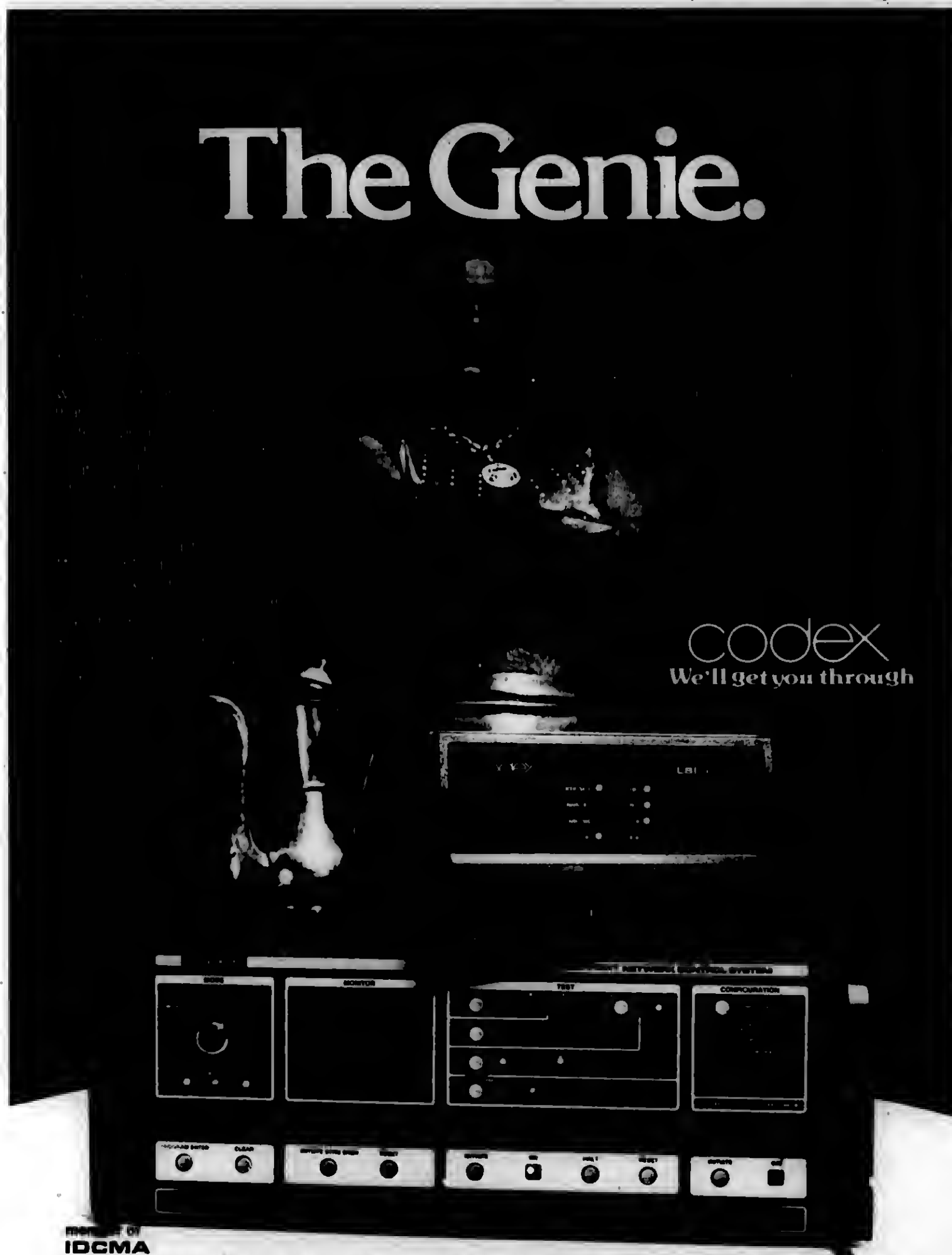
Beside simplifying the clerical procedures of handling orders and accounting, the system gives management a series of 24 reports for audit and control of the system. The DP reports are all-encompassing, covering inventory, accounts receivable and sales statistics. Most important, management can also inquire into the system at any time for an up-to-the-minute picture.

Another innovation is that each warehouse can now have a stock status report from all other locations. Should it be out of stock on an item, it can still give customers fast service by shipping the item from another location.

Managerial Advantages

The critical test of any computer installation is: How well does it work? KG has benefited by gaining tighter control of the entire operation through up-to-date information — control that would have been impossible with the manual accounting system. The firm has fewer out-of-stock conditions on orders, and faster invoicing brings money in sooner. So much so that the interest alone on outstanding accounts

(Continued on Page S/44)



MEMBER OF
IDCMA

Codex Corporation, 15 Riverdale Avenue, Newton, Massachusetts 02195 Tel: (617) 969-0600 Telex: 92-2443 Codex Europe S.A., Bte 7/Av. de Tervuren 412, B-1150 Brussels, Belgium Tel: 762.23.51/762.24.21 Telex: 26542. Offices and distributors in major cities throughout the world.

*Patent Pending

Don't Replace Your 3270s Without Sending For Our Kit.

So far, every company that's bitten on our free 30-day trial offer has decided to keep our equipment. Very good, but not surprising.

Because they all proved to themselves Trivex Plus 70 terminals are more versatile than IBM 3270s. And they did it without biting the bullet. Without danger of obsoleting their systems. Or hurting their user service reputations.

That's the beauty of our Mix and Match Plan: We give you one of our terminals (or a whole system if you want) to try for 30 days. Free. You just plug it in. It's *completely* compatible

with IBM 3270 units. The same goes for our controllers and printers. So you can mix and match our equipment with IBM's any way you want to.

Then you sit back and watch how well our equipment works alongside theirs. You'll see what ours gives you that IBM's doesn't. Features like in-line, on-line and off-line diagnostic capability. Local display-to-print capability. OCR wand. High-resolution, non-glare CRT. Prompting line. Cursor position indicator. Statistical package. And 10-key numeric pad. Features you won't get from IBM for years. If ever. And all Trivex 3270-compatible devices are micro-processor controlled. They're software-modifiable to future changes in network requirements.

Meanwhile, you'll find out our equipment also costs less than IBM's.

Once your 30 days are up, unplug our Plus 70 System and send it back. No problem. Or, like those who've tried it, you can keep it.

Now you've got to admit biting on an offer like this is a lot better than biting the bullet. Just call the number below or write us on your letterhead. A salesman will bring you information on our Mix and Match Plan along with an Executive Decision-Making Kit, complete with operating instructions and a real bullet.

Then we'll give you our best shot.

Write: 3180 Red Hill Ave., Costa Mesa, Ca. 92626 • Phone: (714) 546-7781; (800) 854-3810 or 854-3819.

TRIVEX

Offices in San Jose, Calif. (408) 226-3766/Oakbrook, Ill. (312) 325-8108/Detroit, Mich. (313) 528-2175/Ft. Lee, N.J. (201) 461-4712. European Distributor: Synelec, Telex: 22114 Paris, Brussels, Munich, Amsterdam.

Try One Trivex With Your 3270s Instead Of Biting The Bullet.

You'd like to replace your IBM 3270s with more versatile terminals. It'd make you a hero. But the first step is like biting the bullet because things could blow up in your face.

That's why Trivex invented the free 30-day Mix and Match Plan. It gets rid of the risk of obsoleting your system. Or hurting your user service reputation.

Here's how it works: We'll give you one of our Trivex Plus 70 terminals (or a system if you want) to try for 30 days. Free. Just plug it in. There's nothing else to do because it's completely compatible with IBM 3270 units.

Our terminals not only cost less than IBM's, you'll find they give you more. Features you won't get from IBM for years. If ever.

Call the number below or write us on your letterhead. Our sales rep will bring you information on our free 30-day Mix and Match Plan along with an Executive Decision-Making Kit. It's one offer you should bite on.

Don't Replace Your 3270s
Without Sending For Our Kit.



Everyone That Bit On Our 3270 Offer Is Now A Customer. Why?

Micro Control Expands Terminal Performance

(Continued from Page S/11) in which programs and data run. The operator system stores 9K bytes of programable read-only memory.

CD developed its own operating system and disk assembler for POS data collection. The software and firmware have the attributes of a much larger system running six partitions in round-robin fashion.

In a multiprocessing mode,

the CD 100 runs with three POS scanner partitions — one partition to handle bisynchronous communications similar to IBM 2780, one foreground data entry processing partition and a background partition for disk-to-printer operations.

Data communications is the system are switch selectable between 110 bit/sec and 9,600 bit/sec synchronous, asynchronous and bisynchronous.

In addition to the terminal, the CD 100 includes 10M bytes of disk storage, expandable to 40M bytes. The disk stores applications programs and logs data for up to 60 POS terminals per system.

On-disk programs provide the capability to prepare in-store reports for each location, as well as to format data for transmission over Wats lines to the central system or mainframe at the home office.

Diagnostics provided by Cyberdata can isolate faults in either software or hardware and can determine whether the problem is user-correctable or requires vendor service.

Hierarchical Controllers

CD 100 system controllers are interconnectable in hierarchical fashion so a central system controls a network of satellite systems in distant stores over dial-up Wats lines.

The central unit locks out the keyboard of a satellite when programs are being updated, but does not interface with transaction logging by the satellite.

The central system monitors activity of a satellite performance on an hour-by-hour basis. The CD 100 systems also act as message switches for interstore communications; messages are stored on disk and picked up as data is transmitted to or from each system.

KMart of Canada uses a home office System CD 100 for program development. Once written, software is downloaded to satellite systems in other stores without mainframe involvement.

Under its older system, KMart used POS data concentrators at store locations and kept them connected continuously over private lines to the central mainframe.

With the CD 100s system, the company's IBM 360/40 mainframe will collect summarized and data entry data over a dial-up Wats line during store hours. The 360/40 polls the CD 100 in each of the stores and processes the collected data. The mainframe enters the processed data into the main corporate computer system and also returns appropriate reports to each store's CD 100 system before opening the next day.

Menu of Reports

Many reports can be prepared at each store without mainframe involvement. The store manager pushes one button to get a menu of reports available.

One listed command causes a whole report to be generated. A manager can, for example, get an immediate report on all sales by department, cash register, merchandise class code or even clerk.

The POS system provides the company with a distributed data base under central office control, but without the high communications line charges of the older method.

System prices vary depending on individual configurations. The Cyberdata System CD 100 selling price runs roughly one-half the cost of conventional POS data collection systems. The savings in line charges alone will repay KMart of Canada's system cost the first year, the user estimated.

The average transaction rate in each of the company's stores is about 5,000 per day. Each transaction includes price, tax, total charge and department class code. The systems will soon be programmed to handle transactions in sufficient detail for inventory to be controlled through POS terminal entries.

TI's Model 810 Printer can make a big impact on your printer costs.

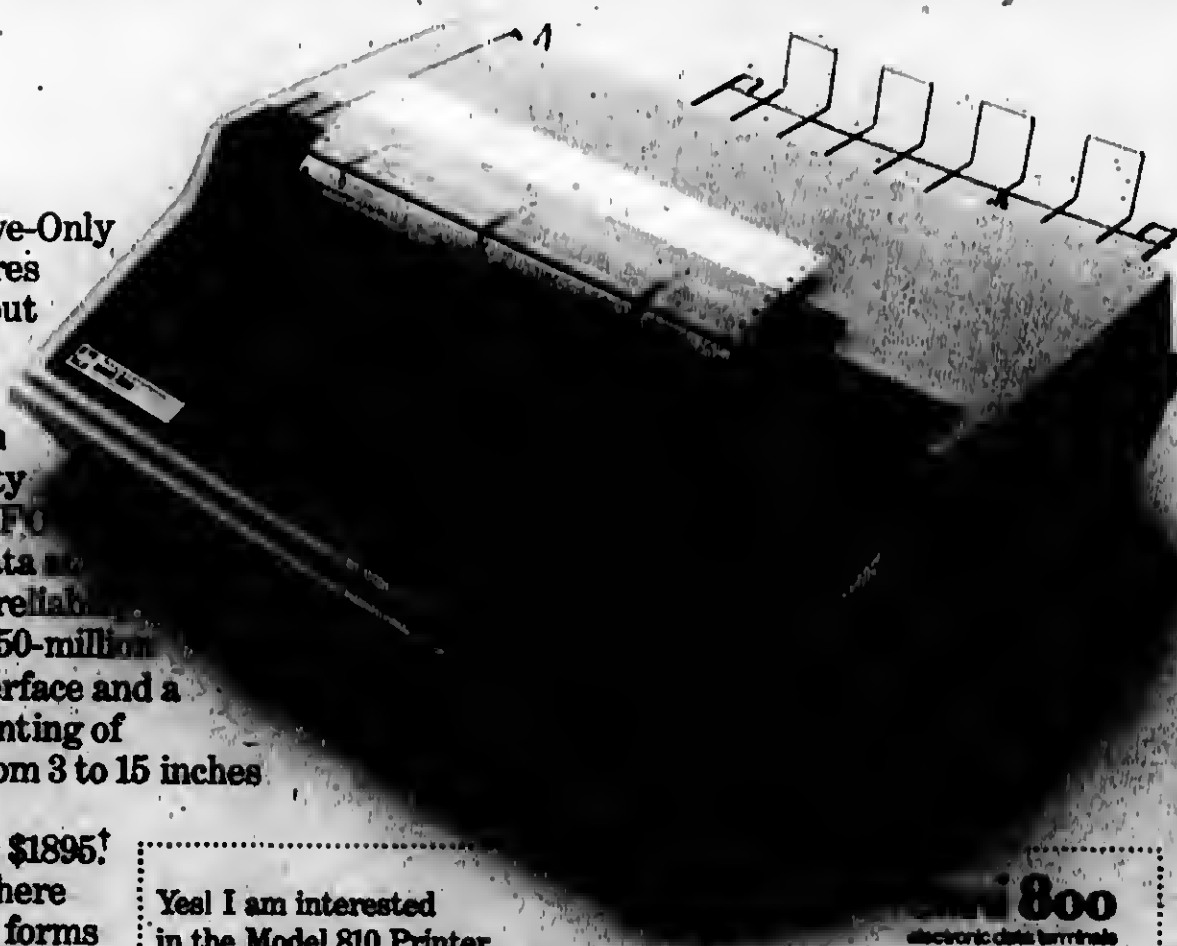
OMNI 800[®] Model 810 Receive-Only Printer has standard features designed for high throughput and reliability.

Features like bi-directional 150-cps printing of an original and five high-quality copies. A 256-character FIFO buffer so you can receive data at speeds up to 9600 baud. A reliable low-cost printhead with a 150-million character life. An EIA interface and a self-test capability. Plus printing of reports, tickets or forms from 3 to 15 inches in width.

These and more ... for \$1895!

For added flexibility, there are options such as vertical forms control with compressed print, expanded print, international character sets, a tear bar and five different interfaces.

Add it all up and you can see why the 810 is the price/performance leader. For more information about how the 810 can impact your printer costs, fill out and mail the coupon. Or call your nearest TI sales office, or Terminal Marketing at (713) 491-5115, ext. 2124.



Yes! I am interested in the Model 810 Printer.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name _____

Title _____

Company _____

Phone _____

Address _____

City _____

State _____

Zip _____

Mail to:

TEXAS INSTRUMENTS

INCORPORATED

P.O. Box 1444, M/S 784, Houston, Texas 77001

17-23-cw

[®]Trademark of Texas Instruments

[†]Quantity one, U.S. Domestic Price.

Copyright © 1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS

Front panel accessibility — All the normally used operator controls are organized into functional groups and logically arranged for maximum operator convenience.

Baud rate switch — Switch from 110, 150, or 300 baud to 600 or 1200 baud transmission easily. Just flip the convenient switch and the terminal easily adapts to your communication speeds.

TwinTeflect™ option — Want to use a special printwheel? Just switch on TwinTeflect when you install the printwheel. Sprint 5 electronics provide the coordination between code and print characters. Available only from Qume.

Dynamic positioning — Create graphs or justify your text easily. With switch selectable 10 or 12 characters per inch spacing. Plus controlled spacing of 1/12" horizontal and 1/16" vertical.



Introducing the smart daisywheel terminal designed especially for the computer industry.

Smart microprocessor logic — You get flexible character spacing, precise plotting resolution, and smart multi-direction carriage slewing. Not to mention high quality printing. Fast.

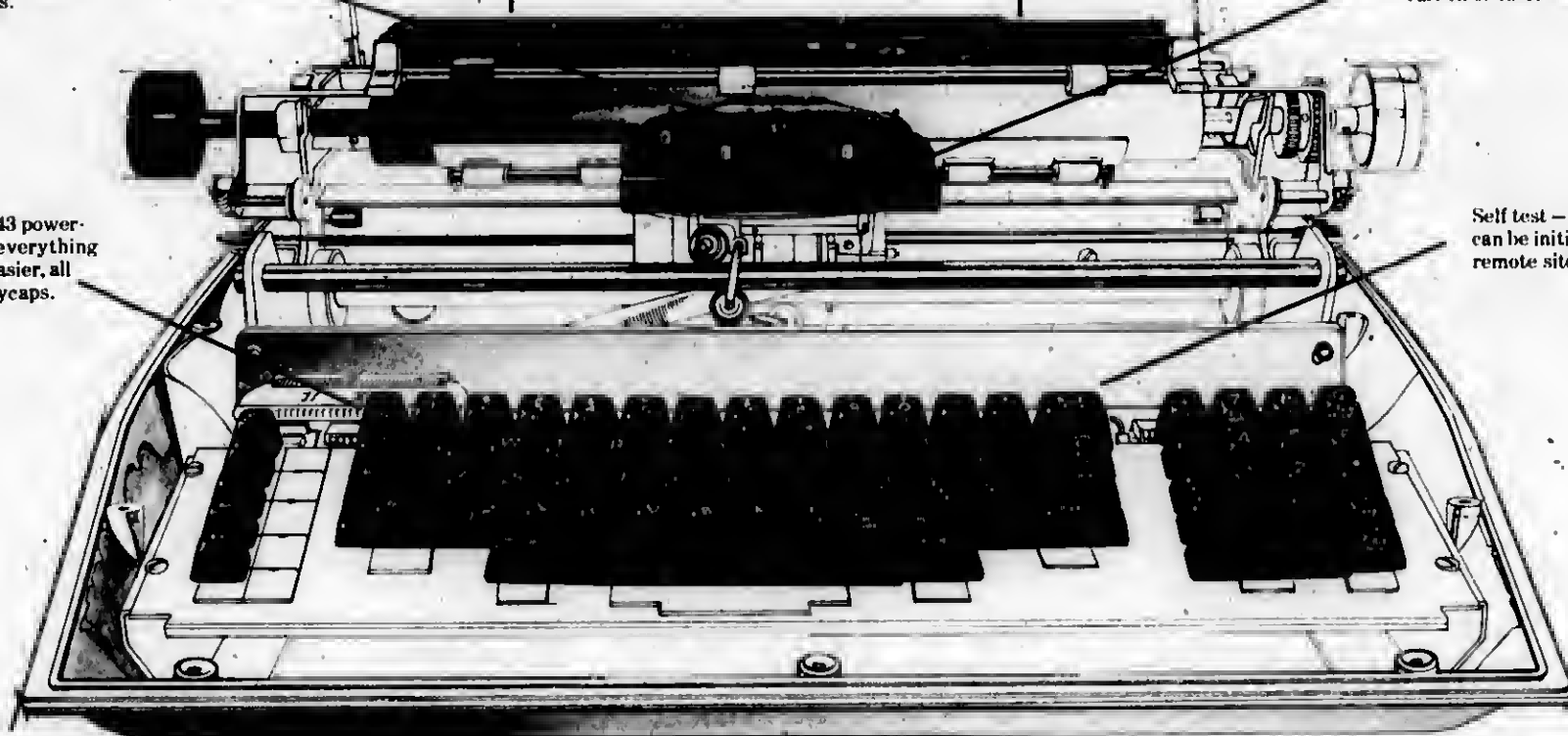
Serial or parallel interface — All Sprint 5's can provide a standard serial RS232C interface to your system. In addition, the keyboard version is available with DC current loop interface, and the printer version is available with DC current loop or parallel interface.

Interchangeable character sets — We've got over 50 different character sets and types. They're easy to change and include international characters, APL, and scientific symbols.

Multicolor ribbons — over 15 different ribbons (10 color choices) to color your messages. Easy to handle cartridges with carbon or fabric multicolor ribbons.

Comprehensive command set — 43 powerful user oriented commands are everything you need. And to make it even easier, all commands are printed on the keycaps.

Self test — Internal self-diagnostic routines can be initiated from the keyboard or from remote sites.



It's called the Sprint 5. And it's from Qume.

That's right. Qume.

We've established quite a reputation in the word processing business. A reputation for letter quality print. And because of that, we didn't want to simply attach a keyboard to a printer and present it to the computer industry as a full blown terminal.

So we designed our Sprint 5 daisywheel terminal from the ground up to meet the needs of the computer industry. Complete with our famous print quality. And 55 cps.

Qume's smart microprocessor gives the Sprint 5 many capabilities not found in conventional terminals. Such as a powerful command set, self-diagnostics, memory storage of tab settings, and forms control programs.

Surprisingly enough, however, the Sprint 5 costs no more than competitive terminals.

Obviously, a product that does much more but costs no more is a better buy.

And when all is said and done, that may be Sprint 5's most outstanding advantage.

For further information on how the Sprint 5 can give your computer letter quality output, contact: Lee Cannon, Qume Corporation, 2323 Industrial Parkway West, Hayward, CA 94545 or phone: (415) 783-6100, Extension 338.

Qume®
the printed word



Bank Uses Synchronous Adapters, Modems

(Continued from Page S/30)
into self-test modes.

Typical tests performed include digital and line loop backs, remote modem power tests and modem self-test. Operators can also use the capability to monitor remote interface signals.

Other Test Devices

In addition to central network diagnostics, the communications racks at the First Federal central site include a number of other test devices that can be patched to monitor lines and equipment using the EIA and VF patch panels. This equipment includes a data scope, oscillator, impulse noise counter, error counter, send and receive db meters, current meter and speaker.

First Federal's terminal system continues to grow, with a number of modifications and improvements in progress. First Federal plans to institute an automatic dial backup system by mid-1978 and has installed a Racal-Milgo Model 23C multiline adapter at the central site in anticipation of this project.

When First Federal opens a new office on Florida's west coast, it expects to take that opportunity to increase the operating speed of part of the network by installing a Racal-Milgo MPS 48 modem with twin ports. Each port will be linked with a 24LSI modem, with the MPS 48 serving, in effect, as a multiplexer.

This type of data concentration to-

gether with higher operating speeds will allow increased traffic loads on the equipment in place with the fewest number of new lines possible.

As First Federal continues to expand, the systems approach is kept in mind. Through expansions and modifica-

tions, a flexible data communications system that can meet present and future needs can be maintained.

Denny is assistant vice-president of computer operations at First Federal Savings and Loan Association in Miami.

Bank Picks On-Line System

(Continued from Page S/2)

time.

"The time savings made possible by the TRW system," Huggins said, "translate to cost savings because fewer phone lines are needed, less computer time is used and faster, more accurate customer service is given. In addition, our costs in bringing a long dis-

stance window on-line are much less."

The terminals give 200 tellers information about the current status of checking, savings, club and loan accounts. More than 100 different types of transactions are possible with the system including account balances, loan status, date of last transaction, interest to date, etc.

Special Functions

The system also allows tellers to interrogate for stop payments and holds, post a deposit immediately (as in the case of a large purchase where a customer check needs to be covered) and be alerted to referral conditions such as lost check books or unusual account activity.

To serve the five correspondent bank's on-line locations, only five phone lines are required. As the system is expanded, telephone lines can be kept to a minimum because actual communication time between terminal and computer is measured in thousandths of a second. As a result, the system appears as if it's responding to scores of inquiries at the same time.

Now that the system is tried and proven, Third National expects to expand it to other correspondent banks where more tellers will let their fingers to the "talking."

System Tracks Steel Products

(Continued from Page S/40)

receivable is paying for the system.

Other benefits are smoother operations, fewer aggravations and minimized accounting error.

Financial Benefits

Most important are the two major financial benefits. Work formerly done by a staff of six is now handled by three people. Tighter control has permitted a reduction of 20% in the inventory level — worth \$5 million.

KG and Turnkey Sales & Leasing have converted each of the eight warehouses to the terminal-based system under a phased program. At least three more locations are planned and even greater savings are expected.

In the near future, KG will be examining the possibility of expanding the system to the Carbon Steel Department, which processes carbon steel and furnishes various configurations of this product from sheets and coils to flat bars. This department has a warehouse and mill in Gulfport, Miss.

As customer benefits of the terminal-oriented system provided by Turnkey Sales, the firm is able to offer its products more efficiently.

Ken Tasuuma is assistant manager in the Iron and Steel Department of Kanemitsu-Gosho, Inc., New York, N.Y.

CUSTOM TAILORED DATA TERMINALS AT OFF-THE-RACK PRICES

We are in the business of buying, selling, leasing, renting, manufacturing and servicing complete data terminal packages, tailoring the equipment and use plan to your particular applications.

Quality terminal hardware from Digital Equipment, Diablo, Teletype, Lear-Siegler and Techtran has been carefully selected to offer our customers the most reliable and popular equipment available. Also, our variety of rental, lease and purchase plans assure data communications users of the best price/performance value.

Our engineering, design and manufacturing capabilities are devoted to "custom-tailoring" standard terminal equipment to the specific needs of our customers. Your requirements are translated into the specific hardware, software, user and service plans needed, without compromising your objectives.

Carterfone is unique because we perform to your requirements through our broad range of equipment and services, resulting in a business atmosphere that is "tailored" to you the customer.

If you've got the feeling that your present or planned terminal equipment is something of a compromise and not totally meeting your requirements, give Carterfone a call.

Carterfone

George Goodwyn, Vice President/Sales
1111 W. Mockingbird Lane, Suite 1400
Dallas, Texas 75247
(214) 630-8700

Costs and Errors Foiled

Airplane Parts Ordering Controlled by DDP

Special to CW

RENTON, Wash. — The Boeing Commercial Airplane Co.'s "Triple Seven" Division, responsible for production of the 707, 727 and 737 aircraft, conducted a study in 1975 and 1976 which showed the firm could achieve significant cost/performance advantages by replacing its punched card-based procurement system with a more advanced CRT terminal system. This factor prompted management to invite bids from some 44 terminal equipment manufacturers.

"We wanted to be thorough and accurate in our hardware and software requirements, so we formed a team of experts from diverse areas within Boeing to assure us of virtually foolproof specifications," according to Larry M. Olson, business systems manager for the division's Material Department.

"The team consisted of representatives from operations, procurement, teleprocessing requirements, hardware management, operating systems and communications, business systems organization and the technology staff," Olson said.

"As a result of our request for bids, 15 companies submitted firm bids for the order. We selected the Sycor, Inc. 440 distributed data entry and processing system because of its cost/performance ratio and because it filled the bill as a 'state-of-the-art' system that would grow with us," he recalled.

"The system has been fully operational since April 1977, and we are currently processing over 2,500 purchase order transactions on the system every week," he added.

Many Advantages

The advantages of the terminal unit over the previous punched card system are many, according to Robert Isaacson, material operations manager.

"The Sycor system is less expensive to lease; requires fewer communications lines and therefore results in less

expensive communications line costs; is more reliable and will handle peak loads; is quieter and provides neater, more orderly data storage; is an intelligent terminal with the capacity to support other functions locally which are unrelated to the procurement system and uses 'state-of-the-art' microprocessor technology in a disk-based system," he said.

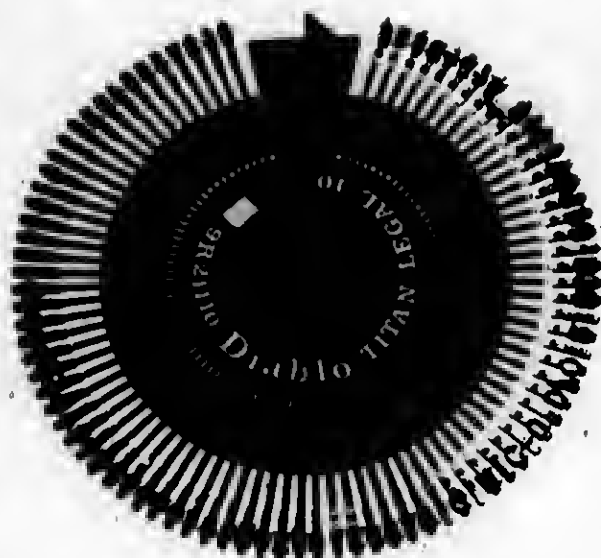
Electronic Traffic Director

At the heart of what Boeing calls its Integrated Purchase Order (IPO) system, the 440 functions as an electronic traffic director controlling all the recordkeeping for procurement, receiving (Continued on Page 5/46)



The purchase requisition input department at this Boeing division uses a Sycor 440 with eight CRT stations.

Xerox re-invented the wheel.



It was the invention of the wheel that got everything rolling in the first place. But it was the re-invention of the wheel by Xerox that got the word processing industry to where it is today.

It all began with the introduction of Diablo's HyType I printer in 1972.

Later, the introduction of the HyType II put print wheel technology into high gear. Features, such as 55 cps and true proportional spacing established industry standards.

In fact, no one has ever managed to duplicate the

combination of HyType's reliability, print quality and speed. And today there isn't a wheel around that isn't based on Xerox technology.

Of course, all our successes with wheels didn't mean that Xerox started coasting on them. The word processing industry required one with more durability so Xerox re-invented the wheel, again. The first metal wheel.

Now you can get up to 60 fonts, exact proportional spacing, and crisp fully formed characters in a wheel that will last up to ten times longer than plastic. In fact, if the 1355WP metal wheel ever does need replacement, it most likely won't come until after 50 million impressions.

Or just about the time Xerox will have re-invented another wheel.

Diablo Systems

XEROX

Diablo and XEROX® are trademarks of XEROX CORPORATION.



9113R RACK MOUNT MODEM WITH BELL 212A COMPATIBILITY

A second generation CMOS Logic Originate/Auto Answer hardwired modem designed to fit the standard 19-inch relay chassis. The modem rack case (also available from OMNITEC) houses up to 16 cards including 103, 202 or a mixture. Bell compatibility also includes 103 and 113. 0-300 baud standard with 600 baud optional. Black anodized face includes LED's for CC, CD, CE, CT, CF, CA, CB, BA, and BB. 9113R stand-alone units also available.

For more information
write Dept. 320 or
call (602) 252-2083 collect.



OMNITEC DATA
"New Dimensions in Modems"
2405 South 24th Street • Phoenix, Arizona 85034

Boeing Arm Uses DDP to Control Parts Orders

(Continued from Page S/45)

ing, quality control inspection results, stores stocking and accounts payable.

In addition to its own functions of on-site processing and recordkeeping, the 440 system communicates daily updates to the central data files of the IBM 370/168 mainframe. This is handled through use of Sycor's interactive remote job entry (IRJE) communications capability.

Used by Purchasing

One of the departments involved with the IPO system is the Purchase Requisition Input Organization, which has a staff of eight and operates one of the division's three 440 systems. The system configuration includes eight CRT terminals, two Sycor

printers, a 300 line/min printer, a 180 char./sec Sprinter and a system controller having 64,000 bytes of central memory and 20 million bytes of fixed disk storage.

Five of the terminals are used for direct entry of the purchasing information. A sixth station is used to handle inquiries. A seventh is used for training new operators and for working exception items. The last station is used for the IRJE transmission to the central computer system.

Purchase requisitions for the division are routed to this department, where they are proofread before key-entry operators enter the requisition data into the 440's master file through the five terminals.

"Entry of the requisition data into the

proper format necessary to create the purchase order is especially easy for new terminal operators to learn. The overall purchase order is displayed on the CRT screen in eight possible formats, each depicting a part of the purchase order document," according to David Leidle, systems analyst for the Material Department.

Simple Procedure

"All the operator has to do is simply request the proper format through a key entry and then enter the information correctly as shown on the display screen," he said.

Purchase orders and/or changes are then printed on the 180 char./sec, Sprinter bidirectional printer. If an inquiry is triggered based upon the

keyed-in purchase order data, the inquiry will be printed on the 300 line/min printer.

The seven-part purchase order is then separated. Two copies go to the vendor and the other five copies are routed appropriately through Boeing's internal channels.

Once the complete purchase information is on the 440 disk, it is transmitted to an IBM 370/168. Unless a problem develops, the purchase order is never looked at again by the preparation organization.

"A big plus in having the 440 system instead of our previous system is that it has an intelligence and a memory capacity which enables us to do off-line processing of other priority assignments on a second shift basis," Leidle said. "We are currently taking advantage of the 440 features for tracking purchase requisitions and drawing acknowledgement forms from our suppliers."

Orderly Reception

Two parts-receiving areas, located at Boeing plants in Reston and Everett, Wash., are each using a 440 system with CRT terminals and Sycor 300 line/min and 180 char./sec printers. The data stations are used for inputting and updating parts information and for IRJE communication to the IBM mainframe.

When parts are received, the receiving clerk stamps each container with a unique number that is also stamped on the packing slip.

The packing slip is then routed to the IPO input receiving area, where the data is keyed into the 440 as an "on-dock" inquiry transaction to ascertain that the descriptive data on the packing slip matches the order specifications in the purchase order file. An index file based upon the number is then created for that part.

At this time, an inspection plan and a routing instruction sheet are generated on the 300 line/min printer. Both of these documents and the packing slip are put in a glassine envelope and, through use of the unique number, are married with the actual container of parts.

File Updated

At the parts inspection station, the results are noted on the inspection plan and that document is routed back to a terminal operator who updates the 440's part index file with the information.

Simultaneously, the parts are routed to the appropriate receiving storeroom, where they are visually inspected for proper quantity and so annotated on the routing instructions. That document is then delivered back to an IPO terminal operator for further updating on the 440's index file.

The 440 system then automatically transmits the completed part index file to the CPU's master file, erasing the local 440 file. This completes the entire "purchase receipt" procurement cycle.

"In summary," Olson said, "our IPO system is working very well and through the technology of computerization, we have been able to keep our system in step with the increased business activity of Boeing. In doing this, we have managed to affect a cost savings over our previous system."

Computer Optics announces a new 3270 feature.



Immediate Delivery

Computer Optics can deliver a complete 3270 replacement installation — CRT displays, remote and local controllers, printers. And we can deliver tomorrow, the next day or as soon as you need it.

Computer Optics is totally dedicated to 3270 series replacement systems.

Minicluster systems that handle up to eight tubes or printers in a remote location. Maxiclusters, either local or remote, for up to 32 tubes or printers on one controller. All are plug-to-plug compatible with IBM equipment.

We've always saved you money over your IBM

3270 costs. And now, we can also save you time.

If you can't wait a year to expand your present display installations, or if you'd simply like to reduce your display costs, call Computer Optics immediately.

After all, time is money.



Computer Optics Inc.

Berkshire Industrial Park, Bethel, CT 06801

Toll free: 800/243-1314 In Connecticut call 1-744-6720 collect.

At Citibank Operations Center Space Planners Help Workstations, People Mix

NEW YORK — A new concept in work space is being implemented at one of Citibank's operations centers here using minicomputers to form the basis of multi-or single-product workstations.

These workstations allow personnel to create, transmit, receive and read information via CRT terminals. Documents can be filed on floppy disks, eliminating space-consuming filing cabinets. Records and files are on microfilm for short-term storage and in digital form for the longer term.

The space environment was designed so that people and minicomputers can work side by side. The company wanted optimal work flow and traffic and wanted to provide a higher degree of mechanical flexibility when and if the bank's needs changed.

The system was designed so that an entire floor of the operations center can be completely revamped in weeks rather than months. It is possible to unplug a computer on one floor and move it to another without laying new lines.

In order for the moving procedure to be accomplished, the design called for a raised floor to be installed. Once that initial investment was made, moves can be accomplished with little effort or cost, according to a company spokesman.

Citibank is frequently changing its space requirements for some new function or customer service and the space concept is a real money saver, the spokesman said.

In addition to the raised floor, Citibank instituted standardized furniture, partitions, air conditioners and auxiliary equipment. Citibank also stores many of these items on the premises, further adding to in-house flexibility by eliminating the usual and perhaps uncertain delays between purchase and delivery.

New Environment

Minicomputer workstations normally aren't just something one can plug in and turn on. In order for the workstations to interface efficiently with personnel and meet flexibility requirements, a new environment had to be designed.

Because of numerous problems such as the need for supplying chilled water, a result of changes in air conditioning requirements caused by the minicomputers, changes in human work space requirements, the need for movable, multipurpose electrical facilities and elimination of certain office furniture such as filing cabinets, a special environment for this type of system had to be designed from the ground up. That's where Citibank enlisted Interior Facilities Associates, a firm that specializes in space planning.

IFA took stock of Citibank's highly specialized needs and helped design a minicomputer/human environment especially for the Citibank facility. To create easy access to high- and low-voltage wiring, CRT lines, chilled water and telephone lines, a standard, raised computer floor was installed. A raised floor is not unusual, but what IFA and Citibank space planners innovated is the placing of these grouped facilities under the floor on 8-ft centers and on a flexible 8-ft radius. Then,

they use easily movable 2-ft by 2-ft computer tiles with a specially designed, movable service hatch that permits placing of equipment virtually anywhere on the floor. This makes it practical and economical to provide service points very close to or directly under machines or workstations, regardless of layout or how often such layouts may be changed.

When not in use the service hatches are simply closed and used as an ordinary computer floor tile or moved elsewhere. When closed, no projections remain and chairs and other furniture may be drawn back and forth without interference.

Those flexible service points also

mean Citibank in-house service personnel are able to move the electrical service points around the entire floor grid without calling in outside services — except perhaps for plumbers to manipulate chilled water lines. In short, moving service points and hooking up computer and other machinery is not unlike moving a typewriter or business machine. Just unplug it, move it and plug it back in.

In addition to considering how to actually set up the computer machinery and flexibly provide the services needed to run it, IFA had another task: to design the environment to facilitate optimum traffic and work flow. They had to quickly learn and understand

enough of the bank's operations before the change to design the best possible layout incorporating the change.

To keep the system flexible, Citibank chose Herman Miller modular furniture, which is clean and modern in design and can easily be shifted as needed.

To make this type of system work, facilities for storing spare parts had to be provided so that any piece of equipment that needs repair or replacement can be serviced immediately. Citibank purchased preordered parts into the system — sufficient air conditioning units, furniture and piping — so that as needs change or increase, parts are taken from storage.

We Put Our Customers Years Ahead In Computer Communications

We're helping some of America's largest corporations build data communications bases that are launching them into the next decade of computer communications. With software that intelligently and reliably processes and routes data. And, by means of international data communications networks linking far-flung computer installations, we help maintain and expand the flow of critical data to top management. On-the-spot service teams help ensure that this data flow remains uninterrupted.

In addition to complex networks, our communications processing equipment provides instant access to any computer or terminal within the system, including message switching between IBM host computers, or, between non-compatible CPU's. Our powerful software is again, the key. It emulates the industry standard IBM 3704 or 3705 communications controller while handling terminals worlds apart.

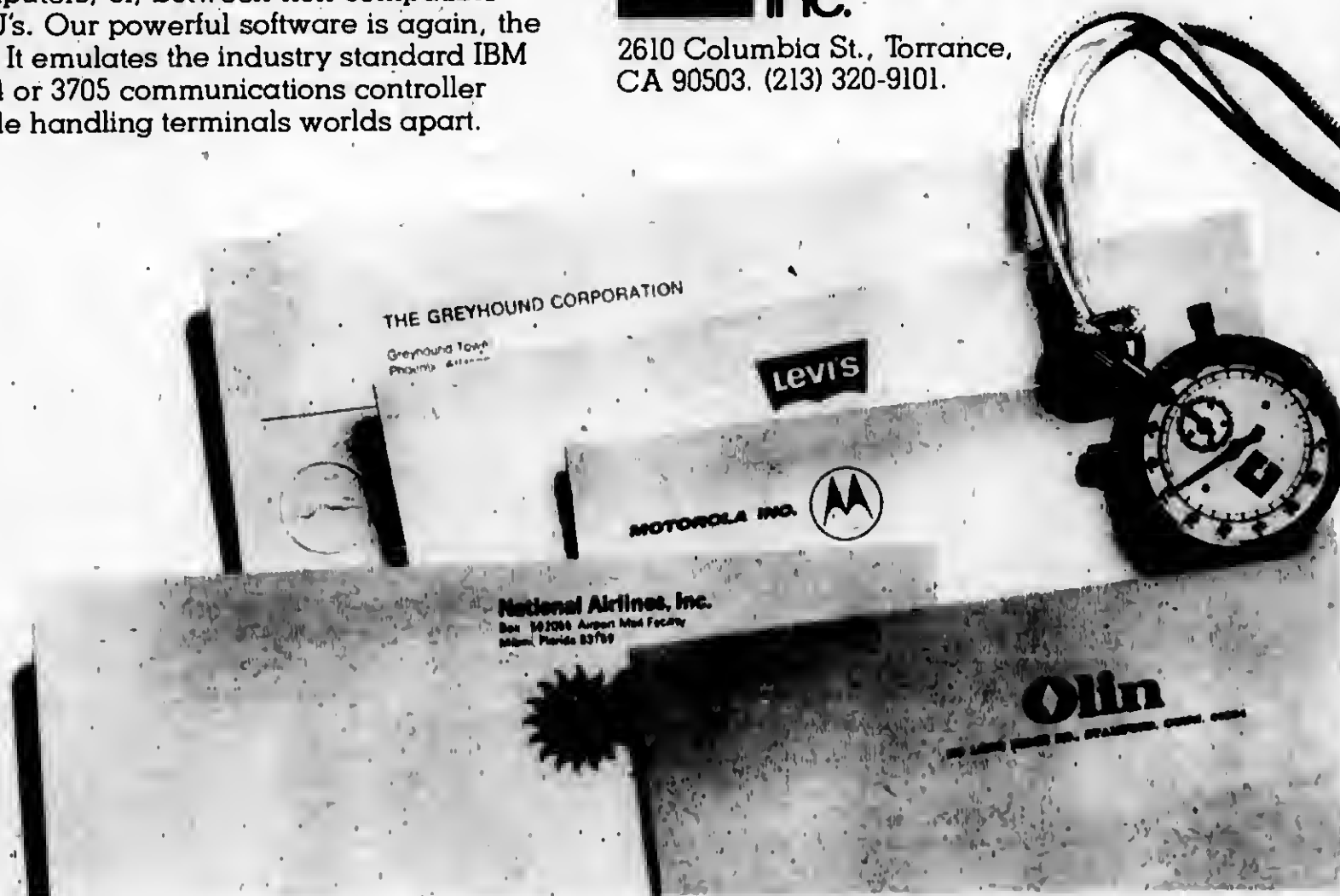
CCI systems enable those terminals to operate like they're next door to your IBM mainframe. And, our systems are designed to handle future expansion, easily and compatibly. As your data communications requirements increase, we'll be right there with you.

Don't wait for the 1980's. Join us there, now. Some of the biggest names in business already have. Find out how you can put your company's name year's ahead in computer communications. Call or write for your set of CCI installation profiles.

We're Winning The Computer Communications Race

Computer Communications, Inc.

2610 Columbia St., Torrance,
CA 90503. (213) 320-9101.



Railroad Building Cardless On-Line Data Base

SAN FRANCISCO — Southern Pacific Transportation Co. (SP) is one of the most profitable and modern U.S. railroads. SP relies on a computerized terminal system to serve the "Golden Empire," stretching from Oregon to the Mexican border, through the Sierras to Utah, along the Gulf Coast to New Orleans and up the Mississippi River to St. Louis.

Management and operations depend on SP's computerized Total Operations Processing System. Among its data base functions, Tops provides on-line inquiry for shippers, top

management and switchyard personnel. One hundred high-speed and several hundred low-speed terminals are installed throughout the Tops network.

"It means more timely data and accurate updating of the central data base, as well as better planning and reporting at all levels," according to J.W. Germany, vice-president of management services.

Tops monitors operating activities like car location, train movement and virtually every other railroad operating activity. "The Tops philosophy is that our decision makers

know what to do. However, they need accurate information to plan and respond to changing requirements. That's what Tops was designed to provide," Germany said.

Tops also gives yardmasters, trainmasters and hundreds of clerks in more than 90 major SP switchyards facts needed to implement management's decisions.

Begun in 1960, Tops took more than eight years to develop and was installed nearly a decade ago. SP President Denman K. McNear reported that Tops saves the railroad \$6 million annually.

System Description

The front line of Tops is a switchyard network of remote teleprocessing terminals attached to a CPU at headquarters. Operations people enter data about events as they occur. After processing, the data is immediately available for management analysis, accounting and billing and operations activity.

"By collecting all operating information," Germany explained, "Tops has a complete status report of the entire railroad at any time."

The installation of more than 100 IBM 3771, 3774 and 3775 data communications terminals is the latest major step in the ongoing modernization of Tops.

SP reported that the new terminals are much faster and "round-the-clock" dependable, helping SP upgrade and consolidate its teleprocessing (TP) network. Furthermore, installation has been quick and easy.

"Tops is a one-time, source reporting system," Bill La Mere, senior system specialist, explained. "When a freight car comes onto our lines we capture data for the complete history of that car on our railroad."

As it develops, other information on empty cars, train movement and the disposition of locomotives, cabooses and train crews is also entered into Tops.

Receiving, editing and storing all operating data, the central Tops computer makes it available to yard, car distribution and traffic offices throughout the railroad.

Headquarters Control

From headquarters, Tops assigns freight cards to shippers, directs and monitors car movement and stores each car's current location. As a train approaches a switchyard, Tops transmits an "advance consist," listing all cars on that train, their destination, their contents and any special instructions, including a card for each car.

When outbound trains are assembled in SP switchyards,

cards are lined up in the order of the cars and reported to Tops, which creates a consist and sends it on to the next switchyard at the appropriate time.

"Cards are the primary form of data entry," La Mere continued. "When a car comes on line, all waybill information is punched into the first 60 columns of a card. As the car is routed to its next stop and on to its destination, new information and updates are entered in the right-hand 20 columns of the punch card."

The 3770 data communications terminals fit SP's image of itself as an up-to-date transportation company.

Versatile and Strong

"We took a general machine and shaped it to our particular needs. As an on-line data entry terminal, the 3770 reads the card reader, reads the keyboard and prepares data for transmission to the host," La Mere said. "Besides printing unsolicited messages from Tops like an advance consist, the terminal sends and receives messages from other switchyards and headquarters management. It also handles local processing," La Mere said.

"Tops is a centralized teleprocessing system," he said. "But we do use the 3770s in a programmable mode. About a dozen programs from headquarters stored on diskette give switchyards the muscle they need to produce switch lists and other local printouts without tying up the line to the host."

"Remember that most messages tend to be very long in the railroad business," La

Mere pointed out. "The consist, for example, lists every car, its weight and contents, its destination, the kind of car it is and other information. Terminal response becomes very important. Not only for getting information out of Tops, but for updating the data base, too."

The SP runs 24 hours a day, seven days a week. So does Tops. A dual system at headquarters alternates one IBM 370/168 on-line while a second 168 stands by. "In the field, our terminals must run continuously," Vice-President Germany said. "The environment is harsh; there's heat, dust and cold, yet the terminals have proven so reliable that in most cases we've installed them without backup."

"We're not operator oriented," Lou Wells, general agent at SP's small but very busy Bayshore switchyard, explained. Almost as many different people at Bayshore use the 3775 in a day as use the pencil sharpener. And they expect the terminal to work as easily and dependably as any other piece of office equipment.

"Demand for the terminal follows the peaks and valleys of traffic in and out of the yard," Wells said. "Fortunately, with the 3770 we can input an entire outbound train in two minutes. With the old terminal that job would take at least 10 minutes."

John Davis, car distributor at Bayshore, said one local list that once took 45 minutes to get now comes back in 10 minutes. "I've never seen our people adopt new hardware so eagerly," Wells added.

Available Immediately For

SHORT TERM LEASE

370/138 370/148 370/145

3330's and OEM 3330's

360/30 360/40 360/50 360/65's

Greyhound Phoenix ICA's

CALL US COLLECT

United States
Austin
Boston
Chicago
San Francisco

Ron Geil
Tom Ryan
Jerry Smith
Dave Hyland

(512) 451-0121
(617) 272-8110
(312) 298-3910
(415) 283-8980

International
Canada
Mexico
Eurasia (U.S. inquiries)
U.K./Europe
Austro-Asia

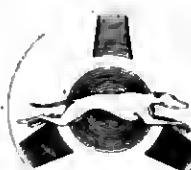
Don Maunder (Toronto)
Andres Contreras
Don Haworth (Dallas)
Joe Gold (Geneva)
John Hallmark (Dallas)

(416) 366-1513
(905) 543-6850
(214) 233-1818
(022) 61-27-54
(214) 233-1818

Non-IBM:
UNIVAC or
CDC only)

John Hallmark (Dallas)
Don Haworth (Dallas)

(214) 233-1818
(214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**

GREYHOUND TOWER, PHOENIX, ARIZONA 85077

Protect Your Computer Data From Theft

... using the new Federal Data Encryption Standard

Join Ketron's technical personnel and industry experts for a 2½ day seminar to review newly developed data encryption technology. Learn state-of-the-art procedures for planning your encryption strategy.

Topic: Computer data security, using commercial cryptographic technology. Includes system solutions and management of cipher keys

May 8-10—New York City
May 22-24—Washington, DC
June 18-20—Barcelona, Spain
July 24-26—Denver, Colorado

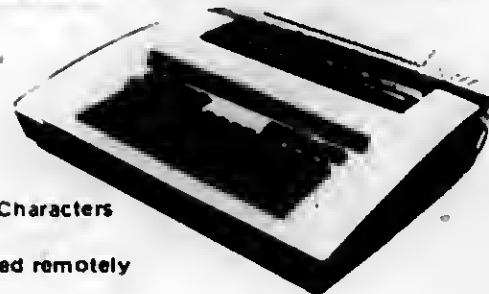
Call or write to:
KETRON, INC.,
Valley Forge Executive Mall, #10
Wayne, PA 19087
Telephone (215) 687-6300 Telex 834394

ECONOMY and POWER

IN STOCK!

Teletype® Model 43

- Display 24 lines, 1920 Characters
- Addressable Cursor
- Keyboard may be cleared remotely
- Ma Bell Compatible



- 110-300 Baud, 132 Characters
- Upper-Lower Case
- RS232 Compatible 20ma option
- 9 x 6 Dot Matrix
- Height 5½", Width 18", Depth 21½", Weight 30 lb.

ADM-3A

Multiterm® Teletype® Data General® Lear Siegler® Data Media®

Sales - Service - Rentals



TERMINAL SYSTEMS INC.

213-769-6772 415-573-7723

For All your Mini Computer and Telecommunication Needs

1100 N. Hollywood Blvd. Hollywood, CA 91605

Formula Stresses Technology

Credit Union's Terminals Help Sustain Growth

SAN ANTONIO, Texas — The Government Employees Credit Union (GECU), headquartered on the Northwest Expressway here, has developed one of the nation's most successful Credit Union growth formulas. Part of this growth is the result of using Automatic Teller Machine (ATM), and CRT terminals.

According to Jim Williams who holds dual roles as president of GECU and president of the Credit Union National Association, the group has been able to blend advances in service with innovations in products such as ATMs and CRTs.

"Staying on the cutting edge of program development has been a basic part of our company philosophy, and it's been a key factor in helping us achieve our growth objectives," Williams commented.

Just as significant in enabling GECU to provide a growing number of financial services to its members is a decision made four years ago when the company began evaluating its batch-oriented DP system.

A subsidiary corporation, FDS, Inc., had been established to provide DP services to GECU as well as other credit unions associated with the Texas Credit Union League. Charged with managing GECU's DP operations, FDS had to make sure product development kept pace with program development.

Batch System Outgrown

"We realized our recordkeeping and accounting load was outgrowing our batch-oriented system," according to FDS president James Aston. "A credit union inherently has more paperwork than either savings and loans or banking institutions, because of the number of paper transactions rather than cash-in-hand operations. So we began looking for an on-line terminal system that would take the load off the credit union's personnel and allow increased services to be offered to members."

What GECU ultimately selected was the Bunker Ramo Information Systems Division 2001 Universal Teller Terminal.

Among the features of the 2001 Aston considers most desirable are the CRT display, built-in memory, automatic printing of receipt and journal, function keys as well as numeric keys, easy-to-use controls and flexibility to adapt to GECU's requirements.

"Because many functions can be completed within the terminal, we've been able to reduce our on-line traffic by as much as 50%," Aston said.

Reductions in line costs aren't the only savings achieved through using the 2001. GECU has been able to reduce the time a member spends at the teller's window during an average transaction to less than three minutes compared with the 7 to 8 minutes formerly required.

"We used to manually verify account numbers, hand-write tickets, count the money and provide a copy of the ticket to the member," Aston said. "With the 2001, the teller simply keys the account number and does little more than watch while the terminal automatically computes change and balances, prepares a transaction ticket and validates the receipt."

Teller's Point of View

From the teller's point of view, the 2001's most helpful feature is probably its inquiry/response capability, Aston emphasized. "In the past we did a lot of research looking up hard-to-find items such as amortization schedules and balances."

"Now the teller spends a few seconds with the 2001 and determines answers to such frequently asked questions as: How much interest am I paying? What would it cost me if I paid off today? How much do I have left to pay? When is my next payment due?" he explained.

Answers to these questions are displayed on the 2001's integral CRT, which can display up to 256 of master file data whenever called for by the operator.

The same data can be printed on a journal roll or voucher at 105 char./sec, providing a permanent record of each transaction. By reviewing the screen, the teller can validate each phase of the transaction and all entries can be proof-read prior to being transmitted to GECU's in-house data center.

Network Components

GECU has 50 Bunker Ramo 2001s and 50 additional terminals in its current network; 2001s are being added at the rate of four per month. The network itself is built around an IBM 370/148 located at the San Antonio headquarters.

The 2001 terminals and other on-line terminals communicate through a System/7 front-end processor under a synchronous protocol through dedicated leased lines to the IBM 370 CPU. The network currently operates at 2,400 bit/sec, although an increase to 4,800 bit/sec is being contemplated.

Four key dedicated lines serve as the backbone for

GECU's on-line system, connecting the headquarters facility to its five main branches and ATMs in San Antonio.

Added to the 90,000 GECU members, some 160,000 participants in 12 major credit unions scattered throughout Texas are provided on-line real-time data processing services by FDS.

Plus, 90,000 additional members in 44 other credit unions are currently receiving batch services. These are provided through keypunch entries to a Univac 1900, which are then captured on disk and transferred to tape for printout.

"Another plus about our network is that our equipment is fully upward-compatible," Aston noted. "For instance, we can add Bunker Ramo's Thrift System 90, a smaller, highly modular DP system, to our network to give us more distributed processing capability when we need it."

Software Generation

Software generation has proved no problem to Aston and his FDS staff. They generated their own system, called Credit Union Processing Isn't Difficult (Cupid) to handle current requirements.

The development of software configuration tables and screen formats for the Thrift System 90 terminals is all that will be required when that system is implemented since Bunker Ramo provides the operating system package.

"The whole idea is to establish a system that provides our tellers with easy access to all the data our members might want and provides it accurately, conveniently, quickly and cost effectively," Aston stated.

Even balancing at the end of the day is not the problem it used to be for the tellers. All they need to do now is count their cash and checks and compare the total with the balance shown by the 2001 (which prints a record of all transactions completed during the day). "Balancing out can be accomplished now in from 20 to 30 minutes," he said.

Training Tellers

Training tellers to use the Bunker Ramo terminal is also a relatively easy task, thanks to the machine's design. For instance, function keys are inscribed in English rather than numerically so the operator can read each step in a logical sequence. The CRT display serves as a guide by signalling any "stop" or "hold" information, interest to be posted or other necessary updating.

If an error is made by the operator, such as the transposition of an account number or

an invalid transaction amount, the error will be indicated and the operator can correct it before proceeding.

Impressive as it is currently, the list of services to GECU members and to credit union members nationally will be vastly broader in the future, according to president Williams.

He cited a major credit union advantage — not being locked in to any predetermined or rigid system — as enabling credit unions to respond to all kinds of financial needs.

Direct deposit of payroll is

already being accomplished by GECU for the Bexar County Hospital District, for example, and more of San Antonio's \$800 million annual federal/state/city payroll will go into credit union depositories, according to Williams.

Some other facilities are only a few months away such as national bank credit cards that his credit union may distribute to members, increased utilization of ATM's in shopping centers and a giant new push for electronic funds transfer (EFT) at key over-the-counter points.



Squeezed by **COSTS?**



Chaffing over **DELIVERIES?**



Want **MORE RELIABILITY?**
EASIER MAINTENANCE?
and a
FULL YEAR WARRANTY?

DX00 SERIES SMART TERMINALS



EECO

1441 East Chestnut Avenue
Santa Ana, California 92701
Phone: (714) 835-6000

SYSTEM 50. \$5250

The Video Processing Station that saves you a bundle.

Whoever thought \$5250 would buy a complete data system?

Well, think about this. \$5250 buys you an intelligent video terminal with a built-in microcomputer and a vast array of software. Such as an advanced diskette operating system (ADOS) with extensive file management, an Assembler,

Editor and Debug package. You also get extended ADDS*BASIC and ANSI standard ADDS*FORTRAN IV. So besides an affordable price, you get languages you can speak.

And there's much more. Like System 50's 32K memory, expandable to 48K. Plus a single IBM 3740 compatible diskette, with an optional second diskette.

All those features. And we aren't finished yet. Because with System 50, you'll have both a keyboard designed for operator convenience and a large 12" screen with 25 lines of 80 legible upper and lower case characters. All this is integrated into an elegant office-quality desk.

If you thought buying an advanced video processing station was out of the question, System 50 is the best answer around.

Quality, Reliability and Integrity. It all adds up to ADDS.

ADDS Applied Digital Data Systems Inc.
100 Marcus Blvd., Hauppauge,
New York 11787 516-231-5400

I want information on System 50.

Name _____

Firm _____ Title _____

Address _____

City _____ State _____

Phone _____

Access to Patient Data Immediate On-Line System Pulses Through Hospital

By C. Jack Price
Special to CW

DALLAS — The Parkland Memorial Hospital here saw the need for a real-time computer system as far back as the early 1960s. Today, our system keeps track of everything from basic patient information, supplies and pharmacy orders to X-ray requests, diet modifications and lab results.

The data base we have provides a central reference bank of information for our entire hospital. Once information about a patient has been entered, it is immediately available to all authorized medical staff members who need to care for that patient.

We enter information about a patient only one time and, by eliminating redundancy, we save time and money and cut the number of errors that naturally occurred with a manual system.

As a result, we have vastly improved our operating efficiency and control. More importantly, our medical staff now spends less time performing administrative tasks and more time working with patients.

Parkland's system, an IBM 370/158, is linked to CRTs throughout the hospital. When a patient checks in, information is transmitted to the CPU from one of these CRTs. The system then updates the hospital file and allows access to the data from anywhere within the hospital.

Data Confidentiality

Confidentiality of patient data is maintained through programming controls and security codes. Financial information, for example, is available only to the business office.

Similarly, any medical personnel using a terminal to inquire about a patient's medical data must have the proper security code. Otherwise, the system will refuse access to the information.

Our on-line system gives us the ability to use the CPU as a vehicle of information between departments as well as a central source of information. To take advantage of that capability, we are adding an order communications application to the system.

Order communications will allow us to instantly transmit physicians' instructions, test requests and lab results from one department to another by means of our terminals.

Although we plan to expand the on-line system further, it already acts as the heart of the hospital, instantaneously pumping information back and forth to various departments.

Parkland Memorial Hospital is the health care facility operated by the Dallas County Hospital District. Our primary purpose is to provide medical care for the indigent popu-

lation of Dallas County.

Working in conjunction with the Southwestern Medical School of the University of Texas Health Science Center at Dallas, we are also a major teaching and research facility. In addition, we have one of the most complete emergency medical care units in the country.

Patient Load

Parkland is an 880-bed hospital with 1,600 physicians on its medical staff. Patient days for 1976 totalled 276,000, and there were 35,000 admissions during that same period. The average length of patient stay was 7-3/4 days.

User With Eye on the Future Goes for Independent Memory

ST. LOUIS — Central Hardware, a 22-store retail hardware chain headquartered here, has upgraded the internal main memory of its medium-scale computer system with the installation of an independent manufacturer's add-on memory.

Central's IBM 370/135 has been upgraded from 96K bytes to 384K bytes with a Memorex Corp. 6400 memory system. The upgrade will be used to support on-line processing now under development and scheduled for implementation in mid-year.

The selection of Memorex as the add-on memory supplier was based on several factors, including price/performance characteristics and the company's product support capabilities, according to a spokesman. But

Last year, the number of outpatient visits was 300,000 and the number of emergency care visits was 174,000. These outpatient and emergency loads showed us to be in need of a real-time data base system.

From 1974 to 1968, our outpatient and emergency patient volume had increased by 70,000. The need for a real-time recordkeeping system became increasingly apparent.

After in-depth research and on-site visits to other hospitals, Dr. David Mishelevich, technical advisor for the Dallas County Hospital District, recommended that Parkland buy IBM's Health Care Support (HCS) system and begin developing a cen-

(Continued on Page 60)

the key factor was the ability of the 6400 memory system to upgrade a broad range of 370 CPUs, from the 135 to the 148.

"We own our mainframe," Will Otherson, DP operations manager said, "but our continued growth will eventually necessitate acquiring a larger machine. We'll be far ahead financially selling a CPU with minimal memory and reusing our add-on unit."

The future expansion of Central Hardware's DP operations "are a continual concern here," Otherson stated. "Obviously, we're looking for maximum cost-effectiveness from our existing hardware and software. But the ability to economically enhance performance as our needs increase

(Continued on Page 62)

Oil Refineries Use Every Drop With Computer-Aided Processes

DES PLAINES, Ill. — Oil refining today means utilizing every drop, and one way to reduce waste is to use a computer to design efficient refinery units.

Oil-refining companies turn to firms such as UOP, Inc. to upgrade existing refineries or design new ones.

Using a large-scale mainframe and interactive terminals, engineers at UOP's Process Division (here) implement new energy-saving refining process designs and make computations in days that used to take weeks, according to E.A. Jones, director of process and computer engineering.

"The computer design process is more thorough and accurate than the traditional manual methods and assures maximum util-

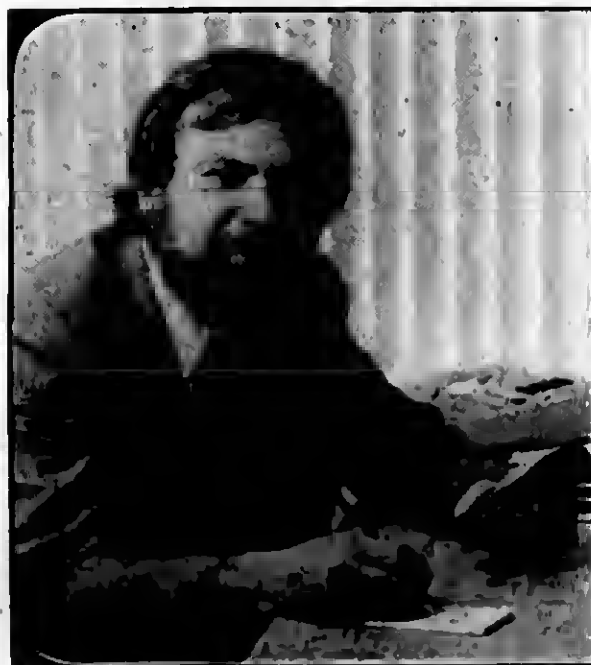
ization of crude oil at a minimum cost," Jones explained.

It has not always been possible to reduce waste in refinery operation. In the early days of refining, only kerosene was desired; today every fraction of crude oil is utilized in some way. Early gasolines would not be acceptable for today's cars because of their low octanes.

In addition, far more gasoline must be extracted from each barrel of crude oil to satisfy industry requirements. This is accomplished by converting much of the heavier crude oil to gasoline by "cracking" the oils and by producing gasoline from the lighter fractions by alkylating some gaseous com-

(Continued on Page 62)

SYSTEMS & PERIPHERALS



I've got the sharpest pencil... when you want to buy a terminal...

Hi... I'm Bert Rudolsky, President of MTI Sales, and if you're looking for terminals or accessories, you can stop looking!

We've got it all, from DECwriters and DECscopes to Modems and Couplers. We've also got the service and the know-how with full factory backup to help the new guy get started in data communications or the old pro update his system for more efficient operation.

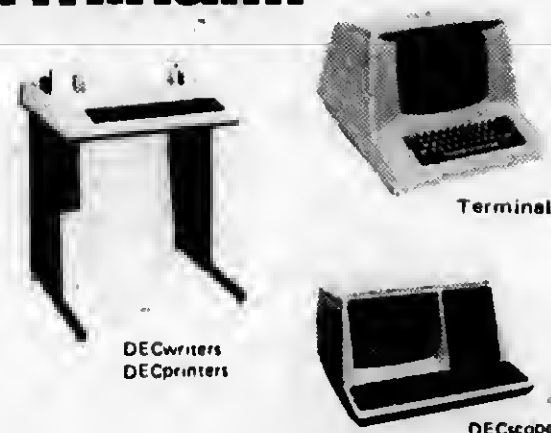
It all means that when you need computer peripherals, you can count on me and the MTI professionals to give you the best deal, best delivery and fastest service.

Buy, lease or rental plans available. Give me a call at 516-482-3500, 212-895-7177 or if you're outside New York 800-645-8016... thanks.



159 NORTHERN BOULEVARD • GREAT NECK • N.Y. 11021

When you buy from MTI you get a price advantage
and a lifetime friend you can count on!



SYNCHRO-SOUND

ENTERPRISES, INC.

Everything you need in small computer systems!

LEAR SIEGLER ADM 3A TERMINAL



Assembled
\$854.95

Kit
759.95

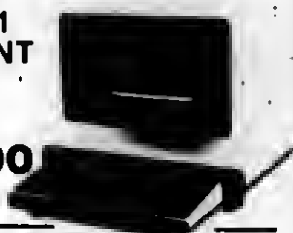
Lower Case Option **69.00**

ADM 1A TERMINAL **\$1529.00**

ADM 2 TERMINAL **\$1995.00**

HAZELTINE MODULAR 1 INTELLIGENT TERMINAL

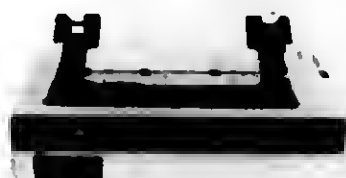
\$1659.00



1500 VIDEO TERMINAL

Kit also available **\$1149.00**

CENTRONICS 703 SERIAL PRINTER **\$2395.00**



761 PRINTER

KSR with Keyboard **\$1695.00**

700 PRINTER **\$1266.00**

OKIDATA MODEL 22 LINE PRINTER

Tractor Feed **\$2249.00** RS 232C Serial Interface **379.00**

MODEL 110 LINE PRINTER

Friction Feed **\$1149.00**

NEW

ADDS REGENT 100 VIDEO TERMINAL **\$1325.00**



IMSAI 8080 MICROCOMPUTER



With 22 Slot **\$649.00**

Microcomputer based Business Systems available



SYNCHRO-SOUND ENTERPRISES
The Computer People
193 25 Jamaica Avenue
Jamaica, New York 11423
212/468 7067 TWX 710 582 5866
Hours 9-4 daily and Saturday
Visit our new showroom
Working units on display
Dept. CW

On-Line System at Parkland Hospital Gives Doctors More Time With Patients

(Continued from Page 59)

tral patient data base. HCS is a multi-purpose package that provides health care delivery, with charge capturing as a by-product.

Highlights of the system in our opinion, are:

- Data accuracy (from entering information only one time).
- Accessibility of medical records.
- Confidentiality of patient information.
- Interdepartmental communications.
- Charge capturing.
- Complete audit trail of patient (who, what, when and where a transaction was entered).

There were other factors in Mishelevich's recommendation to go with the IBM product. As a long-time user of IBM equipment, Parkland could use existing hardware, realizing an economy of cost for our taxpayers.

As a member of IBM's hospital user group called Echo — Electronic Computing, Hospital-Oriented — we could also share solutions and trade programs with other hospitals having similar requirements. Here, too, we could realize cost savings.

The Dallas County Hospital District decided in the fall of 1975 to buy the IBM packages. The first three applications scheduled for implementation were registration, admissions and order communications. Darrell Cranfill joined our staff as director of information services to lead the implementation effort.

Registration Phase

We began the registration phase in February 1976. With support from the vendor, four members of our DP staff had the registration application on-line in three months. One month later, the admissions program was also on the system.

Before the registration and admissions application went on-line, employees from several different departments, including the business office, had to gather information from the patient to make up a complete medical record for him. Now when a patient enters the hospital — whether he registers in the emergency suite or is admitted as an inpatient — he is questioned by only one hospital employee.

All pertinent information (name, address, prior medical record and financial data, for example) is taken by that one employee and entered into the system. In a matter of seconds, the same information is available to all appropriate departments in the hospital. The result is a tremendous savings in time and effort.

Patients benefit from having their medical records more accessible to the hospital staff. For instance, if a doctor needs to locate a record of a patient's emergency room treatment, information is available by using a terminal. With the necessary information, the doctor can more readily decide what treatment to follow. The patient will be treated sooner and able to leave the hospital earlier.

Order Communications

To set up a network of communications between the nursing stations and the ancillary service departments, we have begun implementing the IBM or-

der communications system (OCS). As a part of the on-line system, OCS is expected to provide a fast, efficient means of ordering supplies and services for our patients.

By keying in instructions or by touching a light pen to an appropriate point on the terminal screen, a doctor or nurse will be able to order such things as X-rays, blood tests and respiratory equipment.

Realizing the order communications application would involve nearly every department of the hospital, we established a directions committee headed by John Willis, associate administrator. The committee represents a cross-section of the patient service departments and includes members of the medical staff and representatives from IBM. Its objective is to maintain the schedule of implementation and review any suggested modifications to the system.

Radiology, central supply, pharmacy and the laboratories were the first ancillary services to be put on-line. We expect all service departments to be on-line and each nursing unit to be equipped with at least one terminal shortly. Then we'll stop transporting doctors' orders by runner and by vacuum tube.

Requests for tests and supplies can then be transmitted in seconds. In the ancillary departments, on-line printers will log the requests on hard copy for verification purposes. Charges for services performed or supplies delivered will be automatically generated by the system and made available to the business office for preparing the patient's bill.

The order communications system eliminates the possibility of losing a procedure order, having it misread or failing to add the proper charge to a patient's bill. The system's detailed patient accounting makes lost and late charges, along with uncollected revenues, a thing of the past.

Parkland is one of the first major teaching hospitals in the country to adopt such a wide-ranging on-line system. With a response time of no more than three seconds and uptime of better than 95%, the system promotes user confidence. Hospital personnel in all departments have been enthusiastic about working with it.

Real-Time Benefits

We are successfully using our system to:

- Avoid redundancy and paperwork mistakes.
- Ensure completeness of medical orders.
- Eliminate transcription and interpretation errors.
- Minimize turnaround time of orders to ancillary and support services.
- Build in safeguards against diagnostic and treatment errors (e.g., adverse drug reactions.)

- Speed up preparation of patient bills.

- Prevent lost and late charges.
- Improve collections.
- Record all services rendered, by patient, for planning purposes.
- Shorten hospital stay.
- Reduce on-going personnel costs.

Hospital services are a labor-intensive market. Faced with increasing government requirements, we must look for ways to reduce costs wherever we can.

We feel that our computerized information system is the most cost-effective means of hospital operation today. By delegating time-consuming, simple tasks to the computer, we're using our funds to hire people who will spend most of their time in direct patient care.

Price is Parkland Memorial Hospital's chief administrator and was the 1977 recipient of the Texas Hospital Association's Earl M. Collier award for distinguished Hospital Administration.

ROYTRON™ plug-compatible reader/punch

Desktop combination reader/punch with serial asynchronous RS-232C compatible interface. Designed to operate with a terminal device on the same serial data lines or alone on a dedicated serial line. Reader will generate data at all standard baud rates up to 2400 baud.

Punch accepts data at all standard baud rates up to 600 baud continuous or 4800-baud batch, utilizing a 32 character buffer.

Two modes of operation are provided: Auto Mode — Simulates Model ASR 33 Teletype using ASCII defined data codes (DC 1, 2, 3 and 4) to activate/deactivate the reader or punch; Manual Mode — Code transparent mode. Panel switches control activation/deactivation of reader or punch and associated terminal device.

Tape duplication feature is provided by setting unit to LOCAL mode.



MODEL 1560-AS

High-speed, compact, with self-contained electronics and power supply. Complete in attractive noise dampening housing.



For full details, write or call us.

SWEDA INTERNATIONAL, INC.
Littion OEM Products

34 Maple Avenue, Pine Brook, N.J. 07058/(201) 575-8100

IN U.K. — ADLER BUS. SYSTEMS/OEM PRODS., Airport House, Purley Way, Croydon, Surrey, England
IN FRANCE — SWEDA INTERNATIONAL/OEM, 103-107 Rue de Tocqueville, 75017 Paris, France

By Boosting Recordkeeping Accuracy Records Service Aids Hospitals' Accreditation

By Tim Scannell
CW Staff

PALM BEACH, Fla. — A service bureau here is using a large-scale mainframe to produce medical records and statistical reports for seven area hospitals.

Mediquet, Inc., operating with a Honeywell Information System, Inc. Model 64/20, also compiles utilization reports, justified final diagnoses for billing purposes and other statistics that are vital to a hospital's administrative stability, according to Jean Johnstone, Mediquet president.

A hospital's accreditation and standing within the medical community is usually measured by the accuracy of its records, Johnstone said. "In fact, 48% of all hospitals reviewed by accreditation agencies within the continental U.S. last year were put on probation because they were so far behind in their records," she stated.

Every two years, hospitals are reviewed by the Joint Commission on Accreditation, which determines if a hospital "is meeting the minimum standards to function as a medical facility," Johnstone explained. If a hospital fails to meet the board's standards, it can be placed on probation or even shut down by the committee.

In addition, "no doctor will work on the staff of a hospital that is not accredited because it doesn't have any legal protection covering it against such

things as malpractice suits," Johnstone pointed out.

The medical records of most hospitals routinely run an average of four to seven months behind schedule, Johnstone said. Mediquet, using the HIS 64/20, can process these records on a daily basis and present a hospital with a complete statistical profile in less

the days allotted to a particular patient have to be justified on the medical records.

An "alert" system programmed into the Mediquet computer issues a warning to doctors and administrators when a patient has overstayed his "medical welcome," Johnstone said.

The utilization program is also ex-

sion, is assigned a numerical code and grouped together with similar cases to simplify retrieval.

"You don't have to have people who are trained in medical terminology," Johnstone explained. "If a doctor diagnoses cancer of the breast, someone searching for the record doesn't have to remember that it's also called malignant neoplasm of the breast." The assigned numerical code is all-inclusive, Johnstone said.

System Description

The 64/20 at Mediquet consists of 256K of main memory, three 100M-byte disk units, a 600 line/min printer, a card reader/punch, two tape units, four input terminals and one controller terminal.

Subscribers to the Mediquet service have the option to operate either in an on-line or a batch mode. The hardware installed in each hospital was designed to accommodate its specific needs.

A small hospital (40-bed) might get by with just a printer, while a larger hospital (300 to 350-bed) might need a printer, a few intelligent terminals and associated controllers, Johnstone pointed out.

In some cases, a minicomputer or "some kind of a collective device" could be used to act as an intermediary between the hospital and the level 64/20, she added.

Johnstone and her associates chose
(Continued on Page 64)

"Forty-eight percent of all the hospitals reviewed by accreditation agencies within the continental U.S. last year were put on probation because they were so far behind in their records."

than a week, she claimed.

Mediquet also helps hospitals comply with a two-year-old law requiring them to justify both the admission of a patient and the length of his stay. Under the Hospital Utilization Program, patients are monitored from the point of admission to the time of their discharge, Johnstone said.

Tracking Procedure

Each patient, upon admission, is assigned an approximate amount of days to remain in the hospital. The length of that stay, listed in federally approved manuals, is determined by the doctor's diagnosis of the illness and the patient's age.

Any time spent in the hospital over

tended into the emergency room to catalog the number of people "admitted through" and those who are just outpatients. The system provides a follow-up report on each inpatient, recording whether he was "provided with drugs or dressings or if he required surgery," Johnstone added.

Although the tracking procedure is now a standard practice with every patient, the system was initiated as a means of keeping a constant record of the "tremendous expenditures" associated with the Medicare and Medicaid programs, Johnstone said.

The 64/20 also automatically codes each disease or operation as it is entered into a person's medical record. A particular illness, such as hyperten-

Trying to sell computer peripherals to the world may be a big mistake. Not trying may be an even bigger one.

Doing your own overseas marketing can be a series of expensive headaches.

On the other hand, there's a mighty big market out there.

There is a way to capture the market without the headaches. Or the expense.

Use the services of a competent export marketing organization.

Specifically, the only export marketing organization that has made an in-depth marketing study of the computer peripheral field overseas: Singer Products.

Using our services gives you certain immediate benefits.

One is that you won't have all the problems involved with starting up your business in countries where you don't know anybody, where you don't speak the language, where the local trading practices may be totally alien. We've been there for 40 years. Everywhere. We're a world-wide marketing organization with offices in four strategic areas, and an established distributor network. We know the languages, the trading practices, and the regulations.

Second, you'll have the services of an organization that knows intimately all the markets you'll be going into. Marketing methods that may work very well in the U.S. may not work at all overseas. Each market may indeed require different methods. We're experts in all of them.

Third, distributors will be more willing to handle our products, not only because we're working with them continually, but also because they know we're handling a whole line of complementary products. Thus we can integrate your products into a system.

Once we start selling your products, you'll be able to count on getting your money immediately, and from a domestic source, because we buy everything we sell for our own account, directly from you. It normally takes 120 days or more to get money from overseas accounts. All the financial risks involved, therefore, are ours.

We also take care of all American regulations and licenses. Our export traffic department is familiar with all airlines and

shipping companies serving the world's markets.

We save you a lot of money.

Were you to hire your own expert to handle your overseas sales, he would necessarily be a high-priced individual. He would need at least a minimal staff. And his travel expenses would be considerable.

Moreover, he would be only a single individual. No matter how expert, he could not match the experience of the more than ninety people at Singer Products who are involved only in international trade. And don't forget: you'd have to pay him until he produced—or until you were sure that he couldn't. Even when he did produce, you'd never know how well.

If you deal with us, you'll have no such expenses. You will, in fact, have no selling costs at all for overseas sales, unless you choose to join us in foreign sales calls, in

manning a booth at trade fairs, or in joining one of our seminars.

We lower your unit costs.

Your overseas sales will be, in effect, a pure bonus. That is, you'll be selling many more units than you could if you sold in this country alone without any additional expense. So, whatever your domestic sales, your overseas sales will add enough volume to lower your unit costs significantly. Which of course will increase your profits.

We're looking for all kinds of computer peripherals. If you manufacture any, and want your share of the vast overseas market (without the headaches), let's talk.

Call or write Alan Singer,
Singer Products Co., Inc.,
One World Trade Center,
New York, N.Y. 10048.
(212) 432-1400.



Singer Products
COMPANY, INCORPORATED

Entrex Data Entry Unit Introduced by Nixdorf

BURLINGTON, Mass. — Nixdorf Computer Corp. has announced its first product since the merger of Nixdorf and Entrex operations in the U.S. last year. The Entrex 600/40 is an addition to the Entrex 600 series of distributed processing and data entry systems.

The 600/40 provides for batch and interactive (IBM 3270 emulation) communications. It has 96K bytes of core memory and handles up to 12 terminals (480- or 1,920-character screens), each with a 45 char./sec terminal printer.

The system supports one or two 45 in./sec tape drives, up to two diskette units for I/O, a 300 card/min reader and up to a 600 line/min printer, a spokesman said.

A typical system including a 9-track, 800 bit/in. tape drive, a 5M-byte disk, eight terminals, IBM Binary Synchronous Communications (BSC) and a 165 char./sec system printer leases for \$1,248/mo with a \$500/mo maintenance charge.

Nixdorf is at 168 Middlesex Tpk., Burlington, Mass. 01803.

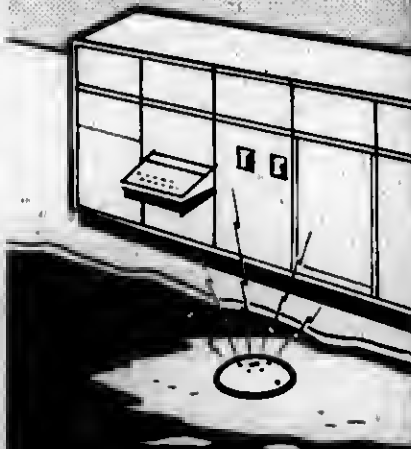
NEW WATER DETECTION ALARM ... FOR COMPUTER AREAS

Warns you of water leakage in sub-floor wiring areas.

- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained... no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

From \$40 — \$70.

Ask about **WATER ALERT** today.



Dorlen Products

Division of Electro Consultants, Inc.
7424 W. Layton Ave., Milwaukee, WI 53220
Phone 414 282 4840

ADD RACING STRIPES TO YOUR CENTURY



Now
Available
For Your

**NCR
101 & 151**

Computer Enhancement Corporation

Memory For: 101 151 200 201 251 300 Criterion

☐ Urgent! Please Phone Me Ext.

☐ Have Your Rep Contact Me

☐ I Want A Demonstration

☐ Send Me All Literature

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone () _____

Ext. _____

For further information call or write:

COMPUTER ENHANCEMENT CORPORATION • 3198 E. Alway Ave., Costa Mesa, California 92626 • 714/754-0621

Processors Aid Oil Refiners



UOP, Inc., designer of oil refineries around the world, uses a mainframe to determine the best distillation steps so that not one drop of oil is wasted. Refineries today, like the model here being inspected by an engineer, are sophisticated plants which process oil through dozens of refining steps.

(Continued from Page 59)

ponents, Jones explained.

The refining industry has been confronted not only with the energy crisis and soaring oil costs, but also by the federal requirements for lead-free gasoline. This has meant a dramatic increase in processing units.

Catalytic Processes

Refineries must add sophisticated catalytic processes using heat and catalysts to change the chemical structure of the raw gasoline to a higher, lead-free octane, Jones said.

UOP's Process Division develops these catalytic processes, one of the most celebrated of which is known as "Platforming", that efficiently produces high-octane gasoline using a platinum catalyst. Almost every refinery in the world employs at least one of UOP's 40 or more petroleum and petrochemical refining processes, Jones said.

Among the variables design engi-

neers must consider in designing the processing units are:

- Crude oil from various sources around the world differs substantially in chemical composition.

- Oil companies want different product slates from inland as opposed to sea coast refineries.

The problem, then, is to take a variety of crude oils containing varying amounts of light and heavy fractions into a refinery and produce a consistent slate of products through various processes.

Engineers at UOP's Process Division utilize terminals to design many of these processing units, with 10 or more units in each refinery. Since these terminals are linked directly with an IBM 370/168, the engineers can immediately edit and change their design calculations.

The system also allows the engineer to use a step-by-step design procedure, similar to what is done manually, but at increased speed.

User Goes With Add-On

(Continued from Page 59)

must also be a prime consideration for us."

Central Hardware handles approximately 40,000 different items. Its 22 outlets range throughout Missouri, Indiana, Illinois, Ohio and Tennessee; two more stores are scheduled to open in Ohio this year. Distribution is centered at the firm's 435,000 square-foot warehouse adjacent to its St. Louis headquarters.

In addition to new stores, expansion has been fueled by a burgeoning inflation-conscious, do-it-yourself trade. To speed paperwork processing, Central Hardware plans to put its central buying and receiving operation online first.

Eventually, 17 CRT terminals will be utilized within the network. They will be supported by IBM's Customer In-

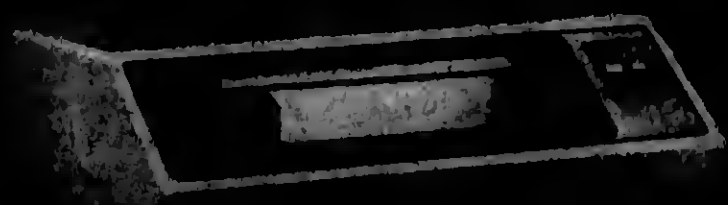
formation Control System (CICS), requiring a series of additional internal memory enhancements.

The memory system was installed by Memorex's field engineering personnel over a weekend last August of last year. It was the first installation of the 6400 memory. The installation went very smoothly, Otherson recalled.

"We did have a faulty wire which was promptly identified and corrected," he said, "and we were up and running on Monday. Since then, we have experienced flawless performance from the unit."

"We looked at several memory suppliers before finally selecting Memorex," he added. The combination of enhanced price/performance, product reliability and field support made a strong case for the 6400, he concluded.

OEM Printers with value-added options and the quality your customers demand



We've built-in I/O compatibility and value-added features across our line

Control Data's OEM printers have value-added features that help you tailor better solutions to your customer's requirements. Built-in features include clear, crisp print quality, acoustically dampened cabinets and easy-operating controls. And we've built in common interface protocol across our line. So you don't have to redesign your interface for each application.

Choose one of our Bi-Directional Position-Seeking Matrix Printers

Our Matrix Printers print single to five part forms with sharp, clean 7 x 7 or 9 x 9 patterns. Standard 10 cpi, 6 lpi and 64 ASCII characters... full line 132-character buffer memories. Options include a paper-saving 16.5 cpi pitch and 8 lpi spacing, 96 and 128-character sets. Speeds range from 70 lpm for 132 columns to 200 lpm for 33 columns.

Cut your customer's paper cost with one of our Band Printers

Offer your customer reduced paper and total life cycle costs with a choice of 10 cpi or compressed pitch 15 cpi bands. Bands switch in seconds. At the 15 cpi density, a full 132-character line prints on letter-sized paper. Multiple options permit you to tailor the printer to your application. Eleven interchangeable bands, identical spare parts kit. Full solid-stroke characters top to bottom. Print speeds with 48 character set: 360, 720 and 1130 lpm.

High performance, high throughput Fastrain Printers

All Fastrain models accommodate any size character set from 16 to 128 with correspondence-grade print quality. Speeds with a 48-character set are 1200, 1600 and 2000 lpm.

Put quality behind your nameplate. Call us at 313/651-8810 or if in Europe, contact one of our European representatives. Or return coupon to:

Harrison Craig, Product Sales Manager,
Control Data Corporation, 1480 N. Rochester Road,
Rochester, Michigan 48063.

C3/27

Please send literature and sample printout of your
☐ Matrix Printers ☐ Band Printers ☐ Fastrain Printers

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

CD CONTROL DATA CORPORATION

More than a computer company

Fiche File Has Side Guides

ORANGE, Calif. — A microfiche file that uses flexible side guides to center and align material was introduced by the Visu-Flex Co.

The Multi-System file is designed with supporting dividers that fit over the side guides and ride freely with microfiche cards, a spokesman said. Front and back panels are adjustable to hold filed material either in a vertical or an included "V" position, he continued.

Multi-System trays are priced at \$17.85 for the 12-in. length and \$22.50 for the 16-in., from Visu-Flex at 1641 W. Collins Ave., Orange, Calif. 92667.

Digitronics Offering Paper Tape Punch

CUMBERLAND, R.I. — A sprocket-fed paper-tape punch with an operating speed of 75 char./sec was announced by Digitronics, a division of Comtec Information Systems, Inc.

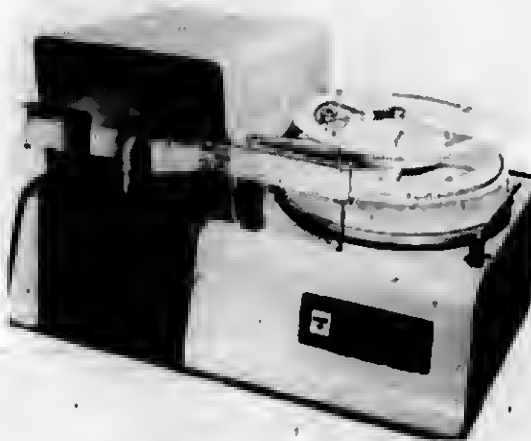
The P 8075/A is designed to give less

slippage and provide positive retraction of punched pins on five- through eight-level data on 1-7/8-in. or 11/16-in. wide paper or Mylar tape, the firm claimed.

The tabletop punch is also available

with paralleled or RS-232C interfacing, the firm said.

Single-unit prices range from \$1,995 to \$2,245, a spokesman said from the firm at 53 John St., Cumberland, R.I. 02864.



Digitronics Punch

Record Accuracy Boosted

(Continued from Page 61)

HIS over other vendors because of the support and encouragement offered in the early stages of Mediquest's development, she said. Prior to leasing its own system, Mediquest bought time on a HIS computer to process records and became acquainted with HIS people on a local basis.

"When I was doing basic development," Johnstone remarked, "they be-

came convinced that I knew what I was doing."

Mediquest is currently expanding into the Indiana, New Jersey and New York areas, Johnstone said. Plans also include establishing a center in Puerto Rico to service the 80 or more hospitals located there.

"Many new subscribers to the system are amazed at the accuracy of our medical recording system and sometimes doubt that the figures are correct," Johnstone said. Their departments will spend countless man-hours checking Mediquest's computer-produced statistics only to discover that "they've been wrong in their figures for the past four or five years," she noted.

Standard Offers Power Supplies

SANTA ANA, Calif. — A line of enclosed and regulated dc power supplies that cover a voltage range of 5V to 48V and a power output from 30 to 500 watts has been announced by Standard Power, Inc.

The CPS series units feature terminal strip connection and voltage and current limit adjustment. They have a response time of 50 msec, a spokesman said.

Line and load regulations are approximately .1% with a .1% typical ripple, he added.

The units require a 115/230 Vdc input with a 47 to 440 Hz frequency, the spokesman noted.

The CPS series, available in off-the-shelf voltages of 5Vdc, 12Vdc, 15Vdc, 24/28 Vdc and 48 Vdc, are priced from \$49 to \$345. Standard Power is located at 1400 S. Village Way, Santa Ana, Calif. 92705.

Burroughs Users Gain Printers

MELBOURNE, Fla. — Documation, Inc. is now offering four line printers, the DOC 2000B, DOC 1800B, DOC 1500B and DOC 1250B, with interfaces to all Burroughs B500, B700 and B800 computer systems with the exception of B5500/5700 systems.

Rated at 2,000-, 1,800-, 1,500- and 1,250 line/min, respectively, using a 48-character set, Documation's printers were designed to replace the Burroughs B9243 and B9246 drum printers and the B9247 train printer.

Documation claimed Burroughs users can expect more features with its printers, including a faster slew rate of 100 in./sec, an automatic powered stacker, an antifold ribbon mechanism, seven operator-changeable 432-character print bands and off-line diagnostics and maintenance.

The Burroughs-compatible printers range in cost from \$51,000 to \$41,500 from Documation, P.O. Box 1240, Melbourne, Fla. 32901.

**"Adding a Memorex 6400
Semiconductor Memory multiplied our
capacity by two and cut turnaround
time by two-thirds.
"That's the kind of math
our college loves!" — Gunter Klein**

Mr. Klein is Manager of Data Processing for West Valley Community College District in Santa Clara and Saratoga, California. From its two campuses in the heart of the Santa Clara Valley, home of the semiconductor industry, the district serves over 23,000 students. Approximately 500 of them are enrolled in courses involving direct use of the college's data processing system.

"Before leasing Memorex's 6400 Semiconductor Memory for our System 370/135, we had a total capacity of 512K and our response time averaged 15 seconds. Now our students get a response within 3 to 5 seconds with the addition of the new memory and a new T.P. monitor."

Besides providing for student needs, Mr. Klein's department also serves the college's administrative, management, and record-keeping needs with 32 on-line CRTs.

"Since installing the 6400, all of our inquiries are being answered more quickly and efficiently."

West Valley's 6400 Memory System was installed, tested, and fully operational with time to spare.

"We chose the Memorex Add-On because it provided the right price-performance mix. Furthermore, we didn't have to wait for delivery. Memorex met our time schedule. We're always looking for new ways to improve our capability. That's why we went to Memorex."

For more information ask your Memorex Representative, locations in principal cities worldwide, or contact Memorex Semiconductor Memories, San Tomas at Central Expressway, Santa Clara, California 95052, phone (408) 987-1981.



MEMOREX

SEMICONDUCTOR MEMORIES

In Search for Upgrade

User No Slouch: Evaluates 43 Systems

By Ann Dooley
CW Staff

FORT WASHINGTON, Pa. — Globe Gear Co. didn't want to take the first computer system that came along when it decided to upgrade, so General Manager George McGann spent a year looking at 43 different systems.

The manufacturing and distributing company here first automated its business with a Univac 9200 batch card system and later changed to an IBM System/3 Model 10 disk-based system. But the system was still in a batch process mode that only ran one disk at a time, and the company was being held back, according to McGann.

In order to find the system suited for Globe Gear's needs, McGann analyzed all the operating procedures in the company and came up with a list of 38 criteria the new system would have to meet.

Some of the more important were support for 16 or more terminals, concurrent multiple terminal processing, instant terminal response, the ability to handle a data base file structure, virtual memory and variable-length records and fields.

Knowing exactly what he wanted, McGann began researching all the available systems in the medium to small system range.

Offerings from most of the well known companies such as Data General Corp., Digital Equipment Corp. and Wang Laboratories, Inc. were examined as well as those from local and lesser known companies.

"You name it, we looked at it," McGann recalled. The system that was finally selected was the Microdata Corp. Reality system, acquired from Keystone Data Systems. The Reality system didn't fit all the criteria, but it came the closest, he said.

Decentralized Goal

Globe Gear wanted to become more decentralized so the staff would be dependent on their own capability to access the computer for research instead of waiting around for someone to give them the answers, McGann said.

In keeping with that goal, the company decided to do its own software in-house by its own non-DP staff. The basic programs were provided by Keystone Data, but all the changes and individual programming for the company's requirements were handled by Globe Gear's staff, McGann noted.

"We pulled the plug on the IBM system once the Microdata Reality was installed," he said. The company was down for about two weeks, but that was expected; it gave everyone an incentive to get it up and running, he added.

A lot of preprogramming had been done,

so the essential programs were running soon after the system was installed — but only in the most rudimentary form. The system performs order entry, sales analysis and promotion, manufacturing control, purchasing, inventory control and all accounting functions.

The system has tuned Globe Gear into a one-business-form company, McGann stated. Carbon paper is no longer used because

he said.

The user, which manufacturers and distributes gears and couplings to more than 600 industrial distributors was able to save 50% of space on disk, according to McGann. The system has helped decentralize the business, give more reliable information, provide the data in much less time and eliminate paperwork, he said, noting the Reality can handle three times the volume of work with

Programming by the Book (Literally)

FORT WASHINGTON, Pa. — "We programmed the system strictly by the book; we were reading it as we went along," was the way George McGann described how his non-DP staff at Globe Gear Co. here programmed its system itself.

"We treated the computer as a tool and treated the subject of programming as an educational requirement," McGann said. The staff studied the manuals and learned that way.

There didn't seem to be any application package to fit the company's needs and "we wanted complete control of the system," a Microdata Corp. Reality, he said.

The programming effort was difficult at first and couldn't have been done without

full management support and approval, he added. Globe Gear lost a few people because they didn't want to get involved in the programming work, he admitted, but everyone is now very independent.

Classes were held daily during working hours and everyone worked toward a goal: computerizing their applications. Twelve staff members went through the training course; some people learned everything in a month while others took about four months before they were considered competent, he said.

McGann let the training effort — and he was one page ahead of his students most of the time. Nevertheless, he said, "We'd do it again the same way."

the system has eliminated 37 of 38 forms. "It's an incredible savings on paper and time," McGann said.

Instead of making form changes for each customer, the system creates the form from a standard business form, depending on the customer's requirements, he explained.

Each terminal can do something different and can interact concurrently with the matrix printer, which has expanded capabilities. In this way, sales inventory and another application can run while the printer is outputting the universal form.

The system includes 12 on-line terminals (10 more are scheduled to arrive soon), a 165 char./sec matrix printer, 25M bytes of on-line disk storage, a tape drive and 40K of core memory in addition to the Microdata Reality CPU. When it was installed a year ago, the system was valued at \$100,000.

The programming was done in Basic, although the system uses Microdata's English language for retrieval and sorting, according to McGann.

"Microdata upgrades rather than scraps its systems, and it's come up with some additional software upgrades," McGann noted adding Globe Gear plans to add more disk capacity.

There was no problem in switching from the IBM 3/10 — in fact, "it was a pleasure,"

the same staff.

People are delighted with the system; there's been very few problems and the service is better than that of IBM or Univac, he claimed.

When a customer call is for information on a product, the staff enters into the terminal several letters identifying the city from which the caller is telephoning. The terminal then lists the customer's accounts in the city by name and account number.

When the account number is entered, the staff member can obtain the credit status, year-to-date sales, specific shipping instructions and number of invoices required by the customer.

The computer checks to see if the requested product is in stock and the customer gets an immediate answer about the product's availability. If a product is ordered, the system immediately prints a shipping label, packing list and shipping receipt.

It also lists the product's shelf number so someone can go to the shelves and pull it from among the 3,000 items stored there.

The system updates the inventory instantly upon order entry and also computes the cash discount, and bills the customer.

The system has increased the staff's morale because it gets the information faster and more accurately, he concluded.

DRS: The real-world data retrieval system.

DRS works for users because it was developed by users. Four simple commands fetch all the data occasional users want; 76 additional commands let sophisticated users probe, pry, massage, and create. And it's very kind to your core: occupying only 80K bytes on a DEC PDP-11; 256K bytes on an IBM 360/370. Small wonder that over 100 organizations large and small use DRS. And love it. Get the details. Call SONCO at 215-667-7670 or use the coupon.

SONCO INC., 146 Montgomery Ave., Bala Cynwyd, PA. 19004
I have a ☐ DEC PDP-11 ☐ IBM 360 ☐ IBM 370
My operating system is _____

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____

INTERNETWORK

Minicomputer Net Keeps Milk Orders Fresh

WOERDEN, The Netherlands — Getting the milk to the right door-step or supermarket was becoming a headache for the CMC/Melkunie Dairy here before it installed a network of minicomputers to handle the daily flow of incoming orders.

The firm, whose name translates to "United Dairies," is one of this country's largest milk processors with eight processing plants and 1,600 employees.

In 1976 it installed its first automated order processing system and expanded that application to all eight of its plants by the end of July 1977. Each plant runs the application on a Data General Corp.'s Nova system.

Before minicomputers were installed, all order processing was done manually. From the moment the order was received (generally by phone) to the last step (waybill for the client, i.e., the milkman or the supermarket), it was a long series of administrative operations.

Working under great stress from late processing of orders resulted in errors and mistakes and, to make matters worse, some orders were even illegible.

Change Necessary

It thus became evident that drastic reorganizational measures should be taken, particularly ones that led to improvement in personnel conditions, streamlining of administrative handling and physical distribution and increased sensitivity to technical breakdowns.

Special steering and work groups were set up by management. The steering group's consultant was Pieter L.M. van Berkel, organization expert with Bakkenist Management Consultants. C.G. Meeder, Intersystems B.V.'s industrial manager, was responsible for the software development.

Rudy Jonker, manager of the Planning and Organization Department, defined the starting points of the project as follows: "We were looking for a system where the entire order processing would take place in one smooth operation. In actual practice, this called for the processing of the incoming or-

ders (telephone and order forms), the calculating and sorting work (preceding truck loading) and the punching required for the future automatic processing and final inspection work.

"Finally, it was imperative to produce legible bills of sale. The entire package of needs and requirements was made up in close cooperation with the distribution departments.

"Following a study of all

available equipment, we opted for the Data General Nova minicomputer with a 48K-word memory, a magnetic tape unit and two printers with a capacity of 200 line/min. In addition, eight or nine keyboard terminals are linked to the computer," Jonker said.

Each of the eight distribution centers have now been equipped with this configuration. The Amsterdam branch was chosen as the pilot site.

The main reasons cited by Jonker for the choice of minicomputers were:

- Distribution points can be automated one after the other, keeping the implementation manageable and allowing a step-by-step investment.
- The operating cost of the minicomputers is substantially lower than that of larger systems.
- In case of breakdown, the downtime is limited to one dis-

tribution point. If one large computer were used, a breakdown would make the entire system inoperative.

The minicomputers were installed after an introduction and training program and after a number of organizational adjustments had been made. The operation has resulted in a smoother order processing system that fits much better into the overall work schedule, the firm said.

"My job
is to make you successful
with computers.
And I do my job."

I'll make you successful with computers. Not because I like you. Not because I'm such a great guy. But, because I know that the more successful you are, the more computers you'll buy. And the more successful I'll be.

Sure it's selfish. But, when my own career is at stake, you can be certain I'll give you better products, better delivery, better prices, and better terms and conditions.

A better factory. Better machines.

Interdata 16-bit computers are built better for one very good reason. Our people have been on your side of the desk. They know the kind of quality it

takes to make an OEM successful.

So we build more carefully and test more thoroughly than our competition. And you get computers that run as soon as they're installed and keep on running.

Choose the Interdata 5/16 with microbus architecture to communicate with terminals and peripherals via low-cost interface chips. The 6/16, king of the box computers. Or the 8/16E system, with up to 256KB memory and peripherals. And for even more power, take a look at our 32-bit line.

Better delivery. 60 days ARO.

To be successful in this business, first you have to have a computer to

be successful with. We deliver 16-bit Interdata computers in 60 days or less. Guaranteed.

Ask our competition if they can guarantee 60-day delivery.

Better terms and conditions.

We also write terms and conditions to make you successful. Like a 38% discount on orders of 100 or more units. Mix and match quantity discounts. Standard multi-year agreements. Spare parts discounts that save you money after the sale. And multiple ordering locations with no penalty for using them.

Ask your sales representative for a copy of our new super OEM agreement:



AKD (402) 392-2606

VOLUME DATA ENTRY SERVICES...

TAPE OR CARDS

"QUALITY AT A LOWER COST"

AMERICAN KEY DATA

Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Using Specialized Software

Small System Tightens Builder's Cost Controls

TWIN FALLS, Idaho — A small business system using accounting software provides Miller Construction here with closer job cost accounting and greater control.

With 100 year-round employees and a dollar volume ranging from \$10 million to \$12 million annually, Miller was eager to improve cost controls. So the firm purchased a

B80 small business system and Management Accounting for Contractors (MAC) software designed by Timberline Systems of Portland, Ore.

"Our job costing was running two to three months behind before the system as installed," according to Janet Merrill, administrative assistant. "We had one person in the office who did practically

nothing else but break down time cards for the job costing," she said.

"With the system the firm receives information on costs as the job goes along," John Anderson, accountant for the firm, said. "If we incur too many costs half way through a job, we can see where we are losing money and can try to balance costs so as to make

money on the overall job."

Since the system generates cost reports on demand, the construction firm can base its costing structure on timely information, Anderson noted.

Bidding Easier

Use of the MAC system also makes bidding easier. "Always before bidding time, I'm asked to run detailed job costs on

comparable jobs," Merrill said.

"MAC allows us to put all the costs per unit for each job down in hard figures and we know they're accurate. Management can then analyze each job. For instance, if there are two similar jobs, but Job A was done in cold weather and Job B was done in warm weather, it's easy to project the costs of Job C."

The basic problem in estimating is knowing the exact cost of every item, according to estimator Pat Chapman. With the system, the firm can keep costs in line and analyze each job to maximize manpower and materials.

"It's impossible to keep that much control over the costs manually. After the job is over, we can see where we made money and where we lost it, per item or unit," he noted.

The superintendent in the field cost codes each item so it can be fed to the system.

"The only problem we have is when the field superintendent codes the job wrong," Merrill explained. "But even then, most of the errors are easy to spot on my printout because one item will cost too much and another item will cost nothing."

The firm is also running a payroll system that prepares checks, an accounts payable system that gives detailed invoices and the general ledger that retrieves input from payroll, accounts payable and job costing to show the company's overall operating picture.

Controls Job Costs

"The real savings comes from being able to control costs on the job," Chapman pointed out.

"Although it's easy to know the cost of the total job, it's hard to determine the exact cost of each item unless the company has an accurate way of keeping track of every individual item" he said. "It's an overwhelming job to do by hand."

"Before Miller put in the MAC system, there were some items that were bid on by guess," Merrill said. "After the firm put in the MAC program, we knew how much each item was worth."

A special OEM hotline.

Agreements are fine. But the true test of a computer manufacturer is service. And that's where we really shine. We back up our local support people with a 24-hour OEM hotline. If you have a problem, one call gets us. Days. Nights. Weekends. Holidays. We're there whenever you need us.

Find out how successful you can be. For free.

So go ahead. Call us toll-free, (800) 631-2154. Or write Perkin-Elmer Data Systems Sales and Service, 106 Apple Street, Tinton Falls, N.J. 07724.

And, with a little luck and a lot of hard work, I'll be successful in my business and you'll be successful in yours.

Here is my card. Send me more information on:

- ☐ 5/16 computers ☐ 6/16 computers ☐ 8/16E systems
☐ 32-bit computers ☐ terminals ☐ mass storage devices.

PERKIN-ELMER
Data Systems

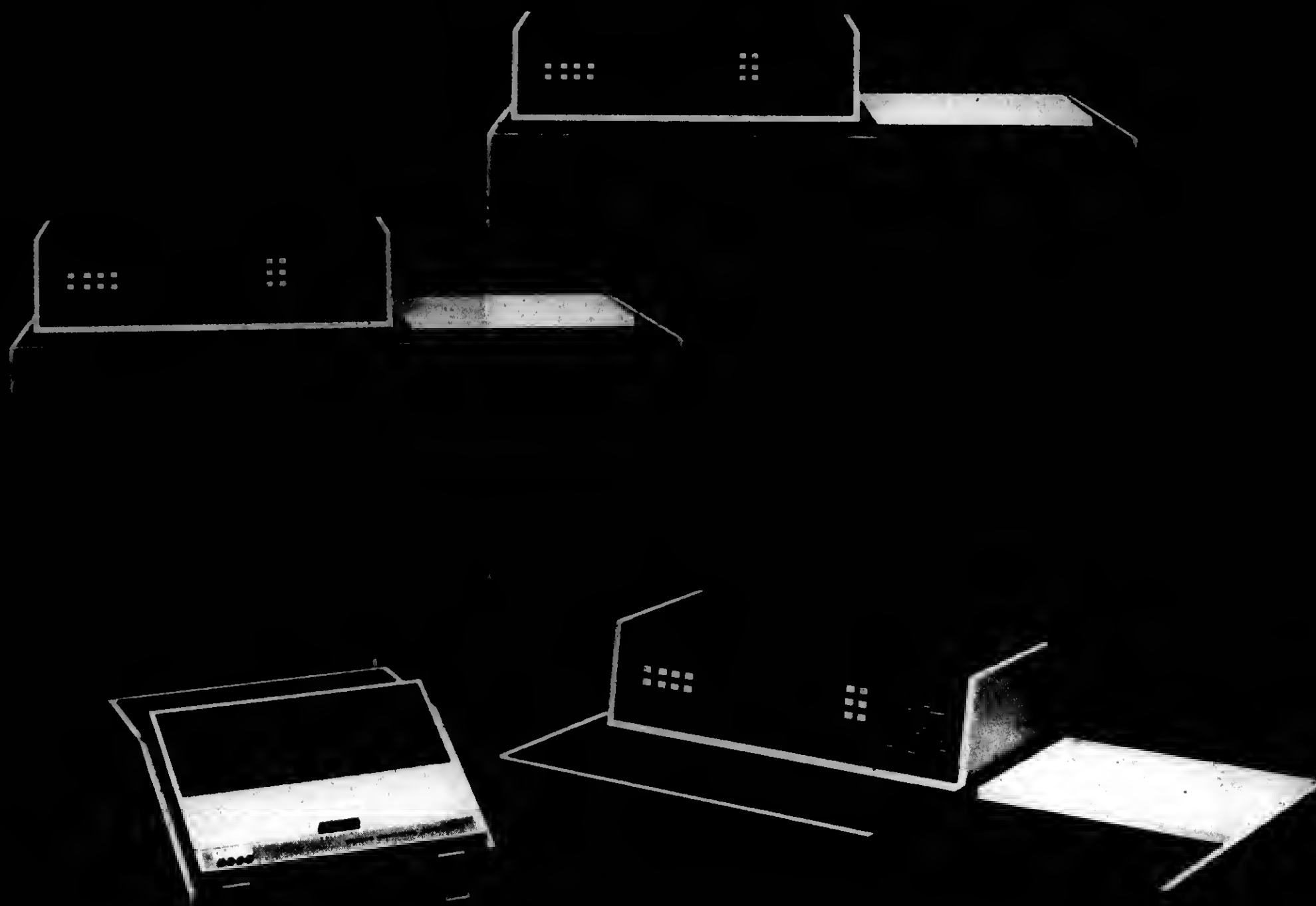
3033 PROCESSOR

- Walk away leases
- Your delivery position or ours in 1978

Comdisco Financial Services, Inc. has arranged over \$200 million in financial leases.

COMDISCO
312-698-3000

Take your choice: on-line or off-line.



3 dry, convenient, laser printers, from Kodak.

For the detailed story, write Eastman Kodak Company,
Business Systems Markets Div., Dept. DP8577, Rochester, NY 14650.

KODAK KOMSTAR Microimage Processors



Micro Bytes

Card Cages Give Support For Micro PC Modules

ROCHESTER, N.Y. — American Technologies has unveiled a series of card cages that provide support and bus interconnection for Motorola Semiconductor Products, Inc. Exorcisor compatible microcomputer printed circuit modules.

The PME 6800 series of cages is available in both five- and 10-card versions. Each includes an Exorcisor compatible backplane, board connectors, a 50-pin daisy chain connector, power supply terminals and card guides, according to a spokesman. The daisy chain connector allows system expansion and provides access to address, data and control signals.

The single-quantity price for the backplane with a full set of edge connectors, regulators and card cage is \$152.45 for the five-card version and \$199.95 for the 10-card model. Quantity discounts are also available from the firm at P.O. Box 23001, Rochester, N.Y. 14692.

Ohio Scientific Adds I/O Boards

Ohio Scientific, Inc. has announced an I/O board for use with its microcomputers. The board features RS-232 and high-speed synchronous interfaces and can be used to add printers or other terminals to any Ohio Scientific micro.

Called the CA-10, the board features a crystal-controlled clock circuit and speeds of 75 bit/sec to 19.2 kbit/sec in asynchronous mode or 250 to 500 kbit/sec in synchronous mode, according to the company. It can accept from two to 16 ports and can be jumpered to be either "continuously addressable memory" or "pageable at the same address" with Ohio's memory management hardware.

The board including two ports is available fully assembled from the company for \$200. Additional ports, up to 16 on the same board, are available for \$50 each from 1333 S. Chillicothe Road, Aurora, Ohio 44202.

Extended Basic for Northstar Users

EL CERRITO, Calif. — The California Software Co. is offering the Palo Alto Tiny Basic (PATB) Extended language to users of Northstar Computers, Inc. disk operating systems.

The extended version of PATB allows string handling as well as the automatic sizing and typing of resident programs, a spokesman said. The disk directory can be accessed while in PATB and all Save and Load functions are available for disk storage and loading of programs, the firm noted.

PATB, originally designed as a memory interpreter, is available on diskette for \$30, including a user's manual, from the firm at Box 275, El Cerrito, Calif. 94530.

Motherboard Cuts Down Bus Noise

SAN CARLOS, Calif. — A shielded motherboard from Artec Electronics, Inc. reportedly eliminates most of the bus noise associated with the S-100 microcomputer by placing ground traces between bus lines.

The board also eliminates ringing caused by fast rise time signals on a microcomputer's bus, the firm said. The terminator has no DC current and therefore doesn't affect the critical zero state voltage of the bus drivers.

The board is designed to fit standard chassis and is available in 16-slot and 10-slot configurations, the firm noted.

Price of the motherboard is \$190 assembled or \$150 in kit form from the firm at 605 Old County Road, San Carlos, Calif. 94070.

Medical Center Concocts Homebrew Patient Monitor

By Jeffrey Beeler
CW Staff

MADISON, Wis. — In an age when hospital administrators increasingly equate expensive medical technology with top-quality health care, a medical center here has rejected some of the lavish spending habits of its contemporaries and implemented a computerized patient monitoring system on a shoestring.

Instead of a relatively costly minicomputer or larger CPU, the system at University Hospitals uses a Z80-based microcomputer assembled from a hobby kit supplied by The Digital Group. Instead of displaying patient variables on a battery of sophisticated CRT terminals, the system outputs the data on a commercial black-and-white television set.

And instead of incorporating an on-line printer, the system uses no hard-copy device at all, according to one of the system's originators, Dr. David C. Flemming, an anesthesiology professor at the University of Wisconsin (UW) here. When doctors require a permanent record of the system's output, they simply photograph the TV set's display screen with an ordinary camera.

Moreover, several of the system's lesser modules including its analog-to-digital converter were custom-built by its designer, UW graduate student Ira Rampil, because they were not commercially available when work on the configuration began in October 1976, Flemming noted.

Cost Pared to \$2,500

Through a combination of design improvisation and budget-minded parts selection, officials at University Hospitals were able to trim the system's cost for the other hardware configurations they considered installing, Flemming said.

But though a "Volkswagen" in cost, the system has proved a "Cadillac" in performance since it began undergoing clinical trials at University Hospitals six months ago.

For Parish, Personal Jobs

Priest Budgets Micro's Time

By Tim Scannell
CW Staff

BOSTON — An Episcopal priest here found "salvation" in his microcomputer system when faced with a mountain of statistical paperwork and an unwilling large-scale mainframe.

Rev. Walter L. Pragnell used his 24K system to prepare complex parish budget reports when production on the IBM system normally used to calculate the figures "slowed down to a dead halt." Problems on the IBM 370/168, located at MIT, apparently began after the installation of a virtual memory (VM) system on the mainframe, Pragnell stated.

Almost all of the diocesan work is handled by the IBM system at the MIT computer complex, Pragnell noted.

As statistician for the Episcopal Diocese of Massachusetts, Pragnell is responsible for, among other things, preparing annual parish quotas or budgets for each parish in the upcoming year.

Quotas are determined by averaging the total number of receipts for each parish from the past five years, performing a "linear regression" on them and projecting these figures ahead two years. This type of equation is "used to get an estimate of what we can expect the general receipts to be," Pragnell said.

Dubbed a "physiological trend monitor" by its developers, the system monitors the vital signs of surgical patients through invasive sensors and transducers attached to the individual's skin. Every three seconds, the microcomputer, with its 34K random-access memory, updates its readings of the vital signs — blood pressure, pulse rate, intracranial pressure and carbon dioxide output — and displays any measurement changes as rising or falling lines on the TV set.

When hospital officials add a small disk drive soon, the system will permanently record these variables and thus provide a factual basis for resolving the medical and legal disputes that sometimes follow surgery.

Because the system graphically represents its output, it allows physicians to detect changes in an individual's vital signs more easily than was possible with the hospital's previous monitoring instruments, which displayed readings as numbers only, Flemming explained. "It's just much easier to interpret patient measurements when they're represented in graphs than when they're shown as numbers," he said.

Flemming credited the system with noting physiological changes doctors might otherwise overlook in the bustle and haste of surgery. When anesthesiologists are preoccupied with the complex technical tasks of operating life-support equipment, they don't have the time to constantly monitor a patient's vital signs, he said.

But because the computer system monitors its subjects continuously, it automatically detects all the physiological changes, even the subtle ones, that patients sometimes undergo during surgery.

Doctors have yet to assess the medical significance, if any, of these slight and short-lived changes, but if they are related in some way to, say, the unexplained comas that afflict a small percentage of surgical patients, the system could prove helpful in clarifying that relationship, Flemming explained.

The projected receipts are then passed through a table similar to the one used by the Internal Revenue Service for personal income tax. This results in a probable budget figure for each parish.

"There's almost no practical, analytical way of doing these calculations," Pragnell explained. There are "nearly 200 parishes involved whose receipts vary ... from maybe \$5,000 for the whole year to close to a million dollars," he said. "The simplest way is to just 'cut and try' ..."

Normally, it would take about 20 "runs" to perform these computations using the IBM mainframe, "but with the VM fouling us up I was lucky to get in one run a day," Pragnell added. "There was a spell there when out of a 17-hour working day, [the 370] was only up for about 10 hours."

Up Against a Deadline

Faced with a deadline, Pragnell wrote a program in Basic, ran it on his microcomputer and, using a trial-and-error method, calculated the budgetary figures. Since Pragnell did not have access to a printer, the IBM system was used to print all of the micro's calculations. "I like to tell my friends that I used the 370 as a printer for my homebrew machine," Pragnell added.

His equipment consists of a Polymorphic
(Continued on Page 73)

Signetics 'Micro Assembler' Available for Bipolar Units

SUNNYVALE, Calif. — Signetics Corp. has introduced a software package that can be used for programming bipolar as well as 16-bit and 32-bit microprocessors, according to a spokesman.

The Signetics Micro Assembler can be used for defining micro instructions, writing and assembling programs and generating paper tape output for read-only memory (ROM) programming, the spokesman stated.

Micro Assembler consists of two independent programs. The first reads the program and the appropriate configuration and format descriptions and produces a listing of the source input and the resulting binary form of the instructions in the program.

This listing also includes diagnostics for errors found and a cross-reference for symbols used in the program, the firm noted.

The second program punches paper tapes that can be used to program micro control store programmable ROMs, the firm stated.

The Assembly language input to the Micro Assembler is divided into two sections. The first, a definition section, specifies the instruction formats and device configurations of the user system. The second represents the program in the form of symbolic micro instructions, the spokesman explained.

The Micro Assembly language supports the standard assembler directives

such as ORG, EQU, SET, SPACE, TITLE and EJECT. Its values may be expressed in decimal, hexadecimal, octal or binary constants, Ascii character constants or symbolic form.

Micro Assembler is available in source form on 9-track tape at a cost of \$775 from Signetics at P.O. Box 9052, 811 E. Arques Ave., Sunnyvale, Calif. 94086.

'Electric Pencil' Supports CP/M

LOS ANGELES — Michael Shraye Software is offering a character-oriented 8080/Z80-based word processor reportedly compatible with microcomputers using the Digital Research, Inc. CP/M disk operating system.

Electric Pencil II can operate either with printers or CRTs. It supports up to two disk drives and has a cassette backup capability, full margin control, end-of-page control, line and paragraph indentation and automatic word and record tally, the firm stated.

Also included are print value chaining, page-at-a-time scrolling, multicolumn and bidirectional printing, centering, underlining and boldface.

Electric Pencil II sells for \$225 in a standard teletypewriter printer version and \$275 in the Diablo version from Michael Shraye Software, 3901 Los Feliz Blvd., Los Angeles, Calif. 90027.

Hobby Havens

MICHIGAN

As a service to hobbyist readers, Computerworld periodically will list the micro clubs in different parts of the country.

Clubs wishing to be included in this listing should send their name and address as well as the name and address or telephone number of a contact person to Frank Vaughan at Computerworld, 797 Washington St., Newton, Mass. 02160.

Mid-Michigan Microcomputer Group Contact: Joyce M. Church, 4307 Mar Moor Drive, Lansing, Mich. 48917. Telephone (517) 321-1587.

NEBRASKA

Mid-America Computer Hobbyists. Contact: Thomas F. Smith, P.O. Box 13303, Omaha, Neb. 68113. Telephone (402) 294-2202.

OHIO

Midwest Affiliation of Computer Clubs (Macc). Contact: Gary Coleman, P.O. Box 83, Cleveland, Ohio 44141. Telephone (216) 732-8458.

PENNSYLVANIA

Central Pennsylvania Computer Club. Contact: Dave Ciemiencicz, 533 N. Holly St., Elizabethtown, Pa. 17022. Telephone (717) 367-6512.

UTAH

Utah Computer Association. Contact: Holly Barney, 1928 S. 2600 East, Salt Lake City, Utah 84108. Telephone (801) 485-3476.

VIRGINIA

Tidewater Computer Club. Contact: C. Dawson Yeomans, 677 Lord Dunmore Drive, Virginia Beach, Va. 23462. Telephone (804) 420-6379.

WASHINGTON

Northwest Computer Club. Contact: John Marshall, P.O. Box 242, Renton, Wash. 98055. Telephone (206) 226-7775.

CALIFORNIA

Beverly Hills High School Computer Club. Contact: Paul Michalisco, 241 Marino, Beverly Hills, Calif. 90212.

Valley Computer Club. Contact: Al Herndon, P.O. Box 6545, Burbank, Calif. 91510. Telephone (213) 842-0912.

Sacramento Microcomputer Users Group (Smug). Contact: Smug, P.O. Box 161513, Sacramento, Calif. 95816. Telephone (916) 381-0335 (Richard Lerseth, newsletter editor).

IOWA

Quad City Computer Club. Contact: Larry Woods, 2632 W. 36th St., Davenport, Iowa 52806. Telephone (319) 391-3125.

LOUISIANA UPDATE

Crescent City Computer Club. New contact: David Hughes, P.O. Box 1097, University of New Orleans, New Orleans, La. 70122. Telephone (504) 271-5440.

OPERATING CONSOLE — A typical operating console contains all controls and indicators necessary for the operation of the processor. It features a switch register, which may be read under program control, LED display indicators and toggle switches for entering data and operating the processor.

OPERATING SYSTEM — 1. A basic group of programs with operation under control of a data processing monitor program. 2. An integrated collection of service routines for supervising the sequencing and processing of programs by a computer. Operating systems may perform debugging, input/output, machine accounting, compilation and storage assignment tasks.

OPERATION — 1. Generally refers to the action specified by a single computer instruction or pseudo-instruction. 2. An arithmetic, logical or transferal unit of a problem, usually executed under the direction of a subroutine.

OP REGISTER — A computer register designed to hold the operation code of computer instructions.

OUTPUT — Refers to information and data transferred from the internal storage of a computer to output devices or external storage.

OVERWRITE — Refers to the activity of placing information

in a location and destroying the information previously contained there.

PACK — In computer programming, pack refers to the act of combining several fields of information into one machine word.

PADDING — Refers to a procedure used to fill out a block of information with dummy records, words or characters.

PAGE — Typically, a set of 4,096 consecutive bytes. Applied to main storage, a set of 4,096 consecutive bytes, the first byte of which is located at a storage address that is a multiple of 4,096 (an address whose 12 low-order bits are 0). 2. The subdivision of a program which can be moved into main memory by an operating system or hardware whenever the instructions of that subdivision need to be performed. A program will be divided into pages in order to minimize the total amount of main memory storage allocated to the program at any one time. The pages will normally be stored on a fast direct-access store.

PAGING — Refers to a procedure for transmitting pages of information between main storage and auxiliary storage, especially when done for the purpose of assisting the allocation of a limited amount of main storage among a number of concurrently executing programs.

LEARNERS' LEAGUE

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Klod. Used with permission of Matrix Publishers, Inc. 207 Kenyon Road, Champagne, Ill. 61820.



COMPUTERWORLD

KEY-EDIT[®] Series 2
takes care of today and tomorrow . . .
we built it that way!

Yes, I want more information on:

- Data Entry — KEY-EDIT 2000
- Data Communications — KEY-EDIT 2022
- File Management — KEY-EDIT 2024

Please send me a copy of: People Side of
Data Entry

Number of terminals installed

Name Title

Company

Address Phone ()

City State Zip

CW 2

Computerworld

Business
Reply Mail

Mail to: P.O. Box 1000
Champaign, IL 61820

Training Set For 8080

SANTA CLARA, Calif. — National Semiconductor Corp. has announced a three-day microprocessor training course entitled "Complex Peripherals for Microprocessors." The course is intended for engineers who are using the 8080A or other 8-bit microprocessors.

Application information and design ideas will be provided for more than 20 peripheral chips and National Semi's Microbus. Emphasis will be on the complex communication devices and the floppy disk controller.

The course will be presented at National Semi's Eastern Training Center, 1 De Angelo Drive, Bedford, Mass. Course dates are March 27-29, April 24-26 and May 22-24.

The Western Training Center at 1333 Lawrence Expressway, Santa Clara, Calif. 95051, has classes scheduled for May 8-10 and June 19-21.

Priest Budgets Micro's Time

(Continued from Page 69)

Systems, Inc. Poly-88 MPU, a Sanyo video monitor, keyboard and recorder.

The Poly-88 system is also used to calculate the attendance figures at the annual convention of the parishes, Pragnell said. The convention is "sort of a diocesan legislature," he explained. The microcomputer using the attendance figures taken from the first Sunday in Advent, Lent, Easter and Trinity Sunday, is programmed to "add them up and arrange them in rank from the smallest to the largest." The number of delegates allowed from each parish is decided in accordance with these figures, he said.

Pragnell, a diabetic, also uses the microcomputer to regulate and keep track of his diet. "I type in the ingredients and quantity and [the microcomputer] will calculate the total nutritional value of the recipe," he said.

Pragnell chose the Poly-88 system because with it he "didn't have to worry about running out of power supply" and the price was right. The only problem he has encountered so far is an incompatibility with some software. "If I want to use somebody else's software system, I have horrendous problems trying to relocate programs in memory," he stated. "The Poly-88 monitor program is at location zero and most programs load at zero. The first K has to be relocated for anything I want to load at zero."

**Look for our
Microcomputing
Classified
Exchange
in the
Classified pages.**

From Computer Technology

DMA Link Fits DEC Units

OAKLAND, Calif. — A direct memory access (DMA) interface board said to be compatible with Digital Equipment Corp. LSI-11, LSI/11-2, and PDP-11/03 systems has been introduced by Computer Technology.

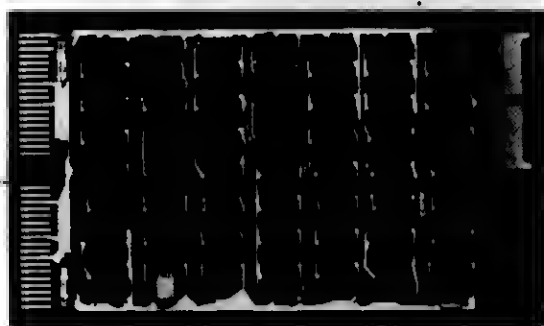
The DMA-L11 handles byte or word transfers at rates of up to 400K

transfer/sec, a spokesman said. Programmed I/O is allowed between the MPU and five of the 16-bit registers in the external device for control of peripherals.

Three 16-bit registers on the DMA board include command/status, memory address and byte count. Up to 32K words or 65K bytes may be transferred in a single operation.

The unit contains a 16-bit bidirectional data bus and has sockets for two 32K by 8-bit programmable read-only memories (Prom) that allow the user to implement a 32-word program for automatic bootstrapping.

The DMA-L11 is priced at \$495 from Computer Technology, 6043 Lawton Ave., Oakland, Calif. 94618.



The DMA Interface Board

Pet Users Get 488 Link

GOLETA, Calif. — A cable assembly that is said to allow the Commodore Pet microcomputer to communicate with IEEE-488 bus devices has been announced by Pickles & Trout.

The Pet-488 assembly plugs directly into the edge connector of the Pet microcomputer and has a 488-compatible connector on the other end, the firm explained.

The cable meets all IEEE-488 specifications for shielding and crosstalk, a spokesman claimed.

The unit is scheduled for delivery after May 1. It will sell for \$30 from Pickles & Trout, P.O. Box 1206, Goleta, Calif. 93017.

**Install the new SERIES 2
KEY-EDIT[®] distributed data entry
system today,
and take care
of tomorrow,
too.**

NEW 1920 CHARACTER DISPLAY TERMINALS
FROM 24,000,000 TO ALMOST ONE BILLION
BYTES OF DISK STORAGE PERFORMS
DATA ENQUIRY ENTRY UPDATING EDITING
PRINTING COMMUNICATIONS AND MORE
ALL SIMULTANEOUSLY

We built it that way!



Show and Tell.



The Show.

The Exposition. Your chance to hold a one-to-one consultation with hundreds of representatives in the know from the nation's top manufacturers. You don't have to travel all over. They're coming soon to a city near you.

And the Show is free! Including exhibitor seminars and demonstrations of the latest developments in:

Data Communications Terminals • Software • Minicomputers • Data Input Equipment • Computer Output Equipment • Supplies • Magnetic Media • Modems • DP Education • Small Business Computer Systems • Flexible Disk Drives • Data Communications Interconnect Equipment • Mini-peripherals • Magnetic Tape Transports • Cassette Systems • Power Supplies • Printer Terminals • Keyboards. And more.

Ask your questions. State your needs. Discuss your plans. This low-key, non-selling atmosphere is your chance of the year to compare what's on the market, all in one place. As sophisticated or as simple a show as you need. You're the center of attention, whatever your level.

You're important enough to bring top people from all over the country to you.

Here are some of the companies who will be looking for you!

NCR	Computerworld	Trac Associates
Varian Graphics	NCI	Sperry Univac
Informatics	AT&T	Xerox
Honeywell	Kodak	Sykes Datatronics
Datamation	BASF	Cummins Allison
Communication News	IBM	American Microprocessor
McCormack & Dodge	Anderson Jacobson	International Data Corp.
Data Rentals	Computer Input Services	Programs, Inc.
Computer Sales International	Paradyne	Beehive International
Intel	ComData	Interdec Data Systems
Electronic Ventures	Gnysis Dne	Software AG
Computer Roomers	Data Processing Sciences	Creative Engineering
Customer Priorities	Applied Computer Systems	Graphic Controls
Computer Software Solutions	Agile	Mini-Computer Systems
Systems Marketing	Woodford Systems	Tandem Computer
S.E.A.	American Used Computer	PCC/Pertec
Tri Data	Business Forms Service	Computrend
Midwest Marketing	Itel Corporation	Extel
Logabax	Deltak	Mentel
AAA Chicago Computer	Peripheral Products	Sycor
Intelligent Systems	General DataComm Industries	Digitronics
Shasta	Continental Peripherals	Computer Services
Mostek	Computer Associates	Datamart
DIVA	Qantel	Courier Terminals
SBC Magazine	Diablo Systems	Modems Plus
Tele-dynamics	Marketechs	Software Design
Control Data	Racal Milgo	Curtis 1000
National Semiconductor	Data Systems Specialists	Spectron
Printonix	Key Tronic	K&K Associates
Codex	Administrative Management	Applied Digital Data
Lear Siegler	Small Systems World	Epic Data
E.M. & M.	American Terminal Leasing	Terminal Rentals
The Morley Company	Journal Systems Management	Applied Data Communications
Varier Graphics	Optical Business Machines	Data Forms Company
Total Typography	McGinn Safe	Imperial Technology
Wang Labs	Allstate Computer	Mathematica
Computer Devices	H/G Professional Forms	Rianda Electronics
Ann Arbor Terminals	Nichols & Company	Computer Corp of America
Datapro Research	Datapro	Cullinane
Inforex	Input Services	Hewlett Packard
Perkin-Elmer	Plessey Services	Pansophic Systems
Telcon Industries	Industrial Computer Controls	Dynatech
Versatec	Vincent Data Products	Western Union
Computer Performance	World Info Systems	Calcomp
Advanced Systems	DP Power	General Computer
Delta Data Systems	Conrac	Atlantic Research
Inform	Educational Data Systems	Telefile Computer Products
Computer Decisions	Cybertek	General Electric
Intosystems	Cosmic	Qume
T-Bar	Business Automation	Moore Business Forms
Corporate Systems	Insyte Datacomm	DataMedia
YE Data	Herrera Kirby	Texas Instruments
Arcus	Foto-fun	Consolidated Computer
St. Louis Info	Hamilton Sorter	Cybersearch
Digilog	Dispotech	Wolfe Computer

The Tell.

The Conference. Computer Expo's Conference takes place from 9 AM to 1 PM, leaving your afternoons free for the Exposition. The Conference includes keynote speeches, case studies, presentations, panel discussions and workshops. Well-known authorities—consultants and users—will share experiences, ideas, insights and foresights with you.

Here's what the Conference includes:

Tuesday

The Executive Briefing.

A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing; Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday (Two simultaneous conferences)

Managing People Problems.

A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Small Business Systems.

A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

Thursday

Distributed Data Processing.

A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Here's the Computer Expo 78 Schedule:

SAN FRANCISCO	March 28, 29, 30
Northwestern Computer Expo	San Francisco Civic Auditorium
HOUSTON	April 11, 12, 13
Southwestern Computer Expo	Astrodome
ATLANTA	April 18, 19, 20
Southeastern Computer Expo	World Congress Center
ST. LOUIS	April 25, 26, 27
Gateway Computer Expo	Gateway Convention Center
CHICAGO	May 2, 3, 4
Midwestern Computer Expo	McCormick Place
NEW YORK	May 9, 10, 11
Mid-Atlantic Computer Expo	New York Coliseum
DETROIT	May 23, 24, 25
Great Lakes Computer Expo	Cobo Hall
BOSTON	May 30, 31, June 1
New England Computer Expo	Northeast Trade Center

COMPUTER CARAVAN'S



Register now!

For the show: The Exposition is free. No advance registration is required for the Exposition. Your business card will admit you. **Exposition hours—10 AM-5 PM.**

For the tell:

The Conference is just \$55 per single day, only \$135 for all three days. You can register on-site.

But Wary of Domination

FTC Chief Optimistic About Competition

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The computer industry can still be defined as "that part of the American economy managed by IBM and its competitors," Alfred Dougherty, director of the Federal Trade Commission's (FTC) Bureau of Competition, said here recently.

"And yet, even as I speak, we are witnessing the emergence of a new market definition — the marriage of data processing and communications into what *Business Week* recently described as a potential \$400 billion hybrid market that could be dominated by either IBM or AT&T," Dougherty told the Computer & Communications Industry Association's (CCIA) Fifth Annual Washington Caucus.

While he acknowledged the "fundamental concern" competitors and antitrust officials have about IBM's and AT&T's status, Dougherty said "there is no good reason... why most of this 'communications' industry cannot be highly competitive" — particularly in the manufacture of peripheral equipment and in the "upstream and downstream industries" now being integrated into the corporate structures of mainframe computer systems manufacturers.

Looking upstream, Dougherty named the semiconductor industry as an excellent example of an industry with a healthy competitive performance record. "Thus, there is a basis for optimism but, at the same time, a clear and present danger of domination by giants," he said.

Centralized control of an industry rapidly becoming as indispensable as the automobile and oil enterprises, unless made adequately responsive to public needs through demo-

cratic governmental regulatory mechanisms, cannot be tolerated for long without sacrifice of freedom, Dougherty stated.

The Bureau of Competition is not involved directly in fighting anticompetition in the computer industry, its chief said, adding that it is developing themes, however, "which relate to industry structure and 'could significantly affect your long-term interests.'"

'Competition Policy'

Working from the assumption that the antitrust laws haven't been successful in achieving their fundamental goals without "fantastically expensive marathon litigations," the FTC is fashioning a broader theory called "competition policy."

"The purpose of competition policy is to seek the right mixture in each industry and in the economy as a whole, regulated, private and quasi-regulated activity," Dougherty said. Nonintervention by government is the preferred approach, he explained, and any intervention must have as its objective making competition work for the consumer.

Consumer sovereignty, an economic structure that is consistent with the democratic and social norms of the U.S., the potential for individuals to attain self-fulfillment through their economic roles, a maximum use of self-policing mechanisms and the operation of the economic activity in a framework of fairness and ethical commercial conduct are the watchwords of competition policy, Dougherty stated.

"We intend to place new emphasis on the concept of fairness," the FTC official added. "Although efficiency considerations are important in antitrust analysis, they alone should not dictate competition policy. Our minds are open to the larger social, political



CW Photo by E. Holmes

Alfred Dougherty

and economic issues which must form public administration."

Specifically, the FTC has followed the development of domestic satellite communications for years now and has gone to court to force the Federal Communications Commission (FCC) to give greater consideration to the antitrust aspects of the application of Satellite Business Systems (SBS) to establish
(Continued on Page 76)

Study Sees IBM Pushed to Diversify

By Jeffry Beeler

CW Staff

NEW CANAAN, Conn. — Plummeting hardware prices and the resulting decline in large systems revenues have forced IBM to expand into markets it has thus far ignored and strengthen its hold on product areas it has already penetrated, according to a management consulting and research firm here.

In a 40-page analysis of IBM's financial strength, corporate strategy and technological resources, International Resource Development, Inc. (IRD) predicted telecommunications would form the chief target for IBM's diversification efforts during the next 10 years. By 1990, the firm's revenues from telecommunications equipment and services will total \$5 billion compared with \$27 bil-

lion for computer systems and services, IRD estimated.

But to maintain its historically high sales and earnings growth, IBM will also have to deepen its penetration of other existing markets, including the office products and educational systems sectors, which promise the company potential revenues of \$10 billion and \$1 billion respectively by 1990, IRD added.

At the same time, IBM will also feel mounting pressure to broaden its market base into hitherto unfamiliar product areas, including personal computers, consumer electronics and microprocessor-based control instrumentation. Twelve years from now, the firm's revenues from personal computers and consumer electronics prod-

ucts could total \$1 billion and \$2 billion respectively, the study predicted.

With a \$5 billion reserve of cash and marketable securities, the company certainly will not lack for capital to finance these and other prospective diversifications, IRD added.

'No-Lose Proposition'

To bolster its position in the communications market, IBM will introduce several products that will link the various modules of a typical telecommunications network. Some of these connecting parts will include controllers, multiplexers, "smart" switches and PBX systems, the study forecast.

The linchpin in IBM's telecommunications
(Continued on Page 76)

No one knows more about servicing Centronics Printers than Centronics.

And no one can offer you a more cost effective service contract. For full details call today. Toll free: 1-800-258-1952. Or write Centronics Data Computer Corp., Hudson, NH 03051.

CENTRONICS SERVICE
Simply Better

COMPUTER INDUSTRY

Falling Prices Seen Pushing IBM to New Marts

(Continued from Page 75)

market plans will be Satellite Business Systems (SBS), a project sponsored jointly with Comsat General and Aetna. SBS's success would give IBM a competitive advantage in the telecommunications field by allowing the firm to determine the specifications for future data communications equipment, set standards that rival common carriers would have to adopt and ensure the compatibility of its hardware with AT&T's integrated digital service, the report explained.

IRD views the satellite communications business as a no-lose proposition for IBM. Either SBS will prove a profitable business venture or it will force Bell to supply the facilities through which IBM's future generations of office and computer equipment will communicate, the consulting firm said.

Product Expectations

Within the context of Systems Network Architecture (SNA), IBM during the next few years will introduce several "important" products, including intelligent terminals for distributed processing systems, and possibly enter the time-sharing field again, IRD continued.

By the end of this or the next year, IBM will also add another member to its line of large-scale computer systems, but "there probably will not be a dramatic introduction similar to that of the 360 and 370," the study predicted.

Rather, as the 370 line reaches the end of its product life by the end of the decade, the firm will begin replacing its existing computer models with newer

systems. The replacement process could begin at the large end of IBM's line with a 370/178 and would probably end by the early 1980s, IRD forecast.

Other products that users can probably expect in the coming years from IBM will include one or more image-processing systems, improved speech recognition systems and optical character readers; a facsimile transceiver and a small stand-alone display word processor, PBX hardware, teleconferencing equipment and communications controllers.

In the office products sector, IBM's market strategy will aim to integrate the company's equipment into a hypothetical "office of the future." IBM's line of office products — word proces-

sors, typewriters, dictation equipment and copiers — probably will not change significantly, but the company will transform the machines so they will interact with each other, with computers and with remote locations, IRD predicted.

Just how rapidly IBM's diversification plans will advance will depend on the Justice Department's antitrust action against the company. Although the suit probably will not result in a breakup of the firm, it could force IBM to a consent decree, IRD said.

"A settlement would probably include agreements from IBM not to deny competitors access to its software, not to harden its software and not to introduce radically new systems incompatible with present machines,"

the report noted.

IBM foresees major growth opportunities in the developing Third World countries. As hardware prices continue to fall and markets in the underdeveloped nations become increasingly saturated, the growth potential of the underdeveloped nations will grow, the consulting company said.

"Consequently, IBM is likely to compromise with the countries which demand some local ownership; if it does not, other companies will," the report explained. Moreover, IBM will also continue expanding its export sales to communist countries, with the short-term emphasis at least on trade with China.

IRD is located at 125 Elm St., Box 1131, New Canaan, Conn. 06840.

FTC Chief Wary Of Domination

(Continued from Page 75)

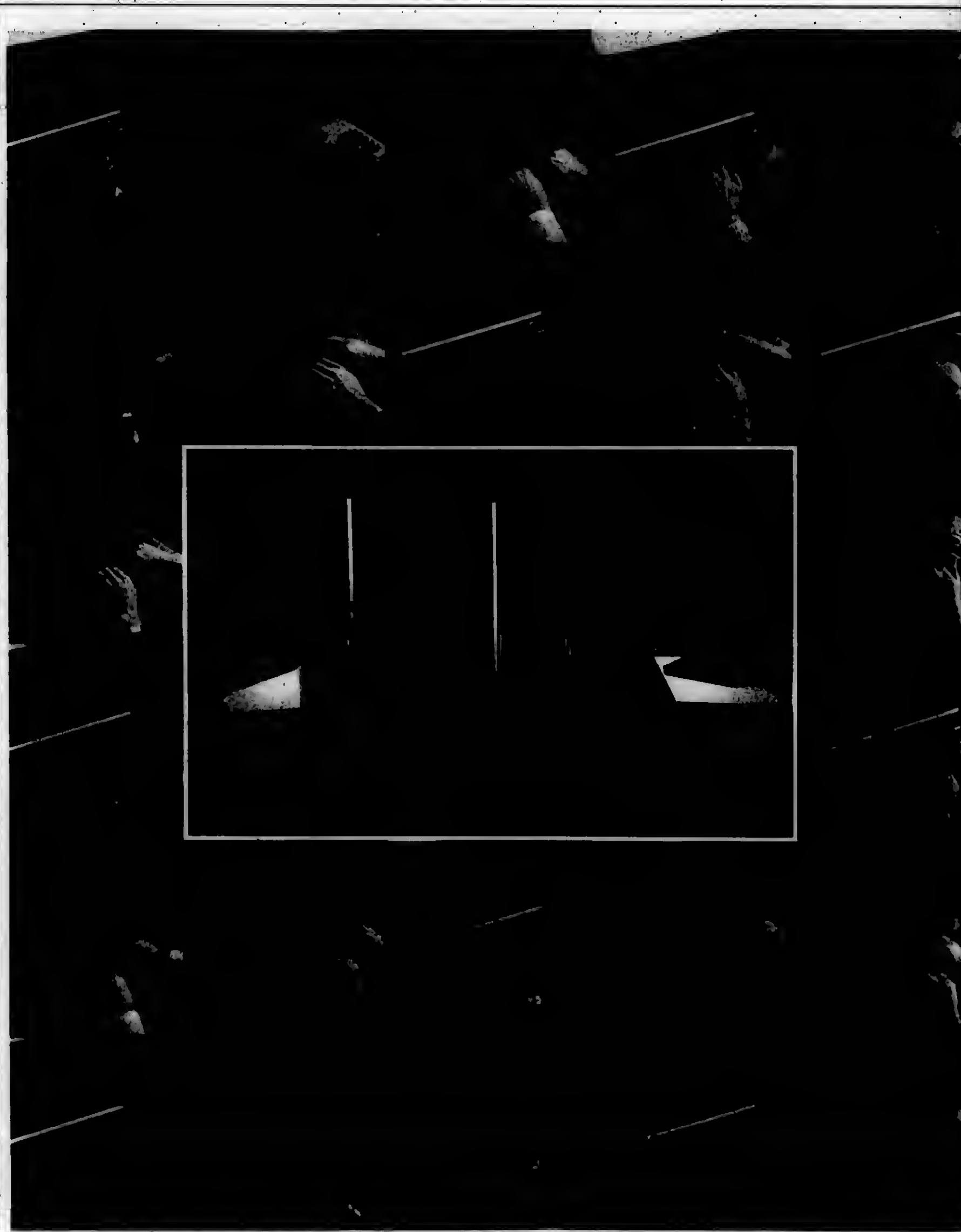
and operate domestic satellite communications services, he pointed out.

"It has seemed to us a rather worthy matter of the government's serious concern that the SBS entry would be formed by IBM, the leading firm in the computer field, and by Comsat General, the most experienced common carrier in the space satellite field. We have suggested that this joint venture might eliminate the benefits of potential competition between IBM and Comsat and, further, that the FCC's order allowing the venture might permit the entrenchment of SBS and the loss of any likelihood of a truly competitive environment," Dougherty said.

The Bureau of Competition's effort in the proceeding is part of the FTC's larger purpose of attempting to influence federal agencies to give serious consideration to the competitive effects of their action, Dougherty stated. "The FTC will undoubtedly continue and, indeed, step up its regulatory intervention activities," he promised.

In another industry, electronic funds transfer (EFT), the FTC has made it clear to the National Commission on EFT that its final report did not go far enough in protecting consumers.

The Bureau of Competition also opposed the efforts of some on the EFT commission to recommend overturning the Justice Department's 1956 consent decree with AT&T to allow Bell to play an even more active role in EFT.



Price Drop Motivates Reopening County Denies Bid Request Biased Toward IBM

By Brad Schultz
CW Staff

SANTA CRUZ, Calif. — Santa Cruz County has reopened the bidding to upgrade its DP facilities following a Univac protest alleging the county slanted its request for proposal (RFP) to favor IBM.

The bidding was reopened because two vendors — IBM and Control Data Corp. — dropped prices, not because officials wanted to accommodate Univac, according to the county's Assistant Auditor-Controller Thomas M. Platner.

The RFP will now be reworded slightly to stress the point that other vendors' products are as acceptable as

IBM products if they can match IBM performance, Platner added.

The county already uses IBM equipment, and the RFP revision will not alter the fact that IBM products are specifically mentioned in the RFP's "proposed configuration" section with the implication that they are the standard other vendors must match or exceed, he indicated.

Easy Identification

Platner said IBM products were cited because "it was the easiest way to exactly identify the type of hardware we were looking for, or the equivalent. We're saying that we want any CPU that will operate as an IBM 370/138."

The county invited 25 vendors to enter the bidding, but received only six bids, one of which was thrown out. While Univac's "no bid" was accompanied by a protest that the RFP was discriminatory, only Univac made that protest and there are indications that several of the other nonbidders had different reasons for dropping out of the competition.

Platner said that most of the dropouts were IBM third-party vendors.

County systems programmer Art Mihelic said "I read some of the rejection letters and one specifically stated that they did not bid because we required the serial numbers of the equipment and they could not supply those serial

numbers. We also had a requirement that the equipment could not be more than two years old, and they could not meet that specification."

County officials saw their experience in this hardware acquisition as somewhat analogous to a type of situation described in *Computerworld* recently [CW, Feb. 27], Mihelic indicated. An article originally published in *CNReport* as a "Ploy of the Month" pointed out that "some computer vendors that deal in popular mainframe models have resorted to shell game tactics, effectively selling the same equipment more than once or selling equipment that does not exist."

The article mentioned at least four things that should be done in negotiating to acquire equipment, which county officials did, he said.

"That RFP was prepared four months ago and we were doing exactly what you directed should be done in a bid procedure, and these people can't meet those kinds of specifications," Mihelic said.

According to the RFP, the county considered a total DP system replacement unnecessary. However an upgrade of the county's IBM 360/40 was mandatory, as was the addition of direct access disk storage, high-speed line printer capabilities and teleprocessing hardware to allow interactive programming.

Univac Response

Platner said Univac offered no response to the RFP until just before bids were due. Univac's representative, J. Douglas Goodrow, never tried to discuss the situation with Platner's office except to state the no-bid response and protest, according to Platner.

Goodrow also sent a letter of protest to the county supervisors which the county administrative officer and the county purchasing agent reviewed.

Platner noted that the bidding was divided into four units, so the vendors must compete unit by unit.

Bid unit 1 was the CPU configuration; bid unit 2 was the disk hardware; bid unit 3 was the line printer; bid unit 4 was the teleprocessing hardware, Platner explained.

As its standards for bidding, the RFP included the following IBM products:

- Unit 1 — An IBM 370/138 CPU with 1M-byte main storage, two block multiplexer channels and 1M-byte multiplexer channel, the integrated file adapter for 3330/3340 series disks, the integrated 3203/4 printer attachment and the 2314/3340 compatibility feature.

- Unit 2 — A 3340 direct access storage facility with 3340/A2 and -B2 components and five 3348/70 disk packs.

- Unit 3 — A 3203/4 line printer.

- Unit 4 — A 3272/2 control unit, four 3277/2 displays and one 3286/2 printer.

"Control Data Corp., as an example, bid its plug-compatible ... 3330 disk drive. We have not rejected its bid. It bid a controller and 1403 printer for bid unit 3, and we have not rejected that bid," Platner said.

In light of the reopening of competition, Univac is reconsidering its no-bid stance, Goodrow confirmed.

All at once, it's Harris.

Harris now delivers the most cost/performance effective multi-use computer system in the industry.

Our new family of high performance systems—S115, S125 and S135—together with our powerful VULCAN Virtual Memory Operating System supports more than 50 terminals. Simultaneously.

This is a whole new line of medium-scale, multi-use systems with increased reliability and new state-of-the-art technology. You get greater I/O throughput. MOS memory with error correction. Powerful micro processor based CPU. Broad selection of highly reliable peripherals. And all operate with ANSI 74 COBOL, FORTRAN, RPG II, FORGO, SNOBOL, and extended BASIC.

The Harris S100 systems take on many different jobs all at the same time. Multi-stream batch processing. Multiple concurrent RJE's, both host and remote. Multiple interactive time sharing. Real-time processing. And this new generation of high performance computer systems from Harris delivers these all to you, concurrently.

If your need is distributed processing, time sharing, data base management, or any type of concurrent multi-use application, benchmark our new computer system against any other system in the industry.

Harris Computer Systems, 1200 Gateway Drive, Fort Lauderdale, Florida 33309. Telephone (305) 974-1700. Europe: Harris Intertype, Ltd., 145 Farnham Road, Slough, SL1 4XD, England.

All at once, it's Harris.



HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

Demand Outstrips Supply Survey Finds 'Seller's Market' in Retail Field

By Jeffrey Beeler
CW Staff

WESTLAKE, VILLAGE, Calif. — Almost any hardware vendor with the capital plus the technical and management talent can establish a strong position in the retail computer field, a market research firm here recently concluded after surveying computer store owners and customers.

Demands for hobby and personal computers exceeds supply by such a

wide margin that even the industry's least competent manufacturers have managed to stay in business, Image Resource noted in a study entitled "1978 Retail Computer Buyers Survey." "It's a seller's market and everyone is selling his product, be it large or small," the report said.

A glance at the industry's recent financial growth confirmed Image Resource's conclusion. Last year, overall sales in the retail computer industry

totaled an estimated \$104 million. Store revenues accounted for \$52 million of that total, the research firm said.

This year, total sales will near \$200 million compared with about \$120 million in store revenues, and by 1980 the two figures will jump to about \$425 million and \$300 million respectively, Image Resource added.

Gross \$25,000/Mo

On the average, owners of computer retail stores gross \$25,000/mo although a few outlets that deal primarily in small business systems reported revenues of \$50,000 to \$70,000/mo, the firm continued.

With an average markup of 25% on the sales price (33% of product cost), a typical retail computer outlet currently nets \$6,000/mo in gross profits. After rent, taxes, insurance, utilities, advertising and labor, the establishment usually clears "considerably" less than \$20,000/year, the survey noted.

Despite this relatively modest net income, product sales in computer retail stores last year jumped an average of 20% relative to the 1976 level. Moreover, "the overall retail computer market is not close to saturation. It is difficult to find an engineer, programmer or technical student who does not want his own personal, portable, computer that will run Basic," the report said.

As a result, the market research firm advised computer vendors with established product lines to take greater advantage of computer stores as avenues for distributing their wares.

Five-Part Market

Image Resource divided the retail computer market into five sectors — small business systems, hobby computers, educational systems, home computers and personal computers.

Of these five areas, the small business sector "is the hottest and most controversial," and 95% of the stores surveyed plan to gear their activities to the sale of small business systems, the study noted.

Success Secret

To succeed in this enterprise, computer retailers should maintain a business-like atmosphere in their stores, staff their premises with professional-looking personnel who are attentive and interested in customer problems, avoid exaggerating the capabilities of the merchandise and prepare a written or verbal presentation that highlights their strengths as problem solvers, the report advised.

Image Resource also recommended that store owners set aside a quiet, out-of-the-way place where they can listen to customer problems and that they tailor every detail of their service to the client's needs, from the type and quality of the merchandise they carry to the local business functions they attend.

Unlike the small business systems sector, the hobbyist area does not promise significant future growth potential for computer stores, although it forms the base for the current retail computer market, the survey concluded. Image Resource characterized the hobbyist area as "slightly saturated

at the moment" and noted that although a new crop of young enthusiasts will enter the market each year, others will leave the field for various reasons.

"Many hobbyists will eventually move into the business application end or use their computer system as a personal computer to aid in their occupation," the report said.

Educational Field

By contrast, the educational field currently represents one of the largest potential markets for microcomputer configurations, the study pointed out.

In fact, the merchandise currently available in almost any well-stocked retail computer store can satisfy all the criteria for educational DP. The equipment is affordable, reasonably reliable for the light-duty applications they are usually asked to perform in an academic environment and offers a wide range of hardware and software configurations, Image Resource explained.

By year's end, retail computer sales to the high school market will near \$7.5 million and revenues from the college market will hit \$23.5 million, the firm predicted. By 1980, those totals will swell to \$22.5 million and \$62 million, respectively, Image Resource added.

Lack of Know-How

The home computer market, meanwhile, remains the least defined and penetrated of the five major markets. "The concept of placing a configuration of the presently available equipment into the home to be used by Mother for recipes, by Junior for school work and by Dad to connect it to the fire alarm system is simply not viable," the report asserted.

Most households simply lack the engineering know-how to install a small computer that can perform routine domestic tasks, Image Resource said. During the next few years at least, home computers will find most of their applications as preinstalled components of larger units like appliances, environment control systems and home alarms.

In the personal computer sector, the market research firm foresees "almost immeasurable" sales potential because of the versatility of the products. At present, almost all these systems operate in the home, although they were installed at least partly for professional reasons, the survey noted.

During the next few years, however, personal computers will become less homebound as the equipment becomes increasingly portable, Image Resource predicted.



'Let That Be a Lesson to You — We Never Put a Test on and Then Take a Coffee Break.'

Our Service Gets A Perfect Score In Datapro Study

DMS/OS is the data management system of the future. It's the only system that can handle the data of the future.

SOFTWARE MODULE MARKETING

Where Service and Software Come Together



Crocker Bank Building Penthouse • 1007 7th Street • Sacramento • CA 958 4 • Tele. SMMSAC (777 4 • 9 4 44) 7234

Are Your DASD's Drowning... in a Sea of Data?



DMS/OS is the Wave of the Future in Data Management

Brazil Protecting Its Domestic Minicomputers

By Bohdan O. Szuprowicz

Special to CW

N. BERGEN, N.J. — The Indianization brouhaha had hardly blown over when earlier this year Brazil announced that its minicomputer market will be reserved exclusively for domestic minicomputer manufacturers or foreign subsidiaries that operate as joint ventures with Brazilian majority control.

This move was seen as another example of protectionism extending from Western Europe into the rapidly industrializing developing countries with large potential markets. Brazil's decision will help establish a domestically controlled computer industry, but its effect on foreign imports may not be as drastic as some reports seem to suggest or as Brazilians would like it to be.

Brazil's minicomputer market was estimated at only \$10.1 million in 1975 and is expected to reach about \$20.4 million in 1980, when over 7,000 minis should be in operation. This represents only about 8.5% of the total Brazilian market for computers today and is not expected to become much more than 9% of the total by 1980.

Perceptions of the Brazilian market are distorted by the fact that minicomputers represent almost 70% of all installations in that country. A large number of those are small business computers.

Burroughs and Olivetti account for about 75% of all minicomputers in Brazil, but the average value of these units is only \$15,000 each.

In 1975, Burroughs, with almost 1,200 installations, accounted for about 31% of all computers in Brazil and was ahead of IBM. But its market share by value was only 19.2% of the total while IBM, which was second in number of installations, dominated with 60.2% of market value.

What gives the foreign suppliers more concern, however, is that Brazil defines a minicomputer as a system with up to 124K bytes of memory. This is twice the size of the minicomputer standard established by the United Nations and it is seen as an attempt to include some small- and medium-size computer installations under the new production and import restrictions.

Protectionism No Surprise

Brazilian moves did not take any foreign suppliers by surprise and have been in the making for several years. They are a result of protectionist trends in other countries and of trade realities affecting Brazil as a nation.

Brazil is industrializing rapidly, but must import up to 80% of its oil from abroad and is running a foreign trade deficit of about \$3 billion per year. Development of a domestic minicomputer industry is designed to save Brazil up to \$1 billion over the next decade as well as enhance its national security by ensuring the existence of high-technology industries under local control.

What is particularly interesting in the case of Brazil is the approach taken to implement the new policies. Brazil chose to control the market rather than demand controlling participation in existing foreign subsidiaries.

In 1973 the Brazilian government created a holding company, Digibras, whose mission is to promote and orga-

nize financing for the domestic industry. There are some similarities here with the Japan Electronic Computer Co., which promotes the purchase and arranges financing of Japanese computers in Japan.

This is not unexpected because Japan has been active in the development of Brazil, and Fujitsu found one of its first foreign markets in Brazil. Now Fujitsu is providing technology to one of the new domestic minicomputer companies.

Digibras established the first Brazilian minicomputer manufacturer, Computadores e Sistemas Brasileiros SA (Cobra) that includes British Ferranti, Ltd.'s participation and American Sycor, Inc.'s technology. Cobra has also shown an interest in the acquisition of

Data General Corp. licenses, but demanded assignment of manufacturing rights to a degree that DG was not prepared to grant.

International News

In 1977 Brazil invited bidding for additional minicomputer manufacturing operations in the form of joint ventures under Brazilian control. Although 16 companies, including leading American manufacturers, responded, many disqualified themselves by ignoring the Brazilian government's guidelines for local con-

trol.

As a result Brazil assigned control of minicomputer manufacture and supply to four organizations, including the previously created Cobra. The new firms are Sharp Equipamentos SA, which is using French Logabax technology, Electronica Digital SA, based on Fujitsu know-how, and Laboelectronica SA, which incorporates Nixdorf Computer AG designs from West Germany.

What kind of fruit all this enterprise will bear, only time will tell, but in the meantime there is ample opportunity to keep pushing larger computers, peripherals and all the sophisticated devices you can now hang on minicomputers, but which are not likely to be made in Brazil for some time to come.

Your top competition is going to meet your prime prospects. What are you going to do about it?

They've made a smart decision. Last year the nine computer market areas on our itinerary drew 42,178 qualified buyers.

This year we expect more than 50,000. Can you afford to miss this chance to present your products and services?

There's still room for you. But it's going fast. Get complete information with this coupon now, on how Computer Expo 78 can work for you. Or save time by calling Kim Wichert collect at 617-964-4550.

These companies have already signed to exhibit at Computer Expo 78:

NCR
Varian Graphics
Informatics
Honeywell
Data Automation
Communication News
McCormack & Dodge
Data Rentals
Computer Sales International
Intel
Electronic Ventures
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing
S.E.A.
Tri-Data
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems
Shasta
Mostek
DIVA
SBC Magazine
Tele-dynamics
Control Data
National Semiconductor
Printronic
Codex
Lear Siegler
E.M. & M.
The Morley Company
Vanier Graphics
Total Typography
Wang Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Inforex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Inform
Computer Decisions
Infosystems
T-Bar
Corporate Systems
Dynatech
Western Union
Calcomp
General Computer
Atlantic Research
Telefile Computer Products
General Electric
Qume
Moore Business Forms
DataMedia
Texas Instruments

Computerworld
NCI
AT&T
Kodak
BASF
IBM
Anderson Jacobson
Computer Input Services
Paradyne
ComData
Genesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service
Itel Corporation
Deltak
Peripheral Products
General DataComm Industries
Continental Peripherals
Computer Associates
Qantel
Diablo Systems
Marketechs
Racal-Milgo
Data Systems Specialists
Key Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
McGunn Safe
Allstate Computer
H/G Professional Forms
Nichols & Company
Datapro
Input Services
Plessey Services
Industrial Computer Controls
Vincent Data Products
World Info Systems
DP Power
Conrac
Educational Data Systems
Cybertek
Cosmic
Business Automation
Insyte Datacomm
YE Data
Arcus
St. Louis Info
Digilog
Herrera Kirby
Foto-fun
Hamilton Sorter
Dispotech
Consolidated Computer
Cybersearch
Wolfe Computer

Trac Associates
Sperry Univac
Xerox
Sykes Datatronics
Cummins Allison
American Microprocessor
International Data Corp.
Programs, Inc.
Beehive International
Interlec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini-Computer Systems
Tandem Computer
PCC/Perlec
Computrend
Extel
Mentel
Sycor
Digitronics
Computer Services
Datamart
Courier Terminals
Modems, Plus
Software Design
Curtis 1000
Spectron
K&K Associates
Applied Digital Data
Epic Data
Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathematica
Rianda Electronics
Computer Corp of America
Cullinane
Hewlett Packard
Pansophic Systems

COMPUTER
CARAVAN'S



I'm Interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

- ☐ We're interested in exhibiting.
☐ Have Sales Representative call me
☐ Send Reservation Agreement
☐ Send Copy of 1977 Attendee Analysis

- | | | |
|--|---------------|---------------|
| ☐ Southern California Computer Expo | Anaheim/LA | March 21-23 |
| ☐ Northwest Computer Expo | San Francisco | March 28-30 |
| ☐ Southwestern Computer Expo | Houston | April 11-13 |
| ☐ Southeastern Computer Expo | Atlanta | April 18-20 |
| ☐ Gateway Computer Expo | St. Louis | April 25-27 |
| ☐ Midwestern Computer Expo | Chicago | May 2-4 |
| ☐ Mid-Atlantic Computer Expo | New York | May 9-11 |
| ☐ Great Lakes Computer Expo | Detroit | May 23-25 |
| ☐ New England Computer Expo | Boston | May 30-June 1 |

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone: (____) _____

Research Group Predicts Down Cycle for Minis

BOSTON — For the past three years, the minicomputer industry has been growing at 35% to 40% annually — 5% to 10% faster than trend-line predictions.

Now, it appears minis are heading for a down cycle, according to a recent analysis released by New England Research, the research arm of Adams, Harkness & Hill, a Boston-based brokerage house.

The current downturn, expected to bottom out during the first half of 1979, may be a reaction to the above-average demand for minis from 1975-1977, according to the firm.

Growth projections for minicomputers are 30% for the first

half of 1978, slipping to 20% for the second half of the year and lower still for the first six months of 1979.

However, the group does not foresee negative growth.

A previous down cycle during the last three quarters of 1974 resulted in a decline in growth from 40% to 10%.

How will the downturn affect minicomputer manufacturers? Although Kenneth Olsen, president of Digital Equipment Corp., forecast a downturn and began trimming nonessential employment categories, analysts at New England Research predict DEC will be one of the most seriously affected companies, particularly since it will not be able to rely on a

large backlog of orders. This comes just as DEC's plant is ready for full production.

In addition, the Interdata Division of Perkin-Elmer faces slippages.

On the other hand, New England Research forecasts that

Data General Corp. and Wang Laboratories will not be as hard-hit as some of their competitors. Analysts credit DG's ability to respond to changes in demand and point to Wang's product mix as factors that will create a resistance to

the down cycle.

Regardless of whether the cycle develops as predicted, New England Research does not foresee any serious erosion of these companies market position or earnings per share.

Transmission Equipment Mart Set at \$710 Million Level by '82

WILTON, Conn. — The U.S. market for data transmission equipment and systems will generate approximately \$710 million in revenue by 1982, nearly 2-1/2 times the present sales of \$280 million, according to Charles P. Johnson, president of General Datacomm Industries, Inc.

Johnson said he anticipates that the number of data terminations in the U.S. — any equipment responsive to computers — will increase from 1.2 million in 1976 to 128 million by the year 2000.

Major changes in marketing strategy will accompany the expected growth. Johnson cited creation of industrywide standards for data transmission equipment by U.S. and foreign governmental agencies as a major contributor to change. Johnson considers the adoption of the "network concept" — the relationship of individ-

ual products and systems into communications networks — the most important marketing strategy for companies seeking industry leadership.

Leadership will also depend on such factors as breadth of customer base, the ability to understand user needs and the extent of the company's direct service organization, he said.

DEC® Data System Owners
Need new reports within minutes?
DEC® OEM's
Having trouble speaking English?

SYMBOLIC SYSTEMS® INC.

(DEC's first and foremost business OEM)

PRINT IV™

a user-oriented, query type report writer

To print a report, simply:

- select data desired
- select order desired
- enter selection criteria and required totals
- watch report appear on printer

No programming skills required!
License price includes 1-yr. warranty
For free demo and further information
call, write or telex

FRANK J. PÖNZIO, JR.

SYMBOLIC® SYSTEMS
25 Chatham Road Summit, NJ 07901
(201) 277-6100/Telax No. 13-6476

Foreign Orders & Installations

Edwin H. Bradley and Sons Ltd., a British holding company, plans to install an on-line network linking various operations. The system includes an NCR Corp. N-8450 system.

The UK's Midland Bank has ordered Arbat Systems, Ltd.'s Swift software package with associated Digital Equipment Corp. PDP-11/60-based hardware.

The Greek Meteorological Organization has leased a Control Data Corp. dual Cyber 18-20 store-and-forward message switching system to expand and improve its weather forecasting. All nations of the world exchange weather data over this network by means of a numerical code that permits meteorologists to communicate without language barriers. The five-year lease of the system will total \$1 million.

Eagle Star Insurance Group of Cheltenham, England, has ordered display terminal installations valued at about \$1.4 million from Harris Systems Ltd.

Gothaer Versichergen, a West German insurance firm located in Goettingen, has ordered Univac equipment valued at \$2.2 million. The equipment consists of Univac's 90/80 system, an extension of main memory and peripheral equipment to an existing 90/70 system, and 78 Univac 400 intelligent terminals.

DG Eclipse Fortran 6?

Better yet, CFOR, a user-oriented programming language, is now available for your ECLIPSE. CFOR is easy to learn and implement, and is translated to DG's fast-executing FORTRAN 5. Intelligent control flow and rational syntactic cosmetics lead to "GOTO-less" structured programs which are easy to write, read, debug and modify. A commercial field variable data type extends CFOR to data processing environments while retaining the computational, multi-tasking, interactive qualities of FORTRAN.

Contact David N. Langley

FINNING

FINNING COMPUTER SERVICES LTD.

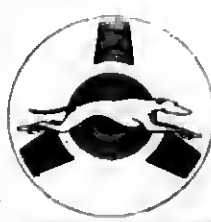
555 Great Northern Way, Vancouver, B.C., V5T 1E2, (604) 872-7474

Available Immediately For
SHORT TERM LEASE
370/138 370/148 370/145
3330's and OEM 3330's
360/30 360/40 360/50 360/65's
Greyhound Phoenix ICA's
CALL US COLLECT

United States		
Austin	Ron Geil	(512) 451-0121
Boston	Tom Ryan	(617) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dave Hyland	(415) 283-8980

International		
Canada	Don Maunder (Toronto)	(416) 366-1513
Mexico	Andres Contreras	(905) 543-6850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joe Gold (Geneva)	(022) 61-27-54
Austro-Asia	John Hallmark (Dallas)	(214) 233-1818

Non-IBM:		
UNIVAC or)	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**
GREYHOUND TOWER, PHOENIX, ARIZONA 85077

IEBCOMPR IS DEAD

If you've always wanted IEBCOMPR to

- Underline Unequal Bytes
- Print Hex and/or Character
- Compare Specific Records or Fields
- Predefine Error Record Quantities
- Compensate for Missing Records
- Print Portions of a Record
- Process VSAM Files
- Compare an entire PDS

Then call us for a free 30 day trial of ACCUCHEK.

ARKAY COMPUTER INC.
24 Manor House Road
Newton Centre, MA 02159
(617) 964-1894

Detach here, moisten and seal envelope securely before mailing

Fold and insert order form (attached through binding) and remittance here.

Thank you for your order.

USE THE ATTACHED
ORDER FORM AND
THIS ENVELOPE FOR

a new subscription
new address
new title
new industry

first class
permit no 40760
newton ma

no postage stamp necessary if mailed in the United States



797 Washington Street
Newton MA 02160

Urges Government Action

National Semi Head Warns of Japanese Threat

LOS ANGELES — The U.S. semiconductor industry will be destroyed within 10 years unless the federal government institutes and enforces free-trade rules for Japanese-made products, Charles E. Sporck, president of National Semiconductor Corp., warned here recently.

Speaking before the Los Angeles Society of Securities Analysts, Sporck expressed concern that monopolistic Japanese companies will be as successful in dominating the semiconductor industry as they have been in many other industries.

"Successful domination of markets by Japanese companies has weakened or destroyed the corresponding industry in the U.S.," he said. He cited such examples as steel, motorcycles, CB radio, hi-fi electronics, TV receivers, sewing machines, calculators and various passive electronic components. The tactic most often used, he observed, is "predatory pricing."

According to Sporck, "Japan's prime target today is the DP industry. Domination of the semiconductor market in the U.S. is only a part of an overall strategy that intends to gain control of the computer industry in this country."

Japan's Ministry of International Trade has organized the computer industry into two groups: one that is developing equipment compatible with IBM computers and another that is developing more advanced non-IBM equipment, he noted.

"Clearly, IBM and every other computer manufacturer in the U.S. are under attack," he said.

The Japanese semiconductor industry is a formidable competitor because it enjoys several business advantages that are denied the U.S. industry. These advantages include a 12% import tariff in Japan vs. a 6% import tariff in the U.S., he said. Japanese firms have easy access to the U.S. market because well-developed and noncaptive marketing organizations already exist in this country, Sporck added. On the other hand, U.S. access to the Japanese market is restricted because marketing organizations in Japan are limited, poorly financed and difficult to staff.

Since 1973, imports into Japan have increased very little, while exports to the U.S. have multiplied. This imbalance of trade is compounded by the fact that imports into Japan are generally restricted to raw materials, while exports to the U.S. consist largely of manufactured goods.

'Ominous Trend'

"It appears Japan already ships more semiconductors into the U.S. market than American companies ship into Japan. I find this an ominous trend," Sporck said.

In addition, Japanese companies are free to establish small developmental companies in the U.S. for the sole purpose of gaining access to American technology, while it is next to impossible for U.S. firms to operate this way in Japan, he charged.

Furthermore, in Japan, semiconductor industry business and technological developments are coordinated by the Japanese government to minimize duplication. In the U.S., no such coordination exists.

dination exists.

And large subsidies are provided to semiconductor companies for development work consistent with Japanese government policy, he said, while no such subsidies are available in the U.S.

Sporck advocated equality of trade rules rather than protectionism. He said his company and the rest of the semiconductor industry in the U.S. are strong proponents of free trade and therefore were not directly asking for an increase in tariffs on Japanese-made semiconductors.

Modify Trade Rules

Instead, Sporck recommended a modification of the trade rules that apply to Japan.

He believes a balance-of-trade agreement should be made in which imports of Japanese-made semiconductor products be made equal to U.S. exports of the same type of product to Japan. "In no case should anything less than equivalency be required," he said.

The American government must convince Japan to equalize the tariff it levies on semiconductor imports. Furthermore, the capital gains tax structure in the U.S. should be liberalized to provide incentives for companies to gamble on innovative technologies that would otherwise go untried, Sporck contended.

Tax credits and accelerated depreciation

schedules should be provided for increased research-and-development and capital investment. In addition, funds should be granted for development of advanced semiconductor production equipment, he said.

"These responses would help but would not resolve the fundamental problem," Sporck said. "The American economy — which is based historically on free nonmonopolistic trade — is faced with a planned, controlled economy as a direct competitor. Confronted as we semiconductor manufacturers are with a powerful, well-directed opposite economy as an adversary, the disadvantage is formidable."

A real eye-opener from macs®

Join macs for a morning of software testing talk. And go home with a test plan that works. Free.

There's tremendous potential for savings in software development by the use of a test data generator. Datapro Research Corporation says it* and our more than 400 datamacs® users worldwide agree.

Now we want to tell you about the savings in personnel and computer time that can be yours when you build a test plan. And while we have a highly successful proprietary product designed to help you do just that, our series of free seminars are offered in the name of quality software. Which means we will talk about building a test plan that will enable you to improve testing and save money. Whether or not you use our products.

*Here's what Datapro Research Corporation writes about test data generators:

Surveys of data processing installations reveal that — • About one half of the personnel resources used annually are devoted to program debugging and testing • About 50 hours of computer system time per month is spent in support of program test and debug • A further 10 hours per month is lost by the average installation on reruns due to program failure.

User experience with test data generators has revealed that — • Computer time expenditures for program test and debug may be reduced by more than 50 percent • With concomitant manpower expenditure reductions of more than 30 percent.

We know that no matter how good the testing tool, without a test plan, it is useless. We'll call on our experience to help you chart a simple, effective way to build a test plan that will get you more for your software dollar. And we will provide you an actual complete test plan that works. At no charge.

If you're responsible for the ways system analysis and programming are done in your company, then we'll show you how you can make a dramatic impact on the way new systems are developed and installed.

Spend a morning with macs. Learn how to improve programmer productivity, reduce testing costs, and make maintenance programming just plain fun. It'll be a real eye-opener.

Space is limited, so register now. Return this coupon today, or call macs (collect) at 215/265/2910.

macs 1978 series of eye-opener seminars.

March 28, New Orleans, LA	May 11, Vancouver, Brit Col
April 6, Chicago, IL	May 16, Parsippany, NJ
April 10, Los Angeles, CA	May 18, Cleveland, OH
April 11, Philadelphia, PA	May 23, Boston, MA
April 11, Phoenix, AZ	May 23, Cincinnati, OH
April 14, San Francisco, CA	May 25, Milwaukee, WI
April 18, Dallas, TX	June 1, New York, NY
April 20, Houston, TX	June 13, Indianapolis, IN
April 25, Washington, DC	June 14, Atlanta, GA
May 9, Hartford, CT	June 15, St Louis, MO
May 9, Seattle, WA	June 20, Calgary, Alberta
May 10, Portland, OR	June 22, Edmonton, Alberta



macs

management and computer services, inc.
790 valley forge plaza
valley forge, pa 19482
215/265/2910

I want to wake up with your free seminar on software test planning

Please register me for the seminar in _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Telephone _____

☐ Sorry, I can't attend any of your seminars, but I am interested in learning more about software test planning. Please send information

CDC's Plato Enrolls at University of Delaware

NEWARK, Del. — The University of Delaware has completed installation of a Control Data Corp. Plato education system that delivers instructional materials to display terminals throughout the campus.

The system uses a CDC Cyber 173 linked to 60 student terminals. Lesson materials stored in the system are presented on the terminals in the form of text, drawings or animated graphics.

Students interact with the materials through the terminal keyboard or touch the terminal screen to answer questions, work problems, relocate images on the screen and ask for help, CDC said.

"A feature of the system is its ability to individualize materials to the needs of each student," according to Dr. Fred

T. Hofstetter, professor of music and head of the university's computer-based education program. "Depending on the student's success in working through a particular assignment, the system presents a different version of the problem, suggests remedial materials or proceeds to the next segment of the lesson."

Flexible Format

All this student activity is recorded by the system and processed into whatever report format instructors want, thus reducing their clerical tasks, according to the company.

The University of Delaware conducted pilot programs of the Plato education system and developed lessons for nearly three years before deciding

to install its own system. During that period, the terminals were linked to a central CDC Plato system in Minnesota, which is used by other educational institutions and industry and government training groups.

Used by 30 Departments

More than 30 different academic departments at the university now use the Plato system to supplement laboratory and classroom work. Course materials in music, home economics, agriculture, foreign languages, chemistry, nursing and even drama have reportedly been developed for computer delivery.

Illustrating the system's simulation capabilities, Hofstetter said, "agriculture students can watch a plant pic-

tured on the terminal grow or wither, depending on the chemical treatment they prescribed. Music students can correct musical scores, using a synthesizer attached to the Plato terminal, and immediately hear the results of their choices. Dressmaking students can actually create body forms on the terminal and perform fitting requirements before cutting into the fabric or starting alterations."

More than 100 University of Delaware faculty members are involved in developing additional courses for the Plato system, using the same terminal as the students. Course materials can be changed or updated through the terminals, CDC noted.

EDP books you can't afford to be without

SOFTWARE RELIABILITY

Principles and Practices
by G. J. Myers
769/885 Pub. Pr., \$19.95 Club Pr., \$15.75

STRUCTURED COBOL

by A. S. Philippakis and L. J. Kazmier
497/974 Pub. Pr., \$9.95 Club Pr., \$8.45

TOP-DOWN STRUCTURED PROGRAMMING TECHNIQUES

by C. L. McGowan and J. R. Kelly
769/052 Pub. Pr., \$15.95 Club Pr., \$13.50

PRINCIPLES OF DATA-BASE MANAGEMENT

by J. Martin
769/907 Pub. Pr., \$19.95 Club Pr., \$18.25

SYSTEMS SIMULATION

Methods and Applications
by A. M. Colella, M. J. O'Sullivan and D. J. Carlino
768/053 Pub. Pr., \$16.00 Club Pr., \$12.95

ALGORITHMS + DATA STRUCTURES = PROGRAMS

by N. Wirjh
769/664 Pub. Pr., \$18.00 Club Pr., \$13.75

ASSEMBLY LEVEL PROGRAMMING FOR SMALL COMPUTERS

by W. Weller
768/455 Pub. Pr., \$14.95 Club Pr., \$12.50

MINICOMPUTER SYSTEMS Structure, Implementation, and Applications

by C. Weitzman
788/770 Pub. Pr., \$19.50 Club Pr., \$14.50

DEBUGGING SYSTEM 360/370 PROGRAMS USING OS AND VS STORAGE DUMPS

by D. H. Rindfleisch
769/788 Pub. Pr., \$17.50 Club Pr., \$14.75

COMPUTER DATA STRUCTURES

by J. L. Pfaltz
497/435 Pub. Pr., \$17.95 Club Pr., \$13.75

MINICOMPUTERS: Structures and Programming

by T. G. Lewis and J. W. Doerr
773/009 Pub. Pr., \$13.95 Club Pr., \$10.95

MICROCOMPUTERS/MICROPROCESSORS Hardware, Software and Applications

by J. L. Hilburn and P. N. Jullch
771/499 Pub. Pr., \$18.50 Club Pr., \$14.75

ADVANCED ANS COBOL WITH STRUCTURED PROGRAMMING

by G. D. Brown
772/118 Pub. Pr., \$19.95 Club Pr., \$15.95

DATA PROCESSING CONTRACTS

by D. H. Brandon and S. Segelstein
770/972 Pub. Pr., \$34.50 Club Pr., \$25.50

YOUR COMPUTER AND THE LAW

by R. P. Bigelow & S. H. Nycum
769/32X Pub. Pr., \$18.95 Club Pr., \$15.75

THE INFORMATION SYSTEMS HANDBOOK

by F. W. McFarlan and R. L. Nolan
789/29X Pub. Pr., \$35.00 Club Pr., \$25.50



any two
of these great
professional books
for only
\$2.95
values up to
\$69.50

Introductory offer to new members of the Computer Professionals' Book Club

Two special bonus books come to you for \$2.95 with your first club selection

THIS new professional club is designed to meet your day-to-day on-the-job needs by providing practical books in your field on a regular basis at below publisher prices. If you're missing out on important technical literature—if today's high cost of reading curbs the growth of your library—here's the solution to your problem.

The Computer Professionals' Book Club was organized for you, to provide an economical reading program that cannot fail to be of value. Administered by the McGraw-Hill Book Company, all books are chosen by qualified editors and consultants. Their understanding of the standards and values of the literature in your field guarantees the appropriateness of the selections.

How the Club operates: Every month you receive free of charge The Computer Professionals' Book Club Bulletin. This announces and describes the Club's featured book of the month as well as alternate selections available at special members' prices. If you want to examine the Club's feature of the month, you do nothing. If you prefer one of the alternate selections—or if you want no book at all—you notify the club by returning the card enclosed with each Bulletin.

As a Club Member, you agree only to the purchase of four books (including your first selection) over a two-year period. Considering the many books published annually, there will surely be at least four you would want to own anyway. By joining the club, you save both money and the trouble of searching for the best books.



VALUES UP TO \$69.50 WITH MAJOR DISCOUNTS ON ALL OTHER CLUB SELECTIONS. Your bonus books come with the first selection, and you may choose both of them from the books described in this special introductory offer.

EXTRA SAVINGS: Remit in full with your order, plus any local and state tax, and McGraw-Hill will pay all regular postage and handling charges.

NO RISK GUARANTEE:

If not completely satisfied return selections for full refund and membership cancellation.

MAIL THIS COUPON TODAY

COMPUTER PROFESSIONALS' Book Club P.O. Box 582 Princeton Road, Hightstown, New Jersey 08520

Please enroll me as a member and send me the three books indicated. I am to receive the two bonus books at the introductory price of \$2.95 plus my first selection, plus tax, postage, and handling. If not completely satisfied, I may return the books within 10 days and request that my membership be cancelled. If I keep the books, I agree to take a minimum of three additional books during the next two years at special Club prices (guaranteed 15% discount, often more). I will receive the Club Bulletin 13 times a year. If I want to examine the featured selection, I need take no action. It will be shipped automatically. If, however, I want an alternate selection—or no book at all—I simply notify the Club by returning the convenient card always enclosed. I will always have a minimum of 10 days in which to return the card and you will credit my account fully, including postage. If this is not the case, Membership in the club is continuous but cancellable by me at any time after the four-book purchase requirement has been filled. This order subject to acceptance by McGraw-Hill. Orders from outside the continental U.S. must be prepaid. Company, business, or institutional tax exemption status is not applicable to purchases made through individual Club memberships. All prices

subject to change without notice. Offer good for new members only.

Write Code # of 1st bonus book selection here

Write Code # of 2nd bonus book selection here

Write Code # of 1st book selection here

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

P39294

New Companies

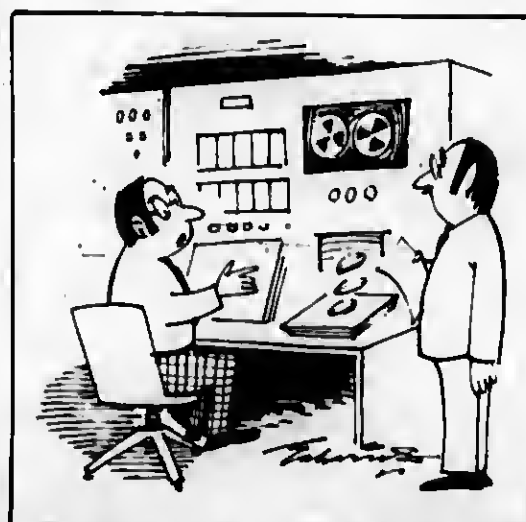
California Microcomputer Co. has introduced into the small business market its 7700 line of microcomputer systems, which come complete with hardware and basic business software packages for handling general ledger, payroll, accounts receivable and accounts payable. The systems will be sold through a nationwide network of dealerships. CMC may be reached through P.O. Box 3199, Chico, Calif. 95927.

Combined Systems Corp. has been formed to provide DP consulting services, custom systems design and contract programming. Full support for the user is provided by the firm, up to and including facility management services. The firm may be contacted at 401 H St., Modesto, Calif. 95355.

Winchester Computer Corp. has been formed to provide time-sharing services to the New York City metropolitan region. The firm may be contacted at Suite 1211, 1270 Broadway, New York, N.Y. 10001.

Abernathy Business Consultants, Inc. is specializing in the computer field for businesses who plan first-time use of computers and capacity planning for large computer users. Seminars and workshops will also be offered at the firm's location at Suite 1801, 51 Monroe St., Rockville, Md. 20850.

The Software Co. is engaged in creating, developing, licensing and selling computer systems, programs and related consultant activities. The firm is located at 900 Dallas Federal Savings Tower, 8333 Douglas Ave., Dallas, Texas.



'It Won't Give a Firm Prediction, But It Does Give Out Three Chinese Fortune Cookies.'

IBM Wins Verdict In Royal Data Case

LAS VEGAS — IBM has won a directed verdict here in a case brought by Royal Data, a now-defunct service firm that was headquartered here.

In the suit, Royal Data had charged that IBM forced it out of business by spreading rumors that claimed the founder of Royal — John Perazzo — had connections with organized crime.

IBM had argued that Royal went out of business because it was not offering a marketable service.

Judge Roger Foley issued the directed verdict, claiming "there isn't any evidence or inference that supports the plaintiffs' contention that it had a marketable product."

IBM, Comten Sign Pact

ST. PAUL, Minn. — IBM and Comten Inc. here have entered into a nonexclusive, worldwide patent-licensing agreement.

The agreement provides for payment to Comten of \$2.4 million and a five-year, royalty-free license permitting each company to conduct its present and future business without liability to the other.

The payment to Comten was primarily for the use of Comten's patents for computer performance, measurement and evaluation products, the firms said.

The payment will result in income after taxes of approximately \$1 million or 54 cents per share for its fiscal year ending Dec. 31, 1978.

Supershorts

Cipher Data Products has awarded the International Division of California Computer Products, Inc. exclusive European marketing rights for its complete line of compliance arm and microprocessor-controlled vacuum column tape drives.

Applied Digital Data Systems, Inc. (Addis) has reached agreement with TRW's Customer Service Division under which TRW has agreed to install and maintain Addis System 70 intelligent network terminals and System 50 video processing stations throughout the U.S.

Zentronics Ltd. has announced the formation of Zentronics Data Products Division with headquarters in Downsview, Ontario. It will incorporate the Data Products Group of Nedco, Ltd., which along with Zentronics Ltd. is a subsidiary of Northern Telecom Ltd. Zentronics Data Products will coordinate the marketing and distribution of products including those of Lear Siegler, Inc., Teletype Corp. and Exel Corp.

Software AG has announced two changes in its marketing structure, which it hopes will enable the company to take advantage of the expanding market for data base management and teleprocessing software packages. The Central Region, headed by Tom Berrisford, will include 16 states from Texas to Ohio and will be headquartered in Houston. The Southeastern Region, headed by Ralph Partlow, will include eight states, with headquarters in Miami.

CI Notes

EMI, Paradyne Collaborating

LARGO, Fla. — EMI Ltd., a \$1.6-billion London-based manufacturer of commercial and defense electronics has entered into a distributor agreement with Paradyne Corp. here.

Under terms of the agreement, EMI will distribute Paradyne's line of digital circuitry modems, PIX-II virtual data link systems and Analysis series of communications network fault isolation systems throughout Europe and the UK.

"The agreement with EMI is significant because it represents the first penetration of European markets for our PIX-II system, which displaces a high percentage of equipment, software development and labor content in estab-

lishing IBM-compatible data communications networks," according to Robert S. Wiggins, Paradyne chairman and president.

Commerce Aiding Fairs Abroad

WASHINGTON, D.C. — Overseas trade events, including exhibitions, trade fairs and seminars are part of the export support services being made available to U.S. manufacturers by the Office of International Marketing of the United States Department of Commerce.

"Computers and peripheral equipment" and "business and equipment systems" are the industries targeted for major support. Additional services are product research in 30 foreign markets and export counseling.

For a full schedule of events and further information, contact Peter Ryan, U.S. Department of Commerce, Industry and Trade Administration, Office of International Marketing, Washington, D.C., 20230.

Keane Forms Consulting Group

BOSTON — The Advisory Services Group of Keane Associates, Inc. has formed a technical services consulting group to evaluate computer hardware and software system performance and help customers recognize and solve related problems.

Robert E. Rebello, formerly performance evaluation specialist at the University of Nijmegen, The Netherlands, has been named group manager.

The technical services group analyzes customer system problems by first determining how the system is used, evaluating whether a customer's hardware and software is optimally utilized and then initiating improvements.

Take advantage of the most profitable distributor plan available for the small business computer market. You'll find Randal offers the highest gross margins — from system number one on. And no quotas, billbacks or other hassles. You won't find us competing with you — we only market through distributors, so your success is ours.

Never before have your potential customers been able to buy as much reliable office computer power for such an incredibly low (Randal systems start at \$12,750) price. Every

system is available for 60 days — or less — delivery and priced lower than any comparable competitive models. Plus, you can stop worrying about training — ours is continuous, or service — ours is nationwide.

Randal Data Systems has the broadest family of software-compatible small business computers and an extensive application software library. Just as important, our Business Basic makes it extremely easy to program.

Maybe that's why we have the fastest growing independent distributor network in the nation.

Call us today or send coupon for details.

Randal Data Systems, 365 Maple Avenue, Torrance, California 90503, (213) 320-8550.

Yes, I'm interested in a Randal Data System distributorship. Show me the book.

Other products sold _____

Years in business _____

Geographic coverage _____

Special applications _____

Company _____ Title _____

Name _____

Address _____

City/State/Zip _____

randal data systems, inc. CW 3-27

What Basic 4, DEC, Microdata, Data General, etc. should know about distributors.

Randal wrote the book.



NEC Offers Interval Timer

LEXINGTON, Mass. — A programmable interval timer that operates with the 8080A microprocessor bus structure has been introduced by NEC Microcomputers, Inc. The uPD8253 is an N-channel MOS device that is compatible with the Intel I-8253, the company said.

It reportedly comes in a 24-pin plastic DIP and requires only a single +5V power supply. The part relieves the processor in a microprocessor-based system of time-out and timing loop functions and can serve as a transmission rate generator, a real-time clock, an event counter or a digital one-shot pulse generator, according to the firm.

NEC said the uPD8253 contains

three 16-bit down counters and can be programmed in any one of six operation modes: as an interrupt for the processor on a terminal count; a programmable one-shot pulse width generator; a rate generator; a square wave generator; a hardware-triggered strobe; and a software-triggered strobe. Clock inputs, NEC said, don't have to be from the CPU and can be clocked independently at different rates ranging from DC to 2 MHz.

At \$17 each in quantities of 100 or more, the uPD8253 is an addition to NEC's line of 8080A-compatible peripheral chips and memories and is available from the company at 5 Militia Drive, Lexington, Mass. 02173.

PCS Adds 8K-Byte RAM

SALINE, Mich. — Process Computer Systems, Inc. (PCS) has introduced a Cmos random-access memory (RAM) module that the company claims provides 8K bytes of memory with a 450-nsec cycle.

The PCS 1814 provides a built-in battery backup and charging circuitry that retains information for a minimum of seven days, the company said. Additionally, the module provides an external battery, should increased battery support be required. The module's switch-selectable write protect is reportedly helpful for development and debugging purposes.

The PCS 1814 comes in two versions. The basic module has 4K bytes of RAM installed in sockets, with sockets provided for the additional 4K bytes, PCS said. The switch-selectable base

starting address permits memory to be interlaced with existing systems.

Another switch is provided to allow disabling of the upper 4K bytes of RAM so that other memory in the system can utilize that memory space, the company spokesman said.

OEM Products

The second version of the PCS 1814 has 8K bytes of RAM and can be used in the firm's Superpac 180 series microcomputer system, the company added.

The Basic 1814 RAM module costs \$795 each; the 8K option, \$995 each from the company at 750 N. Maple Road, Saline, Mich. 48176.

Chip Handles Bisync, SDLC

LEXINGTON, Mass. — A synchronous receiver/transmitter chip that can handle either binary synchronous (Bisync) or Synchronous Data Link Control (SDLC) protocols in microcomputer systems is available from NEC Microcomputers, Inc. The uPD379 is an N-channel MOS device that is packaged in a 42-pin ceramic DIP and operates at 800,000 bit/sec, the company said.

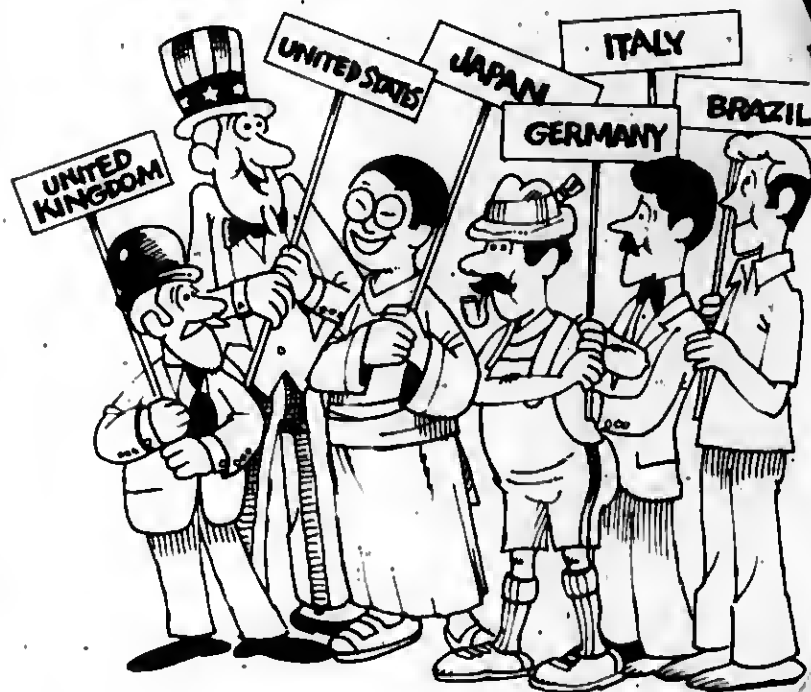
The uPD379 reportedly operates in full- or half-duplex mode and is directly TTL compatible. It has three-state data outputs and a programmable synchronous word and can indicate overrun and underrun errors.

The operation mode, transmission rate and synchronous character of the uPD379 can be changed through the use of external control, NEC said. Applications include telephone systems, modems, CRTs and other terminals.

With this chip, a device can be updated to handle the more advanced SDLC communications protocol through software commands rather than by redesign of the equipment.

Priced at \$16 each in 100-unit quantities, the uPD379 is available from NEC at 5 Militia Drive, Lexington, Mass. 02173.

These countries represent three quarters of the worldwide computer market



And you can advertise in all of them through us.

The International computer market is incredibly concentrated. More than 40% of the world's general purpose computer systems are found in the United States alone, and another 30% can be found in the next four largest computer using countries (Japan, Germany, United Kingdom and France). Add Italy (8th) and Brazil, and you get more than 75% of worldwide general purpose computers. (1)

All of these foreign countries are also heavy importers of U.S.-made computer products and services, with almost a billion and a quarter dollars of imports from the United States in 1976. (2)

As publishers of *Computerworld*, *Computerwoche*, *Computer Management*, *Shukan Computer* and *Data News*; and U.S. representatives of the French and Italian publications, we can give you one-stop advertising service in all of them — including translation and production services. We can also send you one bill — in dollars. So it's as simple as placing space in U.S. publications.

We'll be glad to send you a free market brief with more facts on the international marketplace for computers, as well as information on each publication. Just send in the coupon or give us a call.

Notes:

(1) Measured by value, based on data from International Data Corporation, the world's leading EDP market research company. General purpose computer systems do not include mini-computers or small business systems.

(2) U.S. Commerce Department figures.

These publications reach key computer executives in all of these countries



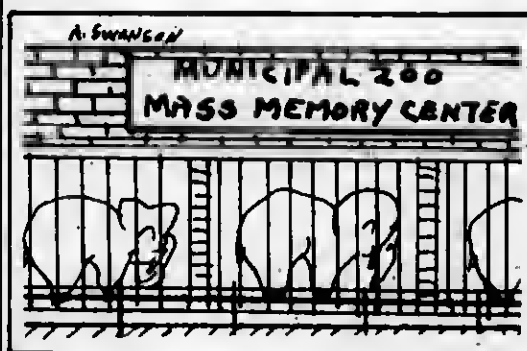
CW COMMUNICATIONS, INC.

To: Roy J. Einreinhofer, Vice President, Marketing
COMPUTERWORLD, 797 Washington Street
Newton, MA 02160 (617) 965-5800

I'd like a free copy of your marketbrief, "The International Marketplace for Computer Products and Services" as well as information on your publications in the countries I have checked.

Germany United Kingdom Italy Brazil
France United States Japan

Name
Title
Company
Address



COMPUTER
INDUSTRY
ACQUISITIONS

Multi-Client Study
For Proposal Call:

IDC

INTERNATIONAL DATA CORP.
214 THIRD AVENUE
WALTHAM, MASS. 02154
1-800-225-8962

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION ANNOUNCEMENTS

Consultant Engineer Exceptional Opportunity to Earn

Aggressive Firm with fully researched ideas - ready for marketing - expanding technical staff in microcomputer systems design and software. Assignments and compensation are part-time, by project. Please send resume in confidence to:

AMD CONSULTING, LTD.

68 - 24 Groton St.
Forest Hills, N.Y. 11375

Senior Programmer

Come live and work
in beautiful Idaho

Our Systems and Programming Department is offering an outstanding opportunity for an experienced COBOL or ALC Programmer.

Candidates for this position must have 2-3 yrs. exp. working with an IBM 370/158 OS/VS1 system or equivalent. Assignments must have been in areas in increasing responsibility.

This position offers excellent opportunity for career development with Idaho's largest, most progressive Bank. For immediate consideration, submit your resume, complete with salary history, to Rosalie Stamos, Professional Employment, IDAHO FIRST NATIONAL BANK, P.O. Box 8247, Boise, Idaho 83707. An equal opportunity employer. (20B) 384-7729.



computer hardware



and software candidates RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

SUPERIOR RESOURCES
16400 Venture Blvd.
Encino, (L.A.) Calif. 91436
(213) 986-4400

COMPUTER CAREERS INC
Specialists-Data Processing
4720 Montgomery Lane, #503
Bethesda, MD 20814
(301) 654-9225

D. BROWN & ASSOC.
Dorothy Spiegel
DP Specialist
610 S.W. Alder, Ste. 711
Portland, OR 97205
(503) 224-6860

**CAREER SPECIALISTS
PERSONNEL SERVICES**
4600 El Camino Real
Suite 206
Los Altos, CA 94022
(415) 941-3200

members of

**National
Personnel
Associates**
Specializing in DP

THE CHALLENGE OF TOMORROW IN TELECOMMUNICATIONS

We're meeting it through planning
systems design and development.

CALL TOLL FREE

(800) 323-1966

In Illinois (800) 942-0491

Monday thru Friday from 8am to 5pm est

Consider applying the latest advances in complex systems to a field larger than any business computer network - the highly visible opportunities on the design team who will make major breakthroughs in large scale telephony process control. The perspective opens new horizons - greater depth and breadth of opportunity for early responsibility and professional advancement. If you have qualifications that match some of the areas below, take a closer look at GTE Automatic Electric Laboratories.

APPLIED RESEARCH

Performs research on circuits, systems and subsystems and related hardware and software in order to provide management with information on concept feasibility and estimated system cost for design and development. Efforts involve providing existing services with new techniques and/or new services on existing equipment.

LONG RANGE PLANNING

Long Range Planning activities involve research studies on a wide variety of subjects related to the telephone communications industry. These studies include such areas as data communications, new technology, new services, future switching networks, evaluation of new switching techniques and review of the impact of political, economic and regulatory considerations. Intent is to provide well founded counsel and recommendations to upper management on future development programs and courses of action.

SYSTEMS DESIGN

New Feature Design Plan and develop the future hardware and software evolution of current large scale fully stored program controlled switching systems. Develop new features for existing equipment, study new features impact on existing systems, and estimate the development costs and requirements.

Product Design Design advanced fully stored program controlled systems for telecommunication application. Develop large scale software programs in an on-line, real-time environment and related digital hardware using CMOS, Schottky, TTL as well as Static and Dynamic MOS.

International Design Develop design philosophy and Architecture Definition of switching systems for international markets. This involves high level design structure development and detailed studies of critical problem areas. Define specific design implementation tasks, review progress and coordinate developments with implementation teams abroad.

SOFTWARE DESIGN

Data Base Software Responsible for logical and physical data base design and implementation related to telecommunications systems. Develop programs which automate the generation of data base contents for these systems in an IBM 370 environment using PL/I.

Support Software Involved in compiler, assembler, simulator maintenance and enhancement as well as other IBM 370 software developments. Support effort is related to micro and large processor developments.

Application Software Large scale development in telephone system real-time control. Diagnostic and fault recognition software, administrative software involving real-time data base administration, switch and network overload procedures as well as executive software.

SYSTEMS CONTROL AND TESTING

Development and execution of comprehensive test plans to evaluate the performance of large stored program switching system prototypes. Execute configuration management on all hardware, software, and components and maintain project control for all activities. System evaluation performed on both laboratory prototypes and initial field site locations.

If you have in-depth expertise in one or more of these areas, and a BS, MS, or PhD in Electrical Engineering, Computer Science, Math or other appropriate engineering discipline as well as an interest in moving forward with challenging new frontier in computer technology, talk with us.

If unable to call, send resume including recent salary history to:

Manager of Technical Employment
Dept. 471 AB



**AUTOMATIC ELECTRIC
LABORATORIES**

400 N. Wolf Road
Northlake, IL 60164

An Equal Opportunity Employer M/F

FLORIDA

Growing Company has openings for Programmer Analysts with strong DOS Assembler experience. Minimum two years with CFO, CFO II, or Life Comm. Need one with systems software and CICS experience. Excellent opportunity. Relocation expenses paid, employee portion of Fringe Benefits paid. Send work and salary history to Founders Life Assurance Company, P.O. Box 1571, Tampa, Florida 33601. Attn: F.C. Enoch.

COMPUTERS IN MEDICINE FELLOWSHIPS

Applications are being accepted for fellowship positions in the M.S. program, Computer Applications in the Health Sciences, at Case Western Reserve University, Cleveland. The program stresses applications of computer technology and includes software engineering, biostatistics, medical information systems, and implementation of computer-based systems. Fellowships are available for both pre- and post-doctoral training.

Information may be obtained from Dr. Robin S. Lake, Biometry, Wean 150, University Hospitals, Cleveland, Ohio 44106 (216) 444-3491.

position announcements

position announcements

position announcements

position announcements

position announcements

Engineers and Programmers



NCR's Engineering & Manufacturing Division in Millsboro, Delaware is a leader in the design and manufacture of ECR/POS intelligent terminals. Ground floor opportunities exist in the design and development of our new C-2140 multi-microprocessor retail system.

REAL-TIME PROGRAMMERS

- Microprocessor software (Assembly Level)
- Operating Systems Design
- I/O Drives
- Diagnostics
- Communication Protocols (SDLC)

Other requirements include Component-Reliability Engineers and Quality Engineers. All positions require a BS in EE, CS or a related discipline.

In addition to excellent career opportunities with NCR, our Millsboro location is right in the heart of the Delmarva Peninsula, better known as the "land of Pleasant Living". We're just minutes from marine recreational areas, wildlife preserves and the nation's finest beaches, and within a 3-hour drive of such major cities as Philadelphia, Baltimore and Washington.

Please send resume with salary requirements or call:

collect, (302) 934-8111

Ron Tull, Dept. CW-327
Engineering & Manufacturing-Millsboro
NCR Corporation
P.O. Box 607
Millsboro, Delaware 19966

An Equal Opportunity Employer

DEVELOPMENT ENGINEERS

- State-of-the-art mass memory devices and technology such as PMOS, NMOS, CMOS, MSI and LSI
- 8080 Based microprocessor design
- Multiprocessor systems architecture
- I/O devices, (wand readers, cassettes, CRTS)
- Computer controlled test systems design

NCR

Programmer

YESTERDAY: In 1902, H.C. Smith recognized the need for quality oil field equipment, and introduced the first Smith rock bit.

TODAY: Smith Tool Technology plays an important role in providing oil around the world

Programmers positions available. All positions must have a minimum of two years experience in COBOL programming in an IBM DOS environment. Should also be familiar with general business applications. Salary from \$14 - 17K commensurate with experience.

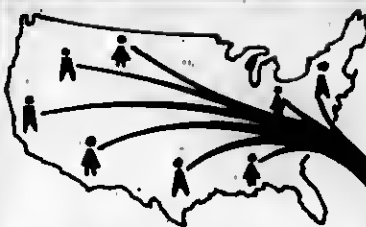
You can expect to receive an excellent salary and benefits package, including medical, dental, and life insurance, retirement, educational assistance (100% reimbursed), sick leave, holidays and vacations.

For immediate and confidential consideration, please, contact GAIL SHORT, Employee Relations.

SMITH ii SMITH TOOL

17871 Von Karman Ave. Irvine, Ca 92714

COMPU SEARCH



specializes in careers for you...

See us in your city

Since 1968, CompuSearch has sought out exceptional individuals with data processing related skills for large and small companies throughout the United States. We also have been very successful in locating challenging new positions for thousands of people who have requested our assistance. If you are a talented achiever interested in learning about situations that will best meet your goals, contact our office nearest you in complete confidence. We keep a close watch for the best available opportunities locally and nationally.

Arlington, VA	(414) 731-5221
Boston, MASS	(703) 841-1700
Braintree, MASS	(617) 262-5050
Cincinnati, OH	(617) 848-1666
Cleveland, OH	(513) 851-5500
Deerborn, MICH	(216) 623-1037
Indianapolis, IND	(313) 336-6650
Jacksonville, FL	(317) 257-4261
Los Angeles, CA	(904) 356-8513
Louisville, KY	(213) 930-1313
Milwaukee, WISC	(502) 456-4330
Omaha, NEB	(414) 273-4430
Pittsburgh, PA	(402) 397-8115
Rochester, NY	(412) 343-7410
Rockford, ILL	(718) 325-1660
San Francisco, CA	(615) 968-1552
Southfield, MICH	(415) 362-0911
Stamford, CONN	(313) 569-2626
Troy, MICH	(203) 324-2232
Tulsa, OKLA	(313) 585-4200
	(918) 622-6632

COMPU SEARCH
Division of
Management Recruiters

COMPUTER PROFESSIONALS ...

L'EGGS PRODUCTS, a division of Hanes Corporation, and the world's Number One manufacturer of women's hosiery has two outstanding Data Processing opportunities in its Winston-Salem, North Carolina headquarters. L'eggs has relied heavily on EDP to meet the needs of its sophisticated operation since its beginning in 1970; and to meet the continuously growing demand for DP support, these additional positions have been added to our staff.

Each opening requires DP experience in a business environment utilizing large scale equipment (IBM 370 Series, Honeywell 6000 or 6600 Series, etc.) and strong written and verbal communications skills.

SYSTEMS PROJECT MANAGER

Candidates should have a minimum of 5 years as a Systems Analyst with:

- 1) Responsibility for completion of major DP projects or parts thereof
- 2) Project planning and reporting exposure
- 3) Proficiency in COBOL language
- 4) Supervisory responsibility
- 5) Broad exposure to support of Financial and/or Accounting functions.

College degree required; Master's desired.

Responsibilities will be overall management of systems projects from conceptualization to final implementation including development and documentation of conceptual design, supervision of detail design, and liaison with user department.

SYSTEMS ANALYST

A minimum of 4 years total DP experience should include at least one year in a Systems Analyst position plus:

- 1) Strong FORTRAN background
- 2) Support of Inventory control
- 3) Heavy exposure to Interactive Applications

Candidates must be capable of preparing detailed systems designs and documentation with minimum supervision and be willing to code and test programs, if necessary to meet deadlines. B.S. degree in Computer Science, Math, Business Administration, or Statistics is desired.

If your background matches the requirements for either of these positions and you have the desire to join an aggressive industry leader, send your RESUME INCLUDING SALARY HISTORY in Strict Confidence to:

Recruiting Coordinator

L'EGGS PRODUCTS
P.O. Box 2495

Winston-Salem, North Carolina 27102
Affirmative Action Employer

L'eggs

position announcements

position announcements

position announcements

position announcements

position announcements

CONSULTING ANALYST

International Information System Staff

NCR is a multi-national corporation offering an opportunity to participate in the planning and control of multi-divisional international development and installation projects.

We are looking for a performer who has demonstrated accomplishment in the MIS field. We need an analyst with 7 or more years business systems experience. There will be 15-25% travel in this position.

BS BA preferred; however, if you possess equivalent work experience required, we will consider.

Please forward resume in complete confidence to:



Max A. Anderson
Corporate Executive &
Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

New! 1978 Computer Salary Survey



Call for your Free copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

This comprehensive free report also gives you expert advice on a variety of important career topics such as: when you should consider a job change; what you need to do to break into management; how to make sure you're getting the proper exposure; why timing is so crucial in your long range career development; how you can avoid stagnation... and much more.

The 1978 Computer Salary Survey has been compiled by Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

For your Free copy, call the Source Edp office nearest you.

East:	Midwest:	St. Louis	West Coast:
Boston 617/482-7613	Chicago 312/762-0657	314/662-3800	Encino CA 213/995-8666
Hartford 203/522-8590	Cleveland 216/771-2070	St. Paul 612/771-0544	Irvine CA 714/833-1730
New York City 212/736-7445	Detroit 313/963-0510	South/Southwest: Atlanta 404/325-8370	Los Angeles 213/388-5500
Philadelphia 215/685-1717	Kansas City 818/474-3393	Dallas 214/387-1600	Oakland 415/444-5955
Stamford CT 203/329-8411	Minneapolis 612/544-3600	Denver 303/773-3700	Palo Alto 415/328-7155
Union NJ 201/687-8700	Northfield IL 312/446-8395	Fort Worth 617/336-9300	San Francisco 415/434-2410
Washington DC 703/790-5810	Oak Brook IL 312/986-0422	Houston 713/828-8705	Seattle 206/454-6400
Wellesley MA 617/237-3120	Rolling Meadows IL 312/392-0244	New Orleans 504/561-6000	Torrance CA 213/540-7500
	Southfield MI 313/352-8520		Canada: Toronto 416/364-2919

source edp

If unable to call, write: Source Edp, Department C3
721 Enterprise Drive, Oak Brook, Illinois 60521
(When writing, please be sure to use home address and indicate position title.)

At Mostek, the EDP Professional finds a home, not just a career opportunity.



Located in Suburban Dallas, Mostek offers you the best of both worlds. A great place to live and a great place to work.

Even though Mostek has only been in existence for less than a decade, we're already a recognized leader and innovator in the electronics manufacturing field. As a result, you'll find our work environment combines large company benefits with small company visibility and opportunity.

Our computer environment consists of an IBM 370/138 operating with QOS/VS, OLI, POWER/VS Software. We have immediate needs for the following EDP professionals.

ANALYST/PROGRAMMERS: Requires 3+ years experience and knowledge of COBOL, RPG, DL/I, CICS familiarity a plus.

SYSTEMS PROGRAMMERS: Requires 2 or more years experience maintaining, installing and debugging IBM software. OS/VS experience would be a definite plus.

PROGRAMMERS: Requires at least one year experience and knowledge of COBOL, RPG/DL/I, CICS familiarity would be a plus.

COMPUTER OPERATORS: Requires 2 years experience in a DOS/VS multipartition environment as well as familiarity with DOS JCL. On-line experience would be a plus.

All of the above positions provide salaries commensurate with ability and experience, excellent benefits and every opportunity for personal and professional growth.

Qualified candidates are urged to call Jeff Lewis collect or send him your resume and salary history in confidence.

MOSTEK

(214) 242-0444, 1215 West Crosby Road, Carrollton, Texas 75006
We are an equal opportunity employer m/f.

SOFTWARE PROGRAMMER

Seattle location. Software Programmer/Engineer. Must have experience with IMS and VSAM II. Experience should include sysgens and teleprocessing. Will be responsible for system software in a large 370 shop. Salary to \$23,000.

ROBERT HALF
PERSONNEL AGENCIES, INC.

Ranier Bank Tower
1301 5th Ave.
Seattle, Wash. 98101
(206) 624-9000

DATA BASE ADMINISTRATOR LOUISIANA STATE UNIVERSITY

Minimum Qualifications: College graduate with at least five years of data processing experience, two years of which must be in data base design or administration. Preference given to experience in IMS, DL/I, DC, and large systems. Successful candidate will control data base activities at LSU and will supervise the activities of one junior DBA. The salary is very competitive with a 3033 support computer. Send confidential resume to:

Dr. John M. Tyler
System Network
Computer Center
Louisiana State University
Baton Rouge, LA 70803

An Equal Opportunity
Affirmative Action Employer

National CSS

MEET THE CHALLENGE OF OUR EVOLUTION

**Design, develop, and market advanced
data processing systems for vast, new
total information service markets.**

**If you are seeking ongoing opportunities to make
the most of your experience-- now, and for a long
time to come.**

**SEE OUR DOUBLE-PAGE SPREAD
ON PAGES 56 and 57
OF THIS ISSUE.**

position announcements

position announcements

position announcements

position announcements

position announcements

EDP Systems Specialists and Financial Analysts

Immediate openings in Orlando, Florida*

Martin Marietta Data Systems, a leader in advanced computer systems and one of the largest full-service data processing facilities in the Southeast, has immediate requirements for:

• **Computer Systems Designers** — You must have 3-7 years of detailed application design and programming experience, coupled with 1-3 years experience in Data Base Management and Telecommunications.

• **Senior Software Systems Designers** — We require 5 years experience and in-depth internal knowledge of operating systems software plus the ability to design and install system enhancements.

• **Data Communications Specialist** — Candidates must have 2-3 years experience working with COMTEN Front End or equivalent processors, a working knowledge of OS/VS, JES2, BTAM, RTAM, and TCAM and the capability of programming in ASSEMBLER language.

• **Systems Financial Manager** — You should have 5 or more years experience in management/systems design. Must be knowledgeable in the areas of payroll, accounts receivable, accounts payable, and general ledger. COBOL or ASSEMBLER language required.

• **Financial Analysts** — We have several openings requiring 1 to 7 years experience in budgets, cost control, systems maintenance, quantitative methods. Programming or EDP background preferred.

• **Financial Manager** — We require 5 years experience in Government interface/negotiations. Must be knowledgeable of ASPR and CAS regulations. BS Accounting preferred.

• **Data Communication Operational Specialist** — Candidates must have two to three years experience in troubleshooting telecommunications problems. You must be familiar with modems, multiplexers and front-end processors. COMTEN experience desirable. You should have a working knowledge of COBOL, PL-1, and teleprocessing test equipment.

Our operating environment consists of dual 370-168's running MVS/JES2, interfacing with TSO, IMS, S2K, COMTEN and other 370's (158's, 145's and 138's). In the near future, two 3033's will be installed. The individuals we are currently seeking should have experience in one or more of the following disciplines:

- **Prime Language**
 - COBOL • ASSEMBLER • DL1
- **Telecommunications**
 - TCAM • RTAM • BTAM • CICS
- **Data Base Management**
 - IMS Preference • Systems 2000 • IDMS
- **IBM 370 OS/VS/VS environment**
- **Manufacturing Applications**
- **Financial Applications**

We offer an excellent fringe benefit package, including pension, performance sharing plan, major medical, vacation, and holidays.

* We also have openings in Denver, Chicago, Baltimore, and Philadelphia.

Please send your resume, indicating geographical preference and the position you are interested in, to: William Dalton, Martin Marietta Data Systems, P.O. Box 5837-MP357, Orlando, Florida 32855. We are an equal opportunity employer, m/f.

MARTIN MARIETTA

MARTIN MARIETTA DATA SYSTEMS



WHY EDP SEARCH?

Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

We have greater than 400 positions open across the U.S. Positions are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

FIELD SERVICE

370/360, H-200,
SYSTEMS XOS, Univac, CDC
All Large & Medium
CPU's
MINI's PDP, NOVA, G.A.,
HP, etc. All Mini
Systems
I/O STC, TELEX, COC,
ITEL, CALCOMP,
etc. All Peripheral Ex-
perience

MTR

(312) 344-6750
MTR ASSOCIATES
1107 Mannheim Road \$12-30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

FLORIDA

ALL DOS/VS/CICS
Prog/Anal Fnc'l Cbl 1SK
Prog/Anal Mfg BAL 16K
Prog/Anal Order Ent 16K
Prog Ldr Order Ent 19K
Prog/Ana Cbl & BAL 15K
Prog/Anal 3 yrs Bnkg 18K
Sys Prog-Sysgen BAL 18K
Analyst-Mfg MRP 19K
Jr P/A-2 yrs Cbl 14K
Prog/Anal-Mfg&Fnc'l 16K

ROBERT HALF

PERSONNEL AGENCIES, INC.

1311 North Westshore Blvd.
Suite 309
P.O. Box 22651
Tampa, Fla. 33622

Immediate Career Opportunities

Morrison Incorporated in Mobile, Alabama is growing rapidly and needs the following career EDP positions filled as soon as possible:

Systems Engineer — 3 to 5 years functioning as a systems engineer/programmer with knowledge of DOS/power/VS INTERNALS, CICS INTERNALS, Telecommunications and 370 Assembler Language.

Senior Systems Analyst — 3 to 5 years functioning as a systems analyst with experience including DOS/power/VS; ANS COBOL; DATA COMMUNICATIONS/DATA BASE (CICS); Requirements definition and systems design of financial and merchandising applications.

Programmer Analyst — 2 years functioning as a programmer writing program specs and designing COBOL programs. Specific experience should include DOS/POWER/VS, ANS COBOL, CICS and developing programs for financial, merchandising and inventory control applications.

Competitive starting salaries, excellent benefits program and opportunities for career growth.

Call now or send resume to:

MORRISON INCORPORATED



Human Resources Department
First National Bank Building
P.O. Box 2608
Mobile, Alabama 36625
205/432-9711 Extension 263

SYSTEMS PROGRAMMER

We have a challenging opportunity for an individual capable of filling a key position within our company. The person we seek will be responsible for the generation and performance evaluation of OOS/VS, CICS/VS, and VSAM as well as other related systems software. If you would enjoy having an excellent opportunity to grow and learn, a salary limited only by your ability, a competitive benefit program, a chance to work with the latest IBM hardware and software systems, and the contentment of working in a pleasant midwestern city, please contact:

Ronald D. Long, AVP

BRENCO AUTOMATION CENTER, INC.

717 Mulberry, Suite 503
Des Moines, IA 50309
(515) 283-2415
A subsidiary of
Brenton Banks, Inc.

POSITIONS NATIONWIDE

CALL TOLL FREE
800-426-0342

SYSTEMS PROGS ... To 30K
Need IBM, H6000, POP/11
and CDC Backgrounds with 2
years experience.
IMS PROGS ... To 26K
Insurance, Banking and Mfging
Background Req.
PROJ LEADERS ... To 28K
Degree Req., with Mfg. Back-
ground
D.B. DESIGNERS ... To 28K
Midwest Firm needs two with
Ins. IMS Background.
APPLI. PROGS ... To 24K
Several openings.
BILL ISGRIG
PARKER PAGE ASSOC.
P.O. Box 12308
Seattle, WA 98111
Offices in Wash., O.C.,
Chicago, Atlanta, Portland, Or.

SYSTEM PROGRAMMERS

Find Challenge and
Opportunity in
San Francisco Bay Area

The success of the Advanced Systems series of computers has created exceptional career opportunities for individuals with OS, OS/VS and DOS/VS operating system experience. A wide range of positions are available for qualified professionals who will participate in challenging development projects or provide assistance to Intel's world-wide staff of Systems Support Representatives.

If you have in-depth knowledge of operating system internals and are looking for a challenging position with excellent growth potential, we would like you to consider a career with INTEL.

Send your resume in confidence to Tricia Meade:

INTEL CORPORATION

3145 Porter Drive
Palo Alto CA 94304
Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS ASSURANCE ANALYST

We have an immediate opening for an individual who will assume the responsibility for operation of computer performance measurement equipment and systems. This is a "hands on" job requiring knowledge of OS/MVS JCL, utility programs and a working knowledge of MVS operating systems. Must be an excellent communicator. Statistical analysis, publication of performance measurement projects and hardware/software recommendation will be part of the overall responsibilities. We are a state-of-the-art shop, operating dual IBM 370/158's. Competitive salary, excellent working conditions, fringe benefits and growth potential.

Send resume to First and Merchants Corporation, P.O. Box 27025, Richmond, VA 23261, attention D. Leonard, or call for appointment (804) 788-2464.

FIRST & MERCHANTS

An Equal Opportunity Employer

Programmer Analyst

Pacific Northwest utility is in need of Programmer-Analyst of levels ranging from Assistant Programmer Analyst to Senior Technical Programmer Analysts. Basic skills in COBOL, FORTRAN, PL 1, CICS, JCL and OS/VS are needed. The more senior positions require a knowledge of the system development process. A degree in engineering, mathematics or business administration is desirable. These positions are available in our corporate system development and users service areas. We have a 370/158 OS/VS environment.

Specific positions are:

Senior Technical Programmer Analysts (\$21,000 to \$25,500)

- Minimum of eight years experience
- Strong numerical analysis background
- To develop common technical library and to provide numerical methods support to open shop users.

Technical Programmer Analyst (\$20,000 to \$25,000)

- Minimum of five years experience
- To support our technically oriented development projects, such as load survey and environmental information systems

Senior Programmer-Analyst (\$20,000 to \$25,000)

- Minimum eight years experience
- To support business oriented projects
- CICS experience desirable

Programmer Analysts (\$18,500 to \$23,500)

Associate Programmer Analysts (\$17,000 to \$21,500)

Assistant Programmer Analysts (\$16,000 to \$20,000)

If you have most of the above qualifications, contact Roxie J. O'Brien, Senior Employment Coordinator, Portland General Electric Company, 121 S.W. Salmon, Portland, OR 97204.

An equal opportunity employer m/f/h



Portland General Electric
121 S.W. Salmon
Portland, OR 97204

DATA BASE, TELECOMMUNICATIONS And HARDWARE EXPERTS

Opportunities In Large Scale Systems Design and Development

AMS is a nationwide leader in the design and implementation of custom, large-scale systems for private and public sector clients. These systems typically involve the use of IBM computers and operating systems, data base management software and teleprocessing monitors. Our Technical Support Group provides the key system architecture design, the development and operational environment, data base design, applications support software, and systems software expertise for our systems projects.

We are now seeking to fill three or four positions in the Technical Support Group by professionals with two or more years of experience in any of the following areas:

Systems Software:

IMS DB/DC, ADABAS, CICS, Software Package Selection, Standards, Security, Restart/Recovery, Data Base Design, and Performance Analysis.

Hardware/Telecommunications:

Hardware analysis and Selection, Telecommunications Network Design, Data Center Operations.

Applications Support:

Development of Specialized Software to Support Applications Programming, Technical Team Management (project oriented).

We have developed a unique and proven approach for the design, development and implementation of large, integrated systems, and clients come to us because we can handle the large, complex and demanding jobs. Becoming a member of our Technical Support Group offers the opportunity to both broaden and refine your skills while doing exciting, challenging work.

If you are interested, please send your resume and salary history to Dept. 14:

Openings are available in our Arlington, New York, Chicago and Detroit offices. Please indicate your preference. EOE.

Mr. Frank A. Nicolai
Executive Vice President



AMERICAN MANAGEMENT SYSTEMS, INC.

1515 Wilson Boulevard, Arlington, Virginia 22209

Offices in New York, Chicago, Detroit, San Francisco

FACULTY POSITION

Available August, 1978, to teach OR/Management Science/Computer Science in degree program similar to ACM/AICPA recommendations. Emphasis on teaching. Masters required, doctorate preferred. Rank and salary dependent on qualifications. Applications must be received by April 15, 1978. Contact: Don B. Mitchell, Head, Computer and Management Science Department, Arkansas Tech University, Russellville, ARK 72801. An Equal Opportunity/Affirmative Action Employer.

EDP CONSULTANT

Tired of the big city
rat race and
excessive travel?

Growing Wisconsin regional CPA firm is seeking a results oriented professional to perform EDP feasibility and other consulting services for clients ranging from less than \$1,000,000 to \$50,000,000 in sales.

Applicants should possess a bachelor's degree in a business related field with a minimum of five years experience. Experience should include strong computer systems experience in small and medium installations, plus prior consulting work in a CPA, consulting or multi-divisional industry environment. An MBA degree is desirable.

The position is located in north central Wisconsin in a city of 60,000 plus population with excellent schools and recreational opportunities.

Salary is commensurate with experience and ability. Send resume, salary history, requirements and references to:

Wipfli, Ulrich & Co.
P.O. Box 866
Wausau, WI 54401

Are you seeking challenges?

We are staffing to meet the needs of our five year plan which includes moving this year to an IBM 3033 and continuing to develop major D/B systems. We are seeking team members who think progressively and are innovators. IMS, DB/DC, VSAM or BAL experience, a plus. Good communication skills an absolute.

PROGRAMMER/ANALYSTS — To assist in detail design and participate in program development on medium to large scale projects.

- 2-3 years ANS COBOL
- 1-2 years OS/JCL, utilities
- Detail design experience required

PROGRAMMERS — To participate in program development on medium to large scale projects.

- 1-2 years ANS COBOL
- Six months to one year OS/JCL, utilities

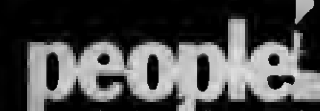
We offer a salary commensurate with experience, complete Jewel benefits and an opportunity to grow with a leader as a leader. Please send detailed resume including salary history in confidence to — Manager of Programming, Information Systems.

JEWEL FOOD STORES

1955 West North Ave.

Melrose Park, Ill. 60160

EQUAL OPPORTUNITY EMPLOYER M/F



position announcements

position announcements

position announcements

position announcements

position announcements

DATA PROCESSING PROFESSIONALS

NEW POSITIONS

We've grown a lot and plan to grow a lot more. If you want to be a part of the challenge of managing an innovative, large scale computer system, we may have the right position for you.

ABOUT OUR COMPUTER CAPABILITIES

Our current configuration consists of a 370/158, 370/145, VM/CMS, DOS/VS and CICS. This year we will be converting to MVS/JES 2, and installing data base.

ABOUT THE NEW POSITIONS

Computer Operations Manager

Reports directly to the Second Vice President of Computer Center Services. This position is responsible for the management of a large, multi-shift computer operations environment. Duties involve planning, budgeting and scheduling of hardware and the computer operations staff.

Technical qualifications include up to 5 years with a medium to large IBM environment, which would include the MVS operating system, CMS or similar time sharing sub-system, and both local and remote on line systems. Managerial qualifications would involve 2 years in direct management.

Operations Control Supervisor

Responsible for problem coordination, change control and capacity planning. Reports directly to the Second Vice President of Computer Center Services. Broad based background and exposure to both operations in programming of medium to large scale systems is required. This is a troubleshooters job and therefore the ability to interface with vendors and technicians as well as varied levels of management is a large part of the job.

Computer Operators

Responsible for operating sophisticated IBM 370 hardware in a multi-shift environment. Also responsible for constant judgement and monitoring of programs as they are run. Should have experience with the MVS operating system.

ABOUT UNION MUTUAL

We are America's fastest growing, major life insurance company and we are Maine's first billion dollar company. We didn't reach these two accomplishments by sitting back and reflecting on our illustrious 130 year history. We are a progressive and innovative mover and shaker in the industry, and we set goals that will be possible only with superior efforts by superior people. We are located in one of the most desirable cities in the entire northeast, a liveable city with the city's amenities, but with the additional bonus of 4 season recreational opportunities just moments away.

All these positions are vital to our plans and as such offer excellent starting salaries and fringe benefits as well as opportunity for career growth. For immediate consideration, please send your resume with complete salary history in strictest confidence to:



Phillips H. Sargent
Director of Employment
2211 Congress St.
Portland, Maine 04112

Unionmutual

An Equal Opportunity Employer

IBM SYSTEMS PROGRAMMERS

We have been retained by a California-based international computer hardware vendor to recruit a number of individuals with proven abilities and high growth potential. With offices throughout the country, they can offer exceptional long-term growth prospects to career oriented professionals regardless of geographic preference. Salaries for current positions range from \$16,000 to \$35,000 with an outstanding benefit package.

Specific assignments include:

- * Systems Generation, Maintenance and In-Depth De-bugging.
- * Design, Development and Implementation of Program Products.
- * Modification and Enhancement to ALL IBM Operating Systems.
- * S.E. Support of User Installations.

Software supported will include: MVS, SVS, VS1, VM, DOS/VS, DOS, JES2, JES3, HASP, ASP, TCAM, VTAM, NCP and SNA.

Candidates should have current internals experience with one or more of the above software products. Exceptional individuals at all levels are invited to explore these opportunities in complete confidence. All responses will be answered promptly.

PAUL-TITTLE ASSOCIATES, INC.

8720 George Ave., Suite 900
Silver Spring, MD 20910 (Agcy)
(301) 585-7600

Representing an Equal Opportunity Employer

CORNELL UNIVERSITY Senior Systems Programmer

The Systems Group at Cornell's computing center has an opening for an individual with experience in operating systems internals on large IBM systems. Cornell operates a 370/168 running VM/370 with CMS, VS1, HASP/MVT-OS. Significant work is planned in storage systems (3850), communications (packet networks), spooling systems, and other areas. This position requires a talented individual with high technical competence who seeks challenging work in a congenial environment.

Cornell University is located in Ithaca, a small city in the Finger Lakes area of central New York. Ithaca offers excellent and diverse recreational facilities, freedom from urban problems of smog and overcrowding, and a stimulating intellectual environment. Cornell's benefits are excellent. Call or send a resume to Richard Cogger, OCS-Langmuir Lab, Cornell Research Park, Ithaca, NY 14850 (607) 256-7566.

PROGRAMMER ANALYST

Growth opportunity with dynamic, rapidly expanding, internationally recognized manufacturer.

We are seeking a qualified programmer analyst with 2-3 years experience in financial systems. Position requires person who possesses initiative as well as good verbal and written communications skills. Must also have experience with RPG II programming and the ability to perform analysis.

Positive work environment and great benefits. If qualified, send your resume, including salary history, to:

REDKEN

LABORATORIES INC
6625 Varief Avenue
Canoga Park, CA. 91303

Equal Opportunity Employer m/f

ESL ... on the SAN FRANCISCO PENINSULA ... PROVIDES TEAMWORK + ATMOSPHERE as key ingredients of our continuing growth ...

SYSTEMS PROGRAMMERS

Challenging opportunities for Programming Professionals with 5 years IBM 370/OS experience in a scientific or engineering environment including OS or VM/CMS internals, JCL and Assembler BS in Computer Science, Math or Physics required.

Additional experience in the following areas desired:

- Interfacing minicomputer or microprocessor to host IBM system;
- IBM communications experience with 2701, 3704 or 3705 hardware & software;
- Knowledge of APL, COBOL, PL1 & Fortran, Experience with debugging & software optimization techniques, Exposure to data management & scientific data processing applications essential;
- Graphics software packages.

ESL offers extremely attractive benefits including 11 PAID HOLIDAYS (to include a full week at Christmas), BONUS PLAN, COMPANY PAID MEDICAL/DENTAL and much more!

Please send your resume, including salary history, to Kay Cooper, Professional Employment, ESL Inc., 495 Java Drive, Sunnyvale, CA 94086. An equal opportunity employer. U.S. Citizenship required.



Data Processing Professionals

Control Data Cybersearch® DOES make a difference.

HERE ARE SOME OPPORTUNITIES YOU MAY WANT TO CONSIDER:

If you're exploring career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS • SOFTWARE SPECIALISTS and SALES REPRESENTATIVES for companies nationwide, at no cost to you.

Systems Programmers-MVS	To \$30K
Systems Programmers-IBM "OS"	To \$25K
Mini-Programmers-Scientific	To \$22K
Mini-Programmers-Business	To \$22K
Programmer Analysts-CICS	To \$22K
Programmer Analysts-Business	To \$19K
Programmer Analysts-Insurance	To \$19K
Real-Time Mini Sales-Sci.-Comctns, Potential	To \$35K
Sr. Systems Analysts-Mfg-Ins.-DL-1+Deg.	To \$24K
Mini-Computer Analysts-All levels	To \$24K
Software App. Anal.-Exp.DBS, Telecom, Op Sys	To \$26K
Software Anal.-Exp. CDC Prog. Scope	To \$26K
3.4 or NOSBE	
Programmers-Exp. in Telecommunications	To \$20K
EDP Audit Admin-MBA + 5 Yrs. Exp. Auto. Sys	To \$30K
Systems Designer-New Systems Implementation	To \$25K
Instructor-2 Yrs. Exp. Cobol, BAL or Fortran	To \$18K
Operating System Consultant-5-8 Yrs. Exp. IBM S.E.	To \$30K

For more information, please contact our local office.

CONTROL DATA CYBERSEARCH INC.

a subsidiary of
GD CONTROL DATA CORPORATION

CHICAGO, IL
214 North Michigan
60601
312-454-8490

DALLAS, TX
8585 Stemmons Freeway
75247
214-688-5810

HOUSTON, TX
2000 West Loop South
77027
713-965-5666

IRVINE, CA
17744 Sky Park Boulevard
92714
714-754-7701

LOS ANGELES, CA
8616 La Tijera Boulevard
90045
213-642-2462

MINNEAPOLIS, MN
6800 France Ave. South
55435
612-830-6650

PHILADELPHIA, PA
Two Balacynwyd Plaza
19004
215-667-2400

SAN JOSE, CA
2025 Gateway Place
95110
408-866-3186

position announcements

position announcements

position announcements

position announcements

position announcements

engineers

Semiconductor Test Engineers

There are immediate opportunities for Electrical Engineers to join Burroughs Corporation, a major data processing company. The successful candidates will be responsible for development of characterization and production testing programs for various state-of-the-art devices on the Fairchild "Sentry" Systems.

Qualified candidates must have a strong background in state-of-the-art semiconductor technology and one to two years programming experience on Fairchild "Sentry" Systems (preferably "Sentry" 610 or "Sentry" VII), a BSEE or MSEE is required.

The successful applicant must be able to communicate and interface with others in order to effectively administer the test program development.

These positions offer an excellent salary and fringe benefit package with significant growth potential. For confidential consideration, please forward your resume and salary history, to:

Manager of Professional Employment
BURROUGHS CORPORATION
41100 Plymouth Road
Plymouth, Michigan 48170

Burroughs

An Equal Opportunity Employer M/F

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

COMPUTER SYSTEMS ADVANCED PLANNING SPECIALIST

Will perform feasibility and systems design, procurement justification and evaluation of automatic data processing equipment. Also involves performance monitoring and analysis for improving present computer systems, a CDC CYBER 70/Model 76, and CYBER 170/Model 173 computer systems. BS or equivalent in Electrical Engineering, Computer Science or related field, with 8-10 years of applicable experience.

COMPUTER TRAINING COORDINATOR

Responsibilities will include the development of effective training programs for computer operations personnel, including computer operators and data entry personnel. Candidate should have a degree or equivalent in Computer Science/Mathematics and 3-5 years' experience in operating large scale IBM and CDC computer systems. Applicant should possess effective communication skills.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If interested and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C
EG&G Idaho, Inc.
Box 1625, Idaho Falls, Idaho 83401

U.S. Citizenship Required
We are an equal opportunity employer M/F H



Engineering

systems engineers achieving greater heights

At Northrop Defense Systems Division, our ambitions and accomplishments are constantly preparing us for achieving new heights in the research, development and manufacturing of sophisticated Electronic Countermeasures. And, as a leader in the state-of-the-art, we are constantly expanding our renowned, dynamic Systems Engineering team.

If you aspire to achieving greater personal and professional goals and wish to apply your creativity to problem solving situations, you can find the challenges through a career with Northrop.

We are currently seeking qualified professionals in the following areas, to join our renowned team of Systems Engineers:

SENIOR ENGINEERS

MSEE and a minimum of 3 years experience in hardware or systems design and good written communications skills required. Microwave background necessary.

PROJECT ENGINEERS

A minimum of 5 years experience in EW hardware, software, systems design and analysis (active and/or passive), necessary. Microwave experience required.

ENGINEERS

Experience in active and passive electronic warfare systems and strong software and/or hardware background necessary.

In addition to outstanding opportunities for career advancement, we offer an excellent salary/benefits package. Qualified individuals are invited to send brief letter or resume, in confidence, to:

Manager - Department CM27

NORTHROP CORPORATION

Defense Systems Division

600 Hicks Road, Rolling Meadows, Illinois 60008

An equal opportunity employer m/f

NORTHROP

DIRECTOR CORPORATE SYSTEMS HOUSTON

Will direct efforts of highly qualified professional staff in the development of Financial, Oil & Gas and Corporate systems. MBA with prev exp in programming and design for large IBM 370/OS system. \$30,400,000. Call Jim Fleming, (713) 961-3271, Robert Half Personnel Agencies, 4801 Woodway, Suite 231W, Houston, Texas 77056.

ROBERT HALF
PERSONNEL AGENCIES

SR. ANALYSTS MANUFACTURING \$25-30,000

Boston area manufacturer seeks two divisional consultants to identify and plan strategies for improved M.I.S. Will effect feasibility studies, proposals, & user interfaces to set priorities and solutions. A degree and minimum five years data processing or consulting experience. Knowledge of minis.

Please call Ted Chaloner at (617) 426-4180 or submit resume with salary requirements to:

ROGERS & SANDS

100 Federal Street, Boston, MA 02110

Member of Massachusetts Professional Placement Consultants

PROGRAMMER ANALYSTS

Due to a major expansion, this well respected leader in the insurance industry has several challenging assignments for highly motivated individuals. These positions require at least 2-3 years experience on IBM 360 and/or 370 hardware and software is mandatory. BAL required; COBOL a definite plus. Some CICS exposure ideal.

Individuals selected must be capable of communicating effectively at all levels and be willing to progress into supervisory responsibilities.

Comprehensive salary and benefit structure. Please submit your resume, including salary history, in confidence or call our Personnel Department to arrange an interview.

**NORTH AMERICAN COMPANY
FOR LIFE & HEALTH INSURANCE**



209 S. LaSalle
Chicago, Ill. 60604
(312) 346-2336

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER SALES & SYSTEMS PROFESSIONALS

Hop on the fastest track in the industry Openings Throughout the Country

You may never again be faced with career opportunities as promising as those available with Datapoint today.

Datapoint Corporation is the leader in "Dispersed Data Processing". We manufacture a family of computers, peripheral equipment and provide software and service. For the past five years we have experienced a continuous annual growth of 45%, with the last quarter setting new records in all areas.

Frankly, the demand for our products and services seems to be limited only by our ability to add top notch people to our staff. So we need the following people...fast. And we'll make it worth your while.

SALES REPRESENTATIVES: We're looking for people who have successfully sold mainframes or systems, or people knowledgeable in computers who want an opportunity to break into sales. Bachelor's degrees are preferred.

SYSTEMS ENGINEERS: 2-5 years experience in programming at assembler and compiler levels as well as Bachelor's degree preferred. You will be called upon to provide technical support to our customers, many of which are Fortune 500 companies. Assignments will include preparing demonstrations, analyzing and designing systems, and consulting with customers on software problems.

Positions in both areas provide excellent compensation packages and unsurpassed growth possibilities. Call immediately or send resume and salary history in confidence to John Ross, Domestic Marketing Division Personnel Manager, Datapoint Corporation, 9725 Datapoint Drive, Mail Station M-85, San Antonio, Texas 78284.

1-800-531-7172

DATAPOINT CORPORATION

The leader in dispersed data processing™

We are an equal opportunity employer m/f

ADVANCED OFFICE PRODUCTS

Qyx, a rapidly expanding division of Exxon Enterprises, Inc., is seeking entrepreneurial individuals to participate in the growth of a new information systems business. We are looking for a variety of ambitious professionals who are willing to work long hours in a fast moving, shirt-sleeve environment. Currently, our rapidly growing company, located in the attractive Pennsylvania countryside, near Philadelphia, has an immediate need for:

SYSTEMS ANALYSTS FINANCE

Participate in the design of state-of-the-art, integrated general business system. You will define requirements for financial and accounting systems, evaluate commercial software packages, install and monitor entire systems both personnel and hardware. A fully on-line environment and anxious users await the right candidate. Knowledge of financial systems and COBOL is required; data base management systems, teleprocessing and large and mini computer experience is helpful. A technical degree and a minimum of 4 years experience is required.

Send resume, including salary history, to: Qyx, Division of Exxon Enterprises, Inc., Dept. MIS, P.O. Box 429, Exton, Pa. 19341. Minorities and females are encouraged to apply.

Qyx™

A Division of **EXXON** Enterprises, Inc.

We are an equal opportunity employer, m/f

MICRO/MINI DESIGN & PROG. SPEC.

Growing N.E. Engineering & Computer Mfr. seeks prog. analyst for engineering, T.V., computer product appra. & ac. research areas. Assem. lang., FORTRAN, B.S., M.S., E.E. or Comp. Sci. bkgd. qualify. Starting Salary to \$30,000.

Contact Paul Maiesnar.

**ROBERT HALF
PERSONNEL AGENCIES**
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

SALES

★ OPPORTUNITY ★ ADVANCEMENT ★ INCOME

If you qualify, ANSCO, a leading national distributor of data processing supplies, has an outstanding sales/marketing position for you. This is a salaried inside sales position with exceptional income potential and responsibility. You will be working closely with Data Processing Managers, helping them in making their job easier. You will receive extensive training, a carefully organized program for success, and a record of accomplishment.

To qualify, you must have demonstrated the ability to work hard, enjoy helping people, have had some experience in D.P. operations, and at least 2 years of successful sales in any type product.

Call Mr. Popalke at (213) 532-7780 for more information and a confidential interview.

Los Angeles Location

Data Processing, SYSTEMS SOFTWARE SECURITY SPECIALIST

Virginia based bank holding company seeks highly motivated individual to establish procedures and controls to insure integrity and security of Computer Hardware and Systems Software. Responsibilities to include the planning and scheduling of reviews for EDP Systems, Software and Systems procedures, the preparation of short term and long range audit plans and other related functions. Minimum 3-4 years systems programming is preferred. Degree in Computer Science is required. Must have thorough knowledge of ALC programming and familiarity with COBOL, IBM 370 DOS/VS GRASP environment. Excellent salary and benefits package. Submit resume with salary requirements to:

CW Box 1511, 797 Washington St., Newton, MA-02160.

Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

SUNY/EMPIRE STATE COLLEGE

We are seeking a PROGRAMMER/ANALYST to participate in the design and development of five administrative systems over a period of two years at our Computer Center located in Saratoga Springs, N.Y. DUTIES INCLUDE: COBOL Programming using HIPO techniques; participation in the design of real time administrative systems within an educational environment; design and document systems and programs using HIPO techniques; write TP and Batch Programs. MINIMUM QUALIFICATIONS: IBM 360/370 COBOL or Assembler experience required (FORTRAN, BASIC, APL, OR PL/I NOT acceptable substitute); CICS experience preferred, some TP programming experience (applications) required; experienced in implementing a system from conception to production; knowledge of HIPO techniques and structured programming techniques helpful (will train); preference will be given to candidates who possess at least six years data processing experience. Similar experience on UNIVAC equipment may be acceptable. Probable hiring range: \$14,500-\$16,500 depending upon experience. We are also seeking a Data Processing graduate (or equivalent) to support other Programmer/Analysts. Salary range: \$10,500-\$11,500 (position previously advertised). Candidates MUST be available by May 1, 1978. Send letter of application and resume prior to April 5, 1978 to: Janet A. Zimmer, Director of Personnel and Affirmative Action, SUNY/ESC, 2 Union Avenue, Saratoga Springs, N.Y. 12866. An Equal Opportunity/Affirmative Action Employer.

Manufacturing Systems Opportunity

For the past ten years, Arista has worked with manufacturing organizations assisting them in establishing effective manufacturing planning and control systems based on Material Requirements Planning. Services include full project support with consulting, education, project management, application software, software customization and installation. Arista's set of manufacturing application software modules have been well received by manufacturing organizations (ICP One Million Dollar Award). Naturally, this means working with a variety of computing and data base environments as well as "state of the art" production and inventory control techniques including:

- Material Requirements Planning,
- Master Production Scheduling,
- Shop Floor Control, and
- Capacity Requirements Planning.

Thus, Arista is seeking individuals with programming and systems background in manufacturing applications. Immediate openings include the following positions:

Project Manager

Project management responsibility working directly with client personnel providing problem-solving, education, and guidance services as well as the primary communication link between the client and implementation personnel. 25-50% travel.

Project Leader Client Implementation

Project responsibility customizing existing manufacturing application software products to a particular client's specifications and computing environment. Includes existing code modification, additional sub-system design/implementation and client interface. Some travel.

Programmer/Analyst

Project team member openings on software development and client implementation projects.

COBOL, Bal and Data Base experience a plus. Excellent salary/company benefits and an ideal location. Please send resume to: Leland R. Kneppelt, Vice President Manufacturing Software R & D, P.O. Box 12849, Winston-Salem, N.C. 27107.

Arista

MANUFACTURING SYSTEMS
A XEROX COMPANY

position announcements

position announcements

position announcements

position announcements

position announcements

Programmer/Analyst Come Grow With Us!

We are seeking new individuals with a professional attitude who have the experience and the ability to grow in the consulting environment.

This outstanding professional opportunity offers:

- Stimulating work environment
- A policy of internal promotions
- Professional and technical education
- Above average salaries
- A fully paid benefits plan

Currently we have openings for individuals who have a thorough knowledge of either of the following:

- Oil and gas applications background
- Honeywell large systems, GCOS, GMAP
- COBOL, IMS, CICS, SPF, OS/VS/MVS

Please call, or send your resume to:

CIBER, INC.

Consultants In Business/
Engineering/Research
30400 Telegraph Rd., Suite 386
Bingham Farms, Michigan 48010
(313) 642-2900

TEXAS DIVISION

8303 Southwest Freeway
Suite 711
Houston, Texas 77074
(713) 977-0957



We are an Equal Opportunity Employer

COMPUTER PROFESSIONALS

The Reuben H. Donnelley Corporation, a Dun and Bradstreet Company, is seeking dynamic leaders for participation in the continued development of a highly mechanized publishing system. This system will be utilized in the marketing, publishing, and distribution of telephone directories within the Illinois/Cincinnati area from the Regional Data Processing facility located in Terre Haute, Indiana. The continued growth and achievement of Data Processing has created four immediate opportunities for experienced individuals. Reuben H. Donnelley offers outstanding opportunities for further professional achievement and personal growth within our entire organization. An excellent fringe benefit program is available including profit participation. Degree desired but not essential. Salary commensurate with experience. Positions available include:

PROJECT MANAGER

Opportunity for the individual with previous managerial and extensive systems analysis experience.

DATA BASE/DATA COMMUNICATION MANAGER

Opportunity for individual with practical experience in data base systems design in a communications oriented environment.

ANALYST/PROGRAMMER

Opportunity for individual with previous systems analysis and programming experience.

SENIOR PROGRAMMER

Opportunity for the individual with three to five years experience in ANS-COBOL, VS and Data Base.

For immediate attention, please submit your resume with salary history in confidence to:

R.A. Slover

Area Personnel Manager

THE REUBEN H. DONNELLEY CORPORATION

666 South First Street
Terre Haute, Indiana 47808
An Equal Opportunity Employer M/F

NEWSPAPER EDP PROFESSIONAL

Are you a data processing professional seeking corporate responsibility as a staff consultant with a large, national group of newspapers? You should be familiar with newspaper operations and have a background which includes a wide variety of data processing applications. Experience with H-P 3000 and IBM 370 computers is desirable.

Responsibilities will include coordinating hardware and software selection, performance, installation and implementation as new requirements surface periodically at different plants.

This position requires a self starter who has good communicative and writing skills and is seeking a career position offering exciting challenge with excellent salary and benefits.

If you qualify for this position, send your resume, including salary history, to CW Box 1507, 797 Washington St., Newton, Ma. 02160.

Computer Specialists

United Airlines has immediate openings for data processing professionals at its San Francisco Univac 1100/42 facility for individuals qualified in the following areas:

Systems Programmers

Responsibilities include the support of 1100 EXEC, CMS, DMS-1100, TIP, COBOL compiler and system utilities. Requires prior programming experience with Univac software, preferably in an online TIP/DMS environment.

Data Base Design Analysts

Responsibilities include the design and implementation of integrated data base structures. Requires experience in the design of logical and physical network data structures using a CODASYL data base management system. Experience using DMS-1100 in a real time environment preferred.

Training Specialist

Responsibilities include development of a technical training program and presentation of in-house developed classes. Requires experience in training computer professionals in COBOL, online/data base concepts and online testing techniques. Univac 1100 experience is preferred.

United offers excellent salaries and attractive fringe benefits including travel for you and your family.

If you meet any of the above qualifications, please call us collect at (415) 878-4049. Or send your resume to Employment Manager, United Airlines, San Francisco International Airport, San Francisco, CA 94128. United is an equal opportunity employer.



UNITED AIRLINES

FACULTY POSITION COMPUTER SCIENCE DEPARTMENT

Full-time faculty position, starting Sept., 1978. Teaching graduate and undergraduate in Systems Programming, Systems Analysis, Data Structures, CAI, or combination. Preference given Ph.D. in Computer Science or related area with industrial experience. Rank, salary dependent on qualifications. Send inquiries, vita (include three references) by May 1, 1978, to Dr. Donald Henderson, Computer Science Department, Mankato State University, Mankato, MN. 56001. Affirmative Action/Equal Opportunity Employer.

PROGRAMMING TEAM LEADER (PL-3)

State
University of
New York

Central Administration

Supervises programming team of senior and junior programmers. Plans and directs systems development, design coordination, programming, documentation, training and implementation assistance. Provides technical guidance and assistance to team and project staff. QUALIFICATIONS: A bachelor's degree in business, computer sciences, mathematics or management or equivalent experience. Special emphasis on project management in a structured environment. Minimum of five years' experience in programming utilizing COBOL. Knowledge of on-line applications, PL/I, Mark IV, and CICS desirable.

SALARY: \$17,000-\$20,000. Send resume and letter of application by April 14, 1978 to:

SUNY, Central Administration

Personnel Office - 12th Floor - (PL-3)
99 Washington Avenue, Albany, N.Y. 12248
State University of New York is an
Equal Opportunity/Affirmative Action Employer

Software
Manager
370 Shop
\$26,000-\$30,000
Exeter Associates
Executive Recruiters

Bruce A. Montville
P.O. Box 623
Computer Park
Hampton, N.H. 03842
(603) 926-6712

FINANCIAL SYSTEMS ANALYST/PROGRAMMER IN FLORIDA

If you have a college degree and 2 plus years experience that includes design, development, debugging, installation or support and maintenance in the banking or savings and loan field you may be the person to complement our team of professionals. Teleprocessing, mini and micro computers and/or terminal software exposure would be helpful.

If you are successful in your present position and want to expand your potential, forward your resume and salary history to: Mr. G.E. Meyers, NCR Corporation, 402 N. Hoover Blvd., Tampa, Fla. 33609.
An Equal Opportunity Employer

COMPUTER PROFESSIONALS

We are a dynamic and rapidly expanding company specializing in advanced technology information systems, computer software, and consulting services. We are seeking trained professionals with a desire to perform original work in one or more of the following areas:

- Information systems design, simulation, and evaluation
- Advanced technology information systems
- OOO intelligence systems development
- Data base management
- Communications and networking
- Parallel and array processing
- Computer graphics
- Software design and implementation

We offer an excellent opportunity for career advancement in a stimulating work environment, competitive salaries, and an attractive fringe benefit package including company paid insurance plan. Rome, located at the foothills of the Adirondack mountains, offers excellent year round outdoor sports, recreation, hunting and fishing. Opportunities for advanced education abound in the numerous local colleges and universities.

Call, visit us, or send your resume.
All inquiries handled with the strictest of confidentiality.

MEASUREMENT CONCEPT CORPORATION

1333 East Dominick Street
Rome, N.Y. 13440 (315) 337-1000
WE WANT TO FIT YOUR FUTURE!

position announcements

position announcements

position announcements

position announcements

position announcements



SYSTEMS ANALYSTS

NEW YORK, BOSTON,

CHICAGO, DALLAS, WASHINGTON, D.C.

COMTEN, a leading manufacturer of Communication Systems and Performance Evaluation systems, offers career opportunities to experienced professionals in the following disciplines:

PERFORMANCE EVALUATION

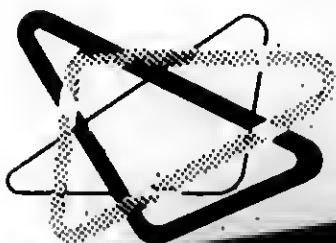
Pre/post sales support... installation and implementation planning of all COMTEN hardware measurement equipment... analysis of large scale (IBM 370/145 equivalent or above) machine environments.

TELECOMMUNICATIONS

Pre/post sales support... design and development of client telecommunications networks... installation and maintenance of COMTEN communication software.

Qualified candidates should possess knowledge of large scale systems (MVT, SVS, MVS), inter-communicative ability, 2-3 years programming experience in BAL, JCL and OS utilities. Hardware diagnostic ability desirable but not essential. Excellent salary and fringe benefits. Send your resume and salary history in strictest confidence to:

Jane Christenson
1950 West County Road B-2
St. Paul, MN 55113



COMTEN

We Are An Equal Opportunity Employer M/F

SYSTEMS ANALYST

Excellent opportunity in central suburban New Jersey with a leader in the motor freight transportation industry. A planned 360/DOS to a 370/DOS VS conversion will be followed by a major development of an online system. The Systems Analyst will lead this development effort.

Position requires an applicant with a comprehensive knowledge of IBM 370 components. Strong COBOL background. Minimum of 2 yrs systems design experience in complex online environment using CICS, CRT terminals or related software and equipment.

Responsibilities will include but are not limited to evaluation of the current batch systems. Detail design for the online system, covering programs, file organization, screens, etc. from the ground up. The individual will ultimately become the Project Leader for the programming and implementation of this system.

In-house training program in the motor freight industry will be available. We offer a good salary, excellent fringe benefits and an opportunity for personal and professional advancement. Respond by resume only including salary history in strict confidence to: A.R. Chanese, Confidential.



AAA TRUCKING CORP.

P.O. Box 8042, Trenton, N.J. 08650

Since 1931

An Equal Opportunity Employer

Career Opportunities for EDP Professionals

We are a prestigious international Big 8 CPA firm - a pacesetter in our profession. Our clients span virtually every segment of the nation's economy. Our midtown N.Y.C. facility includes a 370/158 running multiple operating system under VM/370 plus distributed processing at over 100 remote locations.

We are currently applying leading-edge EDP technology in a major systems development effort. Some of the techniques being utilized include:

- Long-Range Planning methodology
- Network-based system services
- Systems definition/design Cobol language generation software
- Interactive program development
- Data base management systems

We require professionals with a minimum of a Bachelor's degree, exceptional oral and written communication skills, and demonstrated credentials in one or more of the following areas:

- 2-4 years experience in ANS Cobol
- Minicomputer systems development (including Datapoint)
- OS Job Control language
- Structured systems analysis and design
- Data base background desirable

We have an aggressive, positive program of service expansion that provides a creative climate, a receptive environment, and significant career growth for applicants with the willingness and self-confidence to tackle new methodologies and to apply the skills of the future today.

Please forward resume of capabilities including salary requirement to: P.O. Box 1868, FDR Station, New York, N.Y. 10022. An equal opportunity employer, M/F

ATLANTA PROGRAMMERS PROG./ANALYST SYS./ANALYST \$13-25K

We are currently in our second hiring phase of the year. With the new IBM hardware we realize new additions to our staff are necessary to maintain our "Flexible Hours" schedule. Qualifications include medium to large hardware environment, COBOL, and/or BAL and any communications experience is a plus. If you would be interested in exploring our opportunities in Atlanta send resume with salary history to:

Director Of Information Services
P.O. Box 48133
Atlanta, GA 30382

PROGRAMMER/ANALYST

We are a successful transportation company located in Chicago. Our continued growth has created an opening for an experienced programmer/analyst who is results-oriented and a self starter.

The ideal individual should have excellent written and oral communication skills and be capable of working with user departments in defining and implementing computerized systems.

Demonstrated performance should include programming in COBOL (with BAL a plus), system design and implementation for medium to large scale computers. A working knowledge of DOS and experience with on-line applications are a definite plus.

We offer an excellent compensation package. Submit resume including salary history in complete confidence to: CW Box 1510, 787 Washington St., Newton, MA. 02160.

N.C.A.
means never
having to say
you're sorry

PROGRAMMERS, you may have had some bad experiences in your career advancement, with employers, or with amateur placement agencies. You can put a stop to that by using the professional services of the N.C.A. firm nearest to you. It is the very best in your area or they wouldn't be a member of N.C.A. Then you won't have to say you're sorry. No charge to you. No obligation. Confidentiality is assured.

National Computer Associates

CHICAGO
Thomas Hitz and Associates, Inc.
150 W. Wacker Drive, Suite 1700
Chicago, Illinois 60606
Telephone (312) 236-5075

DALLAS
DataPro Personnel Consultants
4255 LBJ Freeway
Suite 142
Dallas, Texas 75234
Telephone (214) 861-5800

DETROIT
Electronic Systems Personnel
Prudential Loan Center
3000 Town Center, Suite 2500
Southfield, Michigan 48075
Telephone (313) 353-6640

FLORIDA
Data Sciences Personnel, Inc.
Suite 205, 15480 N.W. 7th Ave
Miami, Florida 33189
Telephone (305) 865-7881

HARTFORD
Compass, Inc.
800 Hartford Avenue
Hartford, Connecticut 06105
Telephone (203) 548-4240

LOS ANGELES
Consultation Enterprises
Suite 900, 3250 Wilshire Blvd
Los Angeles, California 90010
Telephone (213) 487-0818

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
601 Baker Mall, Suite 1715
Minneapolis, Minnesota 55402
Telephone (612) 335-8714

NEW JERSEY
Systems Search II
75 South Orange Avenue
South Orange, N.J. 07078
Telephone (201) 761-4400

NEW YORK
Bart Associates, Inc.
405 Lexington Avenue
New York, New York 10017
Telephone (212) 867-0908

NORTH CAROLINA
Tech Force, Inc.
1048 E. Wendover Ave
P.O. Box 8888
Greensboro, N. Carolina 27405
Telephone (919) 373-1481

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wilmington, Pa. 19085
Telephone (215) 565-7820

PITTSBURGH
Electronic Systems Personnel
108 Leavitt Building
428 Fort Pitt Avenue
Pittsburgh, Pennsylvania 15215
Telephone (412) 381-8450

SAN FRANCISCO
The Computer Resources Group
Agency, Inc.
303 Sacramento Street
San Francisco, California 94111
Telephone (415) 388-3636

SYRACUSE
CJA Associates Personnel, Inc.
(Agency)
2530 James Street
Syracuse, New York 13208
Telephone (315) 463-6226

WASHINGTON, D.C.
ESP Systems Corporation
Suite 210
1211 Connecticut Avenue N.W.
Washington, D.C. 20036
Telephone (202) 833-8040

COMPUTER SYSTEM PERFORMANCE ANALYST

NCR, Systems Engineering-Torrey Pines, has a position for an individual with experience in:

- Performance modeling and measuring on-line transaction processing system.
- Specifying performance instrumentation.
- Monitoring system performance throughout system development to determine system capacity and throughput.

Experience in on-line operating system development desirable. Send resume and salary history to Cesar Nambis, Employment Specialist.



Systems Engineering/Torrey Pines
5096 Sorrento Valley Blvd.,
San Diego, Calif. 92121

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

INFORMATION SERVICES MANAGER

Position reports to the Director of Management Information for the Virginia Community College System and will have the responsibility for managing the systems development, systems support and user services activities. Prefer Masters Degree in Computer Science, Business Administration or related field with 2-4 years management experience in a MIS developmental environment. Please send resume in confidence stating salary requirement to:

PERSONNEL ADMINISTRATOR
VIRGINIA COMMUNITY COLLEGE SYSTEM
 P.O. BOX 1558
 RICHMOND, VIRGINIA 23212
an equal opportunity employer

EDP Professionals

New York based financial institution seeks the talents of EDP professionals in the following specialties:

PROGRAMMERS TO \$19K+
PROGRAMMER ANALYSTS TO \$22K+

Our Data Processing Center located in Flushing, N.Y. has immediate need for experienced Programmers and Programmer Analysts. If you want to work in a challenging environment and are looking for professional growth positions, then you should consider us.

We are seeking individuals with knowledge of the following:

• IBM 370 DOS/VS, POWER/VS • COBOL
 • HEAVY BAL • TP a plus • Banking Experience a plus

These positions offer excellent remunerations.

You will participate in our outstanding benefit program and be exposed to realistic financial and professional growth in our expanding data processing environment.

Please submit a detailed resume complete with salary history and requirements in confidence to:

PERSONNEL OFFICER
PROFESSIONAL RECRUITING DEPT.
 Republic National Bank of N.Y.
 452 Fifth Avenue, New York, N.Y. 10015
an equal opportunity employer (M/F)

YOU'LL THRIVE IN OUR ENVIRONMENT

You're tops in your line, but you're looking for greater creative challenge and a better chance to keep developing professionally.

You'll be at home at Waters. We've staffed our R&D, manufacturing and marketing groups with outstanding people who came here looking for a chance to create and develop their talents — and found it.

And we've maintained a climate that encourages creative imagination, initiative and judgment. It's borne fruit in a wealth of practical ideas that have put Waters well ahead of competitors in LC instrumentation, with a steady growth rate of 40%.

If you want a share in this kind of creative atmosphere that's spelling success every day, investigate a high-visibility career at Waters. You'll thrive on it!

Manager, Systems Programming

Individual should have broad experience in operating systems and communications. Person should also have the ability to make effective business decisions about systems growth and implementing new systems resources with a minimum of disruption. Excellent written, oral communications skills plus the ability to sell ideas to management is preferred.

This position offers an unusually attractive professional future with our company.

For a confidential appointment, please direct your resume including salary history to Dolph Banks.

WATERS ASSOCIATES

34 Maple Street, Milford, MA 01757
An Equal Opportunity Employer

COMPUTER PROFESSIONALS:
Come enjoy the good life in San Diego!

Move ahead with one of the world's most successful computer manufacturers while living in one of America's most acclaimed vacation centers. San Diego offers you the climate of your choice, from the cool, mild breezes of the ocean to the constant dry warmth of true desert — and every gradation in between. Create your special lifestyle in a hilltop hacienda, an

urban highrise, a country club condominium. Explore mesas and canyons, 70 miles of local beaches and bays, the byways of Baja. Continue your professional education in one of the area's many major colleges and universities, enjoy sports all year, from tennis to whale-watching. NCR — for a good living and a good life.

Immediate openings in these areas

■ FIRMWARE**■ DIAGNOSTIC PROGRAMMING**
(Design, develop programs to support software testing, release and repair.)**■ SOFTWARE DEVELOPMENT**

(Design/implementation of multi-program O/S in a high level language. Experience desired in data base or telecommunications, distributive processing, virtual machine, time sharing compilers)

■ MIS APPLICATIONS**■ SOFTWARE DESIGN SPECIALIST**

with experience in one or more of the following areas: teleprocessing, system architecture, network processing, transaction processing. Participate in design and application of an advanced communications network architecture to meet distributive processing needs of the 1980s.

■ TEST SYSTEMS DEVELOPMENT

Specify, design or evaluate and recommend test systems to support manufacturing digital and analog test requirements. Evaluate current test philosophies, review testability of new product designs and propose product test plans. Requires Electrical Engineering or Computer Science education, thorough knowledge of computer architecture, logic design experience and demonstrated firmware proficiency.

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

Please send resume immediately including salary history, training and experience to the Professional Placement Office at the address below

NCR

Engineering and Manufacturing
 16575 W. Bernardo Drive, San Diego, Calif. 92127

An Equal Opportunity Employer

SENIOR PROGRAMMER ANALYST

Leading NYC consulting firm. Salary to \$30,000. Knowledge of IMS & MFS.

Call for appointment
 George Lang
 (212) 687-0333

MBA HOUSTON

Large Oil and Gas co. has set up a fast track elite group of recent MBA graduates to learn the Oil and Gas business. Facility in place for promotion up and out of D.P. Previous exp with design and programming of IBM 370/OS Business Systems. \$20-25,000. Call Jim Fleming, (713) 961-3271, Robert Half Personnel Agencies, 4801 Woodway, Suite 231W, Houston, 77056.

ROBERT HALF PERSONNEL AGENCIES

TELEPROCESSING ANALYSTS**Looking For A Challenge?**

Outstanding opportunity exists for a "hands-on" person in a "hands-on" environment. Responsibilities will include terminal and modem specification, evaluation and testing. Successful candidate will have a minimum of 3 years experience in data communications, significant exposure to modem and multiplex or hardware and knowledge of terminal protocols, teleprocessing access methods and 370X's.

Bachelor's degree in Electrical Engineering, Physics or Computer Science preferred. To apply for this challenging, Chicago based position, send resume (including salary history) to:

James E. Stainkamp
 Recruiter-Management Sciences



Standard Oil Co.

(Indiana)
 200 E. Randolph Dr.
 MC 0302
 Chicago, IL 60601

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SOFTWARE DEVELOPMENT SPECIALISTS

For PDP 11 Minicomputer Systems

AMS has three openings on its minicomputer software development team in Arlington, Virginia. This small team of twelve professionals is designing and developing the software — special purpose compilers, interpreters, data base managers, display managers — which will support our interactive, turnkey systems for a wide variety of functions — financial management, order entry, inventory control, etc.

At present we are focusing our software efforts on the PDP 11 minis under the RSX-11M system; in the future, it is likely we will be doing similar work on the IBM Series 1 minicomputer.

In eight years, AMS has grown to be a leader in systems and software development. Our 1977 sales exceeded \$21 million, and 1978 sales should exceed \$30 million. We have been successful because we're committed to excellence and we've carefully assembled an unusually competent staff of innovative, results oriented professionals.

One opening is for a senior software person with 4-5 years of experience and a proven record in the design and development of software. Candidates should be able to demonstrate that they have personally developed operational software. The two other openings are for people with 2-3 years of experience working on software development projects. Experience in the design and implementation of real time "product quality" software in assembly language is essential.

The working environment is ideal. A small group using the team approach in design and development. A PDP 11/70 dedicated to development. Your own VT-52 terminal. All work is done in MACRO-11 or PASCAL.

We are looking for doers, not managers. We seek people who want to create effective software. The senior people are leaders by force of their creativity and their ability to produce results. Not by force of their position.

We realize that people who have the ability to create software are rare and we are willing to pay the salary levels necessary to attract them.

If you have these credentials and want the change to do this type of work, please send your resume and salary history to Dept. 16:

Mr. Frank A. Nicolai
Executive Vice President

AMERICAN MANAGEMENT SYSTEMS, INC.

1515 Wilson Boulevard, Arlington, Virginia 22209

An Equal Opportunity Employer M/F



Offices in New York, Chicago, Detroit, San Francisco

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C.
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

Share Yourself...Teach

Just another cliché or a career opportunity?

Our success and growth have resulted in an exceptional career opportunity for you if you've been honing your MVS or JES3 skills by doing, and now desire to take the next step in the "learn-do-teach" cycle. Join the growing software instruction team at Amdahl and learn why so many people say that teaching is the most fun they've had in their DP careers.

SOFTWARE INSTRUCTORS

We currently have openings at our Sunnyvale, California headquarters for qualified professionals ready to take that next step. We invite you to send your resume in confidence to Phil Beckhelm, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. If you're not quite ready or need more information, please call Charlie Wareing, 408/735-4326 (collect), in our Software Education Department. He'll be happy to talk with you. We are an equal opportunity employer.

amdahl

TECHNICAL SUPPORT

An immediate opening is available on the technical services team of our Data Systems and Services department. The qualified applicant should have a minimum of two years of programming experience and two years of systems analysis experience and be skilled in the art of verbal and written communications. Desirable experience: SYSTEM 2000 or other data base management systems; CICS/VS or other communications monitor; IBM 360/370 hardware/software. The job emphasis will be on trouble shooting software problems, support programming and problem solving for business applications programmers.

Send resume to:
Rich Macek
Indiana University
Personnel Division
201 N. Indiana Ave.
Bloomington, Ind. 47401
AN Affirmative Action/
Equal Opportunity Employer

SOFTWARE SPECIALIST

Knowledge of major IBM software to provide support for academic applications. Consult with faculty and students regarding programming needs, management of disk space, and on-going maintenance of computer services software applications. Competence in various computer languages highly desirable. Send resume to:

Miami University
Personnel Office
Room 2, Roubush Hall
Oxford, Ohio 45056
An Equal Opportunity Employer

D.P. CONSULTANTS

Big 20 CPA firm has several openings. 4+ yrs experience on large scale IBM equipment with on line data base. Must be IBM 370/148 or larger. Good growth. Partnership potential. \$33,000 FEE PAID

ROBERT HALF PERSONNEL AGENCIES, INC.

322 Fifth Avenue
New York, N.Y. 10036
(212) 221-4500

PROJECT MANAGER ON-LINE EDP DESIGN/IMPLEMENTATION

As a rapidly growing, medium sized (78 MM) specialty insurance company, we are embarking on a major project to create an on-line insurance processing system. We are seeking an experienced professional to lead a project team throughout the planning, design and installation phases. Successful project completion will lead to upper level management position either in data processing or in another executive capacity.

We require exceptional academic credentials, minimum 5 years data processing experience, expertise in the evaluation of teleprocessing monitors and data dictionary software, and demonstrable accomplishments in the management of large on-line projects. Personal qualities required are strong communication skills (written and oral), enthusiasm, decisiveness and a desire to succeed in an aggressive environment.

The company is headquartered in an attractive Ohio suburb and has an unparalleled record of consistent profitability and growth (profit and volume increases of over 40% in each of the last 2 years). Planned expansion offers unique opportunity for rapid advancement in position and salary.

Please send resume, including salary history and comprehensive track record in complete confidence to:

J. Brian Mullen

progressive companies

6300 Wilson Mills Road
Mayfield Village, Ohio 44143

An Equal Opportunity Employer, M/F



STATE OF ARIZONA

EDP Applications Programmer I

Salary-11,500+. Must possess at least 1 year of digital computer programming experience.

EDP APPLICATIONS PROGRAMMER II

Salary-13,500+. Must possess at least 2 years of digital computer programming experience.

EDP SYSTEMS ANALYST I

Salary 14,400+. Must possess 2 years experience as an EDP Systems Analyst, or 3 years experience in EDP applications programming or related area.

Above positions require knowledge of COBOL, PL-1 and FORTRAN on a Honeywell 6000, IBM 370 or 360, or related systems.

EDP APPLICATIONS PROGRAMMER III

Two immediate openings. Both require at least 4 years of digital computer programming experience: one with substantial background in COBOL language programming/Honeywell 6000, the other with a background in Honeywell 6060 IDS Data Base and teleprocessing communication related software. Salary for both positions is 16K+.

Arizona residency is waived for all positions. Send resume, including job title you are interested in applying for before April 3 to Robert Gonzales, Employment Section, State Personnel Division, State of Arizona, 1831 W. Jefferson, Phoenix, Arizona 85007; or call (602) 271-3401.

DATA PROCESSING

A leading Northwest wholesale food distributor requires Computer Science applicants to fulfill staffing requirements of major EDP services expansion.

- Systems Analyst
- Business Programmer
- Technical Writer
- Data Base Analyst

Positions available require a strong background of advanced systems with a minimum of three years experience in an IBM-OS-COBOL environment.

These are excellent growth opportunities to utilize your degree or work experience in a progressive and expanding Data Processing Department.

Salaries are excellent with complete company benefits program. Please send resume with salary requirements to: Personnel Office, P.O. Box 3763, Seattle, WA 98124.

ASSOCIATED GROCERS INCORPORATED

equal opportunity employer m/f/h

position announcements

position announcements

position announcements

position announcements

position announcements

DATA PROCESSING POSITIONS SAUDI ARABIA

A rapidly growing systems management company has immediate openings in Riyadh, Saudi Arabia.

PROJECT MANAGERS

Challenging positions involve development and operation of innovative TP systems for government agencies. Will manage international staff of DP and micrographics professionals with interaction at the highest levels of government. Must have at least 10 years solid DP experience and at least 5 years in significant management positions. Experience with large scale IBM TP systems required.

OPERATIONS MANAGERS

Challenging positions involve operation of large-scale IBM Teleprocessing system, multi-shift data conversion efforts, and micrographics production. Must have at least six years solid Data Processing experience and at least two years in significant management positions.

SYSTEMS PROGRAMMERS

Positions involve implementation and maintenance of an innovative IBM 370 TP system with CRT and Microfiche terminals. At least two years in-depth experience maintaining IBM OS TP systems required, preferably CICS with 3270 terminals. Must be able to maintain system single-handedly.

SENIOR SYSTEMS ANALYSTS

Minimum of five years experience in analysis and design of business TP applications. Must be knowledgeable in COBOL and IBM OS TP systems, preferably CICS and 3270 terminals. Should be capable of leading large projects.

PROGRAMMER ANALYSTS

Minimum five years experience in applications design and programming in a TP environment on IBM 370 OS systems. Must be fluent in COBOL and assembler and possess knowledge of IBM's CICS and 3270 terminals.

COMPUTER OPERATORS

Minimum two years experience as Senior Operator of IBM OS teleprocessing system.

OPERATIONS INSTRUCTORS

Will be responsible for operations training of Arabian personnel. Must be completely familiar with IBM computer operations and possess instructor skills.

KEYPUNCH INSTRUCTORS

Will train Arabian personnel in keypunch and verification skills. Must have significant practical experience, possess instructor skills, and speak Arabic.

Salaries commensurate with experience. Excellent benefits. Six weeks paid vacation annually with round-trip air fares to place of residence. Free furnished housing and free education for children. Send resume and salary history to:

SYSOREX INTERNATIONAL, INC.

10590 North Tantau Avenue
Cupertino, CA 95014
Attn: J. Singleton

Programmer
Analyst

Supports academic program and faculty research activity. Background in statistics, knowledge of several programming languages required. Proficiency in APL and FORTRAN desired. Experience with SPSS, other statistical packages, time sharing a plus. User services experience also helpful. Salary \$12,749 to \$16,887, depending on qualifications and experience. Excellent fringe benefits. Position available June 1, 1978.

Reply with letter of application and resume by May 5, 1978 to:

Director of Computing Services
SUNY College at Fredonia
Fredonia, New York 14063

SUNY College at Fredonia
is an Equal Opportunity
Affirmative Action
Employer.

FREDONIA

SYSTEMS PROGRAMMER

American Savings and Loan, a major California Association, is seeking a Systems Programmer with experience installing and servicing CICS. Require 5 years experience including 2 years ALC. Some DLI and DOS desirable. We are currently a 158 installation planning a move to a 2 CPU (3031-158) environment in a new facility by year end. Salary commensurate with experience. Please forward resume with salary history to R.H. Leach, Personnel Manager.

American Savings & Loan
15725 E. Whittier Blvd.
Whittier, CA 90607

Equal Opportunity Employer M/F

--SYSTEMS--

--PROFESSIONALS--

--NATIONWIDE SERVICE--

Proj Ldr: N.E. To \$29K
Major mfg, MRP, shop flr, IBM 168

Supv Mfg: S.E. To \$31K
IBM 370, process ind, sysmgt prodn

Sr Sys Anal Midwest To \$25K

Mfg systems, mat'l control, new systems design

Reinc & Fees Paid by Client Co.

FORTUNE
OATA

Div Fortuna Persnl Agency
505 5th Ave, NYC 10017
(212) 682-8600

Company inquiries invited

SENIOR PROGRAMMER ANALYST

BA degree or Certificate in Data Processing and 4 to 6 years programming experience is required. A strong background in ANS COBOL or PL/I is required. This person would assume project responsibility for maintaining and developing all Institutional Research applications and function as direct liaison between the Office of Institutional Research and Office of Computer Services in preparing logical interfaces between existing and newly developed software. Applicant must be able to function independently with infrequent supervision. For information call Dr. David C. Beardslee (313) 377-2387. Send resume to: Oakland University, Employment Office, 141 North Foundation Hall, Rochester, MI 48063 (313) 377-3480. AN AFFIRMATIVE ACTION EMPLOYER.

Engineers

Field Engineers

Coast to Coast Opportunities

Due to Intel's growing Field Engineering Division, opportunities are currently available for experienced Field Engineers in nearly EVERY MAJOR METROPOLITAN AREA in the country.

Intel offers excellent salaries, commensurate with your qualifications and experience, and a comprehensive benefits program.

To find the opportunity nearest to where you live or WANT to live, call this toll-free number: (800) 227-1963; or send your resume to Intel Corporation, Personnel Department, 3145 Porter Drive, Palo Alto, California 94304. An Equal Opportunity/Affirmative Action Employer.

INTEL

CORPORATION

FIELD ENGINEERING DIVISION

SEARCH SPECIALISTS FOR WOMEN

SEEK

PROJECT MANAGER

Excellent opportunity for analyst with systems project leadership experience to be direct liaison with business units of major manufacturer. High level business expertise desirable. Personal and leadership skills most important for development to Manager, Information Systems. Salary: Highly competitive.

Miss Sydney Reynolds
SYDNEY REYNOLDS ASSOC.
342 Madison Ave. NY 10017
(212) 697-8682

EXECUTIVE DIRECTOR OF THE COMPUTER NETWORK University of Nebraska System

The University of Nebraska seeks to fill a major administrative position at the University-wide System level. The Executive Director of the Computer Network is responsible for the entire range of computer activities in the University of Nebraska. Instructional, research and administrative computing services are provided by the Computer Network. The Executive Director should have experience in managing a large computer service organization, preferably in a major university. Familiarity with modern computing equipment and networking is essential. For further information, including a position description, contact William C. Erskine, Executive Vice President for Administration, University of Nebraska, 3835 Holdrege, Lincoln, Nebraska 68583.

Inquiries will be responded to until April 20, 1978. The University of Nebraska is an equal opportunity employer. Minorities, women, and the handicapped are invited to apply.

Motivation Opportunity New Challenges Excellent Benefits YES!

We have positions available in every area of data processing. So, if you are interested in a company who provides the above, along with paid vacations and holidays, company paid major medical, dental and life insurance.

call us toll free Mon. thru Sat. (800) 543-7583

Previous employees call us about your welcome back bonus.

ALLEN SERVICES CORP

DAYTON AIRPORT OFFICE
212 West National Road, Vandalia, Ohio 45377
In Ohio Call collect: (513) 890-1200
An Equal Opportunity Employer M/F

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM 11, Assembler and COBOL.

Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:

W.M. Jones



Harper-Grace Hospitals

Harper Hospital Division
Human Resources Department

3990 John R., Detroit, Michigan 48201
(313) 494-8082

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

INSTRUCTORS

Our Corporate Customer and Support Education Department is seeking professionals to join our staff as Data Processing Instructors.

At NCR, our Technical Instructors are the catalysts that bridge the gap between product and systems development and application in the user environment. In addition to developing courses based on state of the art technology, these instructors are responsible to teach software courses to NCR and customer personnel. Students in such classes represent a full spectrum of EDP professionals from those responsible for design, development, installation, programming, operation and support of NCR computer systems.

Instructor—These positions are staffed by EDP professionals who are desirous of entering the instruction field. Generally their backgrounds involve systems analysis with several years of experience who want to be involved with tomorrow's technical systems today or technical course instructors in academe who want the challenge industry can offer. Math, engineering, programming or computer science instructors in a technical school, Jr. College, College environment are samples of such prior teaching experience.

Senior Instructors—These instructors are staffed by EDP professionals who have developed and taught software concepts in either a formal or informal teaching environment. Some such persons may currently be with the education staff of a hardware or software vendor, the education staff of a large computer user who provides in house software training, the system support or installation department of a hardware or software vendor and teaches new customers on site or the computer science department of a formal educational institution.

These positions are located at our Corporate Education Center, Sugar Camp, Dayton, Ohio. Sugar Camp was constructed exclusively as an education center and represents one of the finest, up to date teaching facilities available today. NCR offers competitive salaries, a comprehensive employee benefit program, a desirable location from an environmental, cultural, travel and cost of living point of view.

If you would like to discuss the positions contact:

Ms. Peggi Washington
1-800-543-2386

In Ohio dial 1-513-449-4150 Collect
Between 9 a.m. - 4 p.m.

or forward your resume including salary history to:

NCR

NCR Corporation
US Data Processing Group
Main & K Street
Dayton, Ohio 45479

An Equal Opportunity Employer

PROGRAMMER/ ANALYST

We are an expanding Dayton, Ohio-based NYSE company operating a chain of 550 Steak Houses in 27 states and Canada. Position available for an individual with at least 3 years OS COBOL experience. IMS Data Base and online network experience preferred. Our system is presently IBM 370-145 OS/VS/IMS, but we are upgrading to IBM 370-3031 OS/MVS/TSO/IMS in the fall of this year.

We offer an excellent compensation and benefits package including fully company paid relocation.

Please forward resume or call collect:

Manager, Corporate Personnel

PONDEROSA SYSTEMS, INC.

P.O. Box 578

Dayton, OH 45401

A.C. (513) 890-6400 ext. 378

An Equal Opportunity Employer M/F/H

PONDEROSA

DATA PROCESSING

SENIOR ANALYST/ PROGRAMMER

Armour Pharmaceutical Company, founded in 1885 is an ethical pharmaceutical manufacturer located just 60 miles Southwest of downtown Chicago.

We have an immediate opening for an individual with 2 to 5 years programming experience. The successful candidate should have a BS degree and experience in:

- 360/OS, RPG II orientation
- Wilbur Library (library maintenance software) or Panvalet and Burroughs Computer experience helpful
- Strong manufacturing background (bill of materials, inventory, purchasing)

We offer excellent compensation based on your previous work and experience. A comprehensive benefit package and many opportunities for both professional and personal development.

For immediate attention, please call or direct your resume in confidence to:

Employee Relations
(815) 932-6771 Ext. 215

ARMOUR PHARMACEUTICAL CO.

Box 511, Kenosha, Ill. 60901

An Equal Opportunity Employer M/F

DATA PROCESSING

Hooker Chemical Company, a world leader in the chemical industry, is seeking data processing professionals interested in careers at good salaries within our Grand Island, New York Corporate Data Processing Department. The company offers excellent benefits and a full range of career-path positions within MIS.

PROGRAMMER/ANALYST

Seeking competent individuals with 2-4 years CICS Software and Application experience. Must have participated in the design of CICS System. VSAM knowledge is a plus.

Responsibilities include system analysis and programming. Applicants must be aggressive, self-motivated and have ability to communicate with user management. Requires, in addition to the above technical requirements, a working knowledge of COBOL and a two year college degree or its equivalent in training and experience. Knowledge of IBM 370 O/S, JCL and utilities desirable.

Previous experience with manufacturing applications a definite plus. Opportunity is open to progress through project leadership positions based upon the individual's performance.

Send resumes and salary history to:

Edward G. Weiser, Professional Recruiting Representative

Hooker Chemical Company

P.O. Box 728, Niagara Falls, NY 14302
An Equal Opportunity Employer M/F

hooker

Subsidiary of Hooker Chemical Corporation

MANAGER SYSTEMS AND PROGRAMMING

Expanding data center requires results oriented professional. Must be experienced in management of development, implementation, and maintenance activities for large scale information systems. Will manage large technical staff. Successful candidate will have degree, 5+ years of systems and project management. Proven track record in a service environment a plus. West coast Florida location. Starting salary \$22,000-\$26,000 commensurate with experience. Forward resume and salary history to: CW Box 1509, 797 Washington St., Newton, MA. 02460.

SOUTHERN CAREERS

EDP AUDITOR

(Will Train)
To \$20,000 Range

Large southern energy products corporations needs qualified programmer/systems analyst to train for EDP audit position. Prefer large IBM mainframe experience in programming/design of computerized accounting systems. Outstanding benefits and career opportunity with dynamic expanding corporation. No EDP audit experience or travel required. Contact Jim Morgan.

Sr. Systems Programmer
To \$22,000 Range

Leading Mid-South corporation needs DP pro for software development in new systems implementation. Prefer IBM 370, OS, systems programming experience with good communications and interface ability. Report directly to MIS. Advance into staff management position. Contact Jim Morgan.

ALL FEES PAID
Call or Send Resume
EXECUTIVE
PERSONNEL
CONSULTANTS

3050 Poplar Suite 1601
Memphis, TN 38157
(901) 761-4560

PROGRAMMER/ANALYST I

\$1,235 - \$1,464

S.F. Bay Area Community College seeking a qualified individual to assist with the design, development, and implementation of timesharing and batch systems on a OEC System 10; to provide technical guidance to faculty, staff, students. Candidates must have a broad range of skills and experience in design and implementation of systems, using COBOL, FORTRAN and MACRO, preferably in a college environment. Minimum 1 year experience in systems and programming. B.S. degree desirable with a major in data processing or computer science. Apply to Solano Community College, P.O. Box 246, Suisun City, CA 94585. Deadline APRIL 5, 1978.

Inventory Systems Analyst

Our company's continued expansion has resulted in a need for an inventory systems analyst for our M/C - Auto Parts Division distribution operation.

The position will involve development of interactive parts ordering utilizing modeling simulation, sales, obsolescence, turnover, and distribution analysis.

Degree in math or computer sciences with statistical background required. Familiarity with DEC 11/70 RSTS/E Basic plus 2, RMS programming is also required.

Operations systems training will be provided.

Qualified applicants are invited to submit resume, with salary requirements, to: Professional Employment, American Honda Motor Company, Inc., 100 W. Alondra Blvd., Gardena, Calif. 90247.

HONDA

An equal opportunity employer, f/m

Make a CAREER MOVE... MOVE TO San Francisco

Excellent career opportunities as well as a multitude of social activities and a temperate climate are available in the San Francisco/Bay Area.

If you are a PROGRAMMER, SYSTEMS ANALYST, or SYSTEMS PROGRAMMER with a minimum of 2 years' experience with insurance, financial, or manufacturing systems, we would like to talk with you about career opportunities available in the San Francisco Bay Area. Salaries 16 to 25K.

FOR PERSONAL LOCAL INTERVIEWS

Call Mr. Bernie Bernstein in PHILADELPHIA, (215) 922-8630, April 2nd thru April 7th; in BOSTON, (617) 227-8644, April 9th thru April 14th; or call 1 (800) 822-2270, ext. 900, anytime. If unable to call send resume to:

or write:

LOGICAL OPTIONS INC.

One Market Plaza, Spear Tower, Suite 2014

SAN FRANCISCO, CA. 94105

415/777-3900

position announcements

position announcements

position announcements

position announcements

position announcements

NEW ENGLAND GILBERT LANE - EDP

• PROGRAMMER ANALYSTS TO \$23K
370 or Honeywell 6000 background. COBOL, JCL.
• SOFTWARE SYSTEMS SPECIALIST TO \$25K
Proficient in problem analysis, Provides systems definition
from initial functional specifications through detailed logic
breakdown.
• PROGRAMMER ANALYST TO \$20K
NCR, Neat III a plus.
For these and many other EDP openings in New England and
throughout the country, call or send resume to:
Bill Nettigen, EOP Consultant
GILBERT LANE PERSONNEL
750 Main St., Hartford, Conn. 06103
(203) 278-7700

THE HIGHER INSTITUTE OF ELECTRONICS BENI WALID, LIBYA

Applications are invited for teaching staff members in the following
fields:

1. Engineering, Drawing and Descriptive Geometry
2. Mechanical Engineering
3. Circuit Theory
4. Electronics
5. Computer Sciences
6. Communications
7. Instrumentation and Control
8. Microwave and Radar Technology
9. Technicians required to run the various laboratories of the
above fields.

The minimum qualifications for Academic Staff are M.Sc. and/or
Ph.D. (Teaching experience is preferred.)

The minimum qualifications required for technicians is a City and
Guilds Technicians Diploma or equivalent. (Preference will be
given to candidates with previous experience.)

Suitably qualified persons are invited to call (202) 452-0840 for an
appointment for an interview. Interviews will be scheduled during
the first week in April in the Embassy of the Socialist People's
Liberian Arab Jamahiriyah, Washington, D.C.

SAN FRANCISCO OPPORTUNITY FOR PROGRAMMER ANALYSTS LARGE SCALE DUAL PROCESSOR SYSTEMS B 6817 - BURROUGHS LARGE SCALE DUAL MINI COMPUTERS (2) DEC PDP 11/70

PLUS A TERMINAL NETWORK CONSISTING OF L.S.
ADM 2's & 3's, ASR 28's, TC 3500, TC 3800, IBM 34,
ASR 33's, TC 500, DATA 100's

We are seeking two individuals to make significant contributions to
the continuing development of our on-line transportation oriented
applications which encompass operations throughout the U.S. and
Canada.

B6817 position requires a minimum of 2 years programming using
COBOL and some system design experience.

PDP-11 position requires a minimum of 2 years programming
using BASIC + and a working knowledge of RSTS-E.

We offer a good starting salary, excellent working conditions, liberal
employee benefit programs, including a fully paid retirement plan.
Relocation allowance for those who qualify.

If you meet the above requirements and are ready for a challenging
opportunity, mail your resume, including salary history to:

Personnel Officer
**WESTERN PACIFIC
RAILROAD COMPANY**
526 Mission St.
San Francisco, CA 94105

An Equal Opportunity Employer M/F



OPERATIONS RESEARCH ANALYST/ PROGRAMMER

Southern California Utility is
seeking an experienced indi-
vidual to support Corporate
Planning and Modeling ac-
tivities.

Experience with Fortran and
PL-1 required. TSO knowl-
edge desirable. Degree in
Math, Engineering, or Com-
puter Science required with
Graduate Degree in Opera-
tions Research or MBA pre-
ferred. Individual will join an
organization progressive in
State-of-the-Art software and
hardware technology. Send
resume and salary require-
ment to:

Employment Office
P.O. Box 1831
San Diego, CA 92112
An Affirmative Action and An
Equal Opportunity Employer.

SYSTEMS PROGRAMMER

Computer mfr. seeks Indiv. w/
MVS, JES-2, OS VS bkgd. for
N.E. location. Must be excellent
diagnostic prog. Hvy. software
debugging & internal knowledge.
Degree pref. Starting salary to
\$28,000. Contact Paul Meisner
or Stan Ourba. (Fee Paid).

**ROBERT HALF
PERSONNEL AGENCIES**
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

SYSTEMS ANALYST

We're going Life Comm III. We are
seeking that one right person with
the desire to be in on the ground
floor of a data base development
with growth potential.

Candidates will have Life Insur-
ance background and experience
with BAL.

We are a Life and Property
Casualty operation with premium
income of over \$35 mil. and are
located in the suburbs of Albany,
N.Y. (the heart of the North
East).

Excellent company-paid benefit
program and salary commensurate
with experience. Send resume and
salary requirement to Personnel
Director.

Ferm Family Ins. Cos.
P.O. Box 656
Albany, N.Y. 12201
An Equal Opportunity Employer

PROGRAMMER ANALYST

A multi-institutional, not-for-
profit health care client, located
in a suburban area of a major
midwest city, seeks a person who
can apply data processing re-
sources to the professional service
departments. A Bachelor degree
or equivalent, systems analysis/
programming experience, and fa-
miliarity with lab and x-ray opera-
tions technology can qualify you
for this position which offers out-
standing challenge and growth at
a corporate level. Send complete
resume and salary needs in confi-
dence. No fee. D.J. Parsons Asso-
ciates, Inc., 711 W. Devon Ave.,
Park Ridge, IL 60068.

COMPUTER PROFESSIONALS PROGRAMMER/ANALYSTS

If you are considering OP consulting for a career, please call OASO.
We are a highly organized team of wild and competent data
processing professionals. And we do good work too - the OASO
way. If you like being yourself - in the right direction. Do it to it.
L.A., SF, TEX., NEB., MILW., CHI., PHIL., MPLS., ATL., NJ, FLA., IA,
WA., etc (Fill in the blank).
Excellent salary and benefits.
When you call ask for Will. Thank You.

DASD CORPORATION

(414) 351-2600
Suite 301 - 8705 N. Port Washington Rd.
Milwaukee, Wisconsin 53217

**DASD
CORPORATION**

PROGRAMMERS/ PROGRAMMER ANALYSTS

A nationwide firm acting in retailing, manufacturing, whole-
saling, finance and agriculture, The Wickes Corporation currently
has unique positions available for Programmers and Programmer
Analysts with at least 1-3 years DS CDBOL experience.

As a key member in our Wheeling based Corporate MIS Group,
you will be working with a 370/158 MVS installation which
serves our varied operations through RJE and on-line systems.

Along with an outstanding salary and convenient suburban
location, Wickes offers a comprehensive benefits program that
includes DPS pension and Thrift Plan. Evening interviews are
available. Interested applicants are urged to send a brief resume
or call (collect)

S.K. Schultz
541-0100 Ext. 2256
THE WICKES CORPORATION
351 W. Dundee Rd.
Wheeling, IL 60090
equal opportunity employer m/f

Programmer Analyst/ Project Manager Excellent Career Opportunity...

Meldinger & Associates, Inc., one of the nation's oldest
independent employee benefit consulting firms, has an im-
mediate & challenging career opportunity for a programmer
analyst/project manager.

The individual will be responsible for coordinating with
consultants, actuaries and a specified group of clients to
deliver timely & accurate services utilizing the most effective
data processing resources & alternatives available. The suc-
cessful candidate will have a degree in business, math or
computer sciences and 3 to 5 years experience with exposure
to systems analysis, job control and COBOL programming.
Strong organizational & communications skills are essential.

Our competitive salary program, supplemented by a progres-
sive financial incentive plan and comprehensive benefit pack-
age offers excellent compensation to the individual selected.
For confidential consideration, please send resume to:

T.C. MAY



MEIDINGER & ASSOCIATES
2440 Grinstead Drive
Louisville, KY 40204

DATA PROCESSING INSTRUCTORS

A rapidly expanding Technical Training Institute has immediate
openings for qualified instructors. Applicants must have a Ph.D. in
Computer Science or related fields with extensive experience in
teaching all areas of Computer Science. 3-5 years practical experi-
ence in programming with COBOL, Fortran, and Assembler on IBM
equipment highly desirable.

These are challenging positions for aggressive computer specialists
seeking personal and professional growth. Our worldwide operations
provide opportunities for mobility and overseas assignments for
those with appropriate qualifications.

Send resume and salary history to:

Dr. Arthur J. Mack
Sysorex Institute
10590 N. Tantau Ave.
Cupertino, CA 95014
An equal opportunity employer

Overseas Adventure To \$40K USA

IRAN

**SYSTEMS ENGINEERS/
SOFTWARE PROGRAMMERS**
UNIVAC 1108 & EXEC VIII
OMS 1100 Data Base Exp

Rare opportunity for 1108 Senior
programmer or Systems program-
mer to live & work in Iran, land
of growth & adventure. 12-24
mon. assignment with many out-
standing benefits. Send resume to
Mr. Tink Nathan, President.

CYBERMETRICS CORP.
P.O. Box 579
McLean, VA 22101
(703) 336-1957
Other positions avail.
USA & Iran

COMPUTER SCIENCE

An imaginative and innovative
teacher for introductory courses
with applications in various disci-
plines. MBA with strong com-
puter programming background
or MS in Computer Science with
strong business background pre-
ferred. Salary and rank open and
competitive. Findlay College, lo-
cated in a secure medium-sized
town in NW Ohio, provides ideal
support for professional, intel-
lectual, and academic pursuits.
Faculty emphasis is on excellence
in teaching. Application deadline
April 15. Send vitae and creden-
tials to W. J. McBride, V.P. for
Academic Affairs, Findlay Col-
lege, Findlay, Ohio 45840. Equal
Opportunity Employer.



To change is a difficult thing for any of us
to do. When thinking in terms of a position
change, it's extremely important you make
the right one. The professionals at E.O.P.
are constantly searching for the best op-
portunities available now. Phone (816) 421-6031
MAIL COUPON!
You're ready for a change - contact us to-
day... you'll be glad you did!

Considering A Change?
ELECTRONIC DATA PERSONNEL INC.
Suite 1202 - 1006 Grand - K.C., Mo. 64106

NAME _____ ZIP _____
PRESENT POSITION/TITLE _____
ADDRESS _____
CITY _____ STATE _____ PHONE (816) 421-6031



position announcements

position announcements

position announcements

position announcements

position announcements

INFORMATION SYSTEMS MANAGER

Coordinate all information processing and systems development activities for a 400 bed Indiana Hospital. Requires demonstrable knowledge of hardware and software utilized in hospital information systems, including information networks and the use of minicomputers as distributed processors. Masters degree in computer science or hospital administration with computer and information systems experience is required. This is a senior level position. Salary commensurate with experience.

Direct inquiries or resumes to:

H.R. Porter & Associates

119 Executive Park
Louisville, Kentucky 40207

CADILLAC EDP OPPORTUNITIES WHAT IS YOUR TRUE WORTH?

It's a seller's market for EDP professionals... you are the seller. Because of this you should take a "hard look" at what your present position offers you... salary, advancement, etc.

We offer assistance in evaluating your present position. Just send us your resume, or a note outlining your experience, no obligation to you... we will call you to discuss your objectives with you.

For more information on our NATIONWIDE-FEE PAID-CONFIDENTIAL placement service contact, or send your resume to:

CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

COMPUTER/ELECTRONICS SPECIALIST

Exceptionally qualified person to establish and direct PDP-11 mini-computer network, including DECLA 11/34 system and several 11/03 microcomputer satellites. Responsibilities include: implementing initial system software, developing software package to run and analyze psychology experiments, writing other specialized programs, designing interfaces for peripheral devices. Experience with PDP-11 family and solid electronics background necessary; experience with psychology applications preferable. Salary negotiable. Write: Chairman, Psychology Department, Mezes Hall 330, University of Texas at Austin, Austin, Texas 78712. An Equal Opportunity/Affirmative Action Employer.

SYSTEMS ANALYST

Experienced in: COBOL, preparation of proposals for justification, implantation of conversions from manual optns to packaged TP. Salary to 14K. Resume/salary req'd to

Lucas County Data Processing,
Lucas County Courthouse
Toledo, Ohio 43624
Attn: VM Bal

programmers

The Ordnance Engineering Division of FMC Corporation, located on the San Francisco Peninsula, is engaged in the research, design and prototype assembly of military tracked vehicles. We have immediate and challenging opportunities for the following:

sr. programmer

At least 5 years' experience designing and implementing application systems. Require experience with IBM, ANS COBOL and structured programming. Must be thoroughly familiar with IBM 370 OS/VS JCL and Utilities. Degree in Business or related area preferred.

programmer

Requires 3 years' experience programming using ANS COBOL in an IBM 370/OS environment with working knowledge of JCL. Structured programming experience required. Must have the ability to assist in the review and analysis of detailed systems specifications and preparation of program instructions, including preparing test data and debugging programs.

For consideration, please send resume or call David Thompson (408) 289-3211, FMC Corporation, Ordnance Engineering Division, 1107 Coleman Ave., San Jose, California 95108. An equal opportunity employer, m/f.

FMC

PROGRAMMER ANALYSTS

Coral Gables Federal Savings & Loan Association has two Programmer/Analyst positions available, offering an exposure to a sophisticated on-line real time Financial System.

SENIOR PROGRAMMER/ ANALYST

should have 4-6 years Assembly Language experience. On-line real time experience and data communications experience required. This position interacts with users in the systems development of major financial systems.

PROGRAMMER/ ANALYST

should have at least 2-3 years Assembly Language experience. Financial and/or communications experience helpful, but not required.

Salary commensurate with experience, plus excellent benefits. Send resume with salary history to:

Samuel H. Fields, Jr.
Director EDP

coral gables federal

2511 Ponce de Leon Blvd.
Coral Gables, FL 33134

SYSTEMS PROGRAMMER

The Regional Information Systems (RIS) located at Eugene, Oregon is looking for a systems programmer who has actual experience in systems generation, implementation and maintenance of MVS. Experience in JES 2, TP and DBMS a plus. RIS is a cooperative data processing center dedicated to providing services to the county and other local government agencies. The current hardware configuration includes an IBM 158, 155 and over 200 terminals and RJE stations. Salary starting up to \$17,000. Please send resume to: Lane County Personnel Department, 2nd Floor Public Service Building, 125 East 6th Ave., Eugene, OR 97401.

VIRGINIA

Business Systems Analyst
\$23,000 FEE PAID

This is very prestigious position within company. Represents a division to Corporate D.P. Financial applications required. Cost experience a plus. Everyone we have placed with this company loves working there. Small town environment.

Call or Send Resume to
Data Processing Dept.
PERSONNEL PLACEMENT
537 O Huffman Mill Rd.
Burlington, NC 27215
(919) 584-5591

**FACULTY POSITION
INFORMATION SYSTEMS**
Available summer or fall 1978 in business information systems. BS and MBA option programs include program design, systems analysis, databases, on-line systems, EDP management seminars. Excellent urban locus for research and consulting. Minimum of relevant masters degree and solid professional EDP experience for one year appointment. Tenure track appointment possible for those with relevant PhD or plans to pursue one. Rank open depending on qualifications. Send resume and references to E.K. Cobb, Chair, Accounting & BIS Department, California State University, Los Angeles, CA 90032. An Equal Opportunity, Affirmative Action, Handicapped, Title IX Employer.

SF based financial institution has immediate openings for Systems Analyst and Programmer/Analyst in support of an IBM 370/148 using DDS/VS with plans to convert to OS/VS.

Systems Analyst

Requirements: Two years of college in computer science/business administration or equivalent experience; two years of COBOL experience in implementing financial analysis applications; excellent communication skills. Exposure to Data Base or Data Communications desirable.

Starting Salary: \$16,500-\$18,500.

Programmer/Analyst

Requirements: One year of COBOL programming experience in financial applications. Exposure to Data Base or Data Communications is a plus.

Starting Salary: \$15,000-\$17,000
Excellent benefits package. Please send detailed resume and salary history to:
CW Box 1572
797 Washington St.
Newton, MA 02160
EOE M/F

ANALYSTS & PROGRAMMERS \$13K-\$30K

SR. SYS. ANALYSTS \$30,000. NJ Consumer prod. div. of Fortune 100 seeks 2 Sr. Sys. Anal., 1-diet, 1-mfg. Exp. in order fulfillment, cust serv or mfg. control sys. aessential. Contact R. Davie, FOX-MORRIS, 3490 U.S. Rt. 1, Princeton, NJ 08540 (609-452-8135).

REAL TIME ENGRS. \$25,000. Tax-Frae, Faa-Pd Middle East. BSEE + min 5 yrs exp in data acq. & proc. control. R. Williams, FOX-MORRIS, 1500 Chestnut St., Phila., PA 19102 (215-561-6300).

SYSTEMS PROGRAMMERS to \$25K. Central Penna. Co seeks 370 Talcommunications exp. VM exp. helps. MECK ASSOC. (emp agcy) 1517 Cedar Cliff, Camp Hill, PA 17011 (717-761-4777).

SYSTEMS ANALYSTS & PROGRAMMERS \$15,000-\$30,000. Immed. Penna. nat'l openings. Commercial & scient. applic's. Contact WEIR PERSONNEL SERV., (emp agcy), 535 Ceurt. Heading, PA 19603 (215-376-8486).

TECH SYST ENGRS \$20,000 range. Data base internal #1, VS #2. Also pro/analyst exps. Send resume & salary to: Ken Murray, CAREER SPECIALISTS, 101 Commons, Bellevue, WA 98004 (206-455-0582).

PROGRAMMER ANALYSTS. \$14,000-\$24,000. 3 yrs cobol exp in mfg or fin envrmnt. Send resume or call: SHERMTECH ASSOC., 4131 N. Grand River, Lansing, MI 48906 (517-323-1002).

SYSTEMS ANALYSTS \$13,000-\$23,000. 2-5 yrs exp in finan. mfg. or banking. COBOL, FORTRAN, IBM 370, OS/VS or M-6000. Deg. preferred/not req. Mid-Atlantic & SE locations. Send resume or call: RUDICK ASSOC., 9 Keger Cantar, Norfolk, VA 23502 (804-461-3994).

npc

all positions listed are fee-paid
NATIONAL PERSONNEL CONSULTANTS

SYSTEMS ANALYST:

The City of Lansing, Michigan is seeking a person with a degree in mathematics, statistics, industrial engineering with 2-5 years technical experience in data processing with priorities in development, distribution, quantity and quality control, structural placement and debugging allied with personal communication skills. Salary \$17,892 with excellent employee benefits. Send all inquiries with complete resume to

D.J. Bodwin
Personnel Director
119 N. Washington Mall
Lansing, Michigan 48933

DP DIRECTOR

\$20,772 - \$23,340

BA or related deg w/emphasis in DP desirable. Exp in IBM Sys 3, Model 15, RPG II/CCP desirable. Five to seven years exp of which 2 yr. must have been at Admin/Supv level. Fwd Col transcript w/resume. Position provides tech and supv control of a centralized DP complex. Appl deadline: 17 Apr 78

Personnel Depart.
Adams County Admin Bldg
450 S. 4th Ave
Brighton, CO 80601
Equal Opportunity Employer

COMPUTER SCIENTIST

HOLLINS COLLEGE

Ph.D. to teach undergraduate courses in computer science and to coordinate academic computer services at private liberal arts college for women.

Send resume and references to Dean Roberts A. Stewart, Hollins College, VA, 24020.
An Equal Opportunity Employer

UNIVERSITY OF PETROLEUM AND MINERALS

DHAHRAN, SAUDI ARABIA

Position available for Computer Technician. Some experience working in a small Animal Laboratory (preferably a Psychology Operant Conditioning Lab) essential. Salary dependent on qualifications. Please send resume to:

Dr. Abdul Aziz Al-Dukhayli
Dean of Faculty and
Personnel Affairs
University of
Petroleum and Minerals
Dhahran, Saudi Arabia

PROGRAMMERS

Immediate openings available for several experienced IBM System/3 programmers. Successful candidates will have 2+ years experience in RPG II or COBOL. Experience or working knowledge of CCP is a definite plus. We have a large System/3 Model 15D with a great many CCP and BI Synch as well as batch applications. South Suburban Chicago location across from I.C. Station. Good starting pay, with excellent company benefits. Interested candidates should send resume and salary history to:

Scott Ivey

Cheker Oil Company

P.O. Box 162
Hazel Crest, Illinois 60429
(312) 335-0800

TEACHING POSITIONS QUANTITATIVE METHODS

California State University, Fresno
School of Business and Administrative Sciences
Accounting and Quantitative Studies Department
Tenure-track positions and Lectureships available Fall 1978. Candidates will teach in one or more of the areas of Computer Science, Statistics, or Applied Mathematics. Doctorate required for appointment to professorial rank. Minimum requirement for appointment to lectureship is appropriate master's degree. If candidates do not have at least one college degree in a business field, they must demonstrate experience in research, or statistics to business problems. Preference will be given to applicants with business experience and teaching experience in a School of Business. Salary will depend on candidate's academic preparation and professional performance. Computer courses include programming, systems, and computer center management. Statistics courses include undergraduate and graduate classes. Applied-business mathematics courses are lower-division survey classes. Deadline is open, but may be closed any time after April 15, 1978. Send resume to Clayton R. Tidyman, California State University, Fresno, 93740. Equal opportunity employer.

CAREER OPPORTUNITY IN INFORMATION SYSTEMS

Midwestern life insurance company has one immediate opening

PROGRAMMER/ANALYST

Successful candidate should have 2-3 years experience in assembler language background.
- Life insurance background a plus.
- Will work in an on line source program maintenance environment.
Company offers an excellent benefits package with competitive salary based upon experience. If interested call toll free 1-800-843-3316.

MIDWEST CHALLENGES IBM EQUIPMENT

Proj Mgr. - Serv Bureau To 24k
Prog./Anal. - COBOL - Mfg. To 24k
D.P. Mgr. - Systems III To 21k
Prog./Anal. - Bank To 17k
Prog./Anal. - COBOL - OS To 18k
Call or write

SHILOVE PERSONNEL SYSTEMS

(317) 257-9281
6100 N. Keystone
Suite 857
Indianapolis, IN 46220
Offices in Akron, Ohio, Columbus, Cincinnati, Pittsburgh and Indianapolis.
A licensed employment agency

COMPUTER PROGRAMMER

Arizona Western College is seeking applications for the position of Computer Programmer. Salary commensurate with qualifications and experience. Two years experience in computer programming. Knowledge of DEC PDP-11 series and BASIC PLUS programming. Direct inquiries to Personnel Office, Arizona Western College, P.O. Box 929, Yuma, AZ 85364. AWC is an Equal Opportunity/Affirmative Action Employer and encourages qualified women, minorities, and handicapped persons to apply.

ASSISTANT PROFESSOR OF COMPUTER SCIENCE

Major duties and responsibilities: Teaching and research. Qualifications: Ph.D. in Computer Science with emphasis on operating systems, compiler construction and programming languages. Starting September 1, 1978. Send resume to Box 57L, Waterman Building, University of Vermont, Burlington, Vermont 05401.
An Affirmative Action Employer.

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR LEASE

IBM SYSTEM 32
13.7 M disk; 285 lpm; 16K IBM
Maintenance contract.
\$100's less than IBM Lease Avail-
able 8/1/78.

Stephen M. Walrath, C.P.A.
30100 Crown Valley Pkwy.
Laguna Niguel, CA 92677
714-831-2131

415 HZ FREQUENCY CONVERTERS

IBM	AMDAHL
370 165	470 V 5
370 168	170 V 6
3032	170 V 7
3031	

SILENTBLOCK

CONTROL SYSTEMS, INC.

R.D. 4 S. Plank Rd.
Middletown, N.Y. 10940
(914) 355-6121

The Logical Choice

BUYING SELLING LEASING

360/30-40-50-65s
CPU - Peripherals
AND SYSTEM/3

3340 A02, B0	23303-1, 11	5410-A14
3830-2	3333-1, 11	3971
3420-4, 6, 8	3420-3, 5	4100
3330-1, 11	3410's	6378
3420-3, 5, 7	1403's	5424-A1
3803-1,2	3420's	5203-2
	2501's	5560
	5441's	5444-2
		5444-2

DATA AUTOMATION CO., INC.
4858 CASH ROAD
DALLAS, TEXAS 75247



AC 214 637-6570

Buy & Sell

Disk Packs

All Types
Trade-Ins

Call: Debbie
DDSI

489A Spring Rd.
Elmhurst, IL 60126
(312) 530-4606

IBM 1800

Complete IBM 1800 System for
sale: 48kw memory 3-1810 disk
drives, 1443 printer, 1442 card
reader/punch, over 200 analog
I/O channels, over 500 digital I/O
channels, etc. plus PDP8/I front
end processor. IBM maintained.
Excellent condition. Available
mid 1978 (negotiable).

Contact:
Prof. O. Grant Fisher
Univ. of Alberta
Dept. of Chemical
Engineering,
Edmonton, Alberta
CANADA T6G 2G6
(403) 432-3301

FOR SALE

Two (2) Electronic Retine Com-
puter Reader (ERCR) w/assoc-
ated CPU's, tape drives, line print-
ers, and misc. peripherals.

Also eight (8) Bar Code Reader/
Sorter (BCRS) systems, Models
1A and 1B, w/associated CPU's,
tape drives and misc. peripherals.

Manufacturer
Recognition Equipment, Inc.
For further details contact:
E. Hutchinson

AMERICAN EXPRESS COMPANY

Phoenix, Ariz.
(602) 248-3082

BUY-SELL TRADE

For Computer
Call Action Write

CAC

404 458-4425 P.O. Box 80572
Atlanta, Ga. 30366

Available For Lease
Fall 1978 Delivery

IBM 3033

Processor Complex
B Meg System
(I.O.A. Sole Owner)
Call

George Gilman or
Charles Rubenstein
(212) 673-9300

We have the experience
and the expertise



381 LAFAYETTE ST. N.Y. 10003
(212) 673-9300



In Canada... let us
quote a custom-configured
IBM computer system in
new condition, with quick
delivery, at big savings
under IBM factory prices.

Don Dupuis
Windsor, Ont.
(519) 258-8910

Jacques Dagenais
Montreal, Que.
(514) 374-5920

Ron Ridding
Toronto, Ont.
(416) 683-3704

CMI -
Remember the name
CMI COMPANY

IBM 3032 Attached Processor AVAILABLE Jan 1, 1979

Contact: Jerry Borisy

JB ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, CO 80228
(303) 988-0820

3033 - 3032

48 month term
1978 delivery
Financing available to
ITC Qualifying Account

CW Box 1461
797 Washington St.
Newton, MA 02160

WANTED 360/20 SUB 5

- 1403 Mod 2 Printer
- 3 2311 Disc Drives
- 2580 No Print

(212) 947-6100

FOR SALE

IBM SYSTEM 32

Model B32, including 5.4 mega-
byte disk, 16K, 64 character set,
120 lpm.

\$29,000

Available immediately
Walter J. Seibert CPAPC
P.O. Box 156
South Salem, New York 10590
(914) 763-8829

**Wanted to lease
3032 in late 1978
Terms negotiable
Contact
Bill Elwood
214/748-8481**

FOR LEASE IBM SYSTEM/32 Model B33 avail Apr '78 2,3 or 5 yrs

LeMans Corporation
Mpls (612) 854-8380
Chic (312) 896-5060

FOR SALE NEW PERKIN-ELMER TERMINALS

Immediate Delivery
FOX 1100's W/Anti Glare Screens
OWL-1200's W/Function Keypad
Line Drawing Character Sets
and Extended Communications
Are Optional
Call or Write
WORLD INFORMATION
SYSTEMS INC
17501 So. Figueroa St.
Gardena, Ca. 90248
(213) 332-6730

FOR SALE S-7360-30F

128K-Two Selector Channels

1-2540	Card Rd. Punch
1-1403N1	Printer (1100lpm)
5-2401-3	Tape Units (RWW)
4-2311	Disk Stor. Units
5-2314(A1)	DASF Spindles

Control Units
2804/2821/2841
Available May 1, 1978

Call Collect
Walt Kameika
(203) 622-1762

FOR SALE

Hewlett Packard Calculator System

2-9830 Calculators with
thermal printers
1-4.9M Byte Disk
1-Mark Sense Card Reader
1-200 LPM Printer
HP Accounting Software
Selling all or part of system
Make Offer

Scenic Airlines

241 E. Reno Avenue
Las Vegas, NV 89119
(702) 739-5611

FOR SALE OR LEASE

IBM 3271-2	Control Units
IBM 3277-2	Display Station
IBM 3284-2	Printers
IBM 3330-11	Disk Storage
IBM 1419-1	Micr Reader

All Available April, 1978
NOVA FINANCIAL CORP.
1301 W. 22nd St.
Oak Brook, IL 60521
(312) 920-8181

WTB-Microdata 64K Maintained

Reality/Reality Royals
10 to 25 MGB. disk
1-Tape Dr.
1-300 lpm printer
3 terminals

CW Box 1508
797 Washington St.
Newton, Ma. 02160

LEASE

370/165 KJ
Serial No. 60183
Available 4-78
370/138 J
Serial No. 20021
Available 4-18-78

Call Mary Berger
Computer Systems
of America, Inc.
141 Milk St.
Boston, MA 02109
(800) 225-2036
(617) 482-4671

For Immediate Sale

DEC 310

Dual Floppies, 32KB
LA35 Printer, VT-50 CRT
COS 310 Software.

Contact
Dick Fitzgerald
Community Computer
Auburn, N.Y.
315-253-2820

PAYROLL PERSONNEL SUPER/PAY ONLY \$960 ANS COBOL 60+ USERS

Users on IBM, Burroughs, Univac
and minis such as NCR, DG, &
Four Phase

Easy to Use 30 Day Trial
Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

WE ARE

BROKERS OF COMPUTER TIME

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE BY OWNER

HEWLETT-PACKARD 3600
SERIES II MODEL 5
(1 Year Old)

Product Number 32415A
256 KB Bytes
2-15 MB Disk Drives
300 LPM Printer
800 BPI Tape

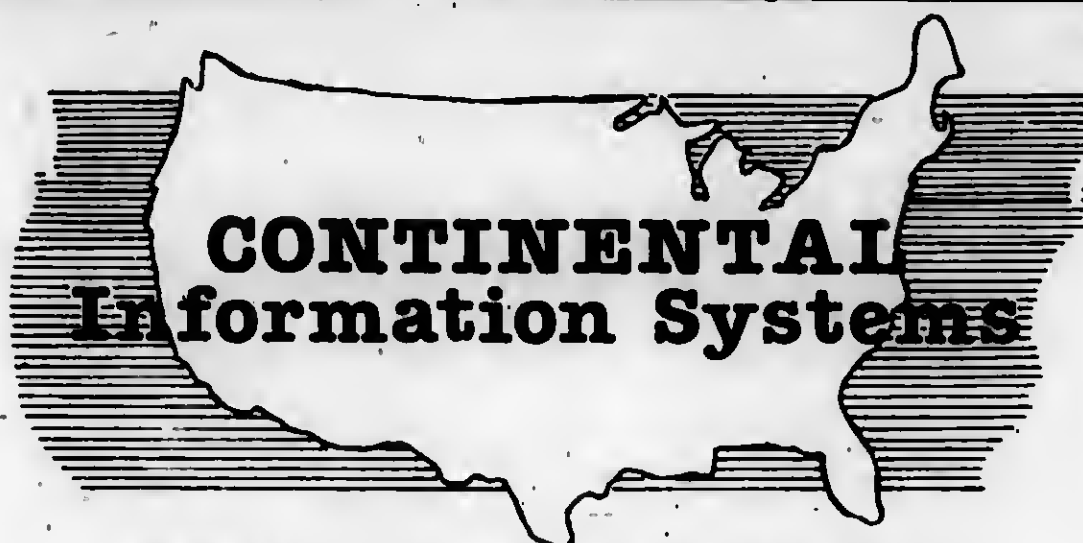
6-2640B Terminals + Console
CRT, MPE II, EDIT, DEBUG,
TRACE, FCOPY, SORT, COBOL,
RPG, IMAGE and QUERY (H-P
Maintenance) 15 KVA Ultra isolation
Transformer, 2 Vadic
VA3405A/1601 Modems.

\$125,000

Available-April 1, 1978

Contact:

Wayne Hamilton 415/986-3900
Robert Boni 408/275-9000

**BUY, SELL, LEASE, SUBLEASE, AND TRADE**

NEW AND PRE-OWNED IBM EQUIPMENT

AVAILABLE

168 KJ - 8 Channel - May

165 K - DAT available - April

158 J - 2 Megs OEM - May

158 AP - new, ITC qualifying - April

155 J2 - April

145 J2 - April

WE ALSO HAVE NEW, ITC QUALIFYING 168, 158, 148,
and 138 IN APRIL - MAY

Call Us!

CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900**Peripherals and I/O**

All 360/370 Disk, Tape
Printers, Readers, and T/P

Gene Chappell
Wanted:

3330's, 3340's & 3420's

CIS is very interested in
buying pre-owned
IBM 370 systems.
If you are thinking
about selling, let us
make you an offer.

DEC

HARDWARE

PDP11-PDP8Processors
Peripherals
Memories**VT52's LA36's****LS120's LA180's**Also available
Other printers and discs
available with controllers
for most minicomputers.**NATIONAL DATA**

SALES CORP.

516/944-7444

FOR SALE

Relocatable
Computer Center
Structure

A 24' x 65' building constructed
and used for computer center.
Special air conditioning, electrical
power and raised floor facilities
for computer equipment. Facility
in good condition. Transportable
in 12' x 65' sections. Price
\$24,000. Contact Purchasing
Agent at Forsyth Memorial Hos-
pital, 3335 Shaw Creek Parkway,
Winston-Salem, N.C. Telephone
(919) 768-2200 ext. 2931.

URGENTLY NEEDED! ANY QUANTITY!

**DEC and
DATA GENERAL**

computer equipment

CASH AVAILABLE

CALL TODAY!

NEWMAN COMPUTER EXCHANGE

IBM 370/158
Attached Processor
System
AVAILABLE
JULY, 1978

Contact: Jerry Borisy
JBI ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, CO 80228
(303) 988-0820

**TOTAL OUTPUT
SERVICE**DIRECTLY FROM
YOUR TAPES

Delivered in Hours!!

- XEROX 1200 9-1/2 x 11 Hard Copy
- Computer Graphics
- Full Kodak KOM-85 Service
- Round-the-clock operation: 24-hrs. a day/7 days a week!

Call Joel Certun
(212) 869-0640

COMVESTRIX

The Output People
1500 B'way, NYC 10036

370/165-II

- FOR SALE OR LEASE
- AVAILABLE JUNE 1978
- AS SHORT AS 24 MONTH LEASE AVAIL

CALL TED MOLINARI AT:

(201) 947-4200

IPB

IPS COMPUTER MARKETING CORP.
2460 Leimone Avenue
Fort Lee, N.J. 07024

WANTED

029-129

We Buy
Rental Credit Machines.
Continue to Rent at A
Discount From IBM Prices.
Call Bob Stackhouse

Data Rentals/Sales

(213) 559-3822

FOR SALE

- One Oate Products line printer/Model 2313/80 col.
- One Model 3873 Memorex disk controller
- Two True Data 400 cpm card readers
- One GRI-99 Model 30 mini-computer with 10MB CDC disk storage.

TeleNo
COMPUTER PRODUCTS, INC.
17131 Dalmier St.
Irvine, CA 92714
(714) 557-6080

Ask for Joe Letbetter

BUY · SELL · TRADE
DATA MODULES
DISK PACKS
DISK CARTRIDGE
Attn: Gerlie Mour
**USED COMPUTERS,
INC.**

7 Woodside Ave.
Berwyn, PA 19312
(215) 847-1881

ECLIPSE C300

- SURPLUS -

20 meg. dual disks, mag tape
300 LPM printer, 8 line communications
4 CRT'S. Full software. 1 1/2 yrs. old

BUY OR LEASE FROM OWNER

PHIL THOMAS

(305) 272-8753

Thomas Business Systems, Inc.

**When you plan to buy or
sell your computer
equipment...**

For complete information call the Greyhound Representative in your area.

WANT TO BUY

370/158 370/155 370/145

U.S.

Home Office
New York
Chicago
Dallas
San Francisco

T. A. Takash
Dick Ventola
Pete Ahern
M. W. "Bill" Tucker
Henry Paulson

602-248-6037
914-849-1515
312-298-3910
214-233-1818
415-283-8980

INTERNATIONAL

Canada
U.K./Europe
Mexico
Austro-Asia
Eurasia
Dallas

Don Maund
Joe Gold
Andres Contreras
John Hallmark
Don Haworth
John Hallmark

416-366-1513
022-81-27-64
905-543-6850
214-233-1818
214-233-1818
214-233-1818

NON-IBM

GO GREYHOUND

Greyhound Computer Corporation

**PREVIOUSLY OWNED
EQUIPMENT & SYSTEMS
N.C.R. & BURROUGHS**

N.C.R. 31, 32 & 151 & 152 Teller Units
735/735 & 745 Mag. Tape Enc. & Line Printers

N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S

Also B-700 Thru B-4700 Systems w/wo Peripherals

WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS**BUYING OR SELLING-CALL US FIRST.**

KEY-EXIMPORT CORP.

256 LIVINGSTON ST. (P.O. BOX 1251) NORTHVALE, N.J. 07047
TELE. N.J. (201) 767-3444 N.Y.C. (212) 736-7736
TELEX 125149 CABLE KEYEXIMP NORTHVALE NJ

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

WANTED

BURROUGHS 'L' Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299

Boynton Business Systems
87 Route 208
Walikill, N.Y. 12584
914-895-2007

DEC HARDWARE

PDP 11 PDP 8

Processors Peripherals
Memories

VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

LIQUID COOLED MAIN FRAME USERS

We have a cooling unit for liquid
cooled CPU's that operates up to
50% cheaper than other available
units. Saves installation time and
money. Does not take up space in
computer room. Comes complete
with 100% back-up system.

CONTROLLED
ENVIRONMENT CORP.

640 Reynolds
Kansas City, KS 66101
(913) 342-3599

Over ten years experience in com-
puter room environments. Ask
about a heat recovery system for
your EDP site. Could save you a
small fortune in utilities.

Why Comdisco is First in the Second Market:

IBM Processors available

135 145

145s needed
135s available
for lease

155

Immediate
delivery with
DAT

158

want to
buy or
lease

165

Available
for sale
or lease

IBM Peripherals available

3420

We will purchase
your 1600 BPI
drives and replace
with Models 4 or 6
immediately.

3330/33

All models
available for
delivery now.

3340 44

Wanted to
buy

SPECIAL

3420 models 4 & 6
available now.
3830-2 Control
Units-Now

IBM 3031, 3032, 3033 operating leases available.

Atlanta 404/256-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107

COMDISCO

New York 201/568-8666
San Francisco 415/944-1111
Paris, France 374-1130

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

Your First Choice in the Second Market

efm computer
leasing, Inc.



3000 mercus avenue
lake success, ny 11040
(518) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65
360/50 370/135

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340's

IBM UNIT RECORD
EQUIPMENT

026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557,
029-059-129

Call us for all your needs, we buy
rent and sell all types of IBM unit
record equipment. Over 12 years
of serving commercial and govern-
ment requirements. Contact ACS
for proposal.

7126 Mullins
Houston TX 77081
(713) 666-2122
TWX 910-881-1526

ACS
EQUIPMENT CORP.

Before you buy or sell used computer
equipment consult

**COMPUTER
PRICE GUIDE**

"The Blue Book of Used Computers"

Quarterly publication contains current
price information about used IBM
computers and peripherals. Includes
newsletter about current price trends
and availabilities.

\$5 per issue - \$18 annual subscription

Computer Merchants Inc.

75 South Greeley Avenue, Chappaqua, New York 10514
Member Computer Dealers Association (914) 238-9831

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 200	\$20/Mo	059	\$1400	\$50/Mo	129	\$3400	\$110/Mo
026	\$ 900	\$30/Mo	082	\$ 800	\$30/Mo	514	\$ 800	\$ 45/Mo
029	\$1800	\$55/Mo	083	\$1700	\$60/Mo	519	\$1000	\$ 55/Mo
046	\$ 900	\$40/Mo	084	\$2500	\$90/Mo	526	\$1200	\$ 50/Mo
047	\$1400	\$60/Mo	095	\$1200	\$60/Mo	549	\$1500	\$ 90/Mo
056	\$ 200	\$15/Mo	099	\$2500	\$150/Mo	557	\$2900	\$100/Mo

Sale: 360/20 system: \$9500. WANTED TO BUY: IBM rental Credit
029- and -129.

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202
Chicago, Illinois 60611
(312) 944-1401

Calif. Branch
115 Harbor Island Rd.
Newport Beach, CA 92660
(714) 675-2810

NATIONAL COMPUTER RENTAL
415 MADISON AVENUE
NEW YORK, NEW YORK 10017
(212) 532-1500



MEMBER OF TIGER LEASING GROUP

SHORT AND LONG TERM
LEASES WITH ATTRACTIVE RATES

360 / 30, 40, 50, 65

370 / 125, 135, 145, 155
138, 148, 158, 168

3031, 3032, 3033 DISK TAPES

WE ALSO BUY - SELL

MEMBER OF COMPUTER LEASING ASSOCIATION

DEC PROCESSORS PERIPHERALS & MODULES

BUY - SELL - LEASE - RENT

\$1,000,000

NEW & USED DEC INVENTORY

- DEC CPU'S
- DEC DISKS & CONTROLLERS
- DEC TAPES
- DEC TERMINALS
- DEC PERIPHERALS
- MISC. BOARDS & MEMORY

Hundreds of Misc. Modules & Cables Available
Call for other components in stock

SAVE 33%

NEW 11T34 CONFIGURATION
\$23,333.33

For fast delivery and substantial Savings\$
CALL the DATALEASE Digital HOTLINE

800-854-0359

DATALEASE

700 No. Valley St., Ste. A, Anaheim, California 92801
(714) 533-3920 Telex 692439

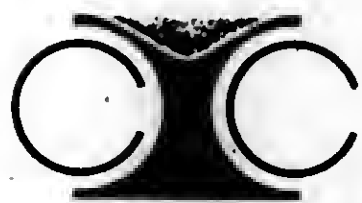
buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WANTED TO BUY**370/155 ANY CONFIGURATION****DAT ORDER POSITION FOR 155**

**COMPUTER
INSTALLATIONS
CORPORATION**

5514 Caroline Street
Houston, Texas 77004

713-524-8249

FOR SALE OR LEASE

Available Now

**370/155 MEMORY
2 1/2 MEGABYTES**

Please Contact:

Harry Blair

OR

Richard Johnson**303X****Leasing**

Large industrial corporation wishes to purchase and lease back to substantial corporations IBM 303X Systems. We will only deal with end users and equipment must be scheduled for delivery in 1978.

CW Box 1410
797 Washington St.
Newton, Mass. 02160

FOR SALE

**IBM Model
158 Memory**

K to KJ or U34 to U35

Available May

Call Anna Rhame

Commonwealth

Computer Advisers, Inc.

707 East Main Street

Richmond, Virginia 23219

(804) 643-4200

For Sale Or Lease System 3/15 Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.

Also complete inventory tapes — disks.
Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

dataserv

buy • sell • lease • trade

370
115/125/135
Steve Lacny
800-328-2406

For Sale or Lease
Any 115/125 configuration
Sending 115/125
Back to IBM

• Call us! We'll show
you how to make money
using your rental credits.

370
138 THROUGH 158
Dove Miller
616-637-8481

For Sale or Lease
138 - 145 - 155
CPUs — Peripherals —
Want To Buy Now!
370/145-H2

7855
8810
6982
6983
3215 Console
3047 Power Units

370
Peripherals
800-328-2406
Tom Anderson

Avail. Now. WTB
3271-2 3272, 3271
3272-2 3277, 3420
3277-2/4633 3803, 3830
3340-B2
3410-3 SD
STOP! Before you send
any of the above machines
back to IBM call us. We'll
show you how to make
money.

360
CPUs and Peripherals
Neal Johnson
800-328-2406

For Sale or Lease
360/30 - 40 - 50 - 65s
CPU — Peripherals —
Memory

We'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory

Sys/3
CPUs and Peripherals
800-328-2406
Sys/32's

**SYSTEM/3
5410-5415
SYSTEM/32
SYSTEM/34
ALL MODELS
Deliver Positions**

Call Toll Free 800-328-2406
or 612-544-0335

Or write: Dataserv Equipment, Inc. 9901 Wayzata Blvd.
P.O. Box 9488, Minneapolis MN 55440

BUY SELL LEASE SYSTEM/3

Models 15, 10, 8, 6
Systems 32 & 34

All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298

Memphis, Tn. 38128

Phone 901/372-2622

Member CDA

2314-B1

- Up to 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

COMDISCO
312-698-3000

SALE ALL IBM Unit Record Equipment 129 & 029's

East Coast
(717) 564-8870
West Coast
(415) 332-6265

Unit Record
Leasing Company
110 Hivista Rd
Sausalito, CA

MINICOMPUTERS & SYSTEMS

Don't waste company time or money. Check with us before you buy or sell.

New DEC Equipment
Immediate Delivery

RK11-RK05 Disk Systems -

\$8500

PDP 11/04s and 11/34s - 20% off list

DZ 11

DEC Station 78

New DG Equipment

Immediate Delivery

DG 10 Mbyte Disk Systems from

\$7500

DASHERS - 15% to 25% off list

Nova 3/12 or 3D - 20% off list

Immediate delivery for MOST

Inventory Clearance

call us for free brochure

MINICOMPUTER EXCHANGE

(408) 733-4400

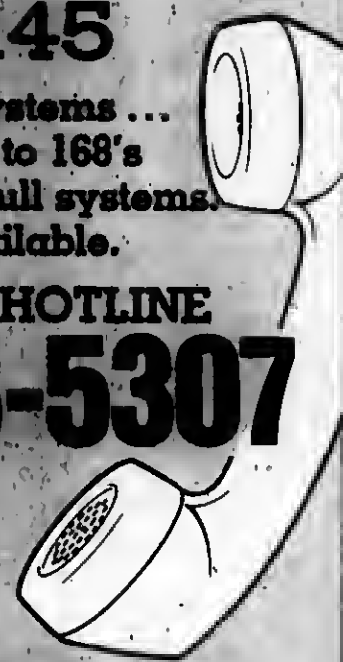
TWX 910-339-9272

Long Term Leases From RANDOLPH

**370/138
370/148
370/135
370/145**

... and all other IBM systems ...
from S/3's and 115's ... to 168's
and all 303X. CPU's or full systems.
Up to 8-year leases available.

CALL THE 370 HOTLINE
800-243-5307



Randolph Computer Company
537 Steamboat Rd., Greenwich, CT 06830
(203) 861-4200

WANT TO BY

- IBM 3420/8 Tape Drives
- IBM 3811/3211 Printer
- IBM 3333/3330 DASD
- IBM 3277 CRT's and Controllers
- IBM 370/135 Model 1 - 512K
- IBM 370/145-512K and 1 Meg.

FOR SALE OR LEASE

- IBM 3420/3 Tape Drives
- IBM 370/138 J - 1 Meg.
- IBM 1403-2 Printer
- IBM 3420/5 Tape Drives

Call

**FORSYTHE
McARTHUR**

(312) 943 3770

Dealer &
Lessor in IBM
Computers

FORSYTHE McARTHUR ASSOCIATES INC.

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Data Systems Marketing Delivery from Stock

Microcomputer Systems

Digital: PDP 11/03 Family with Both Floppy and Hard Disks,
VT-78 Micro 8, Word Station 7B

Data General: Micronova Family

Printer Terminals

Digital: LA-36, LA-35, LA-180, LS-120

Teletype: Model 43

Data General: Dasher 30 and 60 CPS

Diablo: Hyterm 1620 and 1610

Lear Siegler: Hydra Series 200 180 CPS

Texas Instruments: 743, 745, 810

Video Terminals

Lear Siegler: ADM-3A, ADM-2, ADM-2B, ADM-1A, VDP-400

User Programmable

ADD5: Regent 100 and 20C

Digital: VT-52

Data General: Dasher 6053 and 6052

Data Communications and Accessories

DSM: Acoustic Couplers, 103F, 113A, 113B

General Data Comm: 113B Direct Connect, Frequency Division

Multiplex Equipment

Sykes: Single and Dual Drive RS-232 Floppy Disk, IBM 5100

Compatible Floppy Disk

Techtran: 815, 8410, B400, B420, 8421 Single and Dual Cassette

Systems

Software

General Purpose: Disk Operating System, Fortran and Business

Basic for PDP 11/03 and Micronova Families

Distributed Processing: Remote Job Entry, Asynchronous and

Time Communication for PDP 11/03 and Micronova

Families

Business: Public Accountant Client Write Up and Complete Set

of Business Accounting Packages for PDP 11/03

Call 714-560-9222, 800-532-3717 (California)
or 800-854-2684 for DSM Showroom Nearest You

**** CRT'S ****

Harris 9160 Cluster CRT System

- 1920 character screen
- Up to 9600 BPS
- Asynchronous or Synchronous
- Compatible with IBM/360 or IBM/370
- Minicomputer controlled for flexibility
- 62 display terminals and 8 processors available. Will sell in smaller increments

CONTACT:

Schneider Transport, Inc.

Box 2298

Green Bay, WI 54306

Attn: Myles Burcham

(414) 497-2201

FOR SALE
370/168's

CALL CHUCK BLAZEIVICH
(312) 576-6921



MOTOROLA INC.

DIRECT FROM FACTORY • TESTED • WARRANTED

MODEMS

Used ICC Modems at Significant Savings

Now you can buy or lease dependable ICC modems at a special low cost. We have a stock of modems, largely from customers who upgraded their data communications networks with our latest modems. These modems have been factory tested, are under warranty, and are backed by Racal-Milgo's nationwide service/support organization. Quantities are limited. Prompt action can assure you of these substantial savings.

April Special



Order now and

Save
24%

over original price on this 2400 bps modem.

For 4-wire point-to-point applications, this limited version of our 24LSI modem has been reduced from \$1050 to \$795 for this month's special. This is also 16% under our regular S.O.D. purchase price of \$950. A typical 30-month lease rate is \$38.00/month.

The 24LSI (feature B) transmits and receives full or half duplex 2400 bps serial binary data over unconditioned dedicated or dial up lines. Remote testing is optional. This modem is on line compatible with WE201B and ICC 2200/24 data set.

Offer expires April 30, 1978.

Conditions of Sale

- 1) Orders must be postmarked prior to April 30, 1978 with delivery scheduled no later than July 1, 1978
- 2) Offer subject to availability of products
- 3) All prices are F.O.B. Miami, Florida and do not include installation
- 4) Based on ICC Terms and Conditions

40+ TK1 Data Station



The 40+ TK1, a high speed direct dial data station, is now available through our Special Offer Division.

The 40+ TK1 stores messages in an MOS solid-state buffer and is designed to replace low-speed, leased-line and tape oriented terminals. (Note: The 40+ TK1 can be used as a Witek replacement.) Data transmission speeds range from 1200 to 2400 bps over dial up lines. The data station includes an ICC 40+ display station, keyboard, control module, printer and desk—all for the introductory price of \$7,950 (original price was \$14,000).

INVENTORY REDUCTION MUST SELL NEW EQUIPMENT AT OR BELOW OUR DISCOUNTED COST

Data General CS40 Systems
(with printers and CRTs)
Wangco Model 712 Tape Drives
Ball Computer Model 3120
Tapa Controller for Data
General Nova CPU
EDS Model 300 Multiplexers
for Data General Nova CPU
Tally Model 2200, 200 lpm
printer with interface for
Data General Nova CPU
Data General Nova 3/12
W/16k memory & I/O CTL

ACT NOW—SUPPLY LIMITED

CONTACT:



Agency Records Control, Inc.,
Technical Systems, Ext. 223
(713) 693-6122
P. O. Box 1009
Bryan, TX 77801

FOR LEASE IBM 370 SYSTEMS

Available June
168-AP 6 MEG
158-3 3 MEG
158-AP 3 MEG

Available September
158-AP 2 MEG

2, 3 and 4 year
operating leases

also available October

168-U34

Call or write
Jerry Minsky

Alanthus Leasing
Company

111 High Ridge Road
Stamford,
Connecticut 06905
203-348-4820

Typical Savings

2400 bps



MODEM 2200/24

Half or full duplex operation over
dial or dedicated facilities.

Original Price

Special Price

\$1780

\$60/mo.*

\$725

\$29/mo.*

3600 bps



MODEM 3300/36

Dial or dedicated operation with
reverse channel. Built-in
auto-answer on dial-up.

\$3620

\$85/mo.*

\$950

\$38/mo.*

4800 bps



MODEM 4500/48

Automatic equalization uncon-
ditioned dedicated dial lines.
Optional dual 2400 bps operation
on dedicated lines.

\$4980

\$100/mo.*

\$1795

\$72/mo.*

7200 bps



MODEM 4800/72

Dedicated line with optional
multipoint operation for up to three
2400 bps channels.

\$6900

\$165/mo.*

\$1995

\$80/mo.*

9600 bps



MODEM 5500/96

Dedicated line with optional
multipoint operation for up to four
2400 bps channels.

\$7990

\$185/mo.*

\$2995

\$120/mo.*

Prices apply to sale or lease in U.S. only *Based on 30 month lease

Racal-Milgo Special Offer Division, B600 N.W. 41st St., Miami, FL 33166

Reserve now. Phone collect (305) 591-5535 or send this form.

Racal-Milgo

— the new name for ICC

I want more information about
your Special Offer Division
products.

☐ Yes, I am interested in the April
special. Please send order form and
data sheet.

☐ Purchase ☐ Lease Quantity

☐ I'm interested in the following:

Product	Quantity

☐ Purchase ☐ Lease

Name and Title

Company

Street

City

State

Zip

Phone No.

☐ Please place me on your mailing list for future specials.

CW 3/27

135/

192K (GF)
240K (DH)
256K (H)
384K (HG)
512K (I)

- AVAILABLE FOR LEASE
- SHORT OR LONG TERM
- CONFIGURED TO YOUR NEEDS
- WITH OR WITHOUT PERIPHERALS

CALL MARV BERGER (800) 225-2036

Computer Systems
of America, Inc.

141 MILK ST. BOSTON, MA. 02109

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE

3286-2 2803-1
2821-2 2402-3
64K Indep 30 Mem. (2)3410-3 w/D.D.

**3033**

(10/78, 12/78 Lease Only)

1381, 148J

5/32 B33(32K)

3203-4

For Lease or Sale



**BARRETT
CAPITAL
& LEASING
CORPORATION**

14 Redwood Road
White Plains, N.Y. 10603
(914) 761-0070

Carterfone

WILL PURCHASE

FOR SALE

CARTERFONE COMMUNICATIONS CORPORATION

**WE'RE
BUYING
AND PAYING
CASH!!!**

FOR SALE**370/138 J**

1.0 Meg.

with 3046 Power Supply
and 3340 IFA

Available April 10, 1978

data3

computer corporation 114 central avenue, box 286, buffalo, minn. 55313 (612) 682-4664

BROKER

**IN
DEC COMPUTER
SYSTEMS AND
COMPONENTS**

C.D. SMITH
730 N. Post Oak Road
301
Houston, Texas 77024
(713) 686-9405

**FOR SALE
PDP 11/20 SYSTEM**

- | | | |
|-------------|------------|------------|
| 1) 11/20-CA | 2) H720-E | 3) MM1-E |
| 2) BA11-BS | 1) KE11-A | 1) MM11-L |
| 1) EM792-YE | 1) KW11-L | 1) PC11 |
| 1) DC11-AA | 1) LA30-CA | 1) RK11-CA |
| 1) DC11-DA | 1) LP11-JA | 2) RK03-AA |
| 1) DD11-A | 1) ME11-LA | 1) TC11-GA |
| 1) DP11-DA | | 1) CD11-A |

Under DEC Maintenance
FOB Our NY Office
90 Day Availability
Interested?

(212) 869-8700 Frank Cavallo
GRANITEVILLE COMPANY
43 W. 42nd St.
New York, N.Y. 10036

3830'sModel 2's
ITC Qualified**20 AVAILABLE**

4 Each

6/78, 7/78, 10/78,
11/78, 12/78**INTERCAP**

214/387 2652

Leo Minor or Chris Angulo

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
AND PERIPHERALS

WE BUY • SELL • LEASE • TRADE

**transdata**

P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

FOR SALE**IBM 360/67**

1.3m Memory (5 IBM, 1.0 EM&M)
1-Multiplex Channel
(IBM 2870 with 2 subchannels)
2-Selector Channels (one IBM 2860-2)

Available-Sept. 15, 1978-Firm

Will consider offers for entire
system or individual components

Direct Inquiries to:

Director, Computer Services
Amos Eaton Bldg., Room 206
Rensselaer Polytechnic Institute
Troy, N.Y. 12181, or Call 518-270-6635

WANTED TO BUY**IBM 370/155**

with or without DAT

Contact: Harry Blair

(713) 524-8249

BUY-SELL-SWAP**PDP 11's & NOVA's**Systems and Peripherals at very
attractive prices

New and Used

ICS

Computer Equipment Sales

408-735 7360

PAUL PEREZ

408 735 7361



INDEPENDENT

**WE BUY-SELL-
INSTALL & REPAIR**
AT REASONABLE PRICES

HONEYWELL USED
SERIES 200 EQUIPMENT
COMPUTER SYSTEMS
PARTS — PERIPHERALS

Now in stock

2040-64K M7-32K M9
120-1250 — TAPE DRIVES
READERS, PRINTERS, PUNCHES
3200-131K Avail. 6/78

CALL NOW

Wilson Grabin (513) 574-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati, Ohio 45246

LEASE ONLY - LARGE SCALE IBM SYSTEMS**DATES AVAILABLE****3031's**

11/78, 5/79, 6/79

11/79, 5/80

3033's

6/79, 9/79, 12/79

SHORT TERM LEASES**3168 LK****6/78****3168 M****11/78**

For details, call R. Weissblatt-216/351-7444

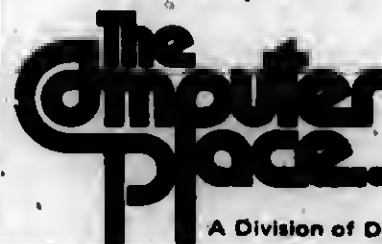
ATTENTION HONEYWELL USERS!

66/20 For Lease—Complete System
196K Word Central Processor, including
Front-end Communication Processor

HIS RENTAL \$23,000/month
TCP RENTAL\$ 7,000/month

64/20, 64K, Full I/O, Comm., Avail. Immed.

For details, call Larry Donat-216/351-7444



4850 Spring Road
Brooklyn Heights, Ohio 44131
(216) 351-7444

A Division of D&D Financial Enterprises, Inc.

**FOR
SALE
OR
LEASE**

370/168

AVAILABLE JUNE 78

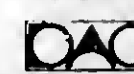
(MODEL 1, 3 or A)

Bob VanHellemont

CMi CORPORATION — (313) 642-8000

TELETYPE
MODELS
43-33-32

NATIONAL
TELETYPEWRITER CORP.
207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap						
For Sale/Lease 370/158 Serial Number 23566 Available June 1, 1978 Contact: Ann Rhame Commonwealth Computer Advisers, Inc. 707 East Main St. Suite 1650 Richmond, Virginia 23219 (804) 643-9123	CMI BUY LINES									
BUY • SELL • LEASE 026 - \$ 850 085 - \$ 750 029 - 1850 088 - 2500 059 - 1375 129 - 3350 082 - 800 514 - 800 083 - 1800 548 - 1500 084 - 2500 552 - 900 557 - 2800 MOHAWK-6401-6403 NCR-736 Want to buy IBM 029's, 129's, 3741's, 3742's COMPLETE LINE BURNERS, SHREDDERS, DECOLLATORS AND BINDERS ECONOMICAL LEASE PURCHASE PLANS  DP SERVICE INC. CALL... STAN PELC or NATALIE REYES 312-774-2556 5505 N. MENARD AVENUE, CHICAGO, ILLINOIS 60630	BUY-SELL-LEASE-TRADE Call (313) 642-8000 <table border="1"> <tr> <td> 3031/3032/3033 (Lease Only) Marilyn Burchi </td> <td> 3420 3803 3333 3830 3330 3340 Darryl Hastings </td> <td> 1403 2821 2501 1442 1443 Kathy Housey </td> </tr> </table>			3031/3032/3033 (Lease Only) Marilyn Burchi	3420 3803 3333 3830 3330 3340 Darryl Hastings	1403 2821 2501 1442 1443 Kathy Housey	360 30/40/50/65 Gary Smith			
3031/3032/3033 (Lease Only) Marilyn Burchi	3420 3803 3333 3830 3330 3340 Darryl Hastings	1403 2821 2501 1442 1443 Kathy Housey								
IBM UNIT RECORD EQUIPMENT 024 077 085 402 514 552 026 082 087 403 519 557 029 083 088 407 523 602 056 084 089 408 548 604 029 129 We Buy Sell or Lease 360s 1400s 1440s  Data Automation Company Pioneers in the Computer Industry National Disk Pack Center (214) 637-6570 4858 Cash Road Dallas, Texas 75247	BUY OF THE WEEK <table border="1"> <tr> <td> 370/158 SN 60306 June availability. Will configure to your requirements. Bob Van Hellemont </td> <td> 370/155J DAT • 3 Channels 1 Meg IBM • 3215 Console Available Now! \$575,000 Gary Smith </td> </tr> <tr> <td> 135 1 All IBM Memory IFA, IPA, ICA Available April. Pam Hoban </td> <td> 3145, 1024 K OEM Memory Can reconfigure to meet your specific needs. Bill Graham </td> </tr> <tr> <td colspan="2"> IBM 158 Memory I to KJ Available April. Carole Solano </td> </tr> </table>			370/158 SN 60306 June availability. Will configure to your requirements. Bob Van Hellemont	370/155J DAT • 3 Channels 1 Meg IBM • 3215 Console Available Now! \$575,000 Gary Smith	135 1 All IBM Memory IFA, IPA, ICA Available April. Pam Hoban	3145, 1024 K OEM Memory Can reconfigure to meet your specific needs. Bill Graham	IBM 158 Memory I to KJ Available April. Carole Solano		3270 CRT's Printers/Controllers 1130 Jim Carleton System/3 Model 15 Jerry Roberts 3742 3741 5496 Jerry Sharon 360/20 085-083-029-059-026-129 Marle Bednarz
370/158 SN 60306 June availability. Will configure to your requirements. Bob Van Hellemont	370/155J DAT • 3 Channels 1 Meg IBM • 3215 Console Available Now! \$575,000 Gary Smith									
135 1 All IBM Memory IFA, IPA, ICA Available April. Pam Hoban	3145, 1024 K OEM Memory Can reconfigure to meet your specific needs. Bill Graham									
IBM 158 Memory I to KJ Available April. Carole Solano										
SALE OR LEASE 1130-2D CPU. 1133 Model 1 1403 Model 2 1442 Model 7 METROPLEX COMPUTER COMPANY, INC. Suite 1208 Honeywell Bldg. 1111 W. Mockingbird Lane Dallas, Texas 75247 TWX 910-961-4171 (214) 634-2750	Call (313) 642-8000									
CMI CORPORATION The IBM Specialists 1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000		IN CANADA CALL: Don DuPuis Windsor, Ont. (519) 258-8910 Ron Ridding Toronto, Ont. (416) 683-3704 Jacques Degens Montreal, Que. (514) 374-5920								

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115 370/125

 **ECONOCOM**
MEMBER COMPUTER DEALERS ASSOCIATION

ECONOCOM
 1255 LYNNFIELD ROAD
 P. O. BOX 17825
 MEMPHIS, TENNESSEE 38117
 901-767-9130

FOR LEASE-FROM LESSEE 370/168-U36 avail. June 1978 3855, 4525, 4560, 2150, 2151, 6111, 3066-II, 3067, 2860-3, 2870-1, 2880-2(2) Will lease for 2, 3, or 4 years Contact: Mr. Frederick D. Lehmann MARTIN MARIETTA DATA SYSTEMS P.O. Box 5837, MP-263 Orlando, Florida 32855 (305) 855-1050, Ext. 7410	FOR LEASE ONLY ITC QUALIFIED LESSEE ONLY 3033 Currently available May 1979 Anticipated improvement February 1979 WESTERN MARKETING & FINANCIAL (415) 526-9221 (312) 397-3311 Fred Hegeman Jack Air
---	---

FOR SALE

370/158-3

IBM COMPUTER

2 Meg Storage
 1433 Additional Block Multiplexor
 1434 Additional Block Multiplexor
 2150 Control Storage Expansion
 2151 Expanded Control Storage
 6111 Register Expansion
 4650 Integrated Storage Control
 7840 3213 PA
 3213-1 Console Printer

Available August 1, 1978.

Contact:
 D.N. Madge
 Cominco Ltd.
 Trail, B.C., V1R 4L8 Canada
 Telephone (604) 364-4861



★
NEW DG NOVA 3/12's
 WITH BATTERY BACKUP AND
 AUTO PROGRAM LOAD
 AND RESTART
 NEW DG MEMORY
 32 OR 16 KB
 IMMEDIATE DELIVERY WITH
 22% DISCOUNT
 CALL CLARK & ASSOC.
 (816) 741-3183

BUYING • SELLING • LEASING • TRADING

1-800-654-9179

TOLL FREE!

call... the **Matchmakers**

CSI COMPUTER SALES INTERNATIONAL, INC. 

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

RANDOLPH NEEDS:
135s, 145s
Any Model
Sub-lease or Purchase

CALL MIKE SEEKINGS
TOLL FREE
800-243-5308

RANDOLPH COMPUTER COMPANY
Division of Firstbank Financial Corporation
A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
537 Steamboat Rd., Greenwich, CT 06830 • (203) 661-4200

We are buying:
3803, 3420,
selling:
360/65, 360/40
& leasing:
360/65, 370/135

Please contact:
Linda Vaughn / (415) 955-0220
Tommy Talbot / (415) 955-0238

ITEL
CORPORATION
Data Products Group

LEASING?
WE'VE GOT YOUR
303X ON ORDER

... plus 135, 138, 145, 148, 158 & 168's too
(over \$130 million worth!)

- We'll write a short-term or long-term lease — on YOUR system or OURS
- We'll configure a total system or part of one to your specifications

"Our leasing concepts are sensitive to your needs"



**COMPUTER
CAPITAL
CORPORATION**

1351 WASHINGTON BLVD., STAMFORD, CT. 06902
203-357-9663

IPB
201-947-4200

WANTED TO BUY

168, 158, 165, 155's
3420-3's with controllers
145-12 and 135-H
360/65,
3330/3333/3340

IPB

Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

FOR SALE

165-KII
DATed, up to 4. mega-byte. For Sale or Lease.

158-K
Available in April with or w/o ISC.

155-J
Avail. in March with or without new DAT.

135-GF
Avail. now. Will configure to your specs

3420-7
available now with switching features.

158 Memory
K to KJ available now.

FOR LEASE

145-10
available immediately for sale or short term lease.

125's
We will purchase and leaseback your 125 system. Save rent starting today. Call for a quote.

IBM RENTAL CREDITS

We will pay for your rental credits on FTP, ETP, and MAC machines. Call us before sending your machines back to IBM.



FOR SALE

370/148 (installed 1 yr.) 2 Mega-byte Memory 3047 Power-Unit & 3286 Printer. Available July 1, 1978 - \$540,000.

CMS Industries, Inc.
5550 Harbor St.
Los Angeles, CA 90040
Contact: C. Koster

SALE OR LEASE

3344-B2

Immediate Delivery

Will Take 3340 B2
on ETP in Trade

Contact: Bernie Gest
215-635 1700

Computer

Marketing, Inc.

7704 Seminole Ave
Melrose Park, Pa
19126



Member Computer Dealers Assoc

FOR SALE/LEASE

Used electrosensitive printers at savings to 2/3 off original selling price. Ideal for personal computing, hobbyist, business and industry. Will recondition to like new. 240 cps, buffered with serial or parallel interfaces. For CRT hard copy or printer terminal I/O at 300/1200 baud. Sale prices start at \$495/each. Call or write Walt Plyter, Sales Manager, Scope Data, Inc., 3728 Silver Star Rd., Orlando, FL 32808 (305) 298-0500.

370/125's

For Sale* Lease* Purchase
***Purchase Leaseback**

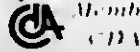
Specialists in 125 Systems
3410's and 3411's Also Available



CORPORATE COMPUTERS, INC.

(203) 661-1500

115 Mason St., Greenwich, CT 06830



370/158

Serial Number 23566
Available May, 1978
Contact: Ann Rhame
Commonwealth Computer
Advisers, Inc.
707 East Main St. Suite 1650
Richmond, Virginia 23219

(804) 643-9123

WANTED TO PURCHASE

6 3420 3's 6631 or 3550 ASAP
1 3803 1 3551 ASAP

FOR SALE

1 3411 3 3221, 7360
1 3410 3 3221

AVAILABLE FOR OPERATING LEASE

12 3420 6's incl. 6425, avail. 4 1 78
2 3803 2's incl. 8100 & 1792, avail. 4 1 78

CALL: (203) 324 9495

STAMFORD COMPUTER GROUP, INC.

927 Westover Road
Stamford, Connecticut 06902

THREE AND FOUR YEAR WALK-AWAY LEASES

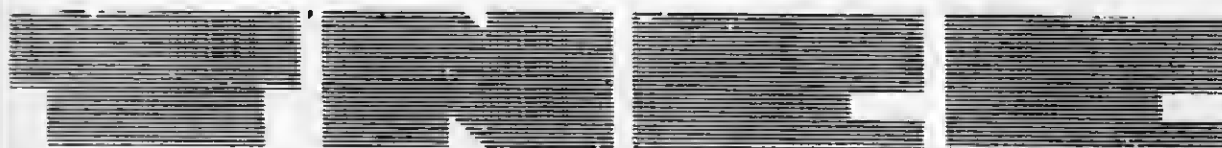
1. ATTACHED PROCESSOR FOR 3158

2. 3158 - 3 MEG WITH APU FEATURE

SPRING AVAILABILITY

3. 3158 - 3 MEG MOD 3

SUMMER AVAILABILITY



THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle - (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman - (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Huntington Station, New York 11746

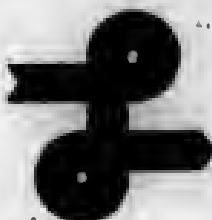
buy sell swap

buy sell swap

FOR SALE

Calcomp 114 Disk Drives
28 Megabyte for use with all types
of mini computers.Available Immediately
Contact: Gene Wendt
CompuMart Inc.
6622 Black Swan Drive
Shawnee Mission, KS 66216
913-631-2992

NOTICE TO IBM CORP.

We are out to buy all of your
installed equipment and lease
it back to your customers at
substantial savings to them:**LeMans Corporation**2950 Metro Drive • Bloomington, MN 55420 (612) 854-8380
315 West State Street • North Aurora, IL 60542 (312) 896-5060**360/20**All Models
Up grades
Features
Immediate
Delivery
Extraordinary
Savings
Special
Purchase/Lease
Plans AvailableCall Marie Bednarz
(313) 642-8000**CMII** The IBM
Specialists
CORPORATION
1500 N. Woodward Ave.,
Birmingham, Mich. 48011, (313) 642-8000

DATA GENERAL

Qty.	Description	Price
1	Nova 2 Mini System	\$24,150
1	Nova 2 with 64KB Core Memory	
1	Auto Program Load	
1	Power Monitor/Auto Restart	
1	10MB Disc Subsystem	
1	4007/08/20 I/O Control & Real Time Clock	
1	ASR-33 Teletype	
1	4063 4-Line Multiplexor	
1	Digi-Data Magnetic Tape Subsystem	
4	Research, Inc. Teletype 3711 Display Equipment Cabinet	

Call or Write:
COMPUTER SYSTEMS SUPPORT CORP.
9112 Gettner Road
Gaithersburg, Maryland 20878
(301) 424-7870



OPERATING LEASES

16 IBM 3420 4Dual Dens. ty
2 IBM 3803-2
Available May 12, 1978
Net 90% IBM ETP
2 Year Basis
Contact
Al Emery
Systems Marketing, Inc.
200 E. Thomas Rd.
Phoenix, Arizona 85012
(602) 264-5600 Telex 667 334**MICRO-
EXCHANGE**FOR SALE: Heath H9 CRT Terminal,
essamblad. \$500. (914) 831-1709
avaningsExperiancad, Microprocessor,
Consulting, Engineering, Team
available to pleca any product into
COMPLETELY DOCUMENTED
PRODUCTION in less time than any-
body. ICESYS COMPUTING COR-
PORATION, 1820 Union Street, San
Francisco 94123 (415) 922-7775,
2158 31st Street, Sante Monica
90405 (213) 450-0505RETAIL MICROCOMPUTER STORE
FOR SALE. Central Indiana outlet
for the nations largest chain of mi-
crocomputer stores. Excellent retail
location. (317) 842-2983FOR SALE — MICRODATA 8K
MEM. BDS, 1800 CPUs, Printed Cir-
cuit Board Repair, MILACRON
Boards, WTB: REALITY System
Boards & Peripherals Mike Sha-
best, Cinti, Ohio 45230, 1-513-
474-1760MICRODATA REALITY CORE
MEMORY John Hardman (201) 751-
3000CRTs (Datapoint), Teletypes, sold,
refurbished, upgradad. Microcom-
puter servicing. Talacomunications
Servicas Co., Box 4117, Alexandria,
Va. 22303 (703) 683-4019.OPPORTUNITY FOR BUSINESS MI-
CROCOMPUTER DEALERSHIPS.
California Microcomputer
Company's (CMC) previous ads in
Computerworld has resulted in sev-
eral established dealerships. If you
are interested in a CMC Dealership
for a small business microcomputer
system that includes CPA approved
business software, call or write us. 1
year free software releases to cus-
tomers. Complete lesing and main-
tenance plan available to dealers.
California Microcomputer Com-
pany, P.O. Box 3199, Chlco, CA
95927 (916) 891-1420.TF580 users group monthly news-
letter. Join now! \$17.00 first year
\$12.00 thereafter. Marsh, 621 13th
South, Onalaska, WI 54650**SOFTWARE
FOR SALE****TSO 3**

The only

TSO for VS1Redesigned to eliminate
TCAM and the staggering
overhead of user swapping**ISP**(Intersystem Spool)
ProcessorSystem-to-System
Communication for VS1

(Write or phone for details)

TSO
Software Corp.(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

FOR SALE

PDP11**IMMEDIATE DELIVERY
Datasystem 354**

Includes:

PDP11/34, 64K, 2-RK05
Disk Drives, 1-VT52
terminal, 1-LA36 terminal,
1-LA180 PrinterIncluding full accounting
applications software.Also immediately available:
• PDP11 High Speed paper tape
reader
• PDP11/03-KA with 16K and
power supplySpindell & Assoc., Inc.
14 W. 40th St.
New York, N.Y. 10018
(212) 221-7270

software for sale

software for sale

TP PROBLEMS?•TSO RJE CICS ...
•TCAM BTAM HASP ...
•3270 2780 TTY ...Our LINE ACTIVITY RECORDER
software package helps diagnose
Access Method, TCU, and Terminal
Protocol problems. (MVT, VS/1,
VS/2, IBM 270X compatible TCUs.)Communications Diagnostic
Systems, Inc. • P.O. Box 706
Falls Church, Virginia 22046
(703) 533-0483**RPG II SYSTEMS**•A/R-OPEN ITEM OR B/F
•ACCOUNTS PAYABLE
•GENERAL LEDGER
•PAYROLL AND LABOR DIST.
•INVENTORY
•CREDIT UNION MAILING, ETC

Extensive Documentation Provided

Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 386-2236**RSTS/E****SOFTWARE PACKAGES**• KD55, a multi-terminal key-to-
disk data entry system.• TAM, a multi-terminal transac-
tion-processing "front-end."• FSORT3, a new, very fast sort.
Directly sorts RSTS/E files con-
taining up to 16 million keys or
records. Up to 70 times as fast
as the RSTS-11 Sort package in
CPU time.(All three are implemented in
assembly language as run-time
systems for efficiency.)

Evans Griffiths & Hart Inc.

55 Waltham St.
Lexington, MA 02173
(617) 861-0670**Blue Chip
Software**Lots of blue chip companies use our
software systems for one simple reason:
blue chip performance.
May we tell you more?**MCCORMACK & DODGE CORPORATION**
381 Elliot Street, Newton Upper Falls, MA 02164, (617) 964-6610

Please send me more information on the system(s) I have checked.

☐ General Ledger	☐ Purchasing
☐ Fixed Assets Analysis	☐ Construction in Progress
☐ Accounts Payable	

Name _____

Title _____

Company _____

Computer _____

Address _____

City _____ State _____ Zip _____

CONVERTING?Try the experts. DASD Cor-
poration encourages test
evaluations of all of our language
translators.RPG/RPG II to COBOL (DOS or OS) will accept all types of RPG and
produce ANS COBOL. Most translations are 100% error free. Our modular
COBOL simplifies maintainability.SYSTEM/3 COBOL to OS COBOL makes this tedious, redundant conversion com-
pletely automatic. We're 97% clean, which frees a lot of man hours for more important
tasks.DOS COBOL to OS COBOL is basically a difference of syntax, but may mean a lot of
wasted man hours.GE MAP to OS COBOL will allow immediate upgrade of your GE 400 series to full ANS
COBOL.360/20 BAL to 360/370 OS ALC is an extremely solid product eliminating a mono-
tonous programming job.

DASD TRANSLATORS SAVE TIME AND MONEY.

Many service options are available: lease, conversion only, conversion and -clean
compile, full conversion responsibility including testing and JCL.For a prompt solution to your conversion problems,
write or call today.**DASD CORPORATION**National Marketing
1480 Renaissance Drive—Suite 315
Park Ridge, Illinois 60068
312/299-5005

software for sale

software for sale

time & services

time & services

time & services

Accounts Payable and Purchase Order System

- Three-way match between invoice, receiver and P.O.
- Short and long term cash requirements ■ Due date and discount calculations ■ Check reconciliation ■ Multi-bank capability ■ 1099 reporting ■ Duplicate invoice detection ■ Recurring payments ■ G. L. interface

From the acknowledged leaders in A.P. and P.O. systems.

IMS

International Management Systems Corporation
4676 Admiralty Way, Marina Del Rey, CA 90291
(213) 822-2022
Contact: John Goetz, V.P. Marketing

GENERAL LEDGER SYSTEM?

What was the only one on the 1977 Datapro Honor Roll?

The answer is: The UCC General Ledger/Financial Control System. It can solve the Accounting Department's financial information problems... without creating new ones for EDP. Call 1(800) 527-3250 toll-free (in Texas, call 214/688-7313) for more information.

UCC

UNIVERSITY COMPUTING COMPANY
P. O. Box 47911 • Dallas, Texas 75247



ACCOUNTING SOFTWARE FOR DEC RSTS/E OR CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Completely on-line, interactive systems available for ACCOUNTS-PAYABLE, GENERAL-LEDGER, FINANCIAL-REPORTING, ACCOUNTS-RECEIVABLE and PAYROLL applications.

These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

If you are installing or have installed a Digital Equipment Corporation RSTS/E or CTS-500 system, contact us for cost-effective solutions to your core accounting problems.

Plycom services, Inc.

(215) 935-5121
P.O. Box 160
Plymouth, IN 46563

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANSI COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our translators, write or call today.



Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

IF COST IS THE PROBLEM, OUR SOFTWARE IS THE ANSWER.

We've got the software you need. Now.

PAYROLL/PERSONNEL
ACCOUNTS PAYABLE
TAXBREAK/TAXCOST

(Payroll Tax
Calculation Modules)
Call us. (415) 845-7991



argonaut
Systems, Inc.
2140 Shattuck Ave.
Berkeley, CA 94704

TIME AND SERVICES

KEYPUNCH SERVICES

- FREE pickup/delivery in Greater Boston area
- QUICK turnaround
- INEXPENSIVE
- CONFIDENTIAL
- VOLUME discounts
- NO monthly minimums
- ACCURACY assured

DATA/SYSTEMS

(617) 244-3454

SERIES/1

PROGRAMMING

- BI-SYNC/ASYNCH/SOLC COMMUNICATIONS
- OEM DEVICE HANDLERS
- RPS SUPPORT
- COMPUTER INTERFACING
- ONLINE Q/L AVAILABLE NOW.
- COMPLETE BUSINESS SYSTEM UNDER DEVELOPMENT

APPLIED COMPUTER SERVICES, INC.
12200 Sylvan St.
North Hollywood, Calif. 91606
(213) 850-1183

DOS TIME USERS!

Still paying for read checks and intervention required's?

We charge only for REAL TIME USED

- 1/4 - MEG 360/40
- Second or Third Shift
- POWER-II Spooling

Contact: Greg Bilsky
Consolidated Computer Svc.
3826 Park Avenue
Edison, NJ 08817
(201) 548-5866

370/158 mod 3 Datacenter

3.5 meg MVS
Specializing in Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Karlovsky
(212) 564-3030

Datamor

132 West 31 St.
New York, N.Y. 10001

COMPUTER TIME

RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 15511
360/30

- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

REMOTE JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide incoming WATS lines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, HASP, INTERCOMM, ROSCOE
- Complete data security including off-site storage

For information
call John MacDougall
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

DEC SYSTEM 10/20

Time Sharing...
Low Cost...

Fortran IV
Cobol
Basic + 2

Call Stan Koy
(312) 644-5650

PRIOR CORPORATION

Computer Services and Supplies
400 North Michigan Avenue
Chicago, Illinois 60611



WANTED: COMPUTER TIME

Will lease substantial blocks of computer time on a DEC 11 series computer configured in RSTS-E. Virginia or D.C. area.

804-977-4671

for sale: NEW DEC PDP 11/V03 Systems: \$8200⁰⁰

32kb dual floppy; RT 11
LA36 or VT52; cabinet
quantity discounts available
CONTACT: Doug Stevens

The SYSTEMS COMPANY
4340 Redwood Highway *137
San Rafael, CA. 94903
(415) 472-7766

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Data Craft, Data General, CDC, DEC, EMM, Fabri Tek, Honeywell, GAI, HP, Interdata, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Varian, XDS.

Any Manufacturer's Memory

THREE DELTA CORP

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

I.B.M. 360-40

All Shifts 128K, 4-2401
MOD-2, 9-2314, 1403-N1,
2540, 1401 Compatibility.

From \$35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036

Contact:
Al Palma (212) 997-1413
Charles Leigey, (212) 997-1411

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Microcomputer Classified Exchange, Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are \$55.30 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs \$110.60 per insertion. Extra space is available in half-inch increments and costs \$27.65. Box numbers are \$3.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____ Title: _____

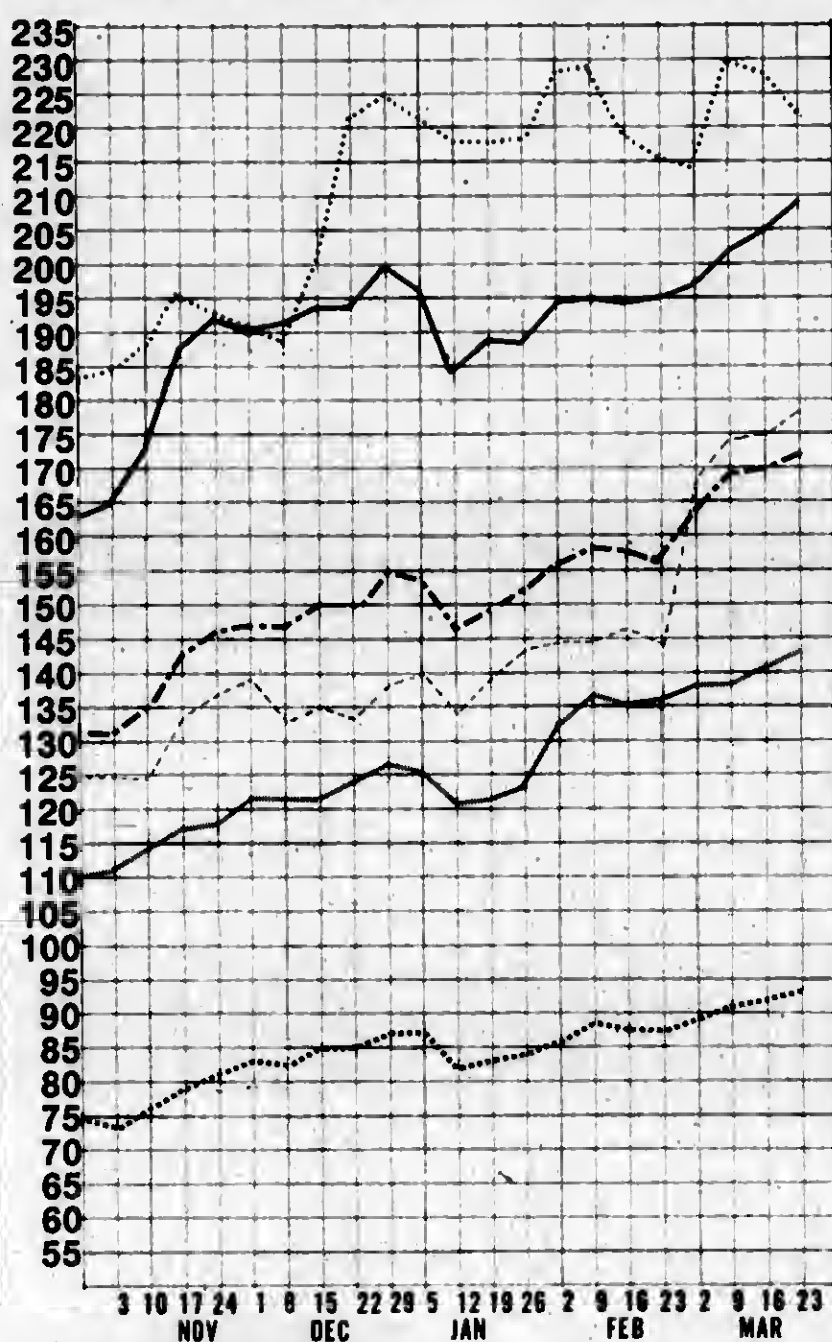
Address: _____

Telephone: _____

Send this form to:
CLASSIFIED ADVERTISING
COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

COMPUTERWORLD Computer Stocks Trading Indexes

— Computer Systems — Software & EDP Services
 - - - Peripherals & Subsystems - - - Leasing Companies
 — Supplies & Accessories — CW Composite Index



Earnings Reports

COMPUTER INVESTORS GROUP Three Months Ended Dec. 31

	1977	1978
Revenue	\$8,775,993	\$8,405,530
Loss	2,189,103	1,312,330
9 Mo Rev	23,635,783	20,426,323
Loss	3,205,621	1,169,840

STORAGE TECHNOLOGY Year Ended Dec. 30

	1977	1978
Shr Ernd	\$2.15	\$1.56
Revenue	162,272,000	121,779,000
Earnings	11,427,000	7,645,000
3 Mo Shr	.71	.49
Revenue	50,375,000	34,887,000
Earnings	3,910,000	2,383,000

a-Adjusted for 8% stock dividend in May 1977.

DATA TERMINAL SYSTEMS Year Ended Dec. 31

	1977	1978
Shr Ernd	\$1.45	\$5.55
Revenue	42,892,556	20,405,590
Earnings	6,757,471	2,367,309
3 Mo Shr	.51	.15
Revenue	12,970,426	716,771
Earnings	2,359,633	716,771

a-Adjusted for three-for-one stock split on Jan. 31, 1978.

DATA RAM Three Months Ended Jan. 31

	1977	1978
Shr Ernd	\$1.26	\$7.79
Revenue	4,187,000	3,081,000
Earnings	591,000	399,000
3 Mo Shr	3.52	1.52
Revenue	11,921,000	7,078,000
Earnings	1,669,000	772,000

TESO DATA SYSTEMS Year Ended Dec. 31

	1977	1978
Shr Ernd	\$1.64	\$1.44
Revenue	14,523,000	10,429,000
Earnings	1,841,000	1,324,000
3 Mo Shr	.63	.40
Revenue	4,597,000	2,997,000
Earnings	766,000	359,000

Computerworld Sales Offices

Vice-President/Marketing
 Roy Einreinhofer
 Advertising Administrator
 Terry Williams
 COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800
 Telex: USA-92-2529

Boston
 Robert Ziegel
 Northern Regional Manager
 Mike Burman
 Frank Collins
 Account Managers
 COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800

New York
 Donald E. Fagan
 Eastern Regional Manager
 Frank Gallo
 Account Manager
 COMPUTERWORLD
 2125 Center Avenue
 Fort Lee, N.J. 07024
 Phone: (201) 461-2575

San Francisco
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Donna Dezelan
 Account Coordinator
 COMPUTERWORLD
 353 Sacramento Street
 Suite 600
 San Francisco, Calif. 94111
 Phone: (415) 421-7330

Los Angeles
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Judy Milford
 Account Managers
 COMPUTERWORLD
 1434 Westwood Boulevard
 Los Angeles, Calif. 90024
 Phone: (213) 475-8486

Japan
 Mr. Shigema Takahashi
 General Manager
 DEMPA/COMPUTERWORLD
 1-11-15 Higashi Gotanda
 Shinagawa-ku, Tokyo 141
 Japan
 Phone: (03) 445-6101
 Telex: J2424461

United Kingdom
 Tony Vickers
 IDG PUBLISHING LTD.
 140-146 Camden Street
 London NW1 9PF
 England
 Phone: (01) 267-1201
 Telex: UK-264737

West Germany
 Hans-Jurgen Ballnath
 COMPUTERWORLD GmbH
 8000 Munich 40
 Tristanstrasse 11
 West Germany
 Phone: (089) 36-40-36
 Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 22, 1978

All statistics compiled,
 computed and formatted
 by
 TRADE QUOTES, INC.
 Cambridge, Mass. 02139

PRICE						PRICE						PRICE					
1977-78		CLOSE	WEEK	WEEK		1977-78		CLOSE	WEEK	WEEK		1977-78		CLOSE	WEEK	WEEK	
RANGE		MAR 22	NET	PCT		RANGE		MAR 22	NET	PCT		RANGE		MAR 22	NET	PCT	
111		1978	CHNGE	CHNGE		(1)		1978	CHNGE	CHNGE		(1)		1978	CHNGE	CHNGE	
COMPUTER SYSTEMS																	
A	AMOHL CORP	22-55	49 1/2	-1/8	-0.2	C	ADVANCED COMP TECH	0-2	1 1/4	-1/4	-16.6	D	DATA ACCESS SYSTEMS	4-5	5	0	0.0
N	BURROUGHS CORP	55-91	60 1/4	-3/8	-0.6	O	ANACOMP INC	7-12	10 3/8	-7/8	-7.7	C	DATA 100	6-12	12	+1/2	+4.3
C	COMPUTER AUTOMATION	18-30	24 1/4	+1/8	+0.5	A	APPLIED DATA RES.	5-10	9 5/8	+5/8	+6.9	A	DATA PRODUCTS CORP	9-19	15 1/2	-1/8	-0.7
N	CONTROL DATA CORP	20-29	24 3/4	-1/8	-0.5	N	AUTOMATIC DATA PROC	23-30	27 1/4	+3/8	+1.3	O	DATA TECHNOLOGY	3-4	4 1/8	-1/8	-2.9
O	CRAY RESEARCH INC	15-31	28 1/2	+2	+7.5	C	COLEMAN AMERICAN COS	1-2	1	+1/8	+14.2	O	DATUM INC	1-2	2 1/2	-1/8	-4.7
N	DATA GENERAL CORP	35-54	43 1/4	-5/8	-1.4	O	COMPU-SERV NETWORK	9-15	9 1/4	+1/2	+5.7	O	DECISION DATA COMPUT	2-2	2	+1/4	+14.2
N	DATAPoint CORP	18-42	40 5/8	+3/8	+0.9	O	COMP. ELECTUION SYSTMS	6-10	9 1/4	0	0.0	O	DELTA DATA SYSTEMS	1-1	3/8	0	0.0
N	DIGITAL EQUIPMENT	37-53	38 3/4	-1/2	-1.2	C	COMPUTER HORIZONS	1-2	2 1/4	0	0.0	A	DOCUMENTATION INC	6-12	10 3/4	+1/8	+1.1
N	ELECTRONIC ASSOC.	2-4	3 7/8	+1/4	+6.8	D	COMPUTER NETWORK	6-11	8 1/4	0	0.0	O	DATARAM CORP	2-24	14 1/2	-1 1/4	-7.9
A	ELECTRONIC ENGINEER.	8-16	13	0	0.0	M	COMPUTER SCIENCES	7-10	9 7/8	+1/2	+5.3	N	ELECTRONIC M & M	4-5	4 5/8	+1/8	+2.7
O	FOUR-PHASE SYSTEMS	13-23	22 1/4	+1/4	+1.1	O	COMPUTER TASK GROUP	1-2	1 3/4	0	0.0	O	FARRI-TER	1-2	1	-	-5.9
N	FOXBORO	28-54	34 5/8	+4 7/8	+16.3	D	COMPUTER USAGE	1-3	1 7/8	+1/8	+7.1	O	GENERAL COMPUTER SYS	0-2	1 1/8	-1/4	-18.1
O	GENERAL AUTOMATION	6-9	8 1/8	0	0.0	C	CONSHARE	5-10	9 1/4	+1/2	+3.7	N	HAZELTINE CORP	8-13	13 5/8	+1/2	+3.8
C	GRI COMPUTER CORP	1-1	1 1/4	0	0.0	C	DATA DIMENSIONS INC	3-5	4 3/4	-1/4	-5.0	N	HARRIS CORP	28-47	46	+1/4	+0.5
N	HEWLETT-PACKARD CO	63-87	63 5/8	+1 1/8	+1.7	D	DATA LAB	1-2	1 1/4	0	0.0	O	INFOMEX INC	4-8	7 3/8	-1/8	-1.6
A	HONEYWELL INC	43-55	46 1/2	+1 7/8	+4.2	M	ELECTRONIC DATA SYS.	14-20	18 5/8	-1/4	-1.3	O	INFORMATION INTL INC	8-14	10	+1 1/4	+14.2
N	IBM	239-286	239 1/2	-5/8	-0.2	D	INSYTE CORP	2-3	1 3/8	0	0.0	O	INTEL CORP	38-57	39	-1 1/2	-3.7
O	MANAGEMENT ASSIST	5-12	11 7/8	+3/8	+3.2	C	IPS COMPUTER MARKET.	1-2	2 1/4	0	0.0	A	LUNDY ELECTRONICS	3-6	4	0	0.0
O	MICRODATA CORP	7-18	13	+1/4	+1.9	O	REAME ASSOCIATES	3-4	3 3/8	-1/8	-3.5	O	NSI DATA CORP	6-15	13 1/4	-3/8	-2.7
O	MINI-COMPUTER SYST	5-12	6 1/2	+3/4	+13.0	D	REYDATA CORP	1-3	1 3/4	+1/8	+7.6						
LEASING COMPANIES																	
C	MODULAR COMPUTER SYS	5-11	10	-1/2	-4.7	A	LOGICON	7-11	13 1/8	+1/4	+1.9	O	MEMOREX	23-34	29 5/8	+1 1/8	+3.9
N	MCR	32-47	42	-1/4	-0.5	A	MANAGEMENT DATA	1-2	1 1/8	0	0.0	N	MOHAWK DATA SCI	5-8	7 7/8	0	0.0
O	PRIME COMPUTER INC	12-29	28 1/2	+3/4	+2.7	A	NATIONAL CSS INC	10-18	17 1/2	+1 1/8	+6.8	O	PENRIL CORP	2-6	6 3/4	+1 3/8	+25.5
N	PERRIN-ELMER	17-22	18	-3/8	-2.0	O	NATIONAL DATA CORP	4-8	7 3/4	0	0.0	A	PERTEC CORP	7-11	9 5/8	-3/8	-3.7
N	RAYTHEON CO	16-37	35	+3/8	+1.0	A	OM LINE SYSTEMS INC	18-24	22 3/8	0	0.0	A	POTEM INSTRUMENT	2-2	2 1/4	0	0.0
N	SPERRY RAND	30-42	35 1/8	+1/4	+0.7	N	PLANNING RESEARCH	3-6	5	+3/4	+17.6	O	PRECISION INST.	2-2	2	0	0.0
O	SYCOR INC	8-21	20 3/4	+1/4	+1.2	D	PROGRAMMING & SYS	1-1	3/4	0	0.0	O	QUANTOR CORP	3-5	3 1/8	+1/8	+4.1
A	SYSTEMS ENG. LABS	5-14	12 7/8	-1/8	-2.8	O	RAPIDATA INC	2-4	3 7/8	-1/8	-3.1	O	RECOGNITION EQUIP	6-10	7 3/4	-1/8	-1.5
A	WANG LABS.	10-15	14 7/8	+3/8	+2.5	D	REYNOLDS & REYNOLD	17-21	19 1/2	+1 3/4	+9.8	C	SCAN DATA	1-2	1 5/8	+1/4	+18.1
PERIPHERALS & SUBSYSTEMS																	
O	ALANTHUS CORP	3-6	5 3/4	0	0.0	C	SCIENTIFIC COMPUTERS	1-4	3 3/8	0	0.0	O	STORAGE TECHNOLOGY	10-29	28 3/4	+1 7/8	+4.9
C	BODINE COURIER CORP	8-16	16 1/8	0	0.0	D	TMSHARE INC	14-23	18 7/8	-5/8	-3.2	O	T BAR INC	7-16	13 3/4	-1/4	-1.7
C	COMISCO INC	9-16	9 1/4	-1/4	-2.6	A	URS SYSTEMS	4-6	6	0	0.0	O	TALLY CORP.	6-8	7 3/8	-1/8	-1.6
A	COMMERCE GROUP CORP	1-3	1/2	-1/8	-20.0	N	WYLY CORP	1-3	2 7/8	+1/8	+4.5	A	TEC INC	6-10	4 3/8	-1/4	-3.7
A	COMPUTER INVSYS GRP	1-2	3/4	0	0.0							N	TEKTRONIX INC	29-40	37 1/8	+1 1/2	+4.2
M	DATRONIC RENTAL	0-2	1 1/2	0	0.0							N	TELEX	2-4	4 3/8	+1	+29.6
A	DCL INC	1-4	2 5/8	-1/2	-16.0							O	TESO DATA SYSTEMS CP	13-20	14 1/4	+3/4	+5.5
N	DPF INC	6-10	8 1/4	+1/4	+3.1							O	WILTER INC	1-1	1/2	-1/8	-20.0
N	ITEL	13-22	17 1/4	-1/4	-1.4												
N	LEASCO CORP	19-31	29 7/8	+1/2	+1.7												
O	LEASPCORP	1-2	1 3/8	-1/8	-8.3												
A	PIONEER TEX CORP	5-11	5 3/4	-1/8	-2.1												
N	U.S. LEASING	10-16	13 1/8	+1/8	+0.9												
SUPPLIES & ACCESSORIES																	
O	ALANTHUS CORP	3-6	5 3/4	0	0.0	N	ADDRESSOGRAPH-MULT	10-18	17 1/2	-1/4	-1.4	A	AMERICAN BUS PRODS	6-8	7 1/2	+1/8	+1.4
C	BODINE COURIER CORP	8-16	16 1/8	0	0.0	O	ADVANCED MEMORY SYS	7-9	8 3/4	0	0.0	O	BALTIMORE BUS FORMS	1-4	2 3/8	+1/8	+5.5
C	COMISCO INC	9-16	9 1/4	-1/4	-2.6	N	ANPEX CORP	8-13	12 3/8	+1/8	+1.0	A	BARRY WRIGHT	10-19	18	+1/4	+1.4
A	COMMERCE GROUP CORP	1-3	1/2	-1/8	-20.0	O	ANDERSON JACOBSON	3-6	5 3/4	+1/2	+9.5	O	CYBERNATICS INC	1-1	7/8	0	0.0
A	COMPUTER INVSYS GRP	1-2	3/4	0	0.0	N	APPLIED DIG DATA SYS	10-20	13 3/8	-1/2	-3.6	O	DUPLEX PRODUCTS INC	14-20	19 1/4	+1/4	+1.3
M	DATRONIC RENTAL	0-2	1 1/2	0	0.0	O	BEEHIVE INT'L	3-12	5 1/4	-5/8	-10.6	N	ENNIS BUS. FORMS	6-11	9 7/8	0	0.0
A	DCL INC	1-4	2 5/8	-1/2	-16.0	A	BOLT, BERANEX & NEW	6-9	6	+1/4	+4.3	N	3M COMPANY	44-56	44 5/8	-3/4	-1.8
N	DPF INC	6-10	8 1/4	+1/4	+3.1	N	BUNER-RAND	8-14	13 3/8	+7/8	+7.0	C	NOORE CORP LTO	24-37	29 3/4	+1/2	+1.7
N	ITEL	13-22	17 1/4	-1/4	-1.4	A	CALCOMP	3-5	4 1/8	0	0.0	N	NASHUA CORP	16-28	24	+1 1/4	+5.4
N	LEASCO CORP	19-31	29 7/8	+1/2	+1.7	C	CAMBRIDGE MEMORIES	1-4	2 3/4	0	0.0	C	STANDARD REGISTER	18-25	23	+3/4	+3.3
O	LEASPCORP	1-2	1 3/8	-1/8	-8.3	C	CENTRONICS DATA COMP	16-30	18 3/8	+3/8	+2.0	O	TAB PRODUCTS CO	8-19	8	-3/8	-4.4
A	PIONEER TEX CORP	5-11	5 3/4	-1/8	-2.1	C	COGNITRONICS	1-1	7/8	0	0.0	N	UARC	18-22	21 7/8	+1/8	+0.5
N	U.S. LEASING	10-16	13 1/8	+1/8	+0.9	C	COMPUTER CONJUM.	3-8	7 3/4	-1 1/8	-12.6	A	WABASH MAGNETICS	10-15	11 1/2	+1/4	+2.5
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH																	
E=INTERNATIONAL; M=MIDWEST; D=OVER-THE-COUNTER																	
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID																	

EXCH: N-NEW YORK; A-AMERICAN; P-PHIL-BALT-WASH
 L-NATIONAL; N-NIOWEST; O-OVER-THE-COUNTER
 D-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
 (1) TO NEAREST DOLLAR

EASYTRIEVE relieves the information bottle-neck



What if you could get the answers you need to make decisions?

EASYTRIEVE is a new growth solution to relieving the information bottle-neck.

EASYTRIEVE is the information retrieval software system from Pansophic that requires no coding forms, no complex machine language. EASYTRIEVE works with simple, English key words to produce reports from the computer as fast as the machinery can move. EASYTRIEVE is simple to learn and to apply, yet can be the basis for entire job accounting systems, EDP audit procedures, modeling and financial systems . . . the list is endless.

Call us today toll free to find out how EASYTRIEVE users around the world are managing through current, reliable information.

EASYTRIEVE. The award-winning software solution in use at over 1,500 IBM 360/370 data centers across the globe. From the people at Pansophic. Offices near you throughout the world.

PANSOPHIC

709 Enterprise Drive, Oak Brook, IL 60521

800-323-7335

buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------



CONTINENTAL
Information Systems

BUY, SELL, LEASE, SUBLEASE, AND TRADE
NEW AND PRE-OWNED IBM EQUIPMENT
AVAILABLE

8 KJ - 8 Channel - May
5 K - DAT available - April
8 J - 2 Megs OEM - May
8 AP - new, ITC qualifying - April
5 J2 - April
5 J2 - April

HAVE NEW, ITC QUALIFYING 168, 158, 148,
and 138 IN APRIL - MAY

Call Us!

CIS
CIS Corp.
600 MONY Plaza
Syracuse, NY 13202
315-425-1900

CIS is very interested in
buying pre-owned
IBM 370 systems.
If you are thinking
about selling, let us
make you an offer.

URGENTLY NEEDED! ANY QUANTITY!
DEC and
DATA GENERAL
computer equipment
CASH AVAILABLE
CALL TODAY!



(313) 994-3200
NEWMAN COMPUTER EXCHANGE

IBM 370/158
Attached Processor
System
AVAILABLE
JULY, 1978
Contact: Jerry Borisy
JBI ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, CO 80228
(303) 988-0820

TOTAL OUTPUT
SERVICE

DIRECTLY FROM
YOUR TAPES

Delivered in Hours!!

- XEROX 1200 8-1/2 x 11 Hard Copy
- Computer Graphics
- Full Kodak KOM-85 Service
- Round-the-clock operation: 24-hrs. a day/7 days a week!

Call Joel Certun
(212) 869-0640

COMVESTRIX

The Output People
1500 B'way, NYC 10036

WANTED
029-129

We Buy
Rental Credit Machines.
Continue to Rent at A
Discount From IBM Prices.
Call Bob Stackhouse

Data Rentals/Sales
(213) 559-3822

FOR SALE

- One Data Products line printer/Model 2318/80 col.
- One Model 3873 Memorex disk controller
- Two True Data 400 cpm card readers
- One GRI-99 Model 30 mini-computer with 10MB CDC disk storage.

Telefile
COMPUTER PRODUCTS, INC.
17131 Delmar St.
Irvine, CA 92714
(714) 557-8880
Ask for Joe Letbetter

BUY · SELL · TRADE
DATA MODULES
DISK PACKS
DISK CARTRIDGE
Attn: Gertie Mourar
USED COMPUTERS,
INC.
7 Woodside Ave.
Berwyn, PA 19312
(215) 647-1881

ECLIPSE C300

- SURPLUS -

20 meg. dual disks, mag tape
300 LPM printer, 8 line communications
4 CRT'S. Full software. 1 1/2 yrs. old

BUY OR LEASE FROM OWNER

PHIL THOMAS

(305) 272-8753

Thomas Business Systems, Inc.

When you plan to buy or
sell your computer
equipment...

For complete information call the Greyhound Representative in your area.

WANT TO BUY

370/158 370/155 370/145

U.S.	Home Office	T. A. Takash	602-248-6037
	New York	Dick Ventola	914-949-1515
	Chicago	Pete Ahern	312-298-3910
	Dallas	M. W. "Bill" Tucker	214-233-1818
	San Francisco	Henry Paulson	415-283-8980
INTERNATIONAL	Canada	Don Maunder	416-366-1513
	U.K./Europe	Joe Gold	022-61-27-64
	Mexico	Andres Contreras	905-543-6850
	Austro-Asia	John Hallmark	214-233-1818
	Eurasia	Don Haworth	214-233-1818
NON-IBM	Dallas	John Hallmark	214-233-1818

GO GREYHOUND
Greyhound Computer Corporation

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

WANTED

BURROUGHS 'L' Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299

Boynton Business Systems
87 Rota 208
Walikill, N.Y. 12584
914-895-2007

DEC HARDWARE

PDP 11 PDP 8
Processors Peripherals
Memories

VT52's, LA30's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

LIQUID COOLED MAIN FRAME USERS

We have a cooling unit for liquid
cooled CPU's that operates up to
50% cheaper than other available
units. Saves installation time and
money. Does not take up space in
computer room. Comes complete
with 100% back-up system.

CONTROLLED ENVIRONMENT CORP.

640 Reynolds
Kansas City, KS 66101
(913) 342-3599

Over ten years experience in com-
puter room environments. Ask
about a heat recovery system for
your EDP site. Could save you a
small fortune in utilities.

Why Comdisco is First in the Second Market:

IBM Processors available

135 145

145s needed
135s available
for lease

155

Immediate
delivery with
DAT

158

want to
buy or
lease

165

Available
for sale
or lease

IBM Peripherals available

3420

We will purchase
your 1600 BPI
drives and replace
with Models 4 or 6
immediately.

3330/33

All models
available for
delivery now.

3340 44

Wanted to
buy

SPECIAL

3420 models 4 & 6
available now.
3830-2 Control
Units-Now

IBM 3031, 3032, 3033 operating leases available.

Atlanta 404/256-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107



New York 201/568-9866
San Francisco 415/944-1111
Paris, France 374-1130

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

Your First Choice in the Second Market

efm computer
leasing, inc.



3000 marcus avenue
lake success, ny 11040
(516) 466-7676

LEASE • BUY • SELL
360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65
360/50 370/135

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340's

IBM UNIT RECORD EQUIPMENT

026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557,

029-059-129

Call us for all your needs, we buy
rent and sell all types of IBM unit
record equipment. Over 12 years
of serving commercial and govern-
ment requirements. Contact ACS
for proposal.

7126 Mullins
Houston TX 77081
(713) 666-2122
TWX 910-881-1526

EQUIPMENT CORP.

Before you buy or sell used computer
equipment consult

COMPUTER PRICE GUIDE

"The Blue Book of Used Computers"

Quarterly publication contains current
price information about used IBM
computers and peripherals. Includes
newsletter about current price trends
and availabilities.

\$5 per issue - \$18 annual subscription

Computer Merchants Inc.
75 South Greeley Avenue, Chappaqua, New York 10514
Member Computer Dealers Association (914) 238-9831

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 200	\$20/Mo	059	\$1400	\$50/Mo	128	\$3400	\$110/Mo
028	\$ 800	\$30/Mo	082	\$ 800	\$30/Mo	514	\$ 800	\$ 46/Mo
028	\$1800	\$55/Mo	083	\$1700	\$60/Mo	519	\$1000	\$ 55/Mo
048	\$ 800	\$40/Mo	084	\$2500	\$80/Mo	526	\$1200	\$ 50/Mo
047	\$1400	\$60/Mo	085	\$1200	\$60/Mo	548	\$1500	\$ 80/Mo
058	\$ 200	\$15/Mo	088	\$2500	\$150/Mo	557	\$2800	\$100/Mo

Sale: 350/20 system: \$8500. WANTED TO BUY: IBM rental Credit
029- and -129.

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202
Chicago, Illinois 60611
(312) 944-1401

Calif. Branch
115 Harbor Island Rd.
Newport Beach, CA 92660
(714) 875-2810

NATIONAL COMPUTER RENTAL
415 MADISON AVENUE
NEW YORK, NEW YORK 10017
(212) 532-1500



MEMBER OF TIGER LEASING GROUP

SHORT AND LONG TERM
LEASES WITH ATTRACTIVE RATES

360 / 30, 40, 50, 65

370 / 125, 135, 145, 155
138, 148, 158, 168

3031, 3032, 3033 DISK TAPES

WE ALSO BUY - SELL

MEMBER OF COMPUTER LEASING ASSOCIATION

DEC PROCESSORS PERIPHERALS & MODULES

BUY - SELL - LEASE - RENT

\$1,000,000

NEW & USED DEC INVENTORY

- DEC CPU'S
- DEC DISKS & CONTROLLERS
- DEC TAPES
- DEC TERMINALS
- DEC PERIPHERALS
- MISC. BOARDS & MEMORY

Hundreds of Misc. Modules & Cables Available
Call for other components in stock

SAVE 33%

NEW 11T34 CONFIGURATION
\$23,333.33

For fast delivery and substantial savings
CALL the DATALEASE Digital HOTLINE

800-854-0359

DATALEASE

700 No. Valley St., Ste. A, Anaheim, California 92801
(714) 533-3920 Telex 692439

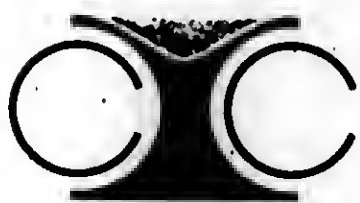
buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WANTED TO BUY**370/155 ANY CONFIGURATION****DAT ORDER POSITION FOR 155**

**COMPUTER
INSTALLATIONS
CORPORATION**

5514 Carolina Street
Houston, Texas 77004

713-524-8249

FOR SALE OR LEASE

Available Now

**370/155 MEMORY
2 1/2 MEGABYTES**

Please Contact:

Harry Blair

OR

Richard Johnson**303X****Leasing**

Large industrial corporation wishes to purchase and lease back to substantial corporations IBM 303X Systems. We will only deal with end users and equipment must be scheduled for delivery in 1978.

CW Box 1410
797 Washington St.
Newton, Mass. 02160

FOR SALE

**IBM Model
158 Memory**

K to KJ or U34 to U35

Available May

Call Anne Rhama

Commonwealth

Computer Advisers, Inc.

707 East Main Street

Richmond, Virginia 23219

(804) 643-4200

**For Sale Or Lease
System 3/15
Complete Systems**

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.

Also complete inventory tapes — disks.
Printers — CPU Upgrades

**Call Avery Reynolds 214-630-6700
TWX 910-861-4936**



Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

dataserv

buy • sell • lease • trade

370
115/125/135
Steve Lachy
800-328-2406

For Sale or Lease
Any 115/125 configuration

Sending 115/125
Back to IBM

Call us! We'll show
you how to make money
using your rental credits.

370
138 THROUGH 158
Dave Miller
616-637-8481

For Sale or Lease
138 - 145 - 155
CPUs — Peripherals —
Want To Buy Now!
370/145-H2

7855
8810
6982
6983
3215 Console
3047 Power Units

370
Peripherals
800-328-2406
Tom Anderson

Avail. Now WTB
3271-2 3272, 3271
3272-2 3277, 3420
3277-2/4633 3803, 3830
3340-B2
3410-3 SD
STOP! Before you send
any of the above machines
back to IBM call us. We'll
show you how to make
money.

360
CPUs and Peripherals
Neal Johnson
800-328-2406

For Sale or Lease
360/30 - 40 - 50 - 65s
CPU — Peripherals —
Memory

We'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory

Sys/3
CPUs and Peripherals
800-328-2406
Sys/32's

**SYSTEM/3
5410-5415
SYSTEM/32
SYSTEM/34
ALL MODELS
Deliver Positions**

**Call Toll Free 800-328-2406
or 612-544-0335**

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
P.O. Box 9488, Minneapolis MN 55440

**BUY SELL LEASE
SYSTEM/3**

Models 15, 10, 8, 6
Systems 32 & 34

All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298

Memphis, Tn. 38128

Phone 901/372-2622

Member CDA

2314-B1

- Up to 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

COMDISCO
312-698-3000

**SALE ALL
IBM Unit Record
Equipment
129 & 029's**

East Coast
(717) 564-8870

West Coast
(415) 332-6265

Unit Record
Leasing Company
110 Hivisla Rd
Sausalito, CA

MINICOMPUTERS & SYSTEMS

Don't waste company time or money. Check with us before you buy or sell.

New DEC Equipment
Immediate Delivery

RK11-RK05 Disk Systems -
\$8500

PDP 11/04s and 11/34s - 20% off list

DZ 11

DEC Station 78

New DG Equipment
Immediate Delivery

DG 10 Mbyte Disk Systems from \$7500

DASHERS - 15% to 25% off list

Nova 3/12 or 3D - 20% off list

Immediate delivery for MOS!

Inventory Clearance
call us for free brochure

**MINICOMPUTER
EXCHANGE**

(408) 733-4400

TWX 910-339-9272

WANT TO BY

- IBM 3420/8 Tape Drives
- IBM 3811/3211 Printer
- IBM 3333/3330 DASD
- IBM 3277 CRT's and Controllers
- IBM 370/135 Model 1 - 512K
- IBM 370/145-512K and 1 Meg.

FOR SALE OR LEASE

- IBM 3420/3 Tape Drives
- IBM 370/138 J - 1 Meg.
- IBM 1403-2 Printer
- IBM 3420/5 Tape Drives

Call

**FORSYTHE
McARTHUR**

(312) 943 3770

Dealer &
Lessor in IBM
Computers

FORSYTHE McARTHUR ASSOCIATES INC.
919 North ...

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Data Systems Marketing Delivery from Stock

Microcomputer Systems

Digital: PDP 11/03 Family with 80th Floppy and Hard Disks.

VT-78 Micro 8, Word Station 78

Data General: Micronova Family

Printer Terminals

Digital: LA-36, LA-35, LA-180, LS-120

Teletype: Model 43

Data General: Dasher 30 and 60 CPS

Diablo: Hyterm 1620 and 1610

Lear Siegler: Hydra Series 200 180 CPS

Texas Instruments: 743, 745, 810

Video Terminals

Lear Siegler: ADM-3A, ADM-2, ADM-2B, ADM-1A, VDP-400

User Programmable

ADDS: Regent 100 and 200

Digital: VT-52

Data General: Dasher 6053 and 6052

Data Communications and Accessories

DSM: Acoustic Couplers, 103F, 113A, 113B

General Data Comm: 1138 Direct Connect, Frequency Division

Multiplex Equipment

Sykes: Single and Dual Drive R5-232 Floppy Disk, IBM, S100

Compatible Floppy Disk

Techtran: 815, 8410, 8400, 8420, 8421 Single and Dual Cassette

Systems

Software

General Purpose: Disk Operating System, Fortran and Business

Basic for PDP 11/03 and Micronova Families

Distributed Processing: Remote Job Entry, Asynchronous and

Bisync Communication for PDP 11/03 and Micronova

Families

Business: Public Accountant Client Write Up and Complete Set

of Business Accounting Packages for PDP 11V03

Call 714-560-9222, 800-532-3717 (California)
or 800-854-2684 for DSM Showroom Nearest You

**** CRT'S ****

Harris 8160 Cluster CRT System

- 1920 character screen
- Up to 9600 BPS
- Asynchronous or Synchronous
- Compatible with IBM/360 or IBM/370
- Minicomputer controlled for flexibility
- 62 display terminals and 8 processors available. Will sell in smaller increments

CONTACT:

Schneider Transport, Inc.

Box 2298

Green Bay, WI 54306

Attn: Myles Burcham

(414) 497-2201

FOR SALE

370/168's

CALL CHUCK BLAZEVICH
(312) 576-6921



MOTOROLA INC.

DIRECT FROM FACTORY • TESTED • WARRANTED

MODEMS

Used ICC Modems at Significant Savings

Now you can buy or lease dependable ICC modems at a special low cost. We have a stock of modems, largely from customers who upgraded their data communications networks with our latest modems. These modems have been factory tested, are under warranty, and are backed by Racal-Milgo's nationwide service/support organization. Quantities are limited. Prompt action can assure you of these substantial savings.

April Special



Order now and

Save 24%

over original price on this 2400 bps modem.

For 4-wire point-to-point applications, this limited version of our 24LSI modem has been reduced from \$1050 to \$795 for this month's special. This is also 16% under our regular S.O.D. purchase price of \$950. A typical 30-month lease rate is \$38.00/month.

The 24LSI (feature B) transmits and receives full or half duplex 2400 bps serial binary data over unconditioned dedicated or dial up lines. Remote testing is optional. This modem is on line compatible with WE201B and ICC 2200/24 data set.

Offer expires April 30, 1978.

Conditions of Sale

- 1) Orders must be postmarked prior to April 30, 1978 with delivery scheduled no later than July 1, 1978
- 2) Offer subject to availability of products
- 3) All prices are F.O.B.: Miami, Florida and do not include installation
- 4) Based on ICC Terms and Conditions

40+TK1 Data Station



The 40+TK1, a high speed direct dial data station, is now available through our Special Offer Division.

The 40+TK1 stores messages in an MOS solid-state buffer and is designed to replace low-speed, leased-line and tape oriented terminals. (Note: The 40+TK1 can be used as a Wiltek replacement.) Data transmission speeds range from 1200 to 2400 bps over dial up lines. The data station includes an ICC 40+ display station, keyboard, control module, printer and desk—all for the introductory price of \$7,950 (original price was \$14,000).

INVENTORY REDUCTION MUST SELL NEW EQUIPMENT AT OR BELOW OUR DISCOUNTED COST

Data General CS40 Systems
(with printers and CRTs)

Wangco Model 712 Tape Drives

Bell Computer Model 3120

Tape Controller for Data

General Nova CPU

EDS Model 300 Multiplexers

for Data General Nova CPU

Tally Model 2200, 200 lpm

printer with interface for

Data General Nova CPU

Data General Nova 3/12

W/16k memory & I/O CTL

ACT NOW—SUPPLY LIMITED

CONTACT:



Agency Records Control, Inc.,

Technical Systems, Ext. 223

(713) 693-6122

P. O. Box 1009

Bryan, TX 77801

FOR LEASE IBM 370 SYSTEMS

Available June

168-AP 6 MEG

158-3 3 MEG

158-AP 3 MEG

Available September

158-AP 2 MEG

2, 3 and 4 year
operating leases

also available October

168-U34

Call or write
Jerry Minsky

Alanthus Leasing
Company

111 High Ridge Road

Stamford,

Connecticut 06905

203-348-4820

135/

192K (GF)
240K (DH)
256K (H)
384K (HG)
512K (I)

- AVAILABLE FOR LEASE
- SHORT OR LONG TERM
- CONFIGURED TO YOUR NEEDS
- WITH OR WITHOUT PERIPHERALS

CALL MARV BERGER (800) 225-2036

Computer Systems of America, Inc.

141 MILK ST. BOSTON, MA. 02109

Typical Savings

2400 bps



MODEM 2200/24

Half or full duplex operation over dial or dedicated facilities.

Original Price

\$1780

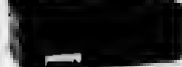
\$60/mo.*

Special Price

\$725

\$29/mo.*

3600 bps



MODEM 3300/36

Dial or dedicated operation with reverse channel. Built-in auto-answer on dial-up.

\$3620

\$85/mo.*

\$950

\$38/mo.*

4800 bps



MODEM 4500/48

Automatic equalization unconditioned dedicated dial lines. Optional dual 2400 bps operation on dedicated lines.

\$4980

\$100/mo.*

\$1795

\$72/mo.*

7200 bps



MODEM 4800/72

Dedicated line with optional multipoint operation for up to three 2400 bps channels.

\$6900

\$165/mo.*

\$1995

\$80/mo.*

9600 bps



MODEM 5500/96

Dedicated line with optional multipoint operation for up to four 2400 bps channels.

\$7990

\$185/mo.*

\$2995

\$120/mo.*

Prices apply to sale or lease in U.S. only * Based on 30 month lease

Racal-Milgo Special Offer Division, 8600 N.W. 41st St., Miami, FL 33166

Reserve now, Phone collect (305) 591-5535 or send this form.

Racal-Milgo

— the new name for ICC

I want more information about
your Special Offer Division
products.

☐ Yes, I am interested in the April special. Please send order form and data sheet.

☐ Purchase ☐ Lease Quantity _____

☐ I'm interested in the following:

Product	Quantity

☐ Purchase ☐ Lease

Name and Title

Company

Street

City

State

Zip

Phone No.

☐ Please place me on your mailing list for future specials.

CW 3/27

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap																					
FOR SALE 3286-2 2803-1 2821-2 2402-3 64K Indep 30 Mem. (2)3410-3 w/D.D. Kennsco 7232 BOONE AVE. NO. / MINNEAPOLIS, MN 55428 PHONE: 612/533-5800	3033 (10/78, 12/78 Lease Only) 1381, 148J 5/32 B33(32K) 3203-4 For Lease or Sale BARRETT CAPITAL & LEASING CORPORATION 14 Redwood Road White Plains, N.Y. 10605 (914) 761-0070	WE'RE BUYING AND PAYING CASH!!! Carterfone WILL PURCHASE FOR SALE CARTERFONE COMMUNICATIONS CORPORATION																							
FOR SALE 370/138 J 1.0 Meg. with 3046 Power Supply and 3340 IFA Available April 10, 1978 data3 computer corporation 114 central avenue, box 266, buffalo, minn. 55213 (612) 662-4000	BROKER IN DEC COMPUTER SYSTEMS AND COMPONENTS C.D. SMITH 730 N. Post Oak Road # 301 Houston, Texas 77024 (713) 686-9405	WANTED ALL 360/370 SYSTEMS AND SYSTEM/3 AND PERIPHERALS WE BUY • SELL • LEASE • TRADE transdata P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647																							
FOR SALE PDP 11/20 SYSTEM <table border="0"> <tr> <td>1) 11/20-CA</td> <td>2) H720-E</td> <td>2) MM1-E</td> </tr> <tr> <td>2) BA11-BS</td> <td>1) KE11-A</td> <td>1) MM11-L</td> </tr> <tr> <td>1) EM792-YE</td> <td>1) KW11-L</td> <td>1) PC11</td> </tr> <tr> <td>1) DC11-AA</td> <td>1) LA30-CA</td> <td>1) RK11-CA</td> </tr> <tr> <td>1) DC11-DA</td> <td>1) LP11-JA</td> <td>2) RK03-AA</td> </tr> <tr> <td>1) DD11-A</td> <td>1) ME11-LA</td> <td>1) TC11-GA</td> </tr> <tr> <td>1) DP11-DA</td> <td></td> <td>1) CD11-A</td> </tr> </table> Under DEC Maintenance FOB Our NY Office 90 Day Availability Interested? (212) 869-8700 Frank Cavallo GRANITEVILLE COMPANY 43 W. 42nd St. New York, N.Y. 10036	1) 11/20-CA	2) H720-E	2) MM1-E	2) BA11-BS	1) KE11-A	1) MM11-L	1) EM792-YE	1) KW11-L	1) PC11	1) DC11-AA	1) LA30-CA	1) RK11-CA	1) DC11-DA	1) LP11-JA	2) RK03-AA	1) DD11-A	1) ME11-LA	1) TC11-GA	1) DP11-DA		1) CD11-A	3830's Model 2's ITC Qualified 20 AVAILABLE 4 Each 6/78, 7/78, 10/78, 11/78, 12/78 INTERCAP 214/367-2652 Leo Minor or Chris Angulo	FOR SALE IBM 360/67 1.5m Memory (.5 IBM, 1.0 EM&M) 1-Multiplex Channel (IBM 2870 with 2 subchannels) 2-Selector Channels (one IBM 2860-2) Available-Sept. 15, 1978-Firm Will consider offers for entire system or individual components Direct Inquiries to: Director, Computer Services Amos Eaton Bldg., Room 206 Rensselaer Polytechnic Institute Troy, N.Y. 12181, or Call 518-270-6635		
1) 11/20-CA	2) H720-E	2) MM1-E																							
2) BA11-BS	1) KE11-A	1) MM11-L																							
1) EM792-YE	1) KW11-L	1) PC11																							
1) DC11-AA	1) LA30-CA	1) RK11-CA																							
1) DC11-DA	1) LP11-JA	2) RK03-AA																							
1) DD11-A	1) ME11-LA	1) TC11-GA																							
1) DP11-DA		1) CD11-A																							
WANTED TO BUY IBM 370/155 with or without DAT Contact: Harry Blair (713) 524-8249		ISI INDEPENDENT WE BUY • SELL • INSTALL & REPAIR AT REASONABLE PRICES HONEYWELL USED SERIES 200 EQUIPMENT COMPUTER SYSTEMS PARTS — PERIPHERALS Now in stock 2040-64K M7-32K M9 120-1250 — TAPE DRIVES READERS, PRINTERS, PUNCHES 3200-131K Avail. 6/78 CALL NOW Wilson Grabin (513) 874-5100 INTEGRITY SYSTEMS, INC 4812 Interstate Drive Cincinnati, Ohio 45246																							
BUY-SELL-SWAP PDP 11'S & NOVA'S Systems and Peripherals at very attractive prices New and Used ICS Computer Equipment Sales 408-735 7360 PAUL PEREZ 408 735 7361		LEASE ONLY • LARGE SCALE IBM SYSTEMS <table border="0"> <tr> <td>3031's</td> <td>DATES AVAILABLE</td> </tr> <tr> <td></td> <td>11/78, 5/79, 6/79</td> </tr> <tr> <td></td> <td>11/79, 5/80</td> </tr> <tr> <td>3033's</td> <td>6/79, 9/79, 12/79</td> </tr> </table> SHORT TERM LEASES <table border="0"> <tr> <td>3168 LK</td> <td>6/78</td> </tr> <tr> <td>3168 M</td> <td>11/78</td> </tr> </table> For details, call R. Weissblatt-216/351-7444 ATTENTION HONEYWELL USERS! 66/20 For Lease—Complete System 196K Word Central Processor, including Front-end Communication Processor HIS RENTAL \$23,000/month TCP RENTALS \$ 7,000/month 64/20, 64K, Full I/O, Comm., Avail. Immed. For details, call Larry Donat-216/351-7444 The Computer Place 4650 Spring Road Brooklyn Heights, Ohio 44131 (216) 351-7444 A Division of D&D Financial Enterprises, Inc.			3031's	DATES AVAILABLE		11/78, 5/79, 6/79		11/79, 5/80	3033's	6/79, 9/79, 12/79	3168 LK	6/78	3168 M	11/78									
3031's	DATES AVAILABLE																								
	11/78, 5/79, 6/79																								
	11/79, 5/80																								
3033's	6/79, 9/79, 12/79																								
3168 LK	6/78																								
3168 M	11/78																								
FOR SALE OR LEASE 370/168 AVAILABLE JUNE 78 (MODEL 1, 3 or A) Bob VanHellemont CMi CORPORATION — (313) 642-8000		SELL NEW • REBUILT TELETYPE MODELS 43-33-32 NATIONAL TELETYPEWRITER CORP. 207 Newtown Rd. Plainview, N.Y. 11803 (516) 293-0444																							

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

For Sale/Lease

370/158Serial Number 23566
Available June 1, 1978

Contact: Ann Rhame

Commonwealth Computer
Advisers, Inc.707 East Main St. Suite 1650
Richmond, Virginia 23219

(804) 643-9123

BUY • SELL • LEASE

026 - \$ 850	085 - \$ 750
029 - 1850	088 - 2500
059 - 1375	129 - 3350
082 - 800	514 - 800
083 - 1800	548 - 1500
084 - 2500	552 - 900
	557 - 2800

MOHAWK-6401-6403 NCR-736
Want to buy IBM 029's, 129's, 3741's, 3742'sCOMPLETE LINE BUSTERS, SHREDDERS,
DECOLLATORS AND BINDERS
ECONOMICAL LEASE PURCHASE PLANS**DP SERVICE INC.**
CALL STAN PELCO or NATALIE REYES**312-774-2556**

5505 N. MENARD AVENUE, CHICAGO, ILLINOIS 60630

**IBM UNIT RECORD
EQUIPMENT**024 077 085 402 514 552 026
082 087 403 515 557 029 083
088 407 523 602 056 084 089
408 548 604 029 129We Buy Sell or Lease
360s 1400s 1440sData
Automation
CompanyPioneers in the Computer Industry
National Disk Pack Center
(214) 637-6570
4858 Cash Road
Dallas, Texas 75247**SALE OR LEASE**1130-2D CPU
1133 Model 1
1403 Model 2
1442 Model 7METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg.
1111 W. Mockingbird Lane
Dallas, Texas 75247 TWX 910-981-4171
(214) 834-2750

CMI BUY LINES

BUY-SELL-LEASE-TRADE

Call (313) 642-8000

3031/3032/3033

(Lease Only)

Marilyn Burch

370/165 370/168

Bob Van Hellemont

370/158

Ron Baker

370/155

Gary Smith

**370
148/145/138/135**

Pam Hoban

370/115/125

Bob Southwell

3420	3803	1403	2821
3333	3830	2501	1442
3330	3340		1443

Darryl Hastings

Kathy Housey

BUY OF THE WEEK**370/168**

SN 60306

June availability. Will
configure to your requirements.
Bob Van Hellemont**135 1**All IBM Memory
IFA, IPA, ICA
Available April.
Pam Hoban**370/155J**OAT • 3 Channels
1 Meg IBM • 3215 Console
Available Now! \$575,000

Gary Smith

**3145, 1024 K
OEM Memory**Can reconfigure to
meet your specific needs.
Bill Graham**IBM 158
Memory I to KJ**

Available April.

Carole Solano

Call (313) 642-8000

**360
30/40/50/65**

Gary Smith

3270 CRT's

Printers/Controllers

1130

Jim Carleton

System/3

Model 15

Jerry Roberts

3742**3741****5496**

Jerry Sharon

360/20

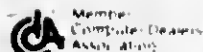
085-083-029-059-026-129

Marle Bednarz



The IBM Specialists

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000

**IN CANADA CALL:**Don DuPuis
Windsor, Ont.
(519) 258-8910Ron Ridding
Toronto, Ont.
(416) 683-3704Jacques Ogeon
Montreal, Que.
(514) 374-5920**BUY • SELL • LEASE • TRADE****SYSTEM/3 370/115
370/125**ECONOCOM
1255 LYNNFIELD ROAD
P.O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

FOR LEASE-FROM LESSEE370/168-U36 avail. June 1978
3855, 4525, 4560, 2150, 2151, 6111,
3066-II, 3067, 2860-3, 2870-1, 2880-2(2)Will lease for 2, 3, or 4 years
Contact: Mr. Frederick D. Lehmann

MARTIN MARIETTA DATA SYSTEMS

P.O. Box 5837, MP-263

Orlando, Florida 32855

(305) 855-1050, Ext. 7410

FOR LEASE ONLYITC QUALIFIED
LESSEE ONLY
3033Currently available
May 1979Anticipated improvement
February 1979WESTERN MARKETING
& FINANCIAL

(415) 526-9221

(312) 397-3311

Fred Hegeman

Jack Air

FOR SALE**370/158-3****IBM COMPUTER**2 Meg Storage
1433 Additional Block Multiplexor
1434 Additional Block Multiplexor
2150 Control Storage Expansion
2151 Expanded Control Storage
6111 Register Expansion
4650 Integrated Storage Control
7840 3213 PA
3213-1 Console Printer

Available August 1, 1978.

Contact:
D.N. Madge
Cominco Ltd.
Trail, B.C., V1R 4L8 Canada
Telephone (604) 384-4861**★
NEW DG NOVA 3/12's**WITH BATTERY BACKUP AND
AUTO PROGRAM LOAO
AND RESTART
NEW OG MEMORY
32 OR 16 KBIMMEDIATE DELIVERY WITH
22% DISCOUNTCALL CLARK & ASSOC.
(816) 741-3183call... the
**Match
makers**

BUYING • SELLING • LEASING • TRADING

1-800-654-9179**TOLL FREE!****CSI COMPUTER
SALES INTERNATIONAL, INC.**

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

RANDOLPH NEEDS:
135s, 145s
Any Model
Sub-lease or Purchase

CALL MIKE SEEKINGS
TOLL FREE
800-243-5308

RANDOLPH COMPUTER COMPANY
Division of Firstbank Financial Corporation
A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
537 Steamboat Rd., Greenwich, CT 06830 • (203) 661-4200

We are buying:
3803, 3420,
selling:
360/65, 360/40
& leasing:
360/65, 370/135

Please contact:
Linda Vaughn / (415) 955-0220
Tommy Talbot / (415) 955-0238

ITEL
CORPORATION
Data Products Group

LEASING?
WE'VE GOT YOUR
303X ON ORDER

...plus 135, 138, 145, 148, 158 & 168's too
(over \$130 million worth!)

- We'll write a short-term or long-term lease—on YOUR system or OURS
- We'll configure a total system or part of one to your specifications

"Our leasing concepts are sensitive to your needs"



**COMPUTER
CAPITAL
CORPORATION**

1351 WASHINGTON BLVD., STAMFORD, CT, 06902
203-357-9663

IPB
201-947-4200

WANTED TO BUY

168, 158, 165, 155's
3420-3's with controllers.
145-12 and 135-H
360/65,
3330/3333/3340

IPB Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

FOR SALE

165-KII
DATed, up to 4. mega-byte. For Sale or Lease.

158-K
Available in April with or w/o ISC.

155-J
Avail. in March with or without new DAT.

135-GF
Avail. now. Will configure to your specs
3420-7

available now with switching features.

158 Memory

K to KJ available now.

FOR LEASE

145-10
available immediately for sale or short term lease.

125's
We will purchase and leaseback your 125 system. Save rent starting today. Call for a quote.

IBM RENTAL CREDITS

We will pay for your rental credits on FTP, ETP, and MAC machines. Call us before sending your machines back to IBM.



FOR SALE

370/148 (installed 1 yr.) 2 Megabyte Memory 3047 Power Unit & 3286 Printer. Available July 1, 1978 - \$540,000.

CMS Industries, Inc.
5550 Harbor St.
Los Angeles, CA 90040
Contact: C. Koster

SALE OR LEASE

3344-B2

Immediate Delivery

Will Take 3340 B2 on ETP in Trade

Contact: Bernie Gest
215-635-1700

Computer Marketing Inc.

7704 Seminole Ave
Melrose Park, Pa
19126



Member Computer Dealers Assoc

FOR SALE/LEASE

Used electrosensitive printers at savings to 2/3 off original selling price. Ideal for personal computing, hobbyist, business and industry. Will recondition to like new. 240 cps, buffered with serial or parallel interfaces. For CRT hard copy or printer terminal I/O at 300/1200 baud. Sale prices start at \$495/each. Call or write Welt Plyter, Sales Manager, Scope Data, Inc., 3728 Silver Star Rd., Orlando, FL 32808 (305) 298-0500.

370/158

Serial Number 23566
Available May, 1978
Contact: Ann Rhame
Commonwealth Computer
Advisers, Inc.
707 East Main St. Suite 1650
Richmond, Virginia 23219

(804) 643-9123

370/125's

For Sale* Lease* Purchase
***Purchase Leaseback**

Specialists in 125 Systems
3410's and 3411's Also Available



CORPORATE COMPUTERS, INC.

(203) 661-1500
115 Mason St., Greenwich, CT 06830



WANTED TO PURCHASE

6 3420 3's 6631 or 3550 ASAP
1 3803 1 3551 ASAP

FOR SALE

1 3411 3 3221, 7360
1 3410 3 3221

AVAILABLE FOR OPERATING LEASE

12 3420 6's incl 6425, avail 4 1 78
2 3803 2's incl 8100 & 1792, avail 4 1 78

CALL (203) 324-9495

STAMFORD COMPUTER GROUP, INC

927 Westover Road
Stamford, Connecticut 06902

THREE AND FOUR YEAR WALK-AWAY LEASES

1. ATTACHED PROCESSOR FOR **3158**

2. **3158 - 3 MEG** WITH **APU** FEATURE

SPRING AVAILABILITY

3. **3158 - 3 MEG MOD 3**

SUMMER AVAILABILITY



THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle - (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman - (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Huntington Station, New York 11746

buy sell swap

buy sell swap

FOR SALE

Calcomp 114 Disk Drives

28 Megabyte for use with all types of mini computers.

Available Immediately

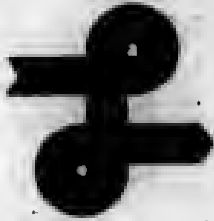
Contact: Gene Wendt

CompMart Inc.6622 Black Swan Drive
Shawnee Mission, KS 66216

913-631-2992

NOTICE TO IBM CORP.

We are out to buy all of your installed equipment and lease it back to your customers at substantial savings to them.

**LeMans Corporation**

2950 Metro Drive • Bloomington, MN 55420 (612) 854-8380
315 West State Street • North Aurora, IL 60542 (312) 896-5060

360/20

All Models
Up grades
Features
Immediate
Delivery
Extraordinary
Savings
Special
Purchase/Lease
Plans Available

Call Marie Bednarz
(313) 642-8000

CMII The IBM Specialists
CORPORATION
1500 N. Woodward Ave.
Birmingham, Mich. 48011, (313) 642-8000

DATA GENERAL

Nova 2 Mini System ... \$24,150
Qty. Description
1 Nova 2 with
64KB Core Memory
1 Auto Program Load
1 Power Monitor/Auto
Restart
1 10MB Disc Subsystem
1 4007/08/20 I/O Control
& Real Time Clock
1 ASR-33 Teletype
1 4063 4-Line Multiplaxor
1 Digi-Data Magnetic
Tape Subsystem
4 Research, Inc.
1 Talray 3711 Display
Equipment Cabinet
Call or Write:
**COMPUTER SYSTEMS
SUPPORT CORP.**
9112 Gailther Road
Gaithersburg, Maryland 20878
(301) 424-7870



OPERATING LEASES

16 IBM 3420 4Dual Density
2 IBM 3803 2
Available May 12, 1978
Net 90% IBM ETP
2 Year Basis
Contact
At Emery
Systems Marketing, Inc.
200 E. Thomas Rd.
Phoenix, Arizona 85012
(602) 264-5600 Telex 667 334

**MICRO-
EXCHANGE**

FOR SALE: Heath H9 CRT Terminal, assembled. \$500. (914) 831-1709 evenings

Experienced, Microprocessor, Consulting, Engineering, Team available to place any product into COMPLETELY DOCUMENTED PRODUCTION in less time than anybody. ICESYS COMPUTING CORPORATION, 1820 Union Street, San Francisco 94123 (415) 922-7775, 2158 31st Street, Santa Monica 90405 (213) 450-0505

RETAIL MICROCOMPUTER STORE FOR SALE. Central Indiana outlet for the nation's largest chain of microcomputer stores. Excellent retail location. (317) 842-2983

FOR SALE — MICRODATA 8K MEM. BDS, 1800 CPUs, Printed Circuit Board Repair, MILACRON Boards, WTB: REALITY System Boards & Peripherals Mike Shebest, Cinl, Ohio 45230, 1-513-474-1760

MICRODATA REALITY CORE MEMORY John Hardman (201) 751-3000

CRTs (Datapoint), Teletypes, sold, refurbished, upgraded. Microcomputer servicing. Telecommunications Services Co., Box 4117, Alexandria, Va. 22303 (703) 683-4019.

OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS. California Microcomputer Company's (CMC) previous ads in Computerworld has resulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved business software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927 (916) 891-1420.

TRS80 users group monthly newsletter. Join now! \$17.00 first year \$12.00 thereafter. Marsh, 621 13th South, Oneleska, WI 54650

**SOFTWARE
FOR SALE****STONE 3**

The only

TSO for VS1

Redesigned to eliminate TCAM and the staggering overhead of user swapping

ISP

(Intersystem Spool) Processor

System-to-System
Communication for VS1

(Write or phone for details)

STONE
Software Corp.

(714) 636-8501
11588 Trask Avenue
Garden Grove, Ca 92643

FOR SALE

PDP11**IMMEDIATE DELIVERY
Datasystem 354**

Includes:

PDP11/34, 64K, 2-RK05
Disk Drives, 1-VT52
terminal, 1-LA36 terminal,
1-LA180 Printer

Including full accounting
applications software.

Also immediately available:
• PR11 High Speed paper tape
reader
• PDP11/03-KA with 16K and
power supply

Spiridellis & Assoc., Inc.
14 W. 40th St.
New York, N.Y. 10018
(212) 221-7270

software for sale

software for sale

TP PROBLEMS?

• TSO RJE CICS ...
• TCAM BTAM HASP ...
• 3270 2780 TTY ...

Our LINE ACTIVITY RECORDER software package helps diagnose Access Method, TCU, and Terminal Protocol problems. (MVT, VS/1, VS/2, IBM 270X compatible TCUs.)

Communications Diagnostic
Systems, Inc. • P.O. Box 706
Falls Church, Virginia 22046
(703) 533-0483

RPG II SYSTEMS

• A/R-OPEN ITEM OR B/F
• ACCOUNTS PAYABLE
• GENERAL LEDGER
• PAYROLL AND LABOR DIST.
• INVENTORY
• CREDIT UNION MAILING, ETC

Extensive Documentation Provided

Bencroft Computer Systems

P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

RSTS/E**SOFTWARE PACKAGES**

• KDSS, a multi-terminal key-to-disk data entry system.

• TAM, a multi-terminal transaction-processing "front-end."

• FSORT3, a new, very fast sort. Directly sorts RSTS/E files containing up to 16 million keys or records. Up to 70 times as fast as the RSTS-11 Sort package in CPU time.

(All three are implemented in assembly language as run-time systems for efficiency.)

Evans Griffiths & Hart Inc.

55 Waltham St.
Lexington, MA 02173
(617) 861-0670

**Blue Chip
Software**

Lots of blue chip companies use our software systems for one simple reason: blue chip performance.

May we tell you more?



MCCORMACK & DODGE CORPORATION
381 Elliot Street, Newton Upper Falls, MA 02164, (617) 964-6610

Please send me more information on the system(s) I have checked.

___ General Ledger ___ Purchasing
___ Fixed Assets Analysis ___ Construction in Progress
___ Accounts Payable

Name _____

Title _____

Company _____

Computer _____

Address _____

City _____ State _____ Zip _____

CONVERTING?

Try the experts. DASD Corporation encourages test evaluations of all of our language translators.

RPG/RPG II to COBOL (DOS or OS) will accept all types of RPG and produce ANSI COBOL. Most translations are 100% error free. Our modular COBOL simplifies maintainability.

SYSTEM/3 COBOL to OS COBOL makes this tedious, redundant conversion completely automatic. We're 97% clean, which frees a lot of man hours for more important tasks.

DOS COBOL to OS COBOL is basically a difference of syntax, but may mean a lot of wasted man hours.

GE MAP to OS COBOL will allow immediate upgrade of your GE 400 series to full ANSI COBOL.

360/20 BAL to 360/370 OS ALC is an extremely solid product eliminating a monotonous programming job.

DASD TRANSLATORS SAVE TIME AND MONEY.

Many service options are available: lease, conversion only, conversion and clean compile; full conversion responsibility including testing and JCL.

For a prompt solution to your conversion problems, write or call today.

DASD CORPORATION

National Marketing
1480 Renaissance Drive—Suite 315
Park Ridge, Illinois 60068
312/299-5005



software for sale

software for sale

time & services

time & services

time & services

Accounts Payable and Purchase Order System

- Three-way match between invoice, receiver and P.O.
- Short and long term cash requirements • Due date and discount calculations • Check reconciliation • Multi-bank capability • 1099 reporting • Duplicate invoice detection • Recurring payments • G. L. interface

From the acknowledged leaders in A.P. and P.O. systems.

IMS

International Management Systems Corporation
4676 Admiralty Way, Marina Del Rey, CA 90291
(213) 822-2022
Contact: John Goetz, V.P. Marketing

GENERAL LEDGER SYSTEM?

What was the only one on the 1977 Datapro Honor Roll?

The answer is: The UCC General Ledger/Financial Control System. It can solve the Accounting Department's financial information problems... without creating new ones for EDP. Call 1(800) 527-3250 toll-free (in Texas, call 214/688-7313) for more information.

UCC

UNIVERSITY COMPUTING COMPANY
P. O. Box 47911 • Dallas, Texas 75247



ACCOUNTING SOFTWARE FOR DEC RSTS/E OR CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Completely on-line, interactive systems available for ACCOUNTS-PAYABLE, GENERAL-LEDGER, FINANCIAL-REPORTING, ACCOUNTS-RECEIVABLE and PAYROLL applications.

These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

If you are installing or have installed a Digital Equipment Corporation RSTS/E or CTS-500 system, contact us for cost-effective solutions to your core accounting problems.

Plycom services, Inc.

(219) 935-5121
P.O. Box 160
Plymouth, IN 46563

IF COST IS THE PROBLEM, OUR SOFTWARE IS THE ANSWER.

We've got the software you need. Now.

PAYROLL/PERSONNEL
ACCOUNTS-PAYABLE
TAXBREAK/TAXCOST

(Payroll Tax
Calculation Modules)
Call us. (415) 845-7991



argonaut
Systems, Inc.
2140 Shattuck Ave.
Berkeley, CA 94704

TIME AND SERVICES

KEYPUNCH SERVICES

- FREE pickup/delivery in Greater Boston area
- QUICK turnaround
- INEXPENSIVE
- CONFIDENTIAL
- VOLUME discounts
- NO monthly minimums
- ACCURACY assured

DATA/SYSTEMS

(617) 244-3454

- SERIES/1 PROGRAMMING**
- BI-SYNC/ASYNCH/SOLC COMMUNICATIONS
 - OEM DEVICE HANDLERS
 - RPS SUPPORT
 - COMPUTER INTERFACING
 - ONLINE G/L AVAILABLE NOW
 - COMPLETE BUSINESS SYSTEM UNDER DEVELOPMENT

APPLIED COMPUTER SERVICES, INC.
12200 Sylvan St.
North Hollywood, Calif. 91606
(213) 980-1183

DOS TIME USERS!

Still paying for read checks and intervention required's?

We charge only for REAL TIME USED

- 1/4 - MEG 360/40
- Second or Third Shift
- POWER-II Spooling

Contact: Greg Bilsky
Consolidated Computer Svc.
3826 Park Avenue
Edison, NJ 08817
(201) 548-5866

370/158 mod 3 Datacenter

3.5 meg MVS
Specializing in Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Karlevsky
(212) 564-3030

Datamor

132 West 31 St.
New York, N.Y. 10001

COMPUTER TIME

RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 155II
360/30

- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

REMOTE JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide Incoming WATS lines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS 2, NASP, INTERCOMM, Roscoe
- Complete data security including off-site storage

For information
call John MacDougall
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

DEC SYSTEM 10/20

Time Sharing...
Low Cost...

Fortran IV
Cobol
Basic + 2

Call Stan Koy
(312) 644-5650

PRYOR CORPORATION

Computer Services and Supplies
400 North Michigan Avenue
Chicago, Illinois 60611



WANTED: COMPUTER TIME

Will lease substantial blocks of computer time on a DEC 11 Series computer configured in RSTS-E. Virginia or D.C. area.

804-977-4671

for sale: NEW DEC PDP 11/V03 Systems: \$8200⁰⁰

32kb dual floppy; RT 11
LA36 or VT52; cabinet
quantity discounts available
CONTACT: Doug Stevens

The SYSTEMS COMPANY
4340 Redwood Highway #137
San Rafael, CA. 94903
(415) 472-7766

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Data Craft, Data General, CDC, DEC, EMM, Fabri Tek, Honeywell, GAI, HP, Interdata, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Varian, XDS.

Any Manufacturer's Memory

THREE DELTA CORP

1038 Kial Ct.
Sunnyvale, CA 94086
(408) 734-2680

I.B.M. 360-40

All Shifts 128K, 4-2401
MOD-2, 9-2314, 1403-N1,
2540, 1401 Compatibility.

From \$35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036

Contact:

Al Palmo (212) 997-1413
Charles Laigey (212) 997-1411

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Microcomputer Classified Exchange, Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are \$55.30 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs \$110.60 per insertion. Extra space is available in half-inch increments and costs \$27.65. Box numbers are \$3.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____ Title: _____

Address: _____

Telephone: _____

Send this form to:
CLASSIFIED ADVERTISING
COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

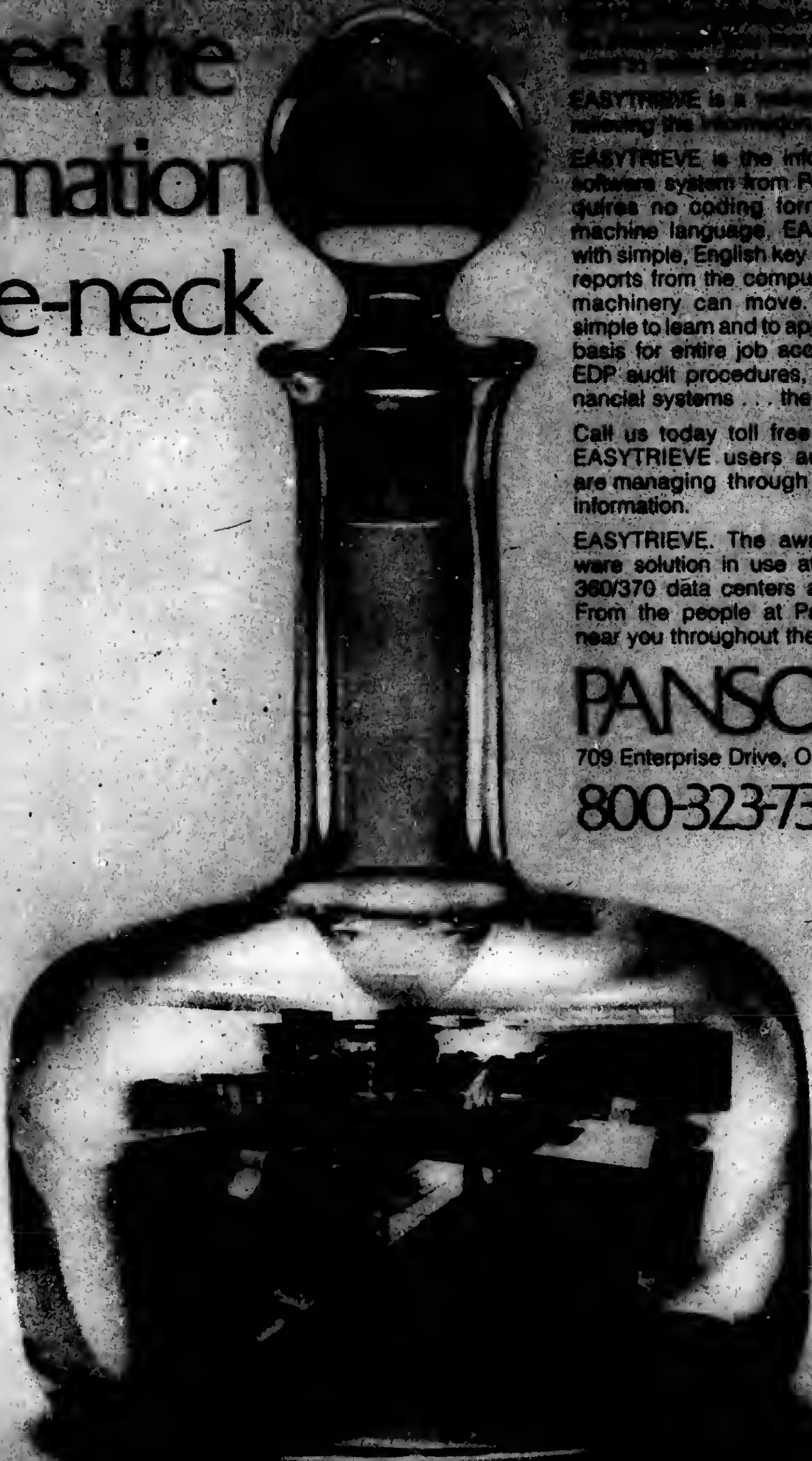
- RPG/RPG II to PL/I
- PL/I to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our translators, write or call today.



Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

EASYTRIEVE relieves the information bottle-neck



EASYTRIEVE is a revolutionary solution to
relieving the information bottle-neck.

EASYTRIEVE is the information retrieval
software system from Pansophic that re-
quires no coding forms, no complex
machine language. EASYTRIEVE works
with simple, English key words to produce
reports from the computer as fast as the
machinery can move. EASYTRIEVE is
simple to learn and to apply, yet can be the
basis for entire job accounting systems,
EDP audit procedures, modeling and fi-
nancial systems . . . the list is endless.

Call us today toll free to find out how
EASYTRIEVE users around the world
are managing through current, reliable
information.

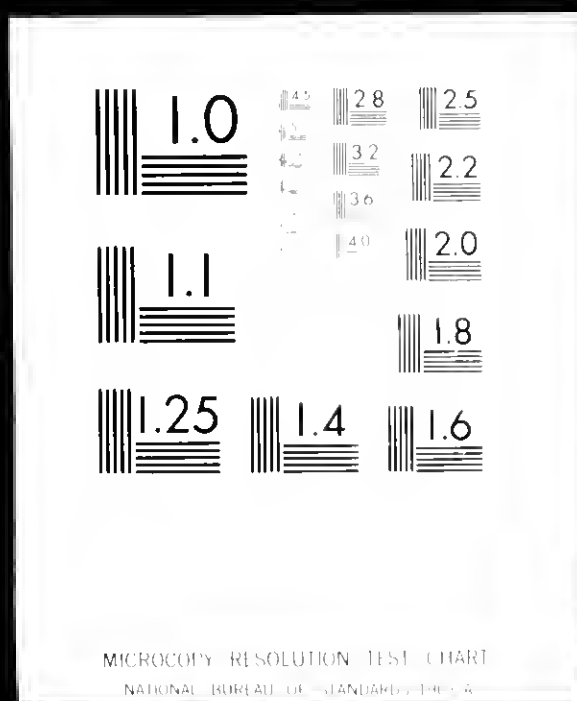
EASYTRIEVE. The award-winning soft-
ware solution in use at over 1,500 IBM
360/370 data centers across the globe.
From the people at Pansophic. Offices
near you throughout the world.

PANSOPHIC

709 Enterprise Drive, Oak Brook, IL 60521

800-323-7335

RESOLUTION CHART



100 MILLIMETERS

INSTRUCTIONS Resolution is expressed in terms of the lines per millimeter recorded by a particular film under specified conditions. Numerals in chart indicate the number of lines per millimeter in adjacent "T-shaped" groupings.

In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and $100 \div 20 = 5$.

Examine "T-shaped" line groupings in the film with microscope, and note the number adjacent to finest lines recorded sharply and distinctly. Multiply this number by the reduction factor to obtain resolving power in lines per millimeter. Example: 7.9 group of lines is clearly recorded while lines in the 10.0 group are not distinctly separated. Reduction ratio is 5, and $7.9 \times 5 = 39.5$ lines per millimeter recorded satisfactorily. $10.0 \times 5 = 50$ lines per millimeter which are not recorded satisfactorily. Under the particular conditions, maximum resolution is between 39.5 and 50 lines per millimeter.

Resolution, as measured on the film, is a test of the entire photographic system, including lens, exposure, processing, and other factors. These rarely utilize maximum resolution of the film. Vibrations during exposure, lack of critical focus, and exposures yielding very dense negatives are to be avoided.